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Research Article

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Determinants of Exclusive Breastfeeding Among Mothers of Infant Between 0 And 6 Months Attending The Health Centres Heal Africa And Virunga, GOMA, DRC

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Abstract

Introduction: *The prevalence of exclusive breastfeeding (EBF) has remained low for a long time in low- and middle-income countries, including the Democratic Republic of Congo. However, it's one of the effective means and a global priority to reduce infant morbidity and mortality due to respiratory and diarrheal diseases. This study aimed to identify the determinants of EBF of infants from zero to six months in the city of Goma, North kivu, DRC, in order to improve the rate.*

Method: *A longitudinal study was adopted, consisting of a historical follow-up of 422 breastfeeding mothers attending Virunga and Heal Africa health centres from April to August 2021. These two health centres belong respectively to the health zones of Karisimbi and Goma, both in Goma city. Data were collected by a pre-tested and structured questionnaire. The sociodemographic, clinical and environmental determinants of EBF were investigated by statistical analyses. The non-exclusive breastfeeding determinants were calculated by using the Cox's regression model.*

Results: *The EBF rate was 50.2%. Four determinants were significantly associated with the risk of introducing new foods to infants before 6 months. Those are: the living environment (aRR = 2.53, 95% CI [1.12-4.09], p=0.007), a cesarean section delivery (aRR = 2.84, 95% CI [1.08-3.43], p = 0.003), lack of post natal care visit (aRR = 1.92, 95% CI [1.09-2.75], p = 0.015), as well as lack of knowledge about EBF (aRR = 3.29; 95% CI [1.10-4.71], p = 0.013) which increased the risk of discontinuing the EBF.*

Conclusion: *It is vital to develop and step up communication strategies and actions aimed at increasing the knowledge of women of childbearing age and breastfeeding mothers about the benefits of the EBF and the importance of attending the various consultations visit. All communication channels should be used to reach women wherever they live.*

Keywords: Exclusive Breastfeeding, Determinants, Goma, DRC

1. Background

Breastfeeding is a biocultural phenomenon, it is not only a biological process, but as well a culturally determined behaviour. As such, there are important implications to understand the past, present and future state of the human species [1].

As part of ensuring the proper growth, development and optimal health of children, World Health Organization (WHO) recommends that infants should start breastfeeding from the first hour of life, exclusively breastfed for the first 6 months of life, and receive adequate and safe complementary foods in addition to breastfeeding from 6 months to 2 years old and beyond. Optimal breastfeeding protects the child from infections and malocclusion and is associated with the development of intelligence during childhood, adolescence and adulthood. Additional, it may reduce the risk of overweight and diabetes [2].

For the proper optimization of breast milk by infants and its health benefits for children and mothers in developing and industrialized countries, exclusive breastfeeding (EBF) up to 6 months of age is universally recommended [3]. Optimal breastfeeding practices has shown to be effective in preventing infant morbidity and mortality and is one of the most natural and best forms of preventive medicine for infant and young child survival [4]. It has been identified as a global priority to improve child health interventions among public health [5].

Despite this recommendation since 2001 by the WHO and UNICEF to observe EBF during the first six months of life of infants, low implementation is observed in both developed and resource-limited countries [6].

While the overall target for EBF coverage set by WHO is 90%, globally only about 44% of infants aged 0 to 6 months were exclusively breastfed during 2015-2020 [3].

In low and middle-income countries, an average of 37% of children under 6 months were reported to be exclusively breastfed. Additionally, the practice of EBF varied by population in the 49 African countries from 2000 to 2017 [7,8].

In sub-Saharan Africa, although breastfeeding is widespread, it was found in 2017 that only 33% of mothers practice it exclusively during the first six months of a child's life [9].

Previous analyses have shown that most countries will not meet the WHO global nutrition target of increasing the rate of EBF in the first 6 months to at least 50% by 2025 and at least 70% by 2030 [2,7,8].

In the Democratic Republic of Congo (DRC), although efforts are being made to improve the EBF rate, such as raising awearness of mothers about EBF done by healthcare workers and community vonluteers, low prevalence is still observed [10]. Inadequate breastfeeding support for mothers and their perception of infant feeding are among the factors leading to early cessation of breastfeeding. Further more, water supplementation before the age of 6 months is considered by mothers to be essential for the digestion of breast milk and necessary in the geographical conditions of a hot climate [11].

According to the second DRC Demographic and Health Survey of 2013-2014, 98% of children are breastfed at birth, but only 48% of them are exclusively breastfed until the age of 6 months [12].

According to WHO, the prevalence of EBF is likely to improve over the next few years, especially as breastfeeding practices are very sensitive to supportive interventions [13].

This observation was similar in the city of Goma. Following the promotion of breast milk substitutes or supplements by commercial companies, the influence of the environment and the perception of mothers regarding the feeding of their infants, the tendency of breastfeeding mothers is to combine breast milk with water or other commercial products such as cow's milk, cereal porridge, etc. to the detriment of EBF.

In the city of Goma, we have not found any previous study that could highlight the determinants that would influence choice of breastfeeding mode practiced by breastfeeding mothers. Our aim is to identify the determinants of EBF of infants aged 0 to 6 months among breastfeeding mothers in two health zones of the city of Goma. The results of this study will allow us to develop a plan to propose to decision makers in order to consider implemention of realistic and adapted corrective interventions to support the promotion of EBF in our environment.

2. Methods

2.1. Study Setting

The present study was carried out in two sites: Heal Africa Health Center (HAHC) in the Goma Health Zone and Virunga Health Center (VHC) in Karisimbi Health Zone. Both health centers are located in the city of Goma, North Kivu province, DRC.

2.2. Study Design And Participants

This is a longitudinal study; consisting of a historical follow-up of 422 breastfeeding mothers attending Virunga and Heal Africa health centres from April to August 2021.

The study population were consenting breastfeeding women having children between 0 to 6 months old attending the pre-school consultation service in two health centres during the data collection period. Breastfeeding women HIV-positive or those suffring from benign or malignant breast disease, and those carrying a preterm infant or with a congenital malformation were excluded in this study.

2.3. Sampling And Sample Size

We used simple random probability sampling. The sample was

calculated using the Fischer formula (n = Z2. P (1-p)/i2), 95% confidence level and 5% margin of error.

- n = sample,
- N = total sample size,
- P = prevalence,
- i = margin of error,
- Z = confidence level

We added 10% of non-respondents to the sample. The total sample was found by making N = n+10%. The national prevalence of EBF considered was 48% (DHS-DRC II 2013-2014). Thus, the sample size was 422.

The statistical unit of our study consisted of two health zones from which we drew the two Health Centres. The sample was distributed proportionally according to the number of children consulted in the two health centres for pre-school consultations. In 2019, the infants aged 0 to 6 months who attended HAHC and VHC were estimated at 1,561 and 877 respectively. In the end, a sample of 422 breastfeeding mothers was selected, of which 270 were for the HAHC and 152 for the VHC.

3. Data Collection

The data were collected by using a structured, pre-tested questionnaire adressed to eligible breastfeeding mothers in the two study sites. In each of the two health centers, we conducted these research activities using the rooms provided for routine preventive activities. Initially, questionaires were prepared in Fensh, then translated to the local language (Swihili), and back to the French version in order to check its consistency. We worked in collaboration with two nurses (one from each of the two health centers). Both were oriented and well-informed about the data collection process. A pretest was organised with ten breastfeeding women out of the selected study population to ensure the timing, quality, completeness and clarity of the questionaire.

To ensure a clear understanding, all questions on the survey questionnaire were discussed with the participants before they were asked to sign the consent form and complete the questionnaire. They were given the choice of completing the questionnaire in either French or Swahili. To facilitate the task of filling in the questionnaire and to ensure good service to the mothers involved, we were on call throughout this period to answer questions of understanding raised by some of our respondents and facilitated two mothers to fill the questionaire in Swahili. The completed questionnaires were returned to us and we took care to keep them in a safe place for this purpose.

4. Operational Definitions

Breastfeeding: Refers to the proportion of children fed by the woman's milk.

Exclusive breastfeeding: when the newborn or infant is fed only with breast milk and does not ingest any other food (not even water) from birth to six months, except pharmaceuticals such as vitamin supplements, oral rehydration solutions and medicines [6,14].

5. Statistical Analyses

After collecting, coding and checking the data in Excel version 2016, they were coded, entered and analysed by statistical package for social science (SPSS) software version 24.

The data were calculated as the mean and standard deviation for normally distributed quantitative data. And the median (interquartile range) for non-normally distributed quantitative data. Qualitative variables were presented as absolute frequency and relative frequency. The chi-square test was used to compare proportions. In contrast, the Man Whytney U test was used to compare medians. A p-value < 0.05 was considered statistically significant. Factors for non-EBF were looked for by Cox's regression. Relative risk (RR) and confidence intervals (CI) were calculated to assess the degree of risk of a mother not following the EBF.

6. Ethical Consideration

Permission to start the study was obtained from 'médecins chefs de zones' of Goma health zone for the HAHC and of Karisimbi health zone for the VHC. Ethical approval for this study was obtained from ethics committee of the Protestant University of Congo (CEUPC0073). Informed consent was solicited from individual participants.

7. Results

7.1. Socio-demographic characteristics

The average age of the nursing mothers was 27.2±5.4. The age range of 20 to 34 years was predominant (80.8%). 90% of the women were married. The majority of our respondents (68%) came from the Karisimbi health zone. 52.8% had no occupation, while 67.5% had a university education, with a predominance observed in the HAHC (73.3% versus 57.2%, p = 0.002) and 87% of them had a high socio-economic level.

7.2. General characteristics of breastfeeding mothers and EBF

Table 1 compares the proportions of EBF and food introduction according to different socio-demographic, environmental and health service related characteristics. EBF was significantly influenced by the study site (61.2% at the VHC versus 44.1% at the HAHC, p = 0.001), marital status of breastfeeding women (51.6% of married versus 38.1% of unmarried, p = 0.033); mode of delivery (54.6% of vaginal deliveries versus 41.4% of caesarean deliveries, p = 0.007); postnatal visit (54.6% of those who attended postnatal visit versus 46.5% of those who did not, p = 0.019) as well as knowledge of EBF (56.1% of those who had heard of EBF versus 41.2% of those who had not, p = 0.003).

7.3. Determinants of food introduction

Table 2 summarizes the determinants of introduction of foods other than breast milk before 6 months of age after statistical analysis. In multivariate analysis, the observed strength of association persisted for four variables, namely: attendance site or living environment (HAHC), mode of delivery by caesarean section, lack of knowledge about EBF and lack of follow-up of postnatal care which were associated 3 times more with the risk of introducing food for the first 3 variables and 2 times more for the last one.

Variables	n	Exclusive breast milk	Introduction of food	P
Age group				**0,754**
<20 years	32	15(46,9)	17(53,1)	
20-34 years	341	170(49,9)	171(50,1)	
≥35 years	49	27(55,1)	22(44,9)	
Study Setting				**0,001**
VHC	152	93(61,2)	59(38,8)	
HAHC	270	119(44,1)	151(55,9)	
Marital status				**0,033**
Not married	42	16(38,1)	26(61,9)	
Married	380	196(51,6)	184(48,4)	
Parity				**0,452**
Primiparous:1	130	63(48,5)	67(51,5)	
Paucipare:2-3	184	89(48,4)	95(51,6)	
Multiparous: 4 and more	108	60(55,6)	48(44,4)	
Provenance				**0,817**
Goma HZ	126	61(48,4)	65(51,6)	
Karisimbi HZ	287	147(51,2)	140(48,8)	
Outside Goma	9	4(44,4)	5(55,6)	
Religion				**0,706**
Catholic	134	72(53,7)	62(46,3)	
Protestant	190	95(50,0)	95(50,0)	
Church of revival	77	35(45,5)	42(54,5)	
Muslim	21	10(47,6)	11(52,4)	
Level of education				**0,275**
Primary or none	43	25(58,1)	18(41,9)	
Secondary	181	95(52,5)	86(47,5)	
University	198	92(46,5)	106(53,5)	
Mothers profession				**0,965**
No profession	223	111(49,8)	112(50,2)	
Informel	113	58(51,3)	55(48,7)	
Formel	86	43(50,0)	43(50,0)	
Spouse education's level				**0,310**
Primary & none	52	25(48,1)	27(51,9)	
Secondary	85			
	49(57,6)	36(42,4)		
University	285	138(48,4)	147(51,6)	
Spouse's profession				**0,117**
No profession	89	43(48,3)	46(51,7)	
Informel	128	74(57,8)	54(42,2)	
Formel	205	95(46,3)	110(53,7)	
SES				

Low	12	8(66,7)	4(33,3)	0,575
Medium	27	15(55,6)	12(44,4)	
High	280	145(51,8)	135(48,2)	
Mode of delivery				**0,007**
Vaginal	282	154(54,6)	128(45,4)	
Caesarean section	140	58(41,4)	82(58,6)	
PNC				**0,019**
Yes	194	106(54,6)	88(45,4)	
No	228	106(46,5)	122(53,5)	
Knowledge toward EBF				**0,003**
Yes	246	138(56,1)	108(43,9)	
No	172	72(41,2)	100(58,1)	

VHC: virunga health centre, HAHC: Heal Africa health centre, p: p-value, HZ: health zone, SES: socio-economic status, PNC: postnatal care, EBF: exclusive breastfeeding.

Table 1 : General characteristics of breastfeeding mothers and the EBF of children under 6 months of age

Variables	**Univariate analysis**		**Multivariate analysis**	
	p	**RR (CI95%)**	***P***	**aRR (CI95%)**
Study setting				
VHC		1		1
HAHC	0,001	1,64(1,21-2,21)	0,007	2,53(1,12-4,09)
Marital status				
Maried		1		1
Non married	0,010	1,51(1,01-2,28)	0,057	1,50(0,99-2,29)
Delivery mode				
Vaginal		1		1
Caesarian section	0,002	1,94(1,08-3,43)	0,003	2,84(1,08-3,43)
PNC				
Yes		1		1
No	0,016	1,82 (1,09-2,69)	0,015	1,92(1,09-2,75)
Knowledge toward EBF				
Yes		1		1
No	0,009	2,44(1,09-3,89)	0,013	3,29(1,10-4,71)

p: p-value, RR: relative risk, aRR: adjusted relative risk, CI: confidence interval, VHC: Virunga health centre, HAHC: Heal Africa health centre, PNC: postnatal care, EBF: exclusive breastfeeding.

Table 2: Determinants of food introduction

8. Discussion

The result in this study shows 50.2% of mothers breastfed exclusively their 0 to 6 months infants in the city of Goma. This is close to results reported in several studies done at the national level; such as 48% reported in 2013 (DHS-DRC 2013-2014) and 49.2% reported in province of Kwango [15,16]. In contrast, Bhattacharjee et al. reported a somewhat lower prevalence of up to 45.9% in DRC [8]. The frequency found in this study is similar to that reported in other countries in the region such as 50% in Tanzania and 52% in Ethiopia [14,17].

In East African countries, Dukuzumuremvi et al. reported an average of EBF prevalence of 55.9%. While in other countries in the sub-Saharan region it is lower [18]. This is the case in Nigeria

with 29%, Mali 24.4% for an estimated continental average of 37% [8,15,19].

The reason for a relative large pourcentage found in this study might be the inclusion in our sample of majority of breastfeeding mothers whom infants age under 6 months; the median being 4 months. Unlike, other previous studies carried on infants between 6 and 12 months in Zimbabwe the prevalence was lower [20].

It should also be noted that, although the finding meets the 50% target set as the WHO global nutrition goal for 2025, it is still far below the WHO target of 90% EBF coverage [8].

In this study, the frequency of EBF was significantly different according to the living environment of breastfeeding mothers: 61.2% at the VHC site versus 44.1% at the HAHC site, p = 0.001. Breastfeeding mothers surveyed at the HAHC had a 3-fold higher risk of EBF interruption than their counterparts surveyed at the VHC (aRR = 2.53, 95% CI [1.12-4.09], p = 0.007). This difference might be explained by the difference in socio-economic level between the majority of breastfeeding women in the two health zones to which these two facilities belong. The majority of women in the Goma health zone (almost all of whom were surveyed at the HAHC site) were of a higher socio-economic level than their counterparts in the Karisimbi health zone, and were therefore subject to low compliance with the EBF. This is in line with the results of previous studies done by Onah et al. in Nigeria; Ogbo et al. and Chandhiok et al. in India [21-23].

The authors explain these phenomena by the fact that high socio-economic class breastfeeding women, having sufficient means, easily afford to buy manufactured products for their infants' nutrition. Still others use them as a symbol of the bourgeoisie [21]. In addition to the reasons mentioned above, we noted the predominance in the HAHC site of breastfeeding mothers who had not yet heard of EBF and a high rate of caesarean delivery. This is in line with findings of studies done by Dhakal et al., Al-Sahab et al. and Onah et al. showing the correlation between knowledge about EBF or caesarean delivery and the frequency [16,21,24].

Turning to mode of delivery (Table 1), 54.6% of breastfeeding mothers who delivered vaginally observed EBF, compared to 41.4% of those who delivered by caesarean section (p = 0.007). Caesarean delivery put infants at 3 times the risk of food introduction compared to vaginal delivery (aRR = 2.84, 95% CI [1.08-3.43], p = 0.003). Breastfeeding mothers who delivered vaginally were therefore three times more likely to comply with the EBF. This result is consistent with the findings of a systematic review and meta-analysis conducted by Prior et al., which found that the rate of EBF at 6 months was lower in women with a caesarean delivery compared with a vaginal delivery, demonstrating the importance of using strong interventions to support women who wish to breastfeed after caesarean delivery [25]. Other authors explain this low prevalence of EBF after caesarean delivery by the many difficulties these women face, preventing them from initiating breastfeeding within the first hour after delivery [21,24,26]. In the present study, breastfeeding mothers who gave birth by caesarean section were in most cases separated from their newborns for hours while recovering from anaesthesia or pain from surgical wounds, and their newborns were followed or observed in the neonatal unit where they often initiated giving formula. Other women limit the frequency of breastfeeding their newborns for fear of pain due to uterine cuts.

The frequency of EBF was 54.6% among breastfeeding mothers who had received at least one PNC visit; while it was 46.5% among those who had not received any (p = 0.019). The PNC visits received by the breastfeeding mothers protected them from the introduction of food before six months. Analyses showed that breastfeeding mothers who did not attend PNC were twice as likely to introduce food into their infants' meals (aRR = 1.92, 95% CI [1.09-2.75], p = 0.015). These results are consistent with those found by Tiruneh et al. who showed in a systematic review that in low- and middle-income countries, postpartum visits promote EBF [27]. In another randomised controlled trial study in Singapore, Su et al. found that postnatal lactation support for mothers significantly improved the rate of EBF up to six months after delivery, and was more effective for this purpose than antenatal education, although both interventions are needed [28].

At the national level, the results of this study are consistent with those previously found by Dhakal et al. in province of Kwango (DRC) that PNC was 3 times more associated with the likelihood of EBF [16]. In our case, this might be explained by the fact that PNC visits provided an ideal setting for sensitization and accompaniment of breastfeeding mothers in their fundamental role of ensuring adequate feeding of their infants, one of their major concerns at such a time. This is in contrast to the prenatal period, when the most common questions are related to the progress of the pregnancy, preparations for delivery and hesitations and doubts about the mode of delivery (for those who give birth by caesarean section). During postnatal visits, most women are receptive to messages of support and promotion of EBF. It is also an opportunity for breastfeeding women and their partners to have discussions with health care providers regarding this issue.

246 out of 422 (58.2%) of breastfeeding women had already heard of EBF; among them we noted a 56.1% rate of EBF versus 43.9% rate of introduction of food. 172 out of 422 (40.8%) of the breastfeeding women had not yet heard of EBF; among them we noted a 41.2% rate of EBF against 58.1% rate of food introduction. These findings show that the practice of EBF in our study was significantly impacted by whether breastfeeding mothers had or had not heard about EBF. Indeed, infants of breastfeeding mothers who had not yet heard about EBF were exposed to a 3-fold higher risk of food introduction (aRR = 3.29, 95% CI [1.10-4.71], p = 0.013). Similar findings were previously reported in study done by Dhakal et al. (2017). Women who had correct knowledge about EBF were twice as likely to observe EBF. The same was true in the Ghana studies by Ayawine et al. and Mogre et al. although authors

were not unanimous about the correlation between knowledge of EBF and its use [29,30].

On this issue, the findings of the present study concurred with those who demonstrated that the more informed breastfeeding mothers are about EBF the better their practice. However, there is a need to ensure the content of the message given to mothers about infant feeding in our settings, including by health care staff, especially as the definition of EBF offered by some of the breastfeeding mothers (including water supplementation to breastfeeding) is not one. This may be one of the reasons for the low prevalence of EBF observed in our settings.

9. Conclusion

Despite expert guidelines recommending good EBF coverage for 0 to 6 months children, the frequency of EBF in the city of Goma is still worrying. At the end of the present study, which set objective of improving the rate of EBF for infants aged 0 to 6 months by identifying its determinants, particularly among breastfeeding mothers, analyses showed that only 50.2% of infants are exclusively breastfed. Four key determinants of food introduction among newborns and infants were retained. These are the living environment, the mode of delivery by caesarean section, the lack of PNC visits and the lack of knowledge about EBF.

This confirms the important roles to be played by breastfeeding mothers and the people around them in the practice of EBF. In addition to the measures already put in place, stakeholders involved in the promotion of EBF can focus their efforts on these determinants in order to accompany breastfeeding mothers and guide them on how to circumvent the environmental difficulties that lead to the failure of EBF.

It is vital to develop and step up communication strategies and actions aimed at increasing the knowledge of women of childbearing age and breastfeeding mothers about the benefits of the EBF and the importance of attending various consultations (ANC visit, PNC visit, infants immunization visit…). All communication channels should be used to reach women wherever they live.

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