

Prevalence and Predictors of Exclusive Breastfeeding among Mothers with Term Deliveries in Adventist Medical Center Manila (AMCM) Immediately Postpartum and at One Month Postpartum

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Abstract

Exclusive breastfeeding in infants provides an optimal nutrition in infants aged under six months. While the World Health Organization (WHO) recommends to exclusively breastfeed their infants even up to 2 years, prevalence and duration of breastfeeding among different countries are declining. The aim of this study is to compare the prevalence of exclusive breastfeeding immediately postpartum and one month postpartum and determine its associated factors and possible predictors in Adventist Medical Center Manila (AMCM). A total of 235 mothers who delivered in the hospital were interviewed using a questionnaire prior to discharge and was followed-up via telephone call at one month postpartum. All analyses were carried out using Statistical Package for the Social Sciences (SPSS) Version 21. All inferential analyses were performed at 5% level of significance, but the interpretation of the multiple binary logistic regression analysis at 10% level of significance and its implications was also considered. The prevalence of exclusive breastfeeding significantly decreased from 100% immediately postpartum to 74% at 1 month postpartum ($p < 0.001$). Among the possible associated factors, at 10% level of significance, 3 factors were considered as independent predictors of exclusive breastfeeding at 1 month postpartum namely: previous breastfeeding experience ($OR = 3.70$, $p = 0.080$) presence of lactation area at work ($OR = 2.08$, $p = 0.087$) and presence of refrigerator at work for breast milk storage ($OR = 2.98$, $p = 0.057$) [1-3].

Keywords: Exclusive Breastfeeding, Optimal Nutrition, Postpartum, Lactation

Introduction

Breastfeeding is an unparalleled method of providing the most ideal, safe and complete food for the growth and development of the young ones. Exclusive breastfeeding for the first 6 months is the optimal way of feeding infants as recommended by the World Health Organization (WHO), American College of Obstetricians and Gynecologists (ACOG) and the Department of Health (DOH) [1]. Breastfeeding may be maintained up to 2 years or beyond and consequently, infants should be provided with supplementary foods.

Breastmilk is the first natural food for infants, it confers immunity, is nutritionally balanced, easily digested and promotes healthy growth because it has an optimal balance of water, sugar and protein as well as enzymes, hormones, growth factors and immunologic substances [2]. Breastmilk also promotes sensory and cognitive development [3]. It is also associated with reduced rates of immunologic, infectious and chronic diseases.

Mothers are benefited by breastfeeding by contributing to the health and well-being with the sense of fulfillment from the physical and

emotional bond they experience with their infant while breastfeeding. It also helps to delay fertility and decreases the risk of cardiovascular disease, breast cancer and ovarian cancer.

Despite the worldwide advocacy and programs on breastfeeding, the incidence and duration of breastfeeding in the Philippines and in other developing countries are decreasing. Current knowledge about the prevalence and predictors of breastfeeding is inadequate probably as a consequence of methodologic limitations of existing studies [4].

According to the National Demographic Health Survey of 2017, 93% of infants and young children have ever been breastfeed. Over half of newborn infants (57%) start breastfeeding within 1 hour of birth, but one quarter of infants who have been breastfeed (24%) received a prelacteal feed during the first 3 days of life. The percentage of children under 2 currently breastfeeding generally declines with increasing age, from 94% among children less than 2 months to 54% among children 18-23 months old. Conversely, bottle feeding is common in the Philippines and generally rises with age, from 25% among children less than age of 2 months to 50% or more among children age 6 months or older. Among children born in the 3 years preceding the survey, the mean duration of breastfeeding is 20 months [5].

Thus, different factors including maternal and newborn factors, delivery, health care provider and hospital factors which affect breastfeeding should be explored and investigated. Therefore, this study will determine these factors and predictors affecting exclusive breastfeeding so that greater compliance to the breastfeeding practice among mothers is encouraged and assured.

Objectives

General Objective

To compare the prevalence of exclusive breastfeeding immediately postpartum and one month postpartum and determine its associated factors and possible predictors in Adventist Medical Center Manila (AMCM)

Specific Objectives

1. To determine the demographic characteristics of mothers who gave birth at full term in Adventist Medical Center Manila (AMCM).
2. To describe the prevalence of maternal, antenatal, delivery and neonatal factors that has been associated with exclusive breastfeeding immediately postpartum.
3. To determine maternal, antenatal, delivery, postnatal and neonatal factors that predict exclusive breastfeeding at one month postpartum.
4. To compare the compliance of mothers to Exclusive Breastfeeding policy in Adventist Medical Center Manila (AMCM) immediately postpartum and 1 month postpartum
5. To determine rate of mothers in the population who are exclusively breastfeeding at one month postpartum.

Significance of the Study

The findings of this study will help the Institution and the Medical Professionals to promote breastfeeding and to develop important strategies for encouraging mothers to breastfeed longer and exclusively. In the Philippine setting, this can be used to promote the breastfeeding programs of the government and to overcome the declining rate of breastfeeding.

Review of Related Literature

Exclusive breastfeeding is defined as giving an infant only breast milk from birth up to 6 months of age, without giving any supplemental food such as liquids or solids, even water, drops/syrups of vitamins and minerals [6]. In the first six months of age, breastmilk is the ideal food to provide optimum quantity and quality of nutrients for infants. It has been shown that breastmilk is one of the evidence-based and cost-effective interventions for child's survival as recommended by World Health Organization.

A systematic review that supports the exclusive breastfeeding recommendation analyzed several studies from different countries and they reported that exclusive breastfeeding up to 6 months of age compared with breastfeeding only to 3-4 months with mixed breastfeeding resulted in lower morbidity from gastrointestinal infection and prolonged lactational amenorrhea [7]. It is estimated that, with exclusive breastfeeding coverage of 90%, 13-15% of deaths of children fewer than 5 years could be averted in low and middle income countries [8]. Thus, optimal breastfeeding practices have been shown to have advantages for child morbidity and mortality, especially in low- and middle- income countries.

Despite the demonstrated benefits of exclusive breastfeeding both to mothers and infants and the efforts to promote it, the prevalence

and duration of exclusive breastfeeding in many countries, including the Philippines and Asia are suboptimum than the worldwide recommendation of exclusive breastfeeding for the first 6 months. Globally, less than 35% of mothers exclusively breastfeed their infants for the first six months. The problem is very common in Sub-Saharan African and other developing countries, 45-57% of infants less than two months and 25-31% of infants 2-5 months were exclusively breastfed in Africa, Asia, Latin America and Caribbean countries [9].

The features associated with prevalence and duration of exclusive breastfeeding are multifactorial. Several studies indicated that maternal related factors, such as maternal education, current marital status, and smoking status, place of residence, employment and economical status of mothers, history of antenatal and postnatal care are associated with exclusive breastfeeding practice [9].

In the study done by Biks, et al., they concluded that employment status, antenatal care, institutional delivery and having micro-finance bank account were predictors of exclusive breastfeeding practice.

In a study by Egata, et al., maternal antenatal care attendance, place of delivery, mode of delivery, knowledge about exclusive breastfeeding, prelacteal feeding, timing of initiation of breastfeeding after delivery, cesarean delivery, smoking during pregnancy, and the household food security status were identified as maternal related factors. Moreover, sex, age, gestational age at birth and birthweight of child, diarrhea and acute respiratory infection were also found to be the child related correlates of non-exclusive breastfeeding in infants aged under six months. It was common among mothers with no marital relationship, poor access to health facilities, and inadequate knowledge about infant feeding practices [10]. The family support, education and behavior change may improve the knowledge, behavior and practice of mothers on optimal and exclusive breastfeeding.

According to study of Dun-Dery, breastfeeding initiation at birth was near universal among professional working mothers, although sustained and exclusive until the sixth month of life but the rate was low at 10.3%. Mothers were well-informed about exclusive breastfeeding and its benefits; however, the knowledge did not translate into practice. Based on the findings, these mothers may require more supportive post-delivery follow-ups [11].

In order to enhance comprehensive exclusive breastfeeding practice during the first six months of the baby, programs aimed to promote exclusive breastfeeding must take multi-factorial considerations. In a study of Kazaura, education level of mothers and attitude towards exclusive breastfeeding were identified to be independent predictors of exclusive breastfeeding [12].

In another study of Jessri, et al., findings suggested that mothers with previous children were more than twice as likely as first time mothers to breastfeed exclusively for 6 months. Similarly, previous studies suggested a dose-response relationship between parity, and breastfeeding initiation and exclusivity among mothers of both singleton and twin infants [13]. It has been observed that multiparous women have confidence, infant feeding knowledge and behavior, and self-efficacy gained through breastfeeding with their earlier experiences and will possibly breastfeed exclusively for 6 months.

One of the directives of the Mother-Baby Friendly Hospital Initiative is to promote immediate skin-to-skin contact ideally at birth and should continue until the infant initiated breastfeeding.

In a study by Moore, et al., evidence supports that the use of skin-to-skin contact promotes breastfeeding and women were probably more likely to exclusively breastfeed from hospital discharge to one month post birth and from six weeks to six months post birth. These women also had higher mean scores for breastfeeding effectiveness. Furthermore, the infants who were given chance to be non-separated from their mothers have better stabilization on physiological parameters [14].

Methodology

Materials and Methods

This was a prospective follow-up study conducted among mothers who were admitted and who gave birth full term in Adventist Medical Center Manila (AMCM) on January, 2018 to June, 2018. The study used a structured questionnaire that captured the information regarding the different factors affecting exclusive breastfeeding. It was constructed by adopting the Ethiopia Demographic and Health Survey (EDHS) 2011, UNICEF/WHO Baby Friendly Hospital Initiative Section 4: Hospital Self-Appraisal and Monitoring and from previous research done on a similar topic and modified accordingly [15-17]. The questionnaire was written in English and consisted of sociodemographic, obstetrical and neonatal information immediately postpartum and at 1 month postpartum. After having been approved by the Institutional Review Board (IRB), the study was initiated January, 2018 and ended July, 2018.

In accordance to the Breastfeeding Act of 2009 and the policy of the Maternity Department in Adventist Medical Center Manila (AMCM), all mothers who delivered to term babies began breastfeeding immediately postpartum. An informed consent was secured from the participant mothers prior to the data gathering. The Researcher or an OB Resident-on-Duty administered the questionnaire to the subjects while the subjects were still admitted. Data at one month postpartum was gathered via telephone call regarding their breastfeeding practices.

Inclusion Criteria

1. Singleton births
2. Term (37 0/7 weeks AOG to 41 6/7 weeks AOG)
3. Delivered in Adventist Medical Center Manila (AMCM) (site of study)

Exclusion Criteria

1. Triplets and Higher-order pregnancies
2. Preterm or Postterm births
3. Newborns with congenital anomalies

Sample Size Formula

A minimum sample size of 210 subjects was required for this study. This value gives 90% power to detect an effect size of 0.494 at 0.05 α -level of significance. The value used for this sample size computation was based on a study by Brown et al 2013 [3].

Legend

n=minimum sample

OR=Odds ratio of married mothers who did not initiate breastfeeding less than 6 months versus single mothers=2.45 [3]

Z α =specified size of the critical region (5%)=1.96

Z β =chosen level of power (90%)=1.282

$$n \geq \frac{(Z_{\alpha} + Z_{\beta})^2}{P(1-P)E^2} \quad E = \ln(OR) \times \frac{\sqrt{3}}{\pi} \quad P = \frac{OR}{1+OR}$$
$$n \geq \frac{(1.96+1.282)^2}{0.710(1-0.710)0.494^2} \quad E = \ln(2.45) \times \frac{\sqrt{3}}{3.1416} \quad P = \frac{2.45}{1+2.45}$$
$$n \geq 209.19 \approx 210 \quad E = 0.494 \quad P = 0.7101$$

Data Processing and Analysis

Descriptive analysis was used to determine the demographic profile of the mothers as well as their profile in terms of maternal, antenatal, delivery, and neonatal factors that may be associated with exclusive breastfeeding at discharge. Measures of central tendency and variation (mean \pm standard deviation and range) were used to describe quantitative variables while frequency distributions were used for categorical variables.

For the association of the different factors with exclusive breastfeeding at 1 month postpartum, crude analysis was first carried out using binary logistic regression. Variables which had p-values <0.25 on crude analysis were considered as having higher likelihood of being associated with exclusive breastfeeding at 1 month postpartum and were entered into the final model, which was analyzed using multiple binary logistic regression. This analysis determined the association between each factor entered in the model and the outcome (exclusive breastfeeding at 1 month postpartum) while controlling for (or holding constant) the values of the other factors entered in the model. Factors that turned out to be significantly associated with the outcome using this analysis were considered as independent predictors of the outcome.

The prevalence of compliance to exclusive breastfeeding at discharge and at 1 month post-partum was obtained by dividing the number of exclusively breastfeeding mothers at the concerned time point and the total number of mothers observed. These frequencies were compared using McNemar change test.

All analyses were carried out using Statistical Package for the Social Sciences (SPSS) Version 21. All inferential analyses were performed at 5% level of significance, but the interpretation of the multiple binary logistic regression analysis at 10% level of significance and its implications was also considered.

Results

Demographic Characteristics

Table 1: Maternal Demographic Characteristics (n = 235)

Characteristic	Frequency (%) or Value
Age(Years)	
Mean	29.8
Standard deviation(range)	5.2(18 – 45)
Civil Status	
Single	22(9)
Married	151(64)
Cohabiting/ Live-in	62(26)
Employment status	
Housewife	58(25)
Self-employed	11(5)
Employed	143(61)
Student	9(4)
Unemployed	14(6)
Educational attainment	
High school	20(9)
Vocational	8(3)
College	200(85)
Post-graduate	7(3)
Number of pregnancies	
Mean	2.0
Standard deviation(range)	1.2(1 – 8)
Number of children	
Mean	1.8
Standard deviation(range)	1.0(1 – 7)
Living with mother/mother-in-law	
Yes	117 (50)
No	118 (50)

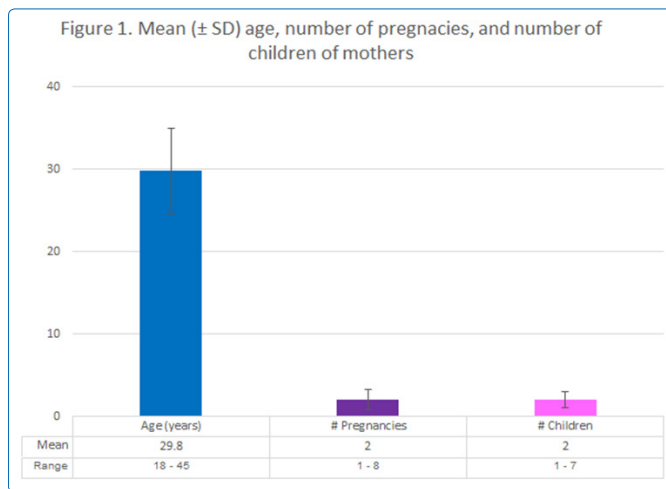


Figure 1: Maternal Demographic Characteristics (n = 235)

A total of 235 mothers were included in the study and their demographic characteristics are summarized in Table 1. Mean age (\pm standard deviation) was 29.8 ± 5.2 years ranging from 18–45 years. Majority (64%), were married and around a quarter (26%) were living-in. Majority (61%) were employed and only a quarter (25%) were housewives. Educationally, most (85%) attained college level. They had an average of 2 ± 1.2 pregnancies, ranging from 1–8 pregnancies and an average of 1.8 ± 1.0 children, ranging from 1-7 children. Half (50%) are living with their mothers or mothers-in-law.

Maternal, Antenatal, Delivery and Neonatal Factors Immediately Postpartum

Table 2a: Maternal Factors that may Affect Exclusive Breastfeeding Immediately Postpartum

Characteristic	Frequency (%) or Value
Presence of maternal co-morbidity	
No	206(88)
Yes	29(12)
Bronchial asthma, not in acute exacerbation ¹	17(7)
Chronic hypertension	2(1)
Hypothyroidism, in ES	2(1)
Acute cholecystitis	1(<1)
Allergic rhinitis	1(<1)
Genital warts	1(<1)
Gastroesophageal reflux disease	1(<1)
Hepatitis B	1(<1)
Iron deficiency anemia	1(<1)
Ischemic heart disease	1(<1)
Urolithiasis	1(<1)
Obstetric/Pregnancy complication	
No	176(75)
Yes	59(25)
Gestational diabetes(GDM), diet controlled	36(15)
GDM, insulin-requiring	6(3)
Gestational hypertension (GH)	4(2)
GDM, diet controlled with GH	3(1)
GDM, newly diagnosed	2(1)
Gravidocardiac	2(1)
Chronic hypertension, uncontrolled	1(<1)
Placenta previa totalis	1(<1)
Previous term newborn	
No	121(52)
Yes	114(48)
Previous preterm newborn	
No	228(97)
Yes	7(3)
Previous breastfeeding experience	
No	133(57)
Yes	102(43)

OB score	
Gravidity (mean ± standard deviation, range)	2.0±1.2, 1–8
Parity (mean ± standard deviation, range) TPAL	1.8±1.0, 1–7
1001	104(44)
2002	59(25)
3003	20(9)
1011	10(4)
2012	9(4)
4004	7(3)
3013	5(2)
Others ²	21(9)

[1] 1 with concomitant mitral valve prolapse [2] 4–1102;3 each–1021; 2001, 2 each–4014, 6016;1 each–1121, 2021, 2102, 3103, 4115, 5015, 7017

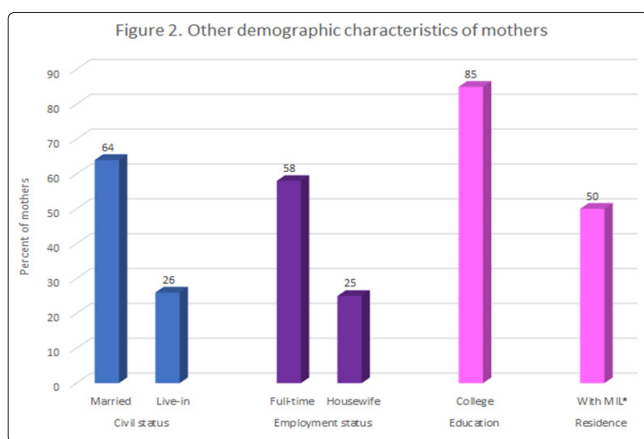


Figure 2: Maternal Factors that may Affect Exclusive Breastfeeding Immediately Postpartum

Maternal factors are summarized in Table 2a. Only a minority (29 mothers, 12%) had co-morbidities with bronchial asthma, not in acute exacerbation as the most common (7%), followed by chronic hypertension and hypothyroidism in Euthyroid State (1% each). A quarter (59 mothers, 25%) had obstetric complications with gestational diabetes (GDM), diet controlled, being the most common (15%), followed by GDM, insulin-requiring (3%) and gestational hypertension (2%). Less than half (48%) had previous term newborns and very few (3%) had previous preterm newborns? Mean gravidity was 2.0 ranging from 1-8 and mean parity was 1.8 ranging from 1–7, with 1-0-0-1 being the most common term-preterm-abortion-live births (TPAL) (44%) followed by 2-0-0-2 (25%).

Table 2b: Antenatal and Delivery Factors that may Affect Exclusive Breastfeeding Immediately Postpartum

Characteristic	Frequency(%) or Value
Attended breastfeeding classes and number of classes attended	
No	198(84)
Yes	37(16)
1	28
2	5
3	1
5	2
10	1
Median (range)	1(1 – 10)
Source of breastfeeding information [1]	
1,2,3,4,5	62(26)
1,2,3,5	29(12)
1,2,5	19(8)
2,3	18(8)
2,5	16(7)
1,2,4,5	14(6)
2,3,4,5	14(6)
1,3	9(4)
1,2,3	9(4)
2,3,5	9(4)
2	6(2)
2,4,5	6(2)
Others ²	24(10)
Type of delivery	
Normal spontaneous delivery	91(39)
Vaginal assisted delivery	17(7)
Cesarean section, elective	45(19)
Cesarean section, emergency	82(35)

[1] 1–Attending physician; 2–nurse/midwife; 3–family; 4–neighbors/friends; 5–media (internet, books, newspapers, flyers, etc.)
 2 4–2, 3, 4;3 each–4,5; 1,3,5; 2 each–2,4; 3,4,5; 1 each–1; 3; 3,5; 1,2,4; 1,3,4; 1,2,3,4; 1,3,4,5

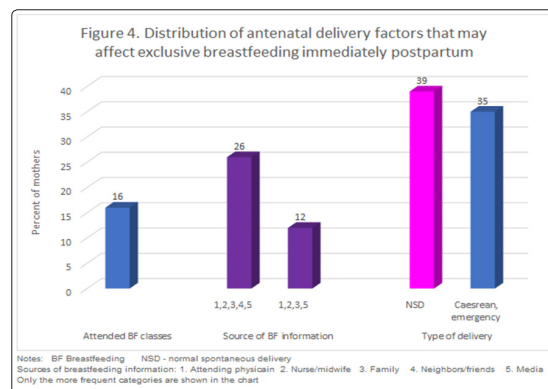


Figure 3: Antenatal and Delivery Factors that may Affect Exclusive Breastfeeding Immediately Postpartum

Antenatal and delivery factors are presented in Table 2b. Only a minority (37 mothers, 16%) attended breastfeeding classes and most of them attended only 1 or 2 classes (28 and 5 mothers, respectively). But all had information on breastfeeding with most of them receiving the said information from multiple sources. More than a quarter (26%) noted receiving it from all sources asked (attending physician, nurse/midwife, family, neighbors/friends, and media) while cumulatively 24% noted receiving it from 4 of those sources. The most common type of delivery was normal spontaneous delivery (39%) followed by emergency Cesarean section (35%).

Table 2c: Neonatal Factors that may Affect Exclusive Breastfeeding Immediately Postpartum

Characteristic	Frequency(%) or Value
Neonatal gender	
Male	117(50)
Female	118(50)
Birth weight (g)	
Mean	3115
Standard deviation (range)	385(2013 – 4338)
5 Minute APGAR score	
<7	2(1)
≥ 7	233(99)
Immediate skin-to-skin contact (<1 hour)	
Yes	229(97)
No	6(3)
Newborn resuscitation	
Yes	5(2)
No	230(98)
Admission to the IC (<24 hours postpartum)	
Yes	29(12)
No	206(88)

was 3115±385g ranging from 2013 to 4338g. Very few (2 neonates, 1%) had 5-minute APGAR of <7 and most (97%) had immediate skin-to-skin contact with their mothers. Very few (5 mothers, 2%) underwent newborn resuscitation and a minority (29 mothers, 12%) were admitted to intensive care less than 24 hours postpartum

Factors Associated with Exclusive Breastfeeding at 1 Month Postpartum

Based on existing literature, maternal, antenatal, delivery, and neonatal factors which may be associated with exclusive breastfeeding at 1 month postpartum were identified and subjected to crude analysis using binary logistic regression. These factors are described in Table 3 and the crude analysis is presented in Table 4.

Table 3: Factors that may Affect Exclusive Breastfeeding at 1 Month Postpartum (n=235)

Characteristic	Frequency(%) or Value
Breastfeeding status 1 month postpartum	
Still exclusively breastfeeding	173(74)
Not exclusively breastfeeding	52(22)
Employment status	
Housewife	58(25)
Self-employed	8(3)
Employed	150(64)
Student	9(4)
Maternal vices post-partum	
Smoking	2(1)
Drinking alcoholic beverage	1(<1)
None	222(94)
Private breastfeeding area at workplace	
Yes	92(39)
No	48(21)
Not applicable	85(36)
Refrigerator to store breast milk at workplace	
Yes	121(52)
No	19 (8)
Not applicable	85 (36)
No data	10 (4)
Intention to continue exclusive breastfeeding	
No	0 (0)
Yes	225 (96)
< 6 months	71 (30)
6 months – 1 year	49 (21)
>1 year	105 (45)
Support in breastfeeding	
None	143 (61)
Husband/partner	37 (16)
Mother/mother-in-law	20 (9)
Husband/partner and mother/mother-in-law	13 (6)

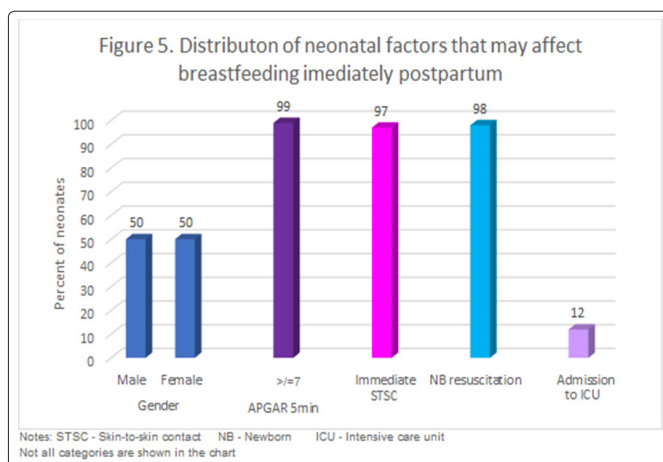


Figure 4: Neonatal Factors that may Affect Exclusive Breastfeeding Immediately Postpartum

Neonatal factors are presented in Table 2c. Gender distribution among neonates were even (50% each gender). Mean birth weight

Others	10 (4)
Husband/partner and others	1 (<1)
Mother/mother-in-law and others	1 (<1)

Table 3 shows that at one month postpartum, 173 (74%) were still exclusively breastfeeding postpartum and 52 (22%) were not, and 10 had no data. These 10 mothers could not be reached despite appropriate attempts hence were considered lost to follow-up. Almost all or 50 out of 52 of those who were not anymore exclusively breastfeeding were using formula milk as an alternative. The most common occupation status of the mothers postpartum were still on-maternity leave (64%) and as housewives (25%). Only 3 have vices. When mothers were employed, almost 4 out of 10 (39%) reported having private breastfeeding areas in the workplace and more than half (52%) reported having a refrigerator to store breast milk at work.

Of the 225 patients who were followed-up one month postpartum, almost all (96%) have the intention to continue exclusive breastfeeding, however, only 173 (74%) were able to practice exclusive breastfeeding. Majority (61%) had no support in breastfeeding and among those who had the most common supporters are their partners (16%) and their partners and mothers/mothers-in-law (9%).

Table 4: Crude Analysis of Factors associated with Exclusive Breastfeeding at 1 Month Postpartum

Factor	Exclusive breastfeeding at 1 month postpartum ¹		Odds ratio	p-value
	No (n = 52) Frequency (%)	Yes (n = 173) Frequency (%)		
Maternal factors				
Parity				
1	28(54)	83(48)	1.23	0.229
2	19(37)	56(32)		
3	3(6)	21(12)		
4	1(2)	9(5)		
5	0(0)	2(1)		
6	1(2)	1(<1)		
7	0(0)	1(<1)		
Living with mother/mother-in-law				
No	22(42)	91(53)	0.66	0.194
Yes	30(58)	82(47)		
Presence of support/assistance during breastfeeding				
No	25(48)	118(68)	0.43	0.009
Yes	27(52)	55(32)		
Previous breastfeeding experience				
No	35(67)	91(53)	1.85	0.063
Yes	17(33)	82(47)		
Intention to continue exclusive breastfeeding				
No	0(0)	0(0)	NA ²	NA ²
Yes	52(100)	173(100)		

Maternal vices postpartum				
No	51(98)	171(99)	0.60	0.676
Yes	1(2)	2(1)		
Maternal co-morbidity				
No	41(79)	157(91)	0.38	0.024
Yes	11(21)	16(9)		
Occupation postpartum				
Employed/student	42(81)	116(67)	2.06	0.061
Housewife/unemployed	10(19)	57(33)		
Private breastfeeding area at work				
No	17(33)	31(18)	2.11	0.060
Yes	19(36)	73(42)		
Not applicable	16(31)	69(40)		
Refrigerator to store breast milk at work				
No	9(17)	10(6)	3.13	0.025
Yes	27(52)	94(54)		
Not applicable	16(31)	69(40)		
Antenatal and delivery factors				
Attendance to breastfeeding classes				
No	47(90)	143(83)	1.97	0.184
Yes	5(10)	30(17)		
Vaginal mode of delivery				
Caesarian	30(57)	92(53)	0.83	0.567
Vaginal	22(42)	81(47)		
Neonatal factors				
Skin-to-skin contact				
No	2(4)	4(2)	1.69	0.551
Yes	50(96)	169(98)		
Admission to IC postpartum				
No	48(92)	150(87)	1.84	0.282
Yes	4(7)	23(13)		

[1] Total percentages may not be 100% due to rounding errors; Bivariate logistic regression used.

[2] Not applicable due to lack of data variability.

The goal of the crude analysis (Table 4) was to identify the factors with p-values of <0.25, which are more likely to be associated with exclusive breastfeeding at 1 month postpartum, and include these in the final logistic regression model. Among the identified factors, parity (p=0.229), living with mother/mother-in-law (p=0.194), presence of support/assistance during breastfeeding (p=0.009), previous breastfeeding experience (p=0.063), maternal co-morbidity (p=0.024), occupation postpartum (p=0.061), private breastfeeding area at work (p=0.060), refrigerator to store breast milk at work (p=0.025) and attendance to breastfeeding classes (p=0.184), had p<0.25 and were included in the final model subjected to multiple binary regression. The odds ratio (OR) could be interpreted as the

likelihood that a mother who is exclusively breastfeeding at 1 month postpartum has been exposed to the said factor compared to a mother who is not anymore exclusively breastfeeding at 1 month postpartum. Factors which are positively associated with exclusive breastfeeding at 1 month postpartum should have odds ratios >1 while those that are negatively associated should have odds ratios <1. Among the selected above more as expected have odds ratios >1. However, some are expected per literature to have odds ratios >1 but had odds ratios <1 such as living with mother or mother-in-law (OR=0.66) and presence of support/assistance during breastfeeding (OR=0.43). Although this is counterintuitive, it should be regarded as tentative (since associations using crude analysis could be confounded) and needs to be confirmed using multiple binary logistic regression, where the association of each of the factors with exclusive breastfeeding will be determined while controlling the effects of the other variables.

Table 5: Results of Multiple Binary Logistic Regression Analysis on Factors Associated with Exclusive Breastfeeding at 1 Month Postpartum (n = 235)

Variable	Odds ratio	95% Confidence Interval	90% Confidence Interval	p-value
Parity	0.65	0.33; 1.28	0.36; 1.15	0.211
Living with mother/mother-in-law	0.71	0.31; 1.60	0.36; 1.40	0.405
Presence of support/assistance during breastfeeding	0.78	0.33; 1.82	0.38; 1.58	0.558
Previous breastfeeding experience	3.70	0.85; 16.02	1.08; 12.66	0.080
Maternal comorbidity	0.82	0.25; 2.71	0.30; 2.24	0.748
Employment status postpartum ¹	0.18	0.01; 2.18	0.02; 1.45	0.176
Presence of lactation area at work	2.08	0.90; 4.82	1.03; 4.21	0.087
Presence of refrigerator at work for breast milk storage	2.98	0.97; 9.16	1.16; 7.64	0.057
Attendance to breastfeeding class (es)	2.58	0.54; 12.39	0.69; 9.63	0.236

[1] Reference is housewife/unemployed vs. Employed; [2] Undefined

The results of multiple binary logistic regression is presented in Table 5. Among the factors included in the model none qualified as significant at 5% level of significance since all p-values are >0.05. However, if the level of significance is adjusted to 10% (or $\alpha=0.10$), 3 factors will turn out significant namely previous breastfeeding experience (O =3.70, p=0.080), presence of lactation area at work (OR=2.08, p=0.087) and presence of refrigerator at work for breast milk storage (OR=2.98, p=0.057), and may be considered as independent predictors of exclusive breastfeeding at 1 month postpartum. Those who are still exclusively breastfeeding at 1 month postpartum are 3.7 times more likely to have previous breastfeeding experience, 2.08 times more likely to have a lactation area at work, and 2.98 times more likely to have access to a refrigerator at work for breast milk storage, compared to those who are not anymore exclusively breastfeeding, while controlling for the possible confounding effects of the other variables in the model. The adjustment of the level of significance from 5% to 10% slightly increases the maximum probability that the conclusion of a significant association is incorrect (from 5% to 10%). It must be noted that associations with p-values that are close to the cut-off of p<0.05 may actually be true associations but the study lacked the power (sample size) to detect it. In such cases, increasing the sample size would increase the study power and reveal the true association at 5% level of significance. Hence a larger sample size would be needed to confirm this possibility.

Frequency and Comparison of Exclusive Breastfeeding

Table 6: Comparison of the Distribution of Exclusive Breastfeeding Immediately Postpartum and 1 month Postpartum

Exclusive breastfeeding	Frequency (%)		Null hypothesis	p-value ¹	Decision
	Prior to discharge (n=235)	At 1 month post-discharge (n=235)			
Yes (%)	235(100)	173(74)	The distributions of different values across the 2 groups are equally likely.	<0.001	Reject the null hypothesis. The distributions differ.
No (%)	0(0)	52(22)			
No data (%)	0(0)	10(4)			

At discharge 100% were breastfeeding and this frequency has fallen to 74% by 1 month postpartum. McNemar change test reveals that this difference is significant (p<0.001). Hence there is a significantly less prevalence (frequency) of exclusive breastfeeding at 1 month postpartum compared to the prevalence at immediately postpartum.

In this study, the prevalence of exclusive breastfeeding at 1 month postpartum decreased 26% below the prevalence prior to hospital discharge. It was below the World Health Organization recommendation of 90%. In parallel with the other studies, exclusive breastfeeding rates are declining postpartum despite the massive campaigns and strategies to improve practice of exclusive breastfeeding.

Frequency and Comparison of Exclusive Breastfeeding at Discharge and 1 Month Postpartum under Best and Worst Case Scenarios on Dropouts

Table 7: Comparison of the distribution of exclusive breastfeeding at discharge and after 1 month under the best and worst case scenarios on dropouts (n = 235)

Scenario and Assumption	Exclusive breastfeeding	Frequency (%)		Null hypothesis	p-value ¹	Decision
		At discharge (n = 235)	At 1 month post-discharge (n = 235)			
Best case: All 10 dropouts still exclusively breastfeeding after 1 month	Yes (%) No (%)	235 (100) 0 (0)	183 (78) 52 (22)	The distributions of different values across the 2 groups are equally likely.	<0.001	Reject the null hypothesis. The distributions differ.
Worst case: All 10 dropouts not anymore exclusively breastfeeding after 1 month	Yes (%) No (%)	235 (100) 0 (0)	173 (74) 62 (26)	The distributions of different values across the 2 groups are equally likely.	<0.001	Reject the null hypothesis. The distributions differ.

[1] Related samples McNemar change test used

The frequency and comparison of exclusive breastfeeding at discharge and 1 month postpartum under the best and worst case scenarios on the dropouts is presented in Table 7. The best case scenario is that all 10 dropouts were still exclusively breastfeeding after 1 month, while the worst case scenario is that the 10 dropouts were not exclusively breastfeeding anymore at 1 month. Under the best case scenario, 78% were still exclusively breastfeeding at 1 month and 22% were not. While under the worst case scenario, only 74% were still breastfeeding at 1 month and 26% were not. In both cases McNemar change test reveals that the difference of the prevalence of exclusive breastfeeding at discharge and 1 month are significant ($p < 0.001$). Hence there is a significantly lower prevalence (frequency) of exclusive breastfeeding at 1 month postpartum compared to the prevalence at the time of discharge whether the best or worst case scenarios are assumed, indicating that the significant drop in breastfeeding after 1 month is robust.

Discussion

The sample size included in the study was more than the minimum sample size required. This value gave 90% power to detect an effect size of 0.494 at 0.05 α -level of significance. The value used for this sample size computation was based on a study by Brown et al 2013 [3].

In this study, the mean age also falls within the reproductive age of mothers who are willing to breastfeed exclusively. Education plays a significant role in determining the duration of breastfeeding because increasing level of education implies the acceptance and readiness of mothers to provide the optimal nutrition for the infants through exclusive breastfeeding. This study showed that majority attained college level and were employed full-time.

The family support including marital status and living with their mothers or mothers-in-law were associated with the practice of exclusive breastfeeding. Similar result from previous studies showed that prevalence of non-exclusive breastfeeding in infants was low at 28% among mothers with no marital relationship. Based on the findings in another study, marital status of mothers was associated with the practice of exclusive breastfeeding because the odds of children born to unmarried mothers had nearly three times the odds

of being not exclusively breastfed compared to their counterparts [10]. It could be explained that unmarried mothers lack support and advices offered on the importance of exclusive breastfeeding by the husbands, mother or mother-in-law and other relatives compared with the married mothers.

There was no association between maternal comorbidities, previous term or preterm newborns, gravidity or parity and prevalence of exclusive breastfeeding immediately postpartum and at 1 month postpartum that was reported in this study. In contrast with the previous studies that suggested a dose-response relationship between parity, and breastfeeding initiation and exclusivity among mothers of both singleton and twin infants this study had no relationship between the variables studied [13].

Although previous studies have documented that cesarean section delivery is associated with lower rates of breastfeeding, this study showed that there was no difference in the prevalence of breastfeeding between women who delivered by cesarean section and women who delivered vaginally.

In addition, even if only a few women attended breastfeeding classes prenatally, exclusive breastfeeding was still 100 % prior to hospital discharge.

As observed in other studies, neonatal factors such as mean birth weight, APGAR score, newborn resuscitation and admission to intensive care unit were not associated with exclusive breastfeeding. Skin-to-skin contact, as advocated in the 10 Steps to Successful Breastfeeding, was not a predictor to exclusive breastfeeding immediately postpartum and at 1 month postpartum.

The findings of this study add to the literature examining maternal, antenatal, delivery and postnatal factors influencing exclusive breastfeeding. Other studies have shown that higher odds of exclusive breastfeeding are seen in women who were advised regarding benefits of exclusive breastfeeding. The result of this study showed that the advice and support given by the attending physician, nurses and the significant others living with the mother postpartum were also associated with exclusive breastfeeding.

Data from this study showed that previous breastfeeding experience was associated with adherence to practice of exclusive breastfeeding at 1 month postpartum. It is consistent with the other studies that suggested that mothers with previous children were more than twice as likely as first time mothers to breastfeed exclusively for 6 months [13].

Majority of the population (64%) were employed and the presence of lactation area at work (39%) and refrigerator to store breastmilk at work (52%) were associated with the persistent practice of exclusive breastfeeding at 1 month postpartum. Most of the mothers will return to work after their two-month leave. The presence of lactation at work and refrigerator to store breastmilk affects their decision to continue exclusive breastfeeding. Other previous qualitative research have indicated obstacles or problems to practice of exclusive breastfeeding and these included difficulty combining work and breastfeeding and problems with breast pumping and milk storage. This shows that lactating mothers should have a place to continue milk collection at work once maternity leave is over.

Conclusion and Recommendation

This study concluded that the prevalence of breastfeeding significantly decreased at one month postpartum. Three factors were considered as independent predictors of exclusive breastfeeding at one month postpartum: including previous breastfeeding experience, presence of lactation area at work and presence of refrigerator at work for breastmilk storage. The Researcher believes that the findings add to the existing literature by expanding the knowledge on factors associated with exclusive breastfeeding. Furthermore, the results here may provide basis for developing breastfeeding support strategies to improve compliance among mothers to the exclusive breastfeeding practice.

Future research is recommended to determine prevalence of exclusive breastfeeding at 6 months postpartum and to include larger sample size in the population.

The following measures should be considered to improve exclusive breastfeeding practice:

1. Enhancing exclusive breastfeeding counseling through regular classes prenatally and postnatally
2. Continue to implement the Mother-Baby Friendly Hospital Initiative
3. Emphasize the importance of community and work-based exclusive breastfeeding education and breastfeeding support programs
4. Implement the program which covers government and private companies regarding provision of breastfeeding areas and refrigerator for storage of milk in the workplace. Working mothers should also be given breastfeeding or breast pumping breaks during the shift.

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