International Journal of Allied Medical Sciences and Clinical Research (IJAMSCR)

ISSN:2347-6567

IJAMSCR | Volume 9 | Issue 2 | Apr - Jun - 2021
www.ijamscr.com

Research Study Medical research

Determinants of Successful Breastfeeding Outcome among Internally Displaced Mothers in Mindanao: It's Effect on the Health of the Infant

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ABSTRACT

This longitudinal cohort study was conducted to examine the determinants of breastfeeding outcome among the internally displaced mothers and consequently its effect on the health of their infant within a 3-month period after birth. Utilizing purposive random sampling technique, a sample of 90 internally displaced mothers who were in their last trimester of pregnancy or have recently given birth were selected from the evacuation centers located in Southern Philippines. Data was gathered through interviews and questionnaires within a three-month period and conducted at three stages starting from the first 24 hours of delivery, first week after delivery, and three months after the birth of the infant. Findings of the multiple regression analysis revealed that only seven predictive variables (monthly income, number of pregnancies, number of living children, type of birth, confidence level in breastfeeding, problems encountered, and level of social support) had significant partial effects in predicting successful breastfeeding outcomes among the internally displaced mothers from Mindanao. Furthermore, the results of the multiple regression analysis also revealed that the strongest and uniquely incremental predictor of successful breastfeeding outcome was the problems encountered during breastfeeding. The study showed that internally displaced families are important social organizations and networks wherein effective participation and support from members constitute an essential part of everyday activities including childcare. It is recommended that awareness programs of the benefits of breastfeeding for the nurse professionals and the society at large be implemented.

Keywords:*Longitudinal cohort study, Breastfeeding outcome, mothers, infant, regression analysis*

INTRODUCTION

Since time immemorial, breastfeeding has been the normal way of providing nutrients to infants. Medical findings every now and then have shown that breastfeeding is highly beneficial to the infant. According to the World Health Organization (2017), breastfeeding improves nutrition (SDG2), prevents child mortality, and decreases the risk of non-communicable diseases (SDG3), and supports cognitive development and education (SDG4). The WHO analysis also indicated that breastfeeding could prevent at least three fourths of deaths in early infancy, and more than a third of deaths during the second year of life. Furthermore, breastfeeding can prevent more than 800,000 under-five deaths per year (Black *et al*2013).

Various studies show multiple factors affecting breastfeeding practice. A study on determinants of exclusive breastfeeding among mothers in Ghana (International Breastfeeding Journal2013) shows that in general, the practice of exclusive breastfeeding was found to be associate with marital status, region and place of delivery. Another study which focused on demographic determinants of breastfeeding duration widely acknowledged that women who are older, better educated and of higher income breastfeed longer (Meedya S, et al. 2010). Hospital practices also is shown to improve breastfeeding duration and exclusivity which includes early breastfeeding initiation, infant rooming-in and providing breast milk only (Murray 2007). The initiation of breastfeeding within 1 hour of birth has numerous immunological and nutritional benefits for newborns that have been found to reduce neonatal mortality (Khanal, et al. 2015). Insufficient milk supply is consistently reported as a reason for early weaning (Thulier D, Mercer J2009). In a retrospective study conducted in Iran by Olang et. Al (2012)

tried to investigate the reasons women discontinued exclusive breastfeeding. Results of the study showed that the most common reason of discontinuation of breastfeeding was perceived insufficiency of breast milk supply and that physicians and other health professionals have an important role to play in encouraging and supporting mothers to maintain breastfeeding. Clinicians may also directly influence maternal breastfeeding behavior (Costanian, et al.2016). In the survey, the mothers with either a family doctor or a midwife as prenatal care provider were significantly more likely to have better breastfeeding practices compared to an obstetrician. The study concluded that in Canada, provider type impacts a mother's breastfeeding decision and behavior rather than quantity and timing of prenatal care (Costanian2016). In another study, it shows that all forms of lay and professional support increased the duration of any breastfeeding (Britton C. et al.2007).

The Marawi siege in 2017 has caused devastation to the people and place and puts the welfare of infants and mothers at a vulnerable state. Breastfeeding practice could be challenged as these times. With the rising gap of knowledge on breastfeeding practices among the women of Lanao del Sur in Mindanao, it inspired the researcher to conduct this study. It is also a less explored field of study which could be investigated, specifically, how being placed in a disaster situation affects breastfeeding practices. Therefore, this study was conducted to identify the factors associated with breastfeeding practices among the internally displaced mothers. The principal aim of this study is to determine the specific factors which may affect successful breastfeeding outcome among mothers in Lanao del Sur and its impact on the health of the infant and consequently establish a norm and identify steps that can be undertaken by policy makers to improve breastfeeding practices during disaster situations. Specifically, the study intends to find answers to the following presented problems: 1) What is the breastfeeding outcome of the respondents as measure by their breastfeeding behavior after three months?, 2) What is the health status of the respondents' infants as measured by the occurrence of infant illnesses during the first three months of life?, 3) Is there a significant association between the respondents' breastfeeding outcome and the health status of the respondents' infants after three months?, 4) Is there a significant association between the breastfeeding outcome among the respondents and the factors that may affect successful breastfeeding in the context of the following (Personal profile, Health care history, Infant feeding practices, Extent of beliefs about breastfeeding, Confidence level in breastfeeding, Problems encountered during breastfeeding, Perceived level of social support)?, and 5) Can successful breastfeeding outcome by age, highest educational attainment, monthly income, status of employment, number of pregnancy, number of living children, type of birth, prenatal care provider, infant feeding practices, be a significant predictors of the extent of beliefs on breastfeeding, confidence level in breastfeeding, problems encountered during breastfeeding, and level of social support?

METHODOLOGY

Study Design: This study made use of evaluative-inferential research design as longitudinal cohort study that utilized descriptive, correlation, and multiple regression analysis designed to establish the breastfeeding outcomes among internally displaced mothers who were staying in evacuation centers and to identify the factors associated with the practice. Correlation design was used to determine whether significant relationships exist between the factors that may affect successful breastfeeding and the breastfeeding outcome of the mothers. The study also tried to establish whether a significant relationship exists between the breastfeeding outcome of the mothers and the health outcome of their infants. On the other hand, standard multiple regression analysis was used to test the hypothesis concerning the predictive values of the independent variables (*i.e.* factors that may affect successful breastfeeding) for the mothers' breastfeeding outcomes.

Sample/Participants: The study was conducted in evacuation centers in Lanao del Sur and Lanao del Norte in Mindanao Southern Philippines, which catered most of the internally displaced families due to the Marawi Siege.

The target population were mothers who were in their last trimester of pregnancy (7-9 months), or have recently given birth, and who were staying in the different evacuation centers. The number of mothers fitting the selection criteria was difficult to estimate as there was no official record of data from the municipalities. A total of 90 mothers with their infants (47 from Lanao del Sur and 43 from Lanao del Norte) were assessed as respondents of the study.

Data Collection:All mothers staying in the evacuation centers who were in the last trimester of pregnancy or have recently given birth, and willing to participate in the research were given a chance to be included in the study. In terms of the general sampling criteria for the mothers, purposive sampling was used. The parameters of the sampling frames for the survey were as follows: (1) they are mothers from Lanao del Sur; (2) they have given birth to a singleton born at least >35 weeks of gestation, weighing at least 5 pounds, and without medical conditions that would affect feeding and within the period of displacement; (3) with intention to breastfeed; and (4) they were internally displaced because of the Marawi siege and staying in evacuation centers.

Instrument: To gather the data, interviews and surveys were conducted using a self-structured questionnaire. The data gathered during the inclusive periods from August to October 2017 were then subjected to statistical analysis using the Statistic Package for the Social Science.

Data Analysis:All variables were examined for normality of distribution, frequencies, and standard deviations. Furthermore, descriptive statistics, Cramer's *V* Coefficient, Spearman *Rho* Correlation; and multiple regression analysis were employed in the study.

Ethical Consideration:A written informed consent was obtained from all the participants of the study. Ethical Clearance was provided by the authors' university ethics review committee.

RESULTS

At the end of the three-month long data gathering, half of the respondents were still exclusively breastfeeding their infants, more than a quarter were mix feeding, and less than a quarter having ceased breastfeeding completely and was exclusively formula feeding their infants. These results rendered an over-all 'partially successful breastfeeding' outcome among the respondents.

Table 1: Frequency and Percentage Distribution of the Respondents' Breastfeeding Outcome after Three Months

Variable	Indicators	*f*	*%*
Were you still exclusively breastfeeding until the baby is 3 months old?	No, I stopped breastfeeding and exclusively bottle fed using formula during the first 3 months	18	20.0
	No, I mix breastfed with bottle feeding during the first 3 months	27	30.0
	Yes, I breastfed my baby exclusively during the first 3 months of life	45	50.0

Fifty percent (50%) of the respondents confirms to still exclusively breastfeeding their infants after 3 months of delivery. This result is fair enough given the situation that the mothers and their families have been in too much stress being displaced as a result of the Marawi siege. Thirty percent (30%) of the respondents were not able to succeed in breastfeeding exclusively and opted to use formula milk as supplementation to breastfeeding. More so, an alarming 20% of the respondents fully ceased breastfeeding and had resorted wholly on formula milk in feeding their infants. This failure to successfully breastfeed was not caused by a particular factor, but was deemed a multi-factorial phenomenon.

Table 2
***Descriptive statistics for the respondents' breastfeeding outcome after three months* (N=90)**

Variable	*M*	*SD*	Descriptive Rating
Partially Successful Breastfeeding	2.30	.785	Combination feeding/ Mix feeding

*Scaling:
1-1.66=Failed Breastfeeding (Exclusive bottle feeding within the first 3 months)
1.67-2.33=Partially Successful Breastfeeding (Combination/mix feeding within 3 months)
2.34-3=Successful Breastfeeding (Exclusive breastfeeding from 0 to 3 months)

The breastfeeding outcome is further categorized based on the characteristic of the infant feeding during the first three months of life namely: "exclusive breastfeeding", "exclusive formula feeding", and "combination /mixed breast and formula feeding". Results of the study showed that the respondents have combination feeding/mix feeding rating based on the collective finding with an overall mean score of 2.30 (*SD*= .785). This rate is described as partially successful breastfeeding, which is the middle rating among the three-scaling system, used for this specific data. This result showed that the respondents didn't totally fail nor achieve full success in exclusively breastfeeding their infants.

Table 3 presents the frequency, percentage distribution and mean of the occurrence of illnesses among the respondents' infants during the first three months of life of the infant.

Table 3: ***Frequency, Percentage Distribution and Mean of the Occurrence of Illnesses among the Respondents' Infants during the First three Months* (N=90)**

Variables	Encountered		Not Encountered		*M*	*SD*
	F	*%*	*F*	*%*		
Fever	72	80.0	18	20.0	.80	.402
Diarrhea	36	40.0	54	60.0	.40	.493
Vomiting	18	20.0	72	80.0	.20	.402
Colic	18	20.0	72	80.0	.20	.402
Fussy/Irritable	18	20.0	72	80.0	.20	.402
Ear infection	0	0.00	90	100.0	.00	.000
Cough or wheezes	63	70.0	27	30.0	.70	.461
Asthma	9	10.0	81	90.0	.10	.302
Rashes	45	50.0	45	50.0	.50	.503
Reflux	45	50.0	45	50.0	.50	.503

Others	4	4.44	86	95.6	.04	.207

Distinguished among the list of illnesses and problems encountered during the first 3 months of life is the occurrence of fever at 80%, cough and wheezes at 70%, rashes and refluxes both at 50%, and diarrhea at 40%. These illnesses comprised most of the complaints of the respondents regarding their child's health status as represented by experienced ailment and problem.

Occurrence of illness (morbidity) among the infants is one of the main indicators of health of the infant. Studies have shown a high correlation between breastfeeding practices and infant health thus, the researcher searched on its actual relation among the displaced mothers and infants due to the Marawi siege. To support such claim, a systematic review of studies conducted in Canada in 2012 reported to have a significant relationship between breastfeeding and morbidity rate (Kramer MS, Kakuma R. 2012). Based on studies from Belarus, Iran, and Nigeria, infants who continue exclusive breastfeeding for six months or more appear to have a significantly reduced risk of gastrointestinal and respiratory infection. No significant reduction in risk for atopic eczema, asthma, or other atopic outcomes has been demonstrated in studies from Finland, Australia, and Belarus (Kramer MS, Kakuma R. 2012).

On the article entitled *Infant Feeding during Disasters* posted by the Office of Human Services, Emergency Preparedness and Response of US**,** reasons to breastfeed during disasters include the following: a) it protects the infants from the risks of using contaminated water supplies during a disaster; b) it can help against respiratory illnesses and diarrhea, which can be fatal for displaced families; and c) breast milk is available all the time without needing other supplies.

Table 4: ***Descriptive statistics for the health status of the respondents' infants during the first three months*** **(N=90)**

Variable	*M*	*SD*	Descriptive Rating
Infant's Health Status	3.64	1.788	Normal Health

*Scaling: 0= High-Level Wellness; 1-4.33= Normal Health; 4.34-7.67= Poor Health; 7.68-11= Very Poor Health

Table 4 above displays the health status of the respondents' infants during the first three months as reflected by occurrence of illnesses during this period. In general, the infant's health in the study is Normal based on the finding with an overall mean score of 3.64 (*SD*= 1.788). This level is described as Normal which is the next highest rating on the health level scale, with High Level Wellness as the highest rate and Very Poor Health as the lowest level in the scale. The health level scale was based on the total scores of the respondents in answering the list of 10 illnesses their infant might have encountered during the 3-month period.

Table 5: Correlation, Respondents' Personal Profile and Breastfeeding Outcome

Variables	Correlation Value	Computed *p*-Value	Analysis of *V* Value	Interpretation	Decision
Age by Breastfeeding outcome	-.788	.000	High Correlation	**	**Reject $H0_1$**
Highest Education Attainment by Breastfeeding outcome	. 413	.000	Moderate Correlation	**	**Reject $H0_1$**
Status of Employment by Breastfeeding outcome	-.040	.708	No Association	NS	Accept $H0_1$
Monthly Income by Breastfeeding outcome	. 131	.017	Weak to Low Correlation	*	**Reject $H0_1$**
Number of Pregnancies by Breastfeeding outcome	-.749	.000	High Correlation	**	**Reject $H0_1$**
Number of Living Children by Breastfeeding outcome	-.749	.000	High Correlation	**	**Reject $H0_1$**

NS – not significant *($p \geq 0.05$)*

Correlation is significant at the *$p \leq .05$, **$p \leq .01$ (2-tailed)

Table 5 shows that among the different maternal profile variables, it is only between status of employment and breastfeeding outcome where there is no significant relationship and wherein the hypothesis was accepted. This means that except for the aforementioned variable, all of the variables in the personal profile of the respondents in some way influence their breastfeeding behavior and ultimately their breastfeeding outcome after three months.

The negative correlation denotes an inverse relationship between the respondents' age and their breastfeeding outcome after three months, indicating that those with higher scores on the age variable (coded as 1=15-20, 2=21-25, 3=26-30, 4=31-35, 5=36-40 years old) tend to have lower breastfeeding outcome scores (coded as 1=*Failed breastfeeding*; 2=*Partially successful breastfeeding*; 3=*Successful breastfeeding*), and vice versa.

The reviewed literature showed that the effects of maternal age on breastfeeding outcomes are inconsistent. Senarath *et al.* (2010) which examined exclusive breastfeeding rates in infants younger than 6 months in Vietnam, Timor-Leste, Indonesia, Cambodia, and the Philippines, revealed that higher maternal age was associated with non-Exclusive Breastfeeding.

In contrast, Amin *et al.* (2011) which conducted a survey of six hundred forty-one Saudi mothers reported increased maternal age as one of the significant positive predictors for early breastfeeding initiation and maintenance.

The relationships between these variables were positive which entail a parallel relationship between highest educational attainment and breastfeeding outcome and between monthly income and breastfeeding outcome. However, education influence differs between developing and developed countries. Educated mothers in most developed countries have returned to breastfeeding (Kassam-Lallanie D, et al 2002; Simard I, et al.2005) while in developing countries, mothers with high education have increasingly switched to bottle feeding or mixed feeding (Wilmoth TA, et al.1995; Morisky DE, et al.2002).In contrast Amin *et al.* (2011) indicated that rural, less-educated, low-income multiparous mothers were more likely to exclusively breastfed their infants as revealed by multivariate logistic regression.

Table 6: *Correlation, Respondents' Breastfeeding outcome and the Health Status of the Infant*

Variables	Correlation Value	Computed *p*-Value	Analysis of *rho* value	Interpretation	Decision
Breastfeeding outcome by Health Status of the Infant	-.788	.000	High Correlation	**	**Reject $H0_8$**

NS – not significant ($p \geq 0.05$)
Correlation is significant at the *$p \leq .05$, **$p \leq .01$ (2-tailed)

Table 6 shows the inverse relationship between the health status of the infants as measured by the occurrences infant illnesses during the first three months of life and coded with higher numbers for increasing level of wellness on the health-illness continuum (0=*High-level wellness*, 1=*Normal health*, 3=*Poor health*, 4=*Very poor health*) and the respondents' breastfeeding outcome which was coded with higher numbers for increasing success in the breastfeeding outcomes.

Table 7: Standard multiple regression of factors predicting successful breastfeeding outcomes reported by internally displaced Mothers in Lanao del Sur and Lanao del Norte (N=90)

Predictors		*B*	*SE B*	β	*t*	*p*
Constant		7.57	.759			
1.	Age	-.001	.072	-.002	-.014	.989
2.	Highest Education Attainment	-.086	.051	-.171	-1.69	.094
3.	Monthly Income	-.329	.091	-.270	-3.60**	.001
4.	Status o	-.906	.152	-.770	-5.94	.073
5.	f Employment					
6.	Number of Pregnancy	-.010	.131	-.115	-2.62**	.000
7.	Number of Living Children	-.010	.131	-.115	-2.62**	.000
8.	Type of Birth	-.142	.038	-.155	-3.73**	.000
9.	Prenatal Care Provider	-.296	.090	-.357	-3.27	.062
10.	Infant Feeding Practices	-.037	.054	-.129	-.696	.488
11.	Extent of Beliefs on Breastfeeding	.240	.043	.301	5.57	.687
12.	Confidence Level in Breastfeeding	.004	.009	.088	.405**	.004
13.	Problems Encountered during Breastfeeding	-.299	.059	-.711	-5.08**	.000
14.	Level of Social Support	.101	.010	.631	9.82**	.000

Correlation is significant at the *$p \leq .05$, **$p \leq .01$
Note: $R = .943$; $R^2 = .881$; Adjusted $R^2 = .879$
Legend: B = unstandardized beta
$SE\ B$ = standard error for the unstandardized beta
β = standardized beta
t = t test statistic

Table 7 shows the results of the multiple regression analysis for the predictors of successful breastfeeding outcomes among mothers in the evacuation centers in Iligan City, Lanao del Sur and Lanao del Norte. As shown in the table, the multiple correlations between successful breastfeeding outcome and the 13 predictors was strong (R=.943) and a significant regression equation was found F (13, 76) = 4.263, p<.001, with an R^2 of .881 and an adjusted R^2 of .879, which indicate that the over-all combination of the 13 predictors account for 88% of the variation in the dependent variable, breastfeeding outcome.

Based on the results of the beta weights, only seven of the thirteen predictive variables showed significant partial effects. They are: monthly income {t(76)=-3.60, p=.001},

number of pregnancies {$t(76)=-2.62$, $p<.001$}, number of living children{$t(76)=-2.62$, $p<.001$}, type of birth{$t(76)=-3.73$, $p<.001$}, confidence level in breastfeeding{$t(76)= 405$, $p=.004$), problems encountered {$t(76)=-5.08$, $p<.001$} and level of social support {$t(76)=9.82$, $p<.001$}. Meanwhile, age, highest educational attainment, status of employment, prenatal care provider, infant feeding practices, and extent of beliefs about breastfeeding did not have significant partial effects in the full model.

Furthermore, the results of the multiple regression analysis also revealed that the strongest and uniquely incremental predictor of the dependent variable, successful breastfeeding outcome, was the problems encountered during breastfeeding (β=.711) which uniquely explained 19% of the variation in breastfeeding outcome ($sr^{2=}$.192), followed by the level of social support (β=.631), monthly income (β=-.270), type of birth (β=-.155), number of pregnancies (β=-.115), number of living children (β=-.115), and lastly, confidence level in breastfeeding (β=.088).

The results of the regression analysis provided partial confirmation for the research hypothesis that successful breastfeeding outcome among mothers is determined by their age, highest educational attainment, monthly income, status of employment, number of pregnancy, number of living children, type of birth, prenatal care provider, infant feeding practices, extent of beliefs on breastfeeding, confidence level in breastfeeding, problems encountered during breastfeeding, and level of social support

DISCUSSION/CONCLUSION

The conduct of the study and the analyses of the data gathered garnered numerous findings. The following were the results drawn from the present study:

At the end of the three-month long data gathering, half of the respondents were still exclusively breastfeeding their infants, more than a quarter were mix feeding, and less than a quarter having ceased breastfeeding completely and was exclusively formula feeding their infants. These results rendered an over-all 'partially successful breastfeeding' outcome among the respondents.

On the aspect of illnesses encountered by the infants during the first three months of life, the following results were garnered: majority of the respondents reported that their infants have experienced fever, cough and wheezing. Half of the respondents' infants experienced rashes and refluxes while less than half reported that their infants experienced bouts of diarrhea. Other minor illnesses reported were vomiting, colic, and fussiness. In general, the infants' health status in the study within the three-month period was deemed normal.

The following are the results of the correlation of variables.

(1) The respondents' breastfeeding outcome after three months had a significant negative relationship with the: (a) personal profile of the respondents in terms of her age, number of pregnancies (gravida), and number of living children;(b) health care history in terms of the type of birth; and (c) problems encountered by the mothers during breastfeeding.

(2) The respondents' breastfeeding outcome had a significant positive relationship with the: (a) personal profile of the respondents in terms of her highest educational attainment and monthly income; (b) confidence level in breastfeeding; and (c) level of social support.

(3) The respondents' breastfeeding outcome after three months had no significant correlation with the: (a) personal profile of the respondents in terms of her status of employment; (b) healthcare history in terms of the mother's prenatal care provider; and (c) extent of beliefs about breastfeeding.

(4) In terms of the relationship between breastfeeding outcome and the health status of the infant, the results showed that there was a significant negative correlation between the respondents' breastfeeding outcome after three months and the health status of their infants in terms of the occurrence of illnesses.

Lastly, the findings of the multiple regression analysis revealed that only seven of the thirteen predictive variables had significant partial effects in predicting successful breastfeeding outcomes among the internally displaced mothers in Lanao del Sur. These were: monthly income, number of pregnancies, number of living children, type of birth, confidence level in breastfeeding, problems encountered, and level of social support. Furthermore, the results of the multiple regression analysis also revealed that the strongest and uniquely incremental predictor of successful breastfeeding outcome was the problems encountered during breastfeeding.

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How to cite this article: DonnabelleLumbatan-Abdullah, Ashley Bangcola. Determinants of Successful Breastfeeding Outcome among Internally Displaced Mothers in Mindanao: It's Effect on the Health of the Infant. Int J of Allied Med Sci and Clin Res 2021; 9(2): 375-381.

Source of Support: Nil. **Conflict of Interest:** None declared.