Original Article

Prevalence of Exclusive Breastfeeding and Associated Factors among Mothers in Karongi District, Rwanda

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Abstract

Background

Exclusive breastfeeding is crucial for an infant's growth and development. In Rwanda, 47% of rural children and 27% of urban children are stunted which could be linked to poor exclusive breastfeeding. Thus, this study was carried out to assess prevalence of exclusive breastfeeding and associated factors in Karongi district of Rwanda.

Method

A cross-sectional design was used involving 261 mothers with infants of 6 to 9 months selected systematically with an interval two as they came to the health facilities. The data were collected using structured questionnaire. The factors independently associated with exclusive breastfeeding were determined using multivariable logistic regression analysis.

Results

The prevalence of exclusive breastfeeding was 87.1%. Married mothers (AOR= 3.15; 95%CI = 1.07 – 9.28), protestant mothers (AOR= 0.15; 95%CI = 0.03 – 0.69), attending prenatal care (AOR= 19.87; 95%CI = 3.00 – 131.68), receiving postnatal care (AOR = 3.07; 95%CI = 1.31 – 7.21) and receiving breastfeeding counseling (AOR= 3.16; 95%CI = 1.03 – 9.69) were identified as independent factors associated with exclusively breastfeeding.

Conclusion

The prevalence of exclusive breastfeeding was high but with various healthcare service associated factors. Therefore awareness and appropriate behavior change communication strategies on exclusive breastfeeding should be encouraged during prenatal and postpartum care for optimum practice.

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Keywords: Exclusive breastfeeding; Factors; Mothers; Prevalence

Introduction

Exclusive breastfeeding (EBF) is the process in which infants are fed only breast milk in the first 6 months of life, without the addition of any other foods or liquids, with the exception of illness that may necessitate the use of oral rehydration or any other syrup containing vitamins, minerals, supplements, or medication.[1,2] It is among the most significant and effective intervention techniques for preventing child mortality as well as a range of childhood illnesses, including infections, pneumonia, malnutrition, rapid infant death syndrome, and diarrhea.[3–6] Inadequate exclusive breastfeeding practices result in 1.24 million infant deaths in Asia and Africa during the first six months of life, and 41% of under-five mortality worldwide occurs in Sub-Saharan Africa.[7,8] Malnutrition-related fatalities in children under five are primarily caused by lack of exclusive breastfeeding.[9]

Although the prevalence rates of EBF in affluent countries like the United States, the United Kingdom and Australia are low at 19%, 1% and 15% respectively,[10] it is usually associated with frequent attendance to healthcare facilities for child treatment, which increases overall healthcare cost,[11] underscoring the necessity of breastfeeding in all societies. In low- and middle-income countries, 37% of infants under six months are exclusively breastfed,[12] while EBF rate in sub-Saharan African countries is 53.3% among the infants below 6 months of age,[13] both of which are much lower than the target of WHO which is 90%.[14,15] Among the East African countries, the prevalence of EBF among young children less than 6 months is reported at 69.3%, 63.2%, 61.4% and 50% in Burundi, Uganda, Kenya and Tanzania respectively,[16] still not meeting the WHO recommendation.[13]

The practice of exclusive breastfeeding is influenced by a number of maternal and child-related factors in low- and middle-income countries. For instance, studies done in Ethiopia showed that child age, residence, parity, maternal age, family size, father's education, place of delivery, having antenatal care visit, counseling during postnatal care as well as maternal knowledge on EBF were associated with EBF practice.[17–19] Maternal positive attitude on the child feeding was found to be the predictor of EBF practice according to a study done in Kenya.[16] Another study carried out in Tanzania also revealed having adequate knowledge, ANC visits, economic status and positive perception on EBS were predictors of EBF.[20] Moreover, a study conducted in Ghana indicated that child age, higher maternal education and higher knowledge of EBS were significantly associated with EBS practice.[21]

In Rwanda, according to a recent demographic health survey done in 2019-20, 81% of mothers practice EBF,[22] probably due to the efforts made to improve maternal health services, such as counseling and education on EBF provided by community health workers during prenatal and postnatal care.[22] Nonetheless, this proportion is still lower compared to the EBF recommended prevalence.[14] In addition, Karongi District is among the top three districts in Rwanda with malnourished children under the age of five.[22] The purpose of this study therefore, to determine the rate of exclusive breastfeeding practice for the first six months and associated factors among mothers with infants aged 6 to 9 months in Karongi District, Rwanda.

Methods

Study design and setting

This cross-sectional study was conducted in Karongi District in the Western Province of Rwanda; and the district has 13 administrative sectors. The majority of the population (93.1%) reside in the rural area, and a little more than a half of them (53%) are females.[23]

Study population and sample size

The target population were mothers who attended health centres with infants aged 6 to 9 months. The health centres included in the study were Rubengera, Kibuye, Bubazi, Kirambo, Police Karongi, Rufungo and Mukungu (Table 1). The seven health centres were randomly selected from the catchment areas of three hospitals, namely Kibuye referral, Kirinda and Mugonero. Using records of vaccinations given within a month, the total population (416) was estimated from all selected health facilities (Table 1). By using Cochran [24] the single population proportion formula, the sample size was determined as follows:

$$n = \frac{Z^2pq}{d^2} = \frac{(1.96)^2(0.19\times0.81)}{(0.05)^2} = 237$$

Where:
n = Needed sample size
Z = Z statistic for a level of confidence (1.96 for 95% confidence level)
d = Margin of error or level of precision that is estimated at 0.05 level of significance
p = Proportion of exclusive breastfeeding is 81% in Rwanda.[22]
Therefore, the estimated sample was 237 mothers.

The contingency of 10% was applied considering the non-response rate and hence the sample size was raised to 261. Based on the average monthly number of mothers who visited a health centres for a vaccine or other services, the sample size was allocated proportionally to the population size. Each health center was visited on the day of vaccination until we reached the number calculated as indicated in Table 1. However, after incomplete data were removed, 249 out of 261 were included in the analysis.

Table 1. Sample distribution

Health centers	Average mothers coming for vaccination or other services per month	Sample size proportional to population size
Rubengera	68	42
Kibuye	65	41
Bubazi	55	35
Kirambo	63	39
Police Karongi	45	28
Rufungo	57	37
Mukungu	63	39
Total	**416**	**261**

Inclusion and exclusion criteria

All breastfeeding mothers were eligible for inclusion in the study, while those who objected to the request to participate were excluded.

Data collection instrument

According to similar studies, a structured questionnaire was utilized to assess the prevalence of EBF and associated factors. [2,6,25] The tool comprised three parts which were socio-demographic factors, obstetric factors and exclusive breastfeeding practices. Exclusive breastfeeding referred to infants receiving only breastmilk, no other liquids, or solids in the first 6 months of life. The mothers were asked whether they were exclusively breastfeeding during the first 6 months. The questionnaire was initially created in English then translated into the local language, Kinyarwanda.

The validity and reliability of the questionnaire were piloted among 20 mothers not to be part of the main study prior to the actual data collection. The purpose of the pilot study was to evaluate the questionnaire's readability, accuracy, and reliability and make the necessary improvements on the instrument. Five trained research assistants collected the information at the selected health centers.

Data collection procedures

By using systematic sampling procedure, respondents were chosen at an interval of two, based on the estimated sample size and the overall target population (416/261 = 1.6 ~ 2). The first mother with a child of 6 to 9 months was chosen randomly using lottery method from the first two mothers who came to the health centers for vaccination.

Data analysis

The data analysis used the IBM SPSS Statistics for Windows version 25.0 (IBM Corp, Armonk, NY, USA). Descriptive statistics such as frequencies and percentages were used to summarize the characteristics of the respondents. Chi-square test ($p < 0.05$) was utilized to assess for variables that were significantly associated with exclusive breastfeeding. Multivariable logistic regression model analysis was used to control the potential factors associated with exclusive breastfeeding practices. The adequacy of the model was assessed using the Hosmer and Lemeshow Test. The test showed a p-value of 0.980, indicating that the model fit the data adequately.

Ethical considerations

The Institutional Review Board (IRB) of Mount Kenya University Rwanda granted ethical clearance (MKU/Ethics/040/2022). After receiving the permission from IRB, permission was also asked from the Karongi district, to collect data. All respondents signed on the informed consent form after detailed explanation about the study objectives and procedures were offered. Participation was voluntary and questionnaires were anonymous. The information provided kept strictly confidential and identification codes used on data which stored in secured place.

Results

Socio-demographic characteristics and obstetric related factors among mothers

Most mothers (29.3%) were aged between 25 and 29 years and followed by those aged from 20 to 24 years (28.1%). Majority of the mothers (69.9%) were residing in rural settings and most (88.8%) of them were either married or cohabiting. Regarding to level of education, about half (45.4%) of the mothers attended primary level of education while 11.2% never attended school. Majority (59.0%) belong to Protestant church. The highest percentage (41.4%) were self-employed while a considerable proportion (38.6%) indicated as being unemployed (Table 2).

Almost all of the mothers (96.4%) delivered at public health facilities. Most of the deliveries (66.3%) were normal vaginal delivery while around a quarter (27.3%) of the mothers delivered by caesarean section. The highest percentage (41.0%) of mothers had at least one live birth. A large percentage (96.8%) of the mothers ever attended for antenatal care services, where majority (63.1%) visited four times or more. About one fifth (20.5%) indicated some birth complications; most of the mothers (89.2%) also received post-natal care services, and about three quarters (77.5%) stated that they received breastfeeding practice counseling and education. Most (78.3%) reported that they had enough time for breastfeeding (Table 2).

Table 2. Socio-demographic characteristics and obstetric related factors among mothers in Karongi district

Variables	n = 261	%
Age of the mother [years]		
20-24	70	28.1
25-29	73	29.3
30-34	59	23.7
34 and above	47	18.9
Marital status		
Single/Living alone	28	11.2
Married/Cohabiting	221	88.8
Mother's education level		
None	28	11.2
Primary	113	45.4
Secondary	88	35.3
University	20	8.0
Partner's education level		
None	34	13.7
Primary	93	37.3
Secondary	87	34.9
University	35	14.1
Religion		
Roman Catholic	67	26.9
Protestant	147	59.0
Adventist	27	10.8
Others	8	3.2
Employment status		
Unemployed	96	38.6
Public servant	14	5.6
Private servant	36	14.5
Self-employed	103	41.4
Place of resident		
Urban	75	30.1
Rural	174	69.9
Distance of work place from home		
Below 1km2	188	75.5
1-5km2	54	21.7
< 5Km	7	2.8
Place of delivery		
Public health facilities	240	96.4
Private health facilities	2	0.8
Home delivery	7	2.8
Mode of delivery		
Normal delivery	165	66.3
Normal delivery with episiotomy	16	6.4
Delivery with caesarean section	68	27.3
Parity		
One	102	41.0
Two	72	28.9
Three	32	12.9
Four	23	9.2
More than Four	20	8.0
Attended antenatal care		
No	8	3.2
Yes	241	96.8
Frequency of antenatal care		
1 Visit	9	3.6
2 Visit	19	7.6
3 Visit	56	22.5
4 Visit	157	63.1
Any birth complications		
No	198	79.5
Yes	51	20.5
Received post-natal care		
No	27	10.8
Yes	222	89.2
Received counseling and education on breastfeeding		
No	56	22.5
Yes	193	77.5
Getting breastfeeding time		
No	54	21.7
Yes	195	78.3

Prevalence of exclusive breastfeeding among mothers in Karongi district

The mothers who took part in this study had an exclusive breastfeeding prevalence of 87.1% (Figure 1).

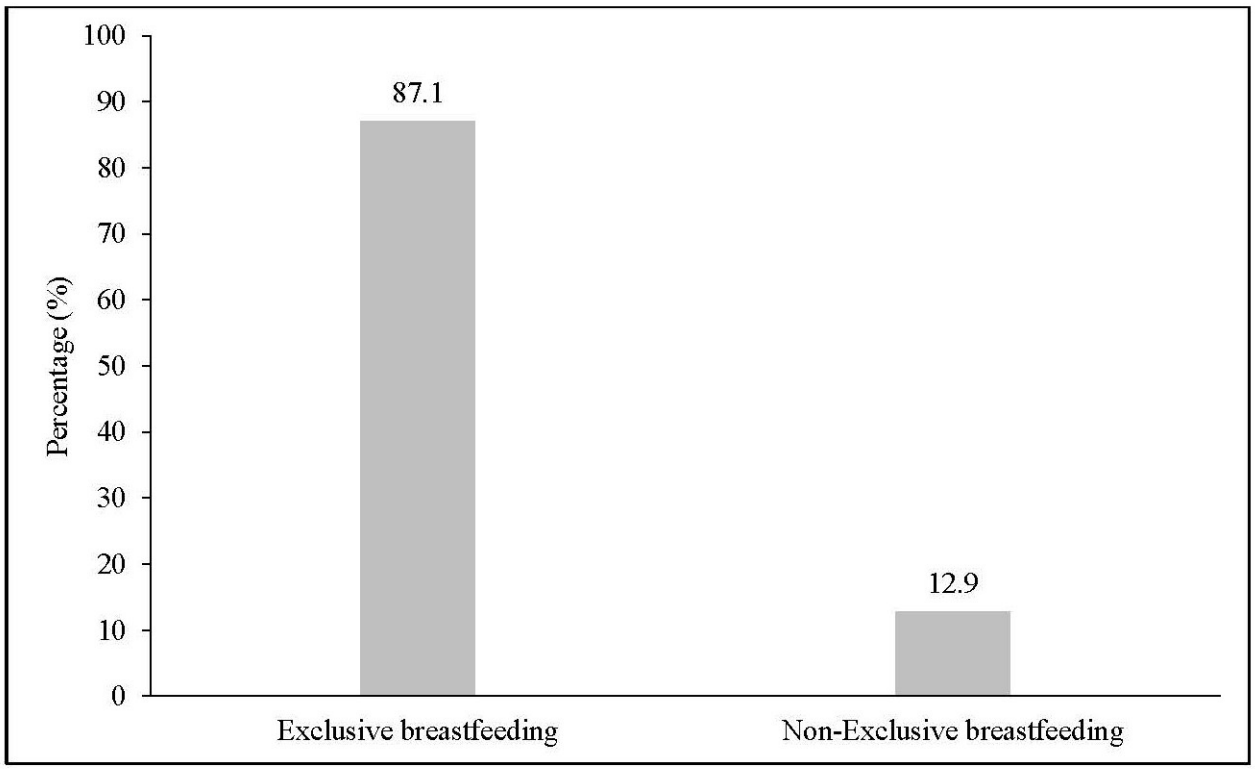

Figure 1. Prevalence of exclusive breastfeeding

Socio-demographic and obstetric factors associated with exclusive breastfeeding practices of mothers in Karongi district

Married women were more likely to exclusively breastfeed than single mothers (p = 0.041). Compared to Protestant mothers, Catholic mothers were substantially more likely to practice exclusive breastfeeding (p = 0.030).

Exclusive breastfeeding was practiced by more mothers who attended antenatal care (p <0.001). Similarly, mothers who got postnatal care were more likely to exclusively breastfeed their infants (p = 0.001). Furthermore, mothers who reported participation in breastfeeding counseling and education were significantly more likely to practice exclusive breastfeeding (p <0.001) (Table 3).

Table 3. Socio-demographic and obstetric factors associated with exclusive breastfeeding practices of mothers in Karongi district

Variables	Exclusive breastfeeding		Non-Exclusive breastfeeding		x^2	p value
	n	%	n	%		
Age of the mother [years]						
20-24	63	90.0	7	10.0	1.06	0.788
25-29	62	84.9	11	15.1		
30-34	52	88.1	7	11.9		
34 and above	40	85.1	7	14.9		
Marital status						
Single/Living alone	21	75.0	7	25.0	4.16	0.041
Married/Cohabiting	196	88.7	25	11.3		
Mother's education level						
None	24	85.7	4	14.3	0.27	0.966
Primary	99	87.6	14	12.4		
Secondary	76	86.4	12	13.6		
University	18	90.0	2	10.0		

Table 3.

Variables	Exclusive breastfeeding		Non-Exclusive breastfeeding		x^2	p value
	n	%	n	%		
Partner's education level						
None	30	88.2	4	11.8	3.21	0.360
Primary	82	88.2	11	11.8		
Secondary	72	82.8	15	17.2		
University	33	94.3	2	5.7		
Religion						
Roman Catholic	65	97.0	2	3.0	8.97	0.030
Protestant	121	82.3	26	17.7		
Adventist	24	88.9	3	11.1		
Others	7	87.5	1	12.5		
Employment status						
Unemployed	82	85.4	14	14.6	0.75	0.861
Public servant	12	85.7	2	14.3		
Private servant	31	86.1	5	13.9		
Self-employed	92	89.3	11	10.7		
Place of resident						
Urban	66	88.0	9	12.0	0.07	0.792
Rural	151	86.8	23	13.2		
Distance of work place from home						
Below 1km2	160	85.1	28	14.9	3.28	0.194
1-5km2	51	94.4	3	5.6		
< 5Km	6	85.7	1	14.3		
Place of delivery						
Public health facilities	210	87.5	30	12.5	1.87	0.393
Private health facilities	2	100.0	0	0.0		
Home delivery	5	71.4	2	28.6		
Mode of delivery						
Normal delivery	143	86.7	22	13.3	0.11	0.948
Normal delivery with episiotomy	14	87.5	2	12.5		
Delivery with caesarean section	60	88.2	8	11.8		
Parity						
One	93	91.2	9	8.8	5.07	0.281
Two	61	84.7	11	15.3		
Three	27	84.4	5	15.6		
Four	21	91.3	2	8.7		
More than Four	15	75.0	5	25.0		
Attended antenatal care						
No	2	25.0	6	75.0	28.51	<0.001
Yes	215	89.2	26	10.8		
Frequency of antenatal care						
1 Visit	8	88.9	1	11.1	5.21	0.157
2 Visit	14	73.7	5	26.3		
3 Visit	51	91.1	5	8.9		
4 Visit	142	90.4	15	9.6		
Any birth complications						
No	173	87.4	25	12.6	0.04	0.834
Yes	44	86.3	7	13.7		
Received post-natal care						
No	18	66.7	9	33.3	11.34	0.001
Yes	199	89.6	23	10.4		
Received counseling and education on breastfeeding						
No	41	73.2	15	26.8	12.53	<0.001
Yes	176	91.2	17	8.8		
Getting breastfeeding time						
No	43	79.6	11	20.4	3.48	0.062
Yes	174	89.2	21	10.8		

Multivariable analysis for predictors of exclusive breastfeeding

Multivariable logistic regression model was used to identify the independent variables associated with exclusive breastfeeding among mothers in Karongi district. Five factors that were linked to exclusive breastfeeding during bivariate analysis were taken into the logistic model; and all of them were independently associated with exclusive breast feeding, as shown in Table 4. Married or cohabiting mothers were about 3 times more likely to practice exclusive breastfeeding compared to single mothers (AOR = 3.15; 95% CI = 1.07 – 9.28; p = 0.038). Protestant church followers were 0.15 times likely to practice exclusive breastfeeding compared to Catholics (AOR = 0.15; 95% CI = 0.03 – 0.69; p = 0.015). Exclusive breastfeeding was nearly 20 times more likely to occur among mothers who had ever received prenatal care (AOR = 19.87; 95% CI = 3.00 – 131.68; p = 0.002). Compared to mothers who did not receive postpartum care, mothers who did were more than three times likely to exclusively breastfeed their infants. (AOR = 3.07; 95%CI = 1.31 – 7.21; p = 0.010). Mothers who got breastfeeding advice and education were 3.16 times more likely to breastfeed exclusively (AOR = 3.16; 95%CI = 1.03 – 9.69; p = 0.044).

Table 4. Multivariable analysis for predictors of exclusive breastfeeding

Variables	EBF n(%)	Non-EBF n(%)	COR(95%CI)	P value	AOR(95%CI)	P value
Marital status						
Single/Living alone	21(75.0)	7(25.0)	Ref		Ref	
Married/Cohabiting	196(88.7)	25(11.3)	2.61(1.01 - 6.77)	**0.048**	3.15(1.07 - 9.28)	**0.038**
Religion						
Roman Catholic	65(97.0)	2(3.0)	Ref		Ref	
Protestant	121(82.3)	26(17.7)	0.14(0.03 - 0.62)	**0.010**	0.15(0.03 - 0.69)	**0.015**
Adventist	24(88.9)	3(11.1)	0.25(0.04 - 1.57)	0.137	0.3(0.04 - 2.05)	0.22
Others	7(87.5)	1(12.5)	0.22(0.02 - 2.69)	0.233	0.23(0.02 - 3.11)	0.271
Attended antenatal care						
No	2(25.0)	6(75.0)	Ref		Ref	
Yes	215(89.2)	26(10.8)	24.81(4.76 - 129.33)	**<0.001**	19.87(3.00- 131.68)	**0.002**
Received post-natal care						
No	18(66.7)	9(33.3)	Ref		Ref	
Yes	199(89.6)	23(10.4)	4.33(1.74 - 10.74)	**0.002**	3.07(1.31 - 7.21)	**0.010**
Received counseling and education on breastfeeding						
No	41(73.2)	15(26.8)	Ref		Ref	
Yes	176(91.2)	17(8.8)	3.79(1.75 - 8.21)	**0.001**	3.16(1.03 - 9.69)	**0.044**

Abbreviations: EBF, Exclusive breastfeeding; AOR, Adjusted Odds Ratio; COR, Crude Odds Ratio; CI, Confidence Interval; Ref, Reference group

Discussion

The purpose of the current study was to determine the prevalence of exclusive breastfeeding practice and associated factors among mothers in Karongi district, Rwanda. According to this study, 87.1% of the mothers indicated that they breastfed their infants exclusively for the first 6 months of life which is almost in accord with the WHO recommendation of 90%.[14] Similarly, a study done in Tigray rural region of Ethiopia showed 87.84% of the mothers having exclusive breastfed of their infants in the first 6 months.[26] According to the most recent Rwanda Demographic Health Survey (RDHS, 2019/20), the EBF was reported at 81.0%.[22] This slight discrepancy between the two findings reflects geographical variation in the practice of EBF in Rwanda, whereby it was found to be 30.4%.

Nevertheless, as most mothers attended ANC services (63.1% visited < 4 times and 22.5% visited 3 times), the high rate of exclusive breast feeding found in this study might be reflecting a good understanding of the practice due to counselling and education received during their ANC visits. On the other hand, the prevalence of EBF in the present study was higher than it was reported in the study done in urban Kigali which was at 56.0%.[27] It was also much higher than the study conducted in Ghana at 27.7%,[28] and in Angola at 51.5%.[29] According to the systematic review done, the overall exclusive breastfeeding practice varied from Central Africa, where it was lowest at 23.7% to Southern African countries, where it was highest at 56.6%,[13] and it varied from 13.0% in Côte d'Ivoire to 58.0% in Togo western sub-Saharan nations.[30,31] This inconsistency in the prevalence of EBF across various regions could be due to variations in study methodologies, socio-demographics of the mothers and children, socio-cultural differences, availability of strategies to promote breastfeeding, sample size of the study included, and economic factors.[32,33]

The study identified four predictors of exclusive breast feeding practices among mothers. These include married mothers, being Catholic affiliate, attending ANC, receiving postnatal care and receiving breastfeeding counselling and education during pregnancy. When compared to the single mothers, married mothers had a statistically significant 3 times higher likelihood of exclusively breastfeeding the child. Similarly, other cross-sectional studies conducted in Tanzania,[34] and Canada,[35] revealed that married mothers are more likely to exclusively breastfeeding their children in firth 6 months than unmarried women. The reason might be that married mothers receive assistance from their husbands/spouses and other family members to practice exclusive breastfeeding while there might not be enough social support for single mothers to continue exclusive breastfeeding.[36]

Religion was also associated with exclusive breastfeeding where compared to Catholics, the likelihood of exclusive breastfeeding was 0.15 times lower among mothers affiliated to the Protestant faith. We were unable to find any research to back up this association, and it is not clear why Protestant mothers are less likely to practice exclusive breastfeeding than Catholic Church affiliates. A qualitative study is necessary to determine whether there are socio-cultural factors that prevent Protestant women from exclusively breastfeeding practice.

Mothers who received breastfeeding information and counseling were thrice more likely to exclusively breastfeed their infants than those who never received. This finding is consistent with other studies, for instance studies done in various part of Ethiopia,[25,26,37,38] and in Uganda.[39] One explanation for this could be that the counseling's information helped the women become more aware of the value of breastfeeding, which led to changes in attitudes about exclusive breastfeeding.[40]

This study found that mothers who had ever had ANC were about 20 times more likely to exclusively breastfeed their infants than mothers who had never received ANC. This is in agreement with previous studies.[5,38,41] In this study breastfeeding exclusively was also three times more common among women who got postpartum care than among mothers who did not. Several previous studies,[25,34,37,38,42] were also in line with this finding confirming that exclusive breastfeeding is more among mothers who had received postnatal care follow-ups. This can be explained by the fact that postpartum care may give the mother the required knowledge and stress the significance of exclusive breastfeeding for the first six months, which may lead to compliance.[17] It is evidenced that access to quality ANC, assistance from healthcare professionals, breastfeeding instruction and promotion programs, and programs that promote breastfeeding were all reported to help with exclusive breastfeeding in developing countries.[43]

It is therefore necessary to enable all pregnant women to attend ANC and as it has additional benefit related to exclusive breastfeeding.

This study has some strengths and limitation. The strength include the fact that study being cross-sectional, it was possible to use probability sampling despite limited resources to generate knowledge that can be utilized in other related larger investigations in this area. On the other hand, cross-sectional study design cannot allow drawing a causal connection between the determinants and exclusive breastfeeding in the research area. In addition, there may have been selection bias given that the study was conducted at health facilities and not in the community. Despite these limitations, the study has revealed important factors influencing exclusive breastfeeding in Karongi District which has many similarities with other districts and therefore able to utilize these results to design intervention strategies.

Conclusion

Although the prevalence of exclusive breastfeeding among mothers of infants younger than 6 months was quite high (87.1%), it was slightly lower than the WHO recommendation (90%). The mothers' marital status, being Catholic affiliates, attended prenatal care, maternal postnatal care and those received breastfeeding education and counseling were identified as key independent factors associated with exclusive breastfeeding. Therefore, the Ministry of Health and relevant stakeholders should increase awareness intervention and appropriate Social and Behavior Change Communication strategies on exclusive breastfeeding during prenatal and postpartum care for optimum practice. Moreover, in order to build a more complete understanding of exclusive breastfeeding, a comparable study with qualitative approach should be carried out.

Authors' contribution

F. N. designed the research, gathered, examined, and analyzed the data, then prepared a manuscript. G. T and M H supervised the investigation, helped with data analysis, and helped with manuscript writing. J. N. offered constructive criticism for the manuscript. All authors have read and approved the manuscript for publication.

Declaration of conflict of interest

The authors declare no conflict of interest with regards to this research.

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