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Patterns of Feeding Indicators of Children in Sana'a City, Capital of Yemen

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Abstract

Background

Appropriate feeding practice is critical for the achievement of a healthy growth and development and mere survival of young children. Lack of appropriate breastfeeding and complementary feeding practices are the main cause of malnutrition. An estimated In Sana'a, 31% of children under five years were stunted, 11% were wasted, and 23% were underweight. Only 10 % of infants aged less than 6 months have been breastfed, 40% of children aged 0 - 24 months have been fed using bottle, and 58% of children aged 6 -24 months received complementary feeding.

Objective

To compute and display the feeding indicators as WHO definition and to assess the factors associated with these indicators among children aged from 0 to 24 months living in Sana'a City, capital of Yemen.

Methods

A sample study consisted of mothers who attended to the Primary Health Care Centers and Hospitals in Sana'a and who had babies less than 2 years of age. It was conducted from April and June 2014 and 601 were randomly selected.

Results

Out of 601 study participants, 96% of children have only breast milk in the first five months, 85% started complementary feeding practices at age (6-9) months, 55% of mothers provide bottle foods with breast milk to their child, while 28% introduce at least 4 food groups from 7 to their children at age recommended. Age of mothers is an important factor that is significantly associated with exclusive breastfeeding and bottle feeding, whereas age of child is important factor which reveals significantly association both with complimentary feeding and minimum dietary diversity indicators.

Conclusion

Dietary diversity practices were inadequate in Sana'a. Age of mothers and age of children were affecting feeding practices. Further researches on improving economic status, a habit of eating together, and exposure to media are important to improve infant feeding practices.

Keywords: Exclusive breastfeed; Complimentary feed; Bottle feeding; Minimum dietary diversity

Introduction

Infant and young child feeding practices directly affect the nutritional status of children under two years of age and, ultimately, impact child survival. Improving infant and young child feeding practices in children 0–23 months of age is therefore critical to improved nutrition, health and development of children. In this period, infants and children are particularly vulnerable to growth retardation, micro-nutrient deficiencies, and common childhood illnesses [1]. However, up to now, indicators that can be used in population-based surveys to measure infant and young child feeding practices have focused mostly on breastfeed¬ing practices. The lack of evidence and consensus on simple indicators of appropriate feeding prac¬tices in children 6-24 months of age has hampered progress in measuring and improving feeding practices, thereby constraining improvements in infant and young child nutritional outcomes [2].

Breastfeeding is the optimal method of infant feeding bringing short- and long-term benefits for infants, mothers, environment, economy and the entire society [3-5]. The World Health Organization (WHO) and other international health bodies have recommended exclusive breastfeeding for six months after birth, to meet their evolving nutritional requirements and achieve optimal growth. Also, while breastfeeding continues for up to two years of age or beyond, infants should be received nutritionally adequate and safe complementary foods at the age of six months [6-10]. The complementary foods are typically provided to children from 6 to 24 months of age [11]. It has been suggested that in addition to disease prevention strategies, complementary feeding interventions targeting this critical window are most efficient in reducing malnutrition and promoting adequate growth and development [12].

Insufficient quantities and inadequate quality of complementary foods, poor child feeding practices, and high rates of infections have a detrimental effect on health and growth in children less than 2 years of age. Even with optimum breastfeeding, children will become stunted if they do not receive sufficient dietary diversity and meal frequency after 6 months of age [2,14,15]. Therefore, WHO recommends that for children 6-24 months old should be received foods at least 4 or more food groups out of the 7 recommended food groups per day. This indicator is called minimum dietary delivery, and it may show better results for children who are not breastfed than those who are breastfed in populations [2,13].

By definition of WHO [2], exclusive breastfeeding means that the infant receives only breast milk, and when exclusive breastfeeding after birth was insufficient quantities and inadequate quality, mother should be introduced to their infant any liquid or semi-solid food from a bottle with nipple/teat were offered along with mother's milk. This indicator called bottle feeding with exclusive breastfeeding.

Breastfeeding enhances mother and baby emotional attachment and contributes to optimal short and long term health outcomes for both. Statistically a baby who is not breastfeeding has more health care needs than its breastfed counterparts [16].

Studies have found higher incidence of illnesses in mothers who do not breastfeed, and babies who are not breastfed. Table 1 summaries the advantages of feeding and the potential risks of not breastfeeding to both mother and her child. The frequency and severity of illnesses in a young infant is often inversely associated with the proportion of the diet which comes from breast milk [18]. It has been suggested that when 25 to 50% of a baby's energy comes from breast milk, the milk will protect the baby from environmental pathogens [19]. Dop and Benbouzid reported that the mean rate of exclusive breastfeeding at four months in the Middle East region is 24%, including Lebanon (7%), Yemen (15%), Pakistan (16%), Jordan (32%) and Iran (48%) [20].

Table 1. Advantages of feeding and Potential risks of not breastfeeding(17)

Mother	Baby
Advantages of Feeding	
-Increase the rate of successfully establishing lactation -Reduce the incidence of breast engorgement -Establish a supply and demand pattern	-Increase breastfeeding duration -Decrease the incidence and severity of physiological jaundice
Potential Risks for not breastfeeding	
• Increased risk of: ovarian cancer, breast cancer • Financial burden: cost of infant formula, meeting sick baby healthcare needs	Increased risk of: respiratory infections, otitis media, childhood leukaemia, SIDS, some long term chronic diseases e.g. diabetes, allergy and milk intolerances

Inappropriate feeding practices increase the risk of under nutrition, illness, and mortality in infants and young children less than 2 years of age [21,22]. Greater than two-thirds of malnutrition related child deaths are associated with inappropriate feeding practices during the first two years of life in such a way that infants and young children received inadequately nutritious diets, poorly diversified and infrequently feeding [15].

Yemen National and Demographic Health Survey 2013 (YNDHS) reported that 47% of children were stunted, 16 % were wasted, and 39 % were underweight which informed the occurrence of both acute and chronic under nutrition [23]. In Sana'a City, about 31% of children were stunted, 11% were wasted, and 23% were underweight. Also, only 10% of infants aged less than 6 months have been breastfed, 40% of children aged 0 - 24 months have been fed using bottle, and 58% of children aged 6 -24 months received complementary feeding [23].

Hence the prevalence of malnutrition is still high among children in Yemen, especially in Sana'a City, and malnutrition is highly associated with low exclusive breastfeeding, bottle feeding with mother's breastfed, and complementary feeding practices, it is imperative that further research is essential to find out actual feeding practices among Infant and young children.

In order to capture the infant and young child feeding (IYCF) practices, there are many indicators for assessing infant and young child feeding practices that are recommended by WHO [2,13,24].

Therefore, the present study focuses on feeding patterns, practices, rates in Sana'a City, namely exclusive breastfeeding (EBF), complementary introduction foods (CF), bottle feeding with mother's breastfed (BTBF), and minimum dietary delivery (MDD) indicators.

Feeding Indicators

Feeding terms used in this study were those defined by the World Health Organization [2,13,24] as presented in Table 2.

Table 2. WHO definitions for infant and child feeding indicators

Indicator	Definition
Exclusive Breastfeeding (EBF) (0 - 5) months	Breast milk from mother or expressed breast milk, no other liquids or solids except vitamin drops or syrups, mineral supplements, or prescribed medicines
Complementary Feeding (CF) (6 - 9) Months	Breast milk and solid or semi-solid foods: any food or liquid like eggs, cheese, rice, cereals, fruits, vegetables
Bottle Feeding with Breastfeed (BTBF) (0 - 24) months	Any liquid (including breast milk) or semi-solid food from a bottle with nipple/teat, anything else: any food or liquid including non-human milk and formula
Minimum dietary diversity (MDD) (6 - 24) months	Receive foods from 4 or more food groups from 7 food groups, the 7 foods groups used are: 1) rice, potato, grains, 2) legumes and nuts, 3) dairy products (milk, yogurt, cheese), 4) flesh foods (meat, fish, poultry, liver), 5) eggs, 6) rich fruits and vegetables, 7) juices

Objectives of the Study

The main objectives of the study are:

1. To compute and display feeding indicators among children aged 0-24 months as defined by WHO in Sana'a City.
2. To distribute the feeding indicators according to child age, sex, maternal age, education, and place of residence.
3. To determine the factors associated with feeding indicators of children aged 0-24 months.

Material

The survey was carried out during April and June 2014 in Sana'a City, the capital of Yemen. The questionnaire was administered consecutively to mothers attending the Primary Health Care Centers and Hospitals in Sana'a City, who had babies less than 2 years of age, and who agreed to join the study. The questionnaire had been designed, tested and modified accordingly. It consisted of 47 questions covering socio economic and educational attainments, vital statistics, maternal characteristics as well as information on child's breastfeeding, feeding practices. Information about breastfeeding, feeding, and bottle feeding practices were included and restricted to the last 24 hours. Mothers were interviewed face-to-face to answer the questions of questionnaire, were asked for consent to answer questions about breastfeeding and the practice of feeding for their children. The sample size was 601 children aged less than 24 months.

Methods

In the study, the target or dependent variables were feeding indicators; namely, exclusive breastfeeding (EBF), complementary feeding (CF), bottle feeding with mother's milk (BTBF), and minimum dietary diversity (MDD), each variable has two categories. The following socio-demographic variables were used: mothers age, education, area, and children's sex and age which were classified as categorical variables. Characteristics of child and mother and feeding indicators data were entered and analyzed using SPSS version 21 software.

Univariate analysis was used to present variables using descriptive analytical methods (frequencies and percentages). Since all variables of the study are categorical, bivariate analysis was also applied on the data. This involved cross-tabulations and results were presented in the form of proportions, and Chi-square test was used to determine the association between categorical independent variables and the indicators of feeding practices [25].

Results

A total of 601 mothers participated in the study, attended the Primary Health Care Centers and Hospitals in Sana'a City, who had babies less than 2 years of age. About 92% of children were still breastfeeding now, of them, 90% were breastfed in the last 24 hours. Nearly 73% of the sample were infants (aged less than 13 months), of them, 40% aged less than 6 months. Only 5% of children aged from 13 to 15 months, while 7% aged from 21 to 24 months in the sample (Table 3).

Characteristics of mothers were outlined in Table 4. Mother's age was divided into five age groups in years. The age distribution indicated that most mothers (82%) in the sample were aged less than 31 years old, of them, 18% were younger mothers (aged less or equal to 20 years). Only 7% of the sample were older mothers (aged > 35 years). About 30% of mothers had no education, while 33% had primary education, 37% of the sample had secondary and higher education, of them, just 9% had university and above education. Approximately, 15% of mothers lived in rural areas of Sana'a.

The findings of key indicators for breastfeeding practices in the sample study were shown in Table 5, as defined in by WHO [2,13,24]. About 96% of children were exclusive breastfed in the last 24 hours, 85% of children had introduced complementary breastfeeding, while 55% were breastfed and fed using bottle. Only 28% of children had at least 4 food groups from 7.

Table 3. Characteristics of Children in Sana'a City, Yemen

Variables	Category	Frequency	Percent
Age in Months	0 - 5	241	40.1
	6 - 9	120	20.0
	10 - 12	79	13.1
	13 - 15	31	5.2
	16 - 20	88	14.6
	21 - 24	42	7.0
Sex	Male	306	50.9
	Female	295	49.1
Breastfed Now	No	50	8.3
	Yes	551	91.7
Breastfed in last 24 hours	No	59	9.8
	Yes	542	90.2

Table 4. Characteristics of Mothers in Sana'a City, Yemen

Variables	Category	Frequency	Percent
Age in years	<=20 years	106	17.6
	21 - 25	225	37.4
	26 - 30	159	26.5
	31 - 35	71	11.8
	> 35 years	40	6.7
Mothers Education	Illiterate	181	30.1
	Basic / Primary	199	33.1
	Secondary	165	27.5
	University and above	56	9.3
Place of Residence	Urban	514	85.5
	Rural	87	14.5

Table 5. Breastfeeding Indicators for Children in Sana'a City, Yemen

Indicator	Children <24 months		As define by WHO		
	N	%	Age in months	n	%
Exclusive breastfeeding	554	92.2	0 - 5	232	96.0
Complementary Feed	356	59.2	6 - 9	102	85.0
Bottle Feeding	329	54.7	0 - 24	329	54.7
Minimum dietary diversity	114	19.0	6 - 24	101	28.1

Also, Table 5 shows the breastfeeding indicators for all children aged less than 24 months in the sample study and breastfed in the last 24 hours. About 92% of children were exclusive breastfed, 59% of children started complementary feeding, while 55% were breastfed and fed using bottle. It observed that only 19% of children had at least four foods groups.

Feeding Indicators by Characteristics of Children

As recommended by WHO [26], children were divided into six age groups (Table 6). The distribution of children among these age-groups was the same as in exclusive breastfeeding mothers: 96% in the first five months, 91.1% at (6-9) months, 91% at (10-12) months, and 86% at (21-24) months, but the association was not significant. Mothers were more attended to their infants than their older children.

About 22% of infants had breast milk and started complementary foods (solid or semi-solid foods) in the first five months, nearly 85% had been introduced to complementary foods (either liquids or solids) at the recommended age group ((6-9) months), and 81% at (21-24) months and a high significantly association between age of children and the complementary indicator.

For bottle feeding indicator, children aged (6-9), (10-12), (12-15), (16-20), and (21-24) months received more food using bottle with breast milk than others, and the association was a negatively significant.

Only 5% of infants had at least 4 food groups per day before six months, the rates of children who received minimum dietary diversity were increasing with age groups but low, and the relationship was highly significant.

Obviously, it appears that urban mothers were more likely to feed their children as compared to rural mothers, except for exclusively breastfeeding indicator (Table 6). 88% of urban children started complementary feed at the recommended age group (6-9) months as compared to 70% of rural children and the difference was statistically significant. Similarly for minimum dietary diversity indicator, about 30% of urban children were had at least 4 food groups per day when compared to rural children, and difference was statistically significant. Also, mothers were feed their males children more than their females children but the differences were not significant for all feeding indicators (Table 6).

Table 6. Distribution of Feeding Indicators by Characteristics of Infants and Children

Variables \ Indicator		EBF	CF	BTBF	MDD
Age of Children in Months	0 - 5	96.0	22.4	43.2	5.4
	6 - 9	91.1	85.0	66.7	23.3
	10 -12	91.0	82.3	65.8	32.0
	13 - 15	90.3	83.9	64.5	32.6
	16 - 20	89.8	85.2	61.4	33.0
	21 - 24	85.7	81.0	45.2	36.2
χ^2		8.71	226.35**	28.15**	53.26**
Area	Urban	95.7	88.0	55.8	30.4
	Rural	97.0	70.0	48.3	14.8
χ^2		0.12	4.24*	1.72	5.52*
Sex	Male	96.1	91.1	55.9	30.9
	Female	95.6	79.7	53.6	25.3
χ^2		0.04	3.04	0.33	1.41

Feeding Indicators by Characteristics of Mothers

Mother ages were divided into five age groups (Table 7). Exclusive breastfeeding rate among older mothers was the highest in Sana's City (100%), followed by younger mothers. The association between age groups of mothers and exclusive breastfed indicator was statistically significant ($P < 0.05$). That is older mothers gave more attention to their children rather than the younger mothers.

Complementary feeding was not related to mothers' age groups, both older and younger mothers tended to be lower feed as compared to others (Table 7). Mothers whose age group (26-30) years were more likely to start complementary feeding (93.9%) as compared to others.

Children to younger mothers (58.6%) were more likely to have been feed using bottle when compared to older, the association was statistically positive and significant ($P< 0.05$). This may be due to the fact that younger mothers had less experience of feeding practices.

About 36% of mothers aged (31-35) were more likely to feed their children at least 4 food groups or more, followed by younger mothers (33.5%). On the contrary, older mothers were the lowest to be feeding their children at least 4 food groups or more per day (12.5%), the association was not significant.

Distribution of feeding indicators by mothers' education was presented also in Table 7. Rates of exclusive indicators were increasing as education level of mothers, mothers with higher education were more interested to feed their children than uneducated mothers, and the association is statistically significant.

Educated mothers were more attending to introduce complementary feed to their children as compared to uneducated mothers and the difference was statistically significant. Similarly to minimum dietary diversity indicator, where more educated mothers tend to give more attention to feed their children at least 4 food groups per day and the difference was statistically significant. On the other hand, to the bottle feeding indicator, uneducated mothers tend more to feed their children using bottle than educated mothers and the difference was not significant.

Table 7. Distribution of Feeding Indicators by Characteristics of Mothers

Variables \ Indicator		EBF	CF	BTBF	MDD
Age of Mothers (Years)	<=20	90.0	76.9	58.6	33.5
	21 - 25	92.9	81.6	57.2	26.7
	26 - 30	94.8	93.9	54.1	24.5
	31 - 35	96.0	87.5	52.7	35.8
	> 35	100.0	77.8	50.0	12.5
χ^2		11.96*	3.62	10.82*	7.41
Mothers' Education Status	Illiterate	76.0	81.4	58.0	19.8
	Basic/Primary	84.9	83.4	56.1	30.0
	Secondary	97.0	87.8	47.3	32.3
	University +	95.2	93.3	43.1	34.3
χ^2		9.12*	8.49*	1.81	5.36*

Discussion

The principal indicators for feeding were exclusively breastfeeding, complementary foods, breastfeeding with bottle, and minimum dietary diversity. Children were considered to be exclusively breastfeed if they only suckled in the last 24 hours. Those who have been feed other liquid, semi-solid or solid foods were offered along with mother's milk, the definition was complemented breastfeeding. If any liquid or semi-solid food from a bottle with nipple/teat were offered along with mother's milk, the definition was bottle feeding. Children who were given mother's milk and received at least 4 or more food groups from 7 food groups per day were considered as minimum dietary diversity.

This study has documented breastfeeding indicators for infant and children feeding practices in Sana'a City, Capital of Yemen. It has also identified the factors associated with breastfeeding indicators.

Exclusive Breastfeeding Indicator

Previous surveys have shown an inconsistent pattern of variation in the incidence of breastfeeding. The exclusive breastfeeding rate decreased from 18% of infants in the Yemen Demographic Maternal and Children Health Survey 1997 (YDMCHS) [27] to 12% in the Yemen Family Health Survey 2003 (YFHS) [28], and into 10.3% as reported by the YNHDS 2013 [23].

The present study finds that the prevalence of exclusive breastfeeding (< 6 months) to be 96% as compared to 64% in Ghana [29], 40% in Dhamar City (Yemen) [30], 16.9% in Dhula Health Center (Yemen) [31], 20% in Nigeria [32], 8% in Saudi Arabia [33], while 2% in Riyadh (Saudi Arabia) [34].

Exclusive breastfeeding was less among illiterate mothers and the relationship was statistically significant, however, the opposite was found that in Urban Slum of Kolkata where it was less among in literate mothers [35]. Exclusive breastfeeding rates were lowest among mothers under the age of 20 (90%) and highest among mothers aged 35 and over (100%) the association was statistically significant. The same result was found in Nigeria [36]. About 91% of children still exclusive breastfed up to 1 year and 86% of children also breastfed until 2 years. The rates of exclusive breastfeeding indicator were decreasing by age groups of children but not significant. There is no association between exclusive breastfeeding indicator and place of residence and children sex. This is similar to a study done in Dhula Health Center (Yemen) [31].

Complementary Feeding Indicator

The habit of giving other liquids to the baby after birth and before 6th month is very common. This means that children are being introduced to water, juice, milk or other types of food much earlier than the recommended 6-9 months. Adequate complementary food (solid, semi solid and soft food) should be introduced at 6 to 9 months [2,13]. Complementary feeding requires that the infant receives breast milk and solid or semi solid food. 85% of infants in the sample were introduced complementary feed at the age recommended by WHO (6-9 months), it is a high percentage in comparison to that in Nigeria (80%) [32] and higher than that reported by the 2013 YNHDS (65%) [23] or in Dhamar City (Yemen) (57.4%) [30].

The present study shows that complementary foods are initiated too early, where 22.4% of infants were received complementary foods before the age of six month. This finding is very lower as compared to those in Kenya (56%) [37], in Giza (Egypt) (60%) [38], and in Riyadh (Saudi Arabia) (88.9%) [34].

Age of child in months was an important child characteristic which shows highly significant association with complementary practices ($P < 0.01$).

For age of mothers, it is not expected that older mothers were tend to be lower fed as compared to others and was not correlated to complementary indicator. This is similar to a study done in Axum town, north Ethiopia [39]. Also, in Burkina Faso, it was found that late introduction of complementary food to be more frequent in mothers aged less than 25 years [40]. However, only Children belonging to young mothers (<25) were more likely to achieve complementary foods in Korogocho Slum, Kenya [41].

Improvements in education leading to higher levels of mother education can result in better practice of complementary and the relationship was statistically significant as documented by studies in Nairobi (Kenya) [37] and in Nepal [42], however, no association between mothers education and complementary feeding in Axum town, north Ethiopia [39]. The practice of complementary was more among urban children than rural and the relationship was statistically significant. Similar finding study that conducted in Kameba Woreda (Ethiopia) [43] but was not significant.

Males were more likely to be introduced to complementary feeding compared with females but not significant. Similar observation was made in a study done in Nepal [42], while significant association was found in Nairobi (Kenya) [37].

Bottle Feeding Indicator

About 55% of children in the sample received liquid or semi-solid food from a bottle with nipple/teat offered along with mother's milk, it is high when compared to 1997 YDMCHS (33%) [27]. About 43% of infants under 6 months were feed using a bottle with a nipple, it is similar to the 2013 YNHDS [23], but much higher than that in Dhamar City (25%) [30].

The tendency to use the bottle increases in relation to child's increasing age. On the contrary, the present study found that bottle feeding rates were decreasing as child's age increasing, and the association was a negatively significant. This is similar to a study done in Yemen [44]. The opposite was found a positive association in Brazil study [45].

A mother's level of education tends to decrease the rates of bottle feeding than illiterate mothers but the relationship was not significantly. However, a significant relationship between using bottle feeding and mother's level of education in a study that was done in Iran [46].

For mother age, the rates of bottle feeding with mother breast milk were decreasing as the age groups of mothers increased and the association was highly significant. This result indicates the relationship between different bottle food practices by age group which implies that bottle food practices decrease as the mother age increases.

Urban children were more feed using bottle than rural children and the association is not significant. This is somehow similar to a study conducted in Dhamar but the association was very significant [47].

Minimum Dietary Diversity Indicator

As recommended by WHO, children should receive at least 4 or more food groups from 7 groups after 6th month with mothers' milk. About 28% of children received at least 4 or more food groups from 7 groups after 6th month with mothers' milk, it is high as comparable to that in Cambodia and Nepal (24%) [48], and higher than findings from India (15.2%) [49] and Ethiopia (Dangila) (12.6%) [50]. However, it is lower than findings from Bangladesh (41.9 %) [51] and Sri Lanka (71 %) [52].

It should be noted that minimum dietary diversity were introduced too early, where 5.4% of infants were received at least 4 or more food groups before 6th month.

Age of a child, education of mother and place of residence were statistically significant associated with minimum dietary diversity.

The study found that children born from educated mothers had more diversified food than illiterate mothers. This study also indicated that children born from mothers who lived in urban areas were reported higher practice of minimum dietary diversity. Another most important factor significantly associated with minimum dietary diversity was age of a child. Children aged (10-12), (13-15), (16-20), and (21-24) months were more having minimum dietary diversity compared to children aged (6-9) months. This result indicates the relationship between different food groups by age group which implies that food groups increase as the child age increases. Similarly, these findings are in line with a study done in Ethiopia [50].

Unexpectedly, it has been that older mothers were the lowest to feed their children at least 4 food groups or more per day (12.5%) as compared to others, the association was not significant.

Conclusion

The present study provides evidence that maternal education is significantly associated with exclusive breastfeeding, complementary, and minimum dietary diversity. This could be educated mothers are more likely to have information (media exposure), understand the education message, nearly 70% had education, about 92% of mothers were housewives, and might have received lessons on child feeding in the curricula at school. In addition, maternal education enhances mothers' knowledge, attitudes and practices towards benefits of feeding practices.

Age of mothers is an important factor that significant associated with exclusive breastfeeding and bottle feeding. This finding may be due to the fact that old and older mothers had more experiences in feeding their children than young and younger mothers and had more exposure to media than young mothers.

Age of child in months was important factor which reveals a significantly association both with complimentary feeding and minimum dietary diversity indicators. This indicated the relationship between different food groups by age group which implies that food groups decrease as the child age decreases. This might be due to late introduction of complementary and minimum dietary diversity in the first six months (22% and 5%, respectively). In addition, children received complementary and minimum dietary diversity feeding at the age recommended by WHO.

Place of residence was also significantly associated with both complimentary feeding and minimum dietary diversity indicators. This association maybe due to urban mothers was more exposed to media, more educated (90%), and more health centers facilities. The low practice of minimum diet diversity in rural region may be due to lake of awareness regarding importance of dietary diversity in rural community compared to urban community, which has access to mass media. Another difference may be traditional beliefs and practices.

Finally, the major infant and child feeding indicators in Sana'a City (Yemen) are exclusive breastfeeding, complementary introduction, bottle feeding, and minimum dietary delivery.

This study showed that a very low proportion of children aged 6-24 months received minimum dietary diversity as measured by the WHO indicators. Inadequacy of dietary diversity is likely to negatively impact subsequent growth and development of Sana'a City children in Yemen.

Despite of WHO recommendations, adhere in breastfeeding and infant and child feeding is still rarely. It is important therefore to develop interventions targeting women, health care workers and policy makers aimed at bridging the gap between current breastfeeding and infant feeding practices in the informal settings and WHO recommendations. It is evident from this study that breastfeeding and feeding indicators are associated with child age, maternal education, age of mothers, and resident place factors and it is crucial to understand and reduce the inequalities. Interventions and further research should address inequalities including gender, access to health care facilities, socio-economic status and family planning. This study only looked at exclusive breastfeeding, introduction of complementary food, bottle feeding, and minimum dietary delivery indicators; further investigation on late introduction of the same indicators is needed.

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