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## Infant feeding practices in urban and rural southern Katanga communities in Democratic Republic of Congo

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### Abstract

**Introduction:** The results of previous scientific studies made in China and Vietnam have shown a big difference in feeding practices of children living in rural areas and those living in urban areas suggesting the influence of economic and socio-cultural factors. The aim of the study is to compare feeding practices of children under the age of five years between urban and rural areas in southern Katanga in the Democratic Republic of Congo (Central Africa). **Methods:** This is a cross-sectional and descriptive study of 1630 mother infant pairs recruited from 250 randomly chosen households from each of 5 different villages near the town of Lubumbashi and two urban areas (Lubumbashi and Kampemba). **Results:** The proportions of mothers who initiate breastfeeding within one hour after birth in urban and rural areas were respectively 48.3% and 46.0% (ORa: 1.32; CI95%: 1.01-1.72). 44.2% of the mother in urban areas exclusively breastfed their children until the age of 6 months versus 14.5% in rural areas ( $p < 0.001$ ). The average age of the children when they stopped breastfeeding was 16.4 months in urban areas versus 17.9 months in rural areas ( $p < 0.001$ ). 91.3% of first foods given in urban areas were cereals ( $p < 0.001$ ) versus 86.8% in rural areas. **Conclusion:** The study showed that mothers living in rural areas breastfeed longer than those who live in urban areas. Moreover, our results show that mother in rural areas use infant formulas and introduce solid, semi-solid or soft food sooner and more often than women in urban areas.

**Keywords:** Breastfeeding, Feeding practices, Infants, Rural, Urban, Katanga.

### INTRODUCTION

The Democratic Republic of Congo is amongst the 5 countries (India, Nigeria, Pakistan, and China) with the highest mortality rate world wide in children younger than 5 years <sup>[1]</sup>. Malnutrition is one of the major causes of death among young children in those countries. The nutritional status of children is almost always determined by their dietary and in low income countries, feeding practices are very often influenced by socio-cultural considerations. Thus the introduction of solid, semi-solid or soft food and the feeding practices are very often incompatible with World Health Organization (WHO) recommendations <sup>[2]</sup>.

In 2010, a survey done by UNICEF in DR Congo revealed that 38% of newborn were breastfed within the hour following their birth even though breastfeeding is universal in this country in general (98%) and in the Katanga province in particular (99%). Moreover, the same study showed that the rate of exclusive breastfeeding until 6 months was 38% <sup>[3]</sup>. In other parts of the world, a large difference between feeding practices in rural and urban areas have been reported in numerous studies. In China and Vietnam for example, economic and cultural factors are believed to influence greatly feeding practices and breastfeeding and explain in part differences in feeding practices between urban and rural mothers <sup>[4,5]</sup>.

This study aims to compare feeding practices of children under the age of five years between urban and rural areas in southern Katanga in the DR Congo (Central Africa).

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**MATERIALS AND METHODS**

**Study setting and participants**

A cross-sectional study was performed between the 1st of April and the 1st of May 2013. Two hundred and fifty households were randomly selected in each of rural locations (Kamisepe, Luwowoshi, Kawama, Lumata, Baia, Ginq Ans) as well as in two municipalities (municipality of Lubumbashi and the municipality of Kampemba). Each rural area was divided into blocks, numbered and selected using computer-generated random selection table. In urban area, streets were also numbered and selected in the same way.

The study population included one couple “mother-child” in each selected household. A total of 1750 couple “mother-child” were chosen in both rural and urban areas.

**Data collection**

The authors have established a questionnaire on the basis of the WHO indicators for evaluation of infant feeding practices [6]:

- Timing of first breastfeed

*Question: How long after birth infant was put to breast?*

*Answers: “≤ 1 hour”, “1-23 hours” or “≥24 hours”*

- Exclusive breastfeeding

*Question: Does your child receive maternal milk only from birth to 6 months and eventually some vitamins, minerals supplements and medication?*

*Answers: “yes” or “no”*

- Timing of introduction of solid, semi-solid or soft food

*Questions: At what age did you introduced other foods into his diet? Which food in the list below? (Cereal based products, dairy products, roots, tuberous plants, plantain banana, haricots, insects, vegetables, fish, meats, eggs and fruits)*

- Use of infant formula milk

*Questions: Does your child consume infant formula milk? At what age have you introduced infant formula milk into his diet?*

- Age of breastfeeding cessation

*Question: How old is he continued to breastfeed?*

Our questionnaire has been improved through a pre-test performed in two groups of women living in the urban municipality of Kampemba as well as rural area of Kawama. Field workers (university students) were trained by the author to conduct the interviews in Swahili language.

116 mothers refused to answer the questionnaire, which brought the total of our sample to 1634 couples, a response rate of 93.4%.

The parameters studied were: mother’s age, parity, mother’s level of literacy, child’s age, child’s sex, timing of first breastfeed, period of exclusive breastfeeding (children receive maternal milk only from birth to 6 months and eventually some vitamins, minerals supplements and medication), age of breastfeeding cessation, type of lactation, timing of introduction of solid, semi-solid or food and first foods.

**Statistical analysis**

All data collected were analyzed and gathered using Epi info 2011 (version 7.1).

Analysis and interpretation were done using the calculation of the proportion, the average and the standard deviation. We compared categorical variables with the use of the X<sup>2</sup> test and continuous variables with the independent-sample t test. P value of ≤0.05 was taken as statistically significant. We obtained the crude OR and 95 % CI for the association of each of these factors with living in urban area. To further identify the independent factors, we performed multivariable analysis to obtain the adjusted odds ratio (aOR) and 95 % CI.

**Ethical considerations**

The participation was confidential after informed consent from the mothers. Data were analyzed in strict confidentiality. After each interview, information/advice on breastfeeding and introduction of solid, semi-solid or soft food was given. The research ethics committee of University of Lubumbashi has approved this project.

**RESULTS**

For a total of 1634 mothers who agreed to answer the questionnaire during the study, 1630 breastfed their child which represent 99.8%; a rate of 99.4% (482/485) in urban area and of 99.9% (1148/1149) in rural areas. The difference between these two groups is not statistically significant (p=0.1503).

**Table 1:** Socio-demographic characteristics of our sample in urban and rural areas in southern Katanga

Parameters	Urban (n=482)		Rural (n=1148)		Total (n=1630)	
	n	(%)	n	(%)	n	(%)
<b>Age of mother (years)*</b>						
<20	7	(1.4)	48	(4.2)	55	(3.4)
20-24	78	(16.2)	301	(26.2)	379	(23.2)
25-29	184	(38.2)	340	(29.6)	524	(32.1)
30-34	147	(30.5)	259	(22.6)	406	(24.9)
35-39	41	(8.5)	131	(11.4)	172	(10.6)
≥40	25	(5.2)	69	(6.0)	94	(5.8)
Mean (years)	29.3±5.3		28.4±6.4		28.7±6.2	
<b>Parity*</b>						
1	70	(14.5)	84	(7.3)	154	(9.4)
2-4	325	(67.4)	680	(59.2)	1005	(61.7)
≥5	87	(18.1)	384	(33.5)	471	(28.9)
Mean	3.1±1.8		3.9±2.2		3.7±2.1	
<b>Level of literacy*</b>						
Illiterate	6	(1.2)	239	(20.8)	245	(15.0)
Primary school	62	(12.9)	562	(49.0)	624	(38.3)
Secondary school	251	(52.1)	336	(29.3)	587	(36.0)
Higher education	163	(33.8)	11	(1.0)	174	(10.7)
<b>Child’s sex</b>						
Female	272	(56.4)	592	(51.6)	864	(53.0)
Male	210	(43.6)	556	(48.4)	766	(47.0)
<b>Child’s age (months)</b>						
≤36	299	(62.0)	651	(56.7)	950	(58.3)
>36	183	(38.0)	497	(43.3)	680	(41.7)

\*p<0.001

**Table 2:** Feeding habits of children in urban and rural areas in southern Katanga

Parameters	Urban (n=482)		Rural (n=1148)		Total (n=1630)		p	ORa [CI 95%]
	n	(%)	n	(%)	n	(%)		
<b>Timing of Breastfeeding initiation (hours)</b>								
≤1	233	(48.3)	528	(46.0)	761	(46.7)		1
>1	249	(51.7)	620	(54.0)	869	(53.3)	0.0420	1.32 [1.01-1.72]
<b>Duration of Exclusive breastfeeding* (months)</b>								
<6	269	(55.8)	984	(85.7)	1253	(76.9)	0.0019	2.15 [1.32-3.50]
≥6	213	(44.2)	164	(14.3)	377	(23.1)		1
Mean	4.9±2.8		3.4±1.9		3.8±2.3		<0.001	
<b>Age of breastfeeding cessation (months)</b>								
≤12	70	(14.5)	124	(10.8)	194	(11.9)	0.0117	1.67 [1.12-2.49]
>12	412	(85.5)	1024	(89.2)	1436	(88.1)		1
Mean	16.4±5.1		17.9±4.5		16.4±5.1		<0.001	
<b>Use of infant formula milk</b>								
Yes	390	(80.9)	359	(31.3)	749	(46.0)	<0.0001	12.66 [9.24-17.33]
No	92	(19.1)	789	(68.7)	881	(54.0)		1
Mean (months)	6.3±4.4		5.4±4.9		5.9±4.7		0.0074	
<b>Age of introduction of solid, semi-solid or soft food (months)</b>								
<6	219	(45.4)	972	(84.7)	1191	(73.1)	<0.0001	4.55 [2.90-7.12]
≥6	263	(54.6)	176	(15.3)	439	(26.9)		1
Mean	5.4±2.8		3.5±1.8		4.0±2.3		<0.001	
<b>First foods</b>								
Cereal based products	440	(91.3)	975	(84.9)	1415	(86.8)		1
Others**	42	(8.7)	173	(15.1)	215	(13.2)	0.4742	1.16 [0.76-1.78]

\* Exclusive breastfeeding: children receive maternal milk only from birth to 6 months and eventually some vitamins, minerals supplements and medication.

\*\*others: Dairy products, roots, tuberous plants, plantain banana, haricots, insects, vegetables, fish, meats, eggs and fruits.

**Table 3:** Duration of Exclusive breastfeeding in urban and rural areas in southern Katanga

Duration (months)	Urban n=482		Rural n=1148		p
	n	(%)	n	(%)	
1	480	(99.6)	1144	(99.7)	1.000
2	463	(96.1)	1032	(89.9)	<0.001
3	419	(86.9)	776	(67.6)	<0.001
4	316	(65.6)	427	(37.2)	<0.001
5	237	(49.2)	249	(21.7)	<0.001
6	213	(44.2)	164	(14.3)	<0.001

*Exclusive breastfeeding:* children receive maternal milk only from birth to 6 months and eventually some vitamins, minerals supplements and medication

As shown in table 1 on socio demographic characteristics, the average age of the mothers was of 29.3 years (range: 17 and 47 years) and 28.3 years (range: 15 and 53 years) in urban areas and rural areas respectively. The proportion of mothers under the age of 25 years was respectively 17.6% in urban area and 30.4% in rural areas. Women living in urban area have given birth less often (7.3% and 14.5% primipara) and were more literate than women in rural areas (respectively 1.2% and 20.8% of illiterates in urban and rural areas). The difference between the socio-demographic characteristics of these two groups is statistically significant ( $p < 0.001$ ).

When it comes to the age and sex of the children, our study didn't find a difference statistically significant between the two groups.

Table 2 presents feeding habits of children in rural and urban areas. The proportions of mothers who breastfed their child within one hour after birth were respectively 48.3% and 46.0% in urban areas and rural areas (ORa: 1.32; CI 95%: 1.01-1.72;  $p = 0.0420$ ).

The mean period of exclusive breastfeeding was 4.9 months in urban area versus 3.4 months in rural areas. Student t test shows a difference statistically significant between these two averages. The proportion of mothers who exclusively breastfeed their child up to 6 months were respectively 44.2% and 14.3% in urban areas and in rural areas (Tables 2 and 3). The difference between the two proportions is statistically significant ( $p = 0.0019$ ), meaning that the second group presents a risk almost multiply by 2 of non-breastfeeding exclusivity before 6 months (ORa: 2.15; CI 95%: 1.32-3.50) (Table 2).

The average age when the children stop breastfeeding was 16.4 months in urban areas versus 17.9 months in rural areas ( $p < 0.001$ ). Respectively 14.5% of children in urban areas and 10.8% in rural areas stop breastfeed before or at 12 months (ORa: 1.67; CI 95%: 1.12-2.49).

The average age when the children received for the first time another milk was 6.3 months and 5.4 months in urban areas and rural areas respectfully; 80.9% of the mothers in urban used infant formula versus 31.3% in rural areas. This comparison shows a difference statistically significant (ORa: 12.66; CI 95%: 9.24-17.33).

In rural areas, the initiation of food supplementation have occurs before 6 months for 84.7% of children whereas 45.4% of children in urban areas (ORa: 4.55; CI 95%: 2.90-7.12); 91.3% of first food given in urban areas were cereals versus 84.9% in rural areas ( $p = 0.4742$ ).

## DISCUSSION

The breastfeeding initiation rate of 99.8% (99.4% in urban areas versus 99.9% in rural areas;  $p > 0.05$ ) is consistent with available data on breastfeeding rates in the Katanga province (DR Congo) [7,8] as well as those seen in developing countries (95%). In Nairobi (Kenya), a country with similar poor environmental sanitation and livelihood conditions, Kimani-Murage found a breastfeeding rate of 99% in urban areas [9].

Although this study showed that almost all urban and rural mothers breastfeed their babies, exclusive breastfeeding rate up to 6 months remains low. However, 44.2% of mothers in urban areas exclusively breastfed their children until 6 months versus 14.3% in rural areas. Therefore, the study reveals that more women in urban areas practiced exclusive breastfeeding (recommended by WHO) than women in rural areas who present a higher risk of non-exclusivity of breastfeeding before 6 months (ORa: 2.15; CI 95%: 1.32-3.50). Moreover, the rate of exclusive breastfeeding remains higher in urban areas at 1,2,3,4 and 5 months (Table 3). Unlike our results, studies conducted in China, Vietnam and Iran have found that the 'exclusive breastfeeding' rates were higher in rural areas than in urban areas [4,5,10]. Numerous factors can be pointed out to explain the high rate of

exclusive breastfeeding in urban areas. For example, aggressive publicity of infant formula in urban areas, mother's higher level of education, higher standing of living, allowing the purchase of baby formula and the higher accessibility of these products [5,11-13].

The important gap between breastfeeding practice specifically in rural areas and WHO recommendations may be due to the fact that rural mothers' knowledge about the benefits of exclusive breastfeeding in a child's first six months of life is poor. Therefore, mothers in rural areas disconnect often, very early with their infant by leaving them at home with the older one, so that they may be released and work fast. At home, the immaturity of this one, makes them think that whatever when the child cries, he is hungry. So they have to feed him with semi solid/solid food to put them to silence. As exclusive breastfeeding promotions improve infant survival, more attention in health planning should be given to its promotion. Consistent with a Nigerian study, giving different fluids to infant is very common which explain the fact that the rate of exclusive breastfeeding is less than 20% [14]. From one country to another, the use of infant formula varies depending on the degree of urbanization. In addition, the activities of the Baby Friendly Hospital Initiative launched by the UNICEF and WHO in the 90s that promote breastfeeding have very little echo in the DR Congo where only 2 health facilities were labeled baby friendly in 2000 [15].

According to WHO recommendations, a newborn child should be breastfed within the 60 minutes after birth [2]. However, in many cultures this initiation is delayed because the colostrum is considered dangerous. In Nigeria, Davies-Adetugbo noted that the initiation of breastfeeding is influenced by many cultural practices; for example prayers and rituals must be performed before a newborn is breastfed for the first time [16]. In Senegal, according to the Tokhantal, newborns receive drops of honey and butter in order to purge the meconium out of the intestines before breastfeeding. It is believed that 20% of neonatal death could have been prevented if the initiation of breastfeeding was done within the first hour of life [17]. In rural West Bengal (India), colostrum is regarded as a harmful fluid to the child's health [18].

In our study, the proportions of mothers who initiate breastfeeding within one hour after birth in urban and rural areas were respectively 48.3% and 46.0% (ORa: 1.32; CI 95%: 1.01-1.72). In the Dominican Republic as well, breastfeeding initiation happen sooner in rural areas compare to urban areas (95% versus 92%) [19]. This result is identical to those of the Ethiopian Demographic Health Survey [20].

However, in other African studies, women in urban areas initiate breastfeeding sooner than women in rural areas. In Goba Woreda, South East Ethiopia, Setegn *et al.* show that Ethiopian women in urban area were 4 times as likely to practice timely initiation of breastfeeding compared to their rural counterparts [21]. In Tanzania, 61.2% of the mothers in urban areas initiate breastfeeding within the first hour of birth versus 42.2% in rural areas [22].

A survey conducted on 324 breastfeeding women from 12 different villages in Gambia reports a high rate (close to 40%) of late breastfeeding initiation (later than 24 hours after birth) and explains this phenomenon by the fact that many women in rural areas believe that the colostrum is a "bad (dirty) milk". Therefore, they express all the colostrum until the milk become white [23].

The average age of children when breastfeeding was stopped was statistically different in urban and rural areas. Moreover, the proportion of urban women who stopped breastfeed at the age  $\leq 12$  months was statistically higher in urban areas (14.5% versus 10.8%; ORa: 1.67; CI 95%: 1.12-2.49). Therefore, we noticed that women tend to breastfeed longer in rural areas than in urban areas. Even though the averages of the duration of breastfeeding in our study is inferior to

those found in Vietnam (27 months in rural areas versus 24 months in urban areas), the authors have similar results as us<sup>[5]</sup>. In a literature review done by Noiromme-Renard, however women with a higher standard of living tend to breastfeed longer than those with limited means<sup>[24]</sup>. This difference can be explained by the fact that our study and the Vietnamese one were done in developing countries whereas the one by Noiromme-Renard was done in developed areas<sup>[24]</sup>.

Breastfeeding beyond 6 months (even up to 24 months) is extremely important because maternal milk provides the child with micronutrients, vitamins and polyunsaturated fatty acids that are in lower concentration in cereal based preparations for children particularly in rural areas<sup>[17]</sup>. In fact, in African countries, complementary foods for children are based on local cereals (maize, rice, sorghum, millet) and roots (cassava)<sup>[17]</sup>.

In the Katanga province, 2/3 of the daily energy intake comes from maize and millet meals. Moreover, porridges based on millet are extremely viscous and so hard to digest; therefore meals are often diluted, which decrease their caloric intake causing nutritional deficiency in children. To cope with this situation, some countries created small production units of millet enriched with proteins by adding local leguminous plant (cassava, soya)<sup>[25]</sup>. These kinds of initiatives should be encouraged in the Katanga province specifically in rural areas.

## CONCLUSION

The study showed that mothers living in rural areas breastfeed longer than those who live in urban areas. Moreover, we noticed they use infant formula and they introduce solid, semi-solid or soft food sooner and more frequently than women in urban areas. Our findings indicate that more attention should be given to the promotion of exclusive breastfeeding in rural southern Katanga communities. Postnatal education on infant feeding practices should be given taking into account the cultural and traditional beliefs.

## What is known about this topic

- The nutritional status of children is almost always determined by their dietary and in poor countries feeding habits are very often influenced by socio-cultural considerations.
- In parts of the world, a large difference between feeding practices in rural and urban areas have been reported.

## What this study adds

- This study suggests that mothers living in rural areas breastfeed longer than those who live in urban areas.
- This study proposes that postnatal education on infant feeding practices should be given taking into account the cultural and traditional beliefs.

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## Authors' contributions

TKL, OM, AMM, FNN and NL carried out the conceptualization, design, data collection and analysis for the study. TKL, OM, PMM and ONL

contributed to the interpretation of the findings and the drafting of the article. Both authors read and approved the final manuscript.

## Conflicts of Interest

The authors declare no conflict of interest.

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