Exclusive breastfeeding practice among Cambodian mothers based on selected socio-demographic characteristics

KAP Noeun

Department of Global Health Policy and Financing
Division of Global Health Policy and Financing
Graduate School of Public Health
Yonsei University

Exclusive breastfeeding practice among Cambodia mothers based on selected socio-demographic characteristics

Directed by Professor Heejin Kimm

A Master's thesis
Submitted to the Department of Global Health Policy and Financing, Division of Global Health Policy and Financing and the Graduate School of Public Health Yonsei University
in partial fulfillment of the requirements for the degree of
Master of Public Health

KAP Noeun

December 2022

This certifies that the Master's Thesis
of KAP Noeun is approved.

_____

Thesis Committee member: Heejin Kimm

_____

Thesis Committee member: Keum Ji Jung

_____

Thesis Committee member: Jakyoung Lee

Graduate School of Public Health
Yonsei University
December 2022

ACKNOWLEDGEMENTS

First, I would like to especially thank my wife, family, and kind parents for the best support. I also appreciate my brothers, sisters, nieces, and nephews for encouraging me to pursue my studies in Korea and empowering me to complete a Master's degree in Public Health Policy and Financing Capacity Building at Yonsei University in the Republic of Korea.

I would like to thank my most respected chair thesis advisor, Professor Heejin Kimm, and thesis committee members, Professor Keum Ji Jung and Professor Jakyoung Lee from the bottom of my heart for assisting me to complete this thesis.

Words cannot express my gratitude and thankfulness to my respected Professor Whiejong Han, Chair Department of Global Health Policy and Management, Graduate School of Public Health, Yonsei University, he will stay in my heart forever.

I would like to thank KOICA for providing a great opportunity to study in the Republic of Korea. I have beautiful memories of the nice and kind people of the Republic of Korea.

Lastly, I would like to thank my friends, brothers, sisters, and class president. I thank all professors for providing the best lectures in the class.

May the Buddha (Buddhism) help everyone stay in peace and prosperity in the world.

Abstract

Background: According to the World Health Organization's (WHO) recommendations, exclusive breastfeeding (EBF) benefits both infants and their mothers. This study aims to explore the differences in EBF based on the socio-demographic characteristic of mothers in Cambodia.

Method: This study uses a cross-sectional study design and data was collected from the Cambodia Demographic and Health Survey of 2014. Additionally, this study was conducted on 688 Cambodian mothers who do EBF and non-EBF of infants aged between zero to six months using descriptive analysis, and multiple logistic regression to measure the relationship between EBF and its factors for a sample design.

Results: Overall, EBF was challenged by working mothers and those with high economic status. The logistic regressions indicated that EBF was low in the richest economic level group (OR, 0.06; 95% CI, 0.01-0.21). Mothers in managerial positions (OR, 0.17; 95% CI, 0.06-0.47), and mothers in a sales position (OR, 0.30; 95% CI, 0.14-0.62) were negatively associated with practices of EBF regarding infants between zero to six months old. Mothers with these socio-demographic characteristics (reference group [poorest 1.00], [notworking 1.00]) were less likely to practice EBF.

Conclusion: Promoting programs that promote six months of EBF to target high-risk groups. Working mothers and the richest economy households were recommended as the target population. Recommendations were made on policies to improve EBF focus on workplace facilities and increase awareness of EBF interventions.

Keywords: Exclusive breastfeeding, demographic characteristics, logistic regression, Cambodia.

TABLE OF CONTENTS

List of Tables

List of Figures

List of Abbreviations and Acronyms

1. UNICEF……..United Nations Children's Fund
2. WHO……..World Health Organization
3. CDHS…….....Cambodia Demographic and Health Survey
4. EBF……...Exclusive breastfeeding
5. EIBF……...Early Initiation Breastfeeding
6. ANC……Antenatal Care

CHAPTER I Introduction

1. Background

Breast milk is best for children, particularly babies aged zero to six months old. It is full of nutrients, clean, harmless, and contains antibodies to protect children from diseases. The mother who breastfeeds their baby also obtains benefits from breastfeeding, such as the reduced risk of ovarian and breast cancer, spaced pregnancies, and breastfeeding babies exclusively from birth to six months can regulate hormones by inducing menstruation (WHO, 2020). According to United Nations Children's Fund (UNICEF) in 2020, breastmilk is not just food for babies – but a rich source of essential nutrients and antibodies that boosts a child's immune system and brain development, and saves lives. Breastfeeding is one way of improving investment in human capital and stimulating economic growth and giving every child the same opportunity to survive and thrive. Without the complementary food and water, breast milk has enough nutrients and energy for growing the baby's body and helping the baby develop physically and psychologically for the first six months of age. According to the scientific investigator, the WHO and UNICEF have recommended exclusive breastfeeding (EBF) for all children for the first six months of life. It has more advantages for the mother by boosting her self-confidence in her infants by providing its necessities, and aiding the infant's growth during the first few months of life (Tan, 2011; Roesli, 2012; WHO dan UNICEF, 2013).

Recent research has shown EBF as a cost-effective intervention to reduce the infant mortality rate in less developed countries (Setegn et al., 2012). Globally, it is predicted that the shortage of EBF to infants in the first six months of life results in 1.4 million deaths and 10% of diseases in under-five children (Oweis et al., 2009). The advantages of breastfeeding include the potential reduction in mortality and morbidity. It was predicted that in the absence of breastfeeding, per year, 595,379 children will die at the age of six months to 59 months from diarrhea and pneumonia, there will be 974,956 cases of obesity, resulting in 98,243 deaths, and mothers will face an increased risk of type 2 diabetes, breast

cancer, and ovarian cancer. Globally, certain factors can save 1.1 billion dollars in a year (Walters et al., 2019).

Despite the many benefits of EBF, only 44% of infants globally were exclusively breastfed between 2015 and 2020 (WHO, 2020), while 53% of children under six months were not exclusively breastfed in low-income countries, 61% in lower-income countries, and 63% in upper-middle-income countries (Victoria et al., 2016).

According to Cambodia Demographic and Health Survey (CDHS), the percentage of EBF was at 65% in Cambodia in 2014. In 2021, it declined to 51%. Specifically, in rural areas, EBF was at 69%, and 40% in urban areas (CDHS key indicators report, 2021). Among these, EBF of infants between zero to one month was 79.9%, two to three months was 67.1%, and four to five months was 50.9% (UNICEF, CDHS, 2014). EBF practices will cease if there is no support for the mothers. Many difficulties associated with EBF border on maternal factors (education of mothers, working mothers, family economy, and breast milk production), infant factors (early initiation of breastfeeding (EIBF), the introduction of additional food), and health workers' factors (Agunbiade dan Ogunleye, 2012).

The practice of EBF may cease if there is no support for the mother. Many relevant problems in the provision of EBF include maternal factors (education of mothers, working mothers, family economy, and breast milk production) infant factors (EIBF, introduction to additional food), and health worker factors (Agunbiade dan Ogunleye, 2012).

To explore the issues in Cambodia, and examine the prevalence of EBF among mothers and maternal factors.

2. Purpose of the Study

This study aims to explore the differences in EBF by the socio-demographic characteristics and healthcare utilization factors of mothers in reproductive-aged in Cambodia.

Currently, we study the association of EBF practices among reproductive women-aged mothers in Cambodia in the following:

1. To identify socio-demographic characteristics and healthcare utilization factors of mothers practicing EBF, the following were considered::

    a. maternal age

    b. education level

    c. wealth index

    d. mode of delivery

    e. occupation types

    f. early initiation of breastfeeding

    g. antenatal care (ANC) visits four or more

    h. place of residence

3. Research Questions

1. What socio-demographic characteristics are associated with EBF?
2. Was EBF associated with age, education, wealth index, mode of delivery, occupation, EIBF, ANC, and place of residence?

4. Hypothesis

EBF would be associated with education, wealth index, mode of delivery, ANC, early initiation breastfeeding, and place of residence in Cambodia.

5. Definition of the terms

Exclusive breastfeeding	An infant receives only breast milk and no other liquids or solids are given, not even water, except drops or syrups for six months old.
Infant	A child below 12 months. For this study, the duration of breastfeeding is from birth to six months old by Cambodia women of reproductive age.
Wealth index	A composite measure of household's cumulative living standard. The wealth index is calculated using easy-to-collect data on the household's ownership of selected assets, such as televisions, and bicycles; materials used for housing instruction; and types of water access and sanitation facility.
Education level	

	Defined by the developmental differences of the mother and how the learning environment is structured.
Mode of delivery	Defined as choosing either vaginal or caesarian section (C-section) delivery.
Maternal occupation	The field or industry you are a part of or the work you are interested in. It can also refer to your role within an organization.
Antenatal care	Care is provided by skilled healthcare professionals to women throughout their pregnancy. It includes risk identification and screening, prevention and management of pregnancy-related or concurrent diseases, and health education and promotion. The WHO recommends four or more ANC visits.
Early Initiation	Protecting the newborn from acquiring infection and reducing newborn mortality within one hour of birth. It facilitates the emotional bonding of the mother and the baby and positively impacts the duration of EBF.
Breastfeeding	Civil subdivision of a country (district, county, municipality, province, department, state) where an individual resides. Urban areas compromise larger places and densely settle areas around
Place of residence	

them. Rural areas compromise open countryside and settlements with fewer than 2,500 residents.

CHAPTER II Literature reviews

Recently, research studies on breastfeeding practice in both developed and developing countries have shown that the high numbers of breastfeeding initiation and starting rate would fall in terms of EBF in the first six months of life (Arif et al., 2021). The Australian data from 2004 to 2009 shows evidence that a high initiation rate of 92% for EBF. This rate has declined to 71% of infants who exclusively breastfed at one month of age, 56% at three months old, and 14% at six months.

Despite the benefits of breastfeeding, less than 40% of infants under six months globally accepted EBF and only 15% may receive continuous breastfeeding for up to 2 years according to WHO recommendations. In Low Middle-Income countries (LMICs), the situation is worse. It has been estimated that only 2 in 10 infants may obtain suitable EBF in the first six months after birth. A new study in Tanzania has also confirmed that only 21% of infants established EBF, and studies in Brazil revealed that the first 30% of the infants were breastfed exclusively in the first six months. Moreover, a study of the Iranian population showed that only 45% of Iranian mothers acknowledge EBF, meanwhile, more studies have also indicated that in some regions such as Zahedan, Yazd, and Qazvin, the rates of EBF are lowest in Iran (Saffari et al., 2017).

However, many countries in the world did not achieve these targets. In Brazil, the rates of EBF declined over time to around 27% and 56%. The same situation occurred in Spain. Several reasons have been adduced for the low rate of breastfeeding, including societal status, educational conditions, and maternal factors. Accordingly, it has been advised that breastfeeding duration should be adjusted based on the ability of mothers. Receiving relevant information at the beginning of breastfeeding may also encourage EBF in the newborn (Suárez-Cotelo et al., 2019).

A study in Indonesia (2021) determined the association between sociodemographics and maternal health utilization related to working mother conditions.

ANC visits are important predictors in this research. EBF is an effective method of contraception and is categorized as a method of lactational amenorrhea, and it helps space pregnancy. Several reasons are related to the EBF such as maternal age, parity, employment status, and place of residence. The other factors that are also related to maternal health service utilization also play a significant role in promoting EBF. While the knowledge, attitude, and communication skills of health staff are important to encourage mothers to practice EBF, other factors are also important, namely the mode of delivery, ANC visits, and the EIBF (Gayatri, 2021).

According to a study, mothers who understand the benefits of breastfeeding are successful in initiating breastfeeding and practicing breastfeeding for a longer duration (Sonko and Worku, 2018). Mothers with a positive attitude toward breastfeeding are also likely to practice breastfeeding at six months (Jessri et al., 2019). However, a cross-sectional study with mothers who participated in ANC and vaccination clinic shows that only 69.8% of maternal women have good knowledge and positive attitude towards EBF (Alamirew et al., 2017). A study showed that difficulties with lactation are also one of the reasons for early cessation, 60% of mothers stop breastfeeding earlier than recommended (Odom et al., 2013).

A community-based survey of 2,354 children in central and western China shows that there are only 28.7% of infants under six months who have ever been exclusively breastfed (Zhu et al., 2017). A recent local study indicated that the rate of EBF is only 6.8% at six months, which is far from the goal of increasing the rate of EBF in the first six months up to at least 50% by 2025. Previous studies have categorized the factors related to breastfeeding into sociodemographic (i.e., age, marital status, social support), and biomedical (i.e., nipple pain, insufficient milk).

According to data from China data in 2010 and 2015, the number of internal immigrants rose from 121 million to 247 million, and 169 million of the population escaped from rural to urban areas. This rapid social and economic transition in China may affect

the practice of breastfeeding. In the 1970s, data indicated that breastfeeding rates fell, especially in big cities, and reached their lowest point in the 1980s. In the 1990s, the breastfeeding rate began to grow, with 80% of mothers breastfeeding at four months since 1993. In 2010, large research has conducted in Central and Western China reported that 98.3% of infants had been breastfed, however, only 28.7% of children under six months were exclusively breastfed, and 55.5 and 9.4% had continued breastfeeding for 1 and 2 years, respectively (Chen et al., 2019).

However, there was less specific research data and an unwillingness to practice EBF in Pakistan. Cultural, economic, and socioeconomic contribute to the early cessation of EBF practice. Only 18% of women started early initial breastfeeding, and only 37.7% of the women retained the practice of EBF (Zakar et al., 2018).

In India, the early discontinuation of breastfeeding and initiation of EBF levels were found among those in urban areas, mothers with higher education, and households with higher socioeconomic levels (Oakley et al., 2017).

The Nigerian study recognized some major factors that are related to non-EBF, including the level rate of maternal education, ANC, poor and rich households, wealthy families, and knowledge of maternal care after birth. This study also suggests the need to examine these factors in differing context-specific settings (Ogbo FA et al., 2018).

Many studies have examined the relationship between the mother's socioeconomic status and breastfeeding, which is regarded as a significant factor in determining the initiation and cessation of breastfeeding (Maycock et al., 2013). Moreover, there was an inadequate indication of the association between socioeconomic status and breastfeeding practices in China at a national level.

Studies have indicated the differences in breastfeeding among women with economic income, including lower early initiation EBF, period of breastfeeding, and EBF rates (Kay et al., 2020; Sriraman & Kellams, 2016). The factors that contribute to

breastfeeding disparities among low-income women include cultural influences, financial need to return to work, and lack of support from partners and family members (Sriraman & Kellams, 2016). The Centers for Disease Control and Prevention (CDC; 2018) indicated that initiation of breastfeeding, exclusivity, and duration rates were low among women of low socio-economic status. The studies found that women with lower education were also less likely to meet their breastfeeding goals (Beauregard et al., 2019).

The breastfeeding rates have had different impacts on the economy or gross domestic product (GDP) of LMICs that have longer EBF time than developed countries (Victora et al., 2016). In high-income countries, the rate of EBF is less than 20% every year. Over 70% of mothers are reported to have initiated EBF every two or more years in the LMICs, such as Bangladesh, India, and Nepal (Benedict et al., 2018). The household wealth index has also been indicated to impact the continuation of breastfeeding to 2 years in LMICs such as India and Pakistan, and several benefits have been associated with long-term breastfeeding.

Regarding education level, the occupation level can be associated with the early discontinuation the breastfeeding for interpersonal (Rollins et al., 2016). Quality and performance of occupation can contribute to the decision-making to stop breastfeeding (Roe et al., 1999). General characteristics have been planned to be associated with breastfeeding termination including the low education level of mothers, working far away from home, early return to work, and inadequate support from negative influences of the breastmilk substitute market (Duong et al., 2005).

According to a study in Indonesia, stunted infants are regarded as poor (Assaf et al., 2020). Current studies have shown a relationship between monthly income household expenditure and stunting, the lower the monthly household expenditure, the more the children appear to be stunted (Ramírez-Luzuriaga et al., 2020). They had assumed of younger infants from poverty households could be protected from stunting if they had initiation of EBF.

Besides health advantages, breastfeeding can ensure many other benefits related to economic, environmental, psychology advantages (McGuire, 2011). The effectiveness of the EBF rate has been predicted around 13%–15% of children deaths under five years old, especially in low-middle income countries (Mgongo et al., 2013). EBF has been determined for many reasons in different countries and as well as in the same countries. Recent research has revealed the many aspects that are associated with EBF; education level, occupation types, awareness of breastfeeding, breastfeeding counseling at the ANC, infant feeding counseling of PNC, supporting exclusively breastfeeding before delivery, practices towards EBF, EIBF, smoking mothers, monthly household index, type of delivery, place of delivery, infant's age and weight, residence, socioeconomic position, parity, discarding colostrum, health system practices and mothers' human immunodeficiency virus (HIV) status (Tan et al., 2011).

According to UNICEF 2020, developed countries have reported that mothers from poor households are less likely to practice EBF than mothers from wealthy families. In reality, studies on the influence of education, occupation, and status on EBF, and obedience to the references (Nkrumah et al., 2016).

According to another study performed in Malaysia on the health-government clinics, the district level of community clinics has indicated of the number of exclusively breastfeeding infants under six months was 43.1%, with factors positively influencing breastfeeding among mothers living in rural areas, ethnicity, non-working mothers, non-smokers, parity, term infants, bed-sharing between mother and infant, and supportive husbands (Tan K et al., 2011).

The maternal education condition has been notified as a potential determinant for child health and survival (Meyrose et al., 2018). Studies have found that the educational level of the mother was a more significant indicator of EIBF than occupation (Skafida et al., 2009). However, many studies on maternal education and breastfeeding practices have noted that the positive relationship between breastfeeding and maternal education will not

be positive at all stages (Acharya et al., 2015). A study performed in Nepal, the United States and Italy found that higher education of mothers involved forwarding of breastfeeding practices (Bertini et al., 2003). Studies in China have noted the effectiveness of maternal education on breastfeeding and other socioeconomic factors. The results of the studies vary and can conflict with the conclusion (Zhao et al., 2017).

Although most studies found many factors contributing to breastfeeding in China and found direct artificial reasons, including maternal health status, socioeconomic, or mode of delivery (Liu et al., 2013; Waits et al., 2018; Wu et al., 2018). Most factors associated with breastfeeding are classified by unconfirmed numerical research such as the mother's age or education level. Various factors are associated with both the initiation and duration of BF. They include advanced age, higher maternal educational level, higher socioeconomic status, and BF education (Lee et al., 2007).

CHAPTER III Research Method

3.1 Study design

This study is a cross-sectional study design and data from the Demographic Health Survey website collected by the CDHS 2014. The CDHS used a stratified two-stage cluster design. In the first stage, clusters were randomly selected from master sampling frames. In the second stage, a systematic sample of households was selected from the clusters. The Cambodia Demographic Health Surveys are conducted nationwide with 15825 individual data that provide a wide range of indicators in the fields of infant and child mortality,

fertility preferences, family planning behavior, maternal mortality, utilization of maternal and child health services, health expenditures, women's status, and knowledge and behavior regarding HIV/AIDS and other sexually transmitted infections. The surveys are conducted on 17,578 women of reproductive ages (15-49) with help from USAID, UNFPA, UNICEF, JICA, Australian AID, KOICA, and HSSP2, with ICF International providing technical assistance. The Directorate-General for Health (DGH) of the Ministry of Health and the National Institute of Statistics (NIS) of the Ministry of Planning is the project implementation agencies. To date, there have been four surveys, which have been completed in 2000, 2005, 2010, and 2014.

3.2 Data collection

Data were retrieved from the CDHS 2014 survey. This survey is representative of the Cambodian population and includes updated and reliable data on infant and child mortality, fertility preferences, family planning behavior, maternal mortality, utilization of maternal and child health services, health expenditures, women's status, and knowledge and behavior regarding HIV/AIDS and other sexually transmitted infections, which were included in the CDHS since 2000 for this survey. The 2014 CDHS outcomes provide a balance between the ability to provide estimates at the subnational level and limiting the sample size. Nineteen sampling domains were defined, 14 of which correspond to individual provinces and five of which correspond to grouped provinces. Moreover, the 2014 survey provides more descriptive data for fourteen individual provinces namely, Banteay Meanchey, Kampong Cham, Kampong Chhnang, Kampong Speu, Kampong Thom, Kandal, Kratie, Phnom Penh, Prey Veng, Pursat, Siem Reap, Svay Rieng, Takeo, and Otdar Meanchey, and five groups of provinces: Battambang and Pailin, Kampot and Kep, Preah Sihanouk and Koh Kong, Preah Vihear and Stung Treng, and Mondul Kiri and Ratanak Kiri.

3.3. Participants

The participants were Cambodian mothers. The information on breastfeeding was obtained through interviews with mothers. Mothers and women of reproductive age were included in this study. The survey samples were selected using the systematic random sampling method and 688 mothers were chosen.

This study was conducted on Cambodian mothers who practiced EBF and those who did not with infants less than six months old. Based on the inclusion and exclusion criteria, the respondents were chosen following the criteria below:

3.3.1. Inclusion and exclusion criteria of mothers

The inclusion criteria were as in the followings:

- Mothers who delivered in the past two years preceding the survey

- Mothers who had lived with infants

- Mothers who had exclusively breastfed their infants under six months of age

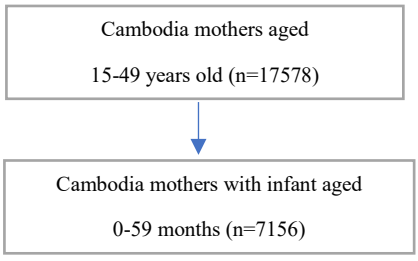
- Mother who did not have serious delivery conditions

3.3.2. The exclusion criteria for infants were as in the followings:

- Infants who suffered from acute or chronic illnesses

- Infants who were delivered prematurely

- Infants under six months of age whose mothers refused to sign the informed consent form



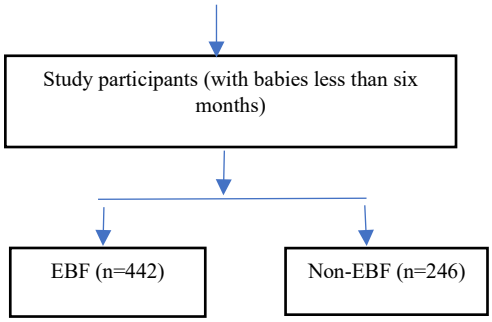


Figure 1. Subject-selection flow

3.4. Measures and Variables

This study is a cross-sectional study and I will be using, analyzing, and studying the raw data from the fourth surveys of the Cambodia Demographic and Health Surveys which involved over a thousand participants in 2014.

The following dependent and independent variables are used for this research to determine the required outcomes:

3.5. Dependent variables

1. Exclusive breastfeeding for six months old.

3.6. Independent variables

The independent variables used for this study included socio-demographic characteristics, and healthcare utilization factors variables which are closely related to the EBF duration. A total of eight independent variables were selected for the study:

1. Maternal age
2. Maternal education level
3. Wealth index
4. Maternal occupation
5. Mode of delivery
6. Antenatal care
7. Early Initiation of breastfeeding
8. Place of residence

3.7. Data Analysis

Data were analyzed via Jamovi version 2.2.5 in 2021 with required dependent and independent variables, descriptive analysis, and multiple logistic regression, which have been used in the analysis to identify the association variables of EBF.

A descriptive analysis of the dataset is presented to show the pattern of data related to the number of EBF and non-EBF. For the descriptive analysis, the frequency and percentage for each selected factor in the study are used, as the results of each variable. Univariate and multivariate logistic regressions are used to measure the relationship between EBF and its factors. The results of the univariate analysis show that the odds ratios for the region, maternal education, wealth index, maternal occupation, mode of delivery, early initial breastfeeding, ANC visit times, and place of residence are at the 5% level of significance while the rest of the factors are not significant with EBF. The results of the binary regression model display the odds ratios, p-values, and corresponding 95% confidence intervals for each factor related to EBF.

3.8. Limitation of the thesis

a. The dataset has some limitations which include missing answers, missing questions, and answers that do not provide relevant information for this thesis.

b. Further studies are required to find more recent data.

3.9. Ethics approval

This study is based on secondary data analysis of CDHS 2014. Personal information such as names and addresses of the mothers were not included while downloading the dataset.

CHAPTER IV Results

4.1. Descriptive Analysis

Table 1. There were 688 participants from the fourth CDHS 2014. Among them, EBF mothers were 64.2% and non-EBF mothers were 35.8%. Based on the age interval, about 67.2% of mothers were aged between 20 to 29 years old. The mothers with no education had a higher EBF percentage at 69.1%. Relatively, disadvantaged households were represented by 76.9% of respondents from the poorest households and 74.4% from poorer households and the p-value was statically significant ($p<0.001$). Most mothers had vaginal deliveries 67.2% and only 39.4% had c-sections which were statically significant ($p<0.001$). Of the 688 mothers, working mothers were 62.2% and non-working accounted for 67.2%.

Of women who started in the first hour of EIBF 68.9% were successful in practicing EBF as a continuation of EIBF. Despite the many benefits of EBF, it was found that among mothers who had five or more ANC visits (62.7%), EBF was higher in rural areas (71.6%) compared to urban areas (45.0%) and it was also statistically significant ($p<0.001$).

Table 1. Demographic characteristics among Cambodian mothers, CDHS 2014

Characteristics	Exclusive (n=442)	Non-ex (n=246)	Total(n=688)	P-value
Mother's age (y)				0.065
15-19	22(61.1)	14(38.9)	36(100)	
20-29	328(67.2)	160(32.8)	488(100)	
30-39	86(55.5)	69(44.5)	155(100)	
40-49	6(66.7)	3(33.3)	9(100)	
Maternal education level				**0.012**
No education	56(69.1)	25(30.9)	81(100)	
Primary education	216(69.0)	97(30.1)	313(100)	
Secondary education	157(59.0)	109(41.0)	266(100)	
Higher education	13(46.4)	15(53.6)	28(100)	
Wealth index				**0.001**
Poorest	120(76.9)	36(23.1)	156(100)	
Poorer	90(74.4)	31(25.6)	121(100)	
Middle	77(64.7)	42(33.3)	119(100)	
Richer	87(64.9)	47(35.1)	134(100)	
Richest	68(43.0)	90(57.0)	158(100)	
Mode of delivery				**0.001**
Natural	413(67.2)	202(32.8)	615(100)	
Cesarean	28(39.4)	43(60.6)	71(100)	
Maternal occupation				0.173
Not working	187(67.3)	91(32.7)	278(100)	
Working	255(62.2)	155(37.8)	410(100)	
Early Initiation of breastfeeding				0.085
1h	281(68.9)	127(31.1)	408(100)	
> 1h	161(62.4)	97(37.6)	258(100)	
ANC visit(times)				0.191
< 4	134(68.0)	63(32.0)	197(100)	
≥ 5	308(62.7)	183(37.3)	491(100)	
Place of residence				**0.001**
Urban	86(45.0)	105(55.0)	191(100)	
Rural	356(71.6)	141(28.4)	497(100)	

*ANC: Antenatal Care

Table 2. Difference in EBF practices in urban and rural areas by socio-demographic characteristics

	Urban	Rural

	EBF	Non-EBF	EBF	Non-EBF	P-value
	86(45.0)	105 (55.0)	356(71.6)	141(28.4)	
Mother's age (y)					
15-19	4(50.0)	4 (50.0)	18 (64.3)	10(35.7)	0.395
20-29	33(50.0)	33(50.0)	183(74.1)	64(25.9)	**0.001****
30-39	27(49.1)	28(50.9)	59(59.0)	41(41.0)	0.235
40-49	2(66.7)	1(33.3)	4(66.7)	2(33.3)	**0.001****
Maternal education level					
No education	2(50.0)	2(50.0)	54(70.1)	23(29.9)	0.021*
Primary education	33(50.0)	33(50.0)	183(74.1)	64(25.9)	**0.001****
Secondary education	45(44.1)	57(55.9)	112(68.3)	52(31.7)	**0.001****
Higher education	6(31.6)	13(68.4)	7(77.8)	2(22.2)	0.022*
Wealth Index					
Poorest	5(71.4)	2(28.6)	115(77.2)	34(22.8)	0.724
Poorer	5(62.5)	3(37.5)	85(75.2)	28(24.8)	0.426
Middle	7(53.8)	6(46.2)	70(66.0)	36(34.0)	0.385
Richer	19(58.2)	17(47.2)	68(69.4)	30(30.6)	0.074
Richest	50(39.4)	77(60.4)	18(58.1)	13(41.9)	0.059
Mode of delivery					
Natural	77(51.3)	73(48.7)	336(72.3)	129(27.7)	**0.001****
Cesarean	9(22.0)	32(78.0)	19(63.3)	11(36.7)	**0.001****
Maternal occupation					
Not working	38(48.7)	40(51.3)	149(74.5)	51(25.5)	**0.001****
Working	48(42.5)	65(57.5)	207(69.7)	90(30.3)	**0.001****
Early Initiation Breastfeeding					
1h	58(55.8)	46(44.2)	223(73.4)	81(26.6)	**0.001****
> 1h	28(39.4)	43(60.6)	133(71.1)	54(28.9)	**0.001****
ANC visit (times)					
< 4	24(54.5)	20(45.5)	110(71.9)	43(28.1)	0.030*
≥ 5	62(42.2)	85(57.8)	246(71.5)	98(28.5)	**0.001****

***P-value < 0.05; **P-value < 0.001**

Table 2. Shows the percentage of the EBF and non-EBF among mothers in rural and urban areas. The EBF in urban areas was 45.0% and 55.0% for non-EBF. In rural areas, EBF was at 71.6% and non-EBF was 28.4%. About 74.1% of mothers between 20 and 29 years old in rural areas practiced EBF, 25.9% did not. Mothers between 40–49 years old who

practiced EBF were about 46.7%, those who did not accounted for 33.3% with a statistically significant p-value ($p<0.001$). For those who had obtained primary and secondary education in the rural area, the EBF was 70.1% and 74.1%, and the p-value was less than ($p<0.001$). The poorest and poorer household indexes were very high in EBF than in urban areas. The poorest in rural areas among those who practiced EBF was 77.2% and the poorer accounted for 75.2%. The EBF percentage of mothers who experienced vaginal delivery in a rural area was 72.3%, while it was 51.3% in an urban area and the p-value was statically significant ($p<0.001$). Those who were working and practicing EBF were 74.5%, and those who were working and not EBF were 69.7%. EIBF is also high compared to EBF in rural areas per hour (73.4%) while the EBF for more than one hour is at 71.9% with a statically significant ($p<0.001$). The ANC visit times, for more than five hours was 71.5% with a statistically significant ($p<0.001$).

Table 3. Association of socio-demographic characteristics among Cambodia mother's practice of EBF

Characteristics	OR	95% CI	P-value
Education level			
No education	1.00	Ref.	
Primary education	0.82	0.23-2.92	0.762

Secondary education	0.3	0.08-1.01	0.054
Higher education	0.11	0.02-0.48	**0.003**
Wealth index			
Poorest	1.00	Ref.	
Poorer	0.77	0.15-3.89	0.753
Middle	0.56	0.12-2.56	0.459
Richer	0.35	0.09-1.40	0.14
Richest	0.06	0.01-0.21	**0.001**
Mode of delivery			
Natural	1.00	Ref.	
Cesarean	0.2	0.10-0.38	**0.001**
Maternal occupations			
No working	1.00	Ref.	
Managerial	0.17	0.06-0.47	**0.001**
Clerical	0.13	0.01-1.51	0.103
Sales	0.3	0.14-0.62	**0.001**
Agriculture	5.43	1.24-23.84	0.025
Service	1.04	0.13-8.33	0.969
Skilled manual	0.6	0.26-1.41	0.248
Unskilled manual	1.02	0.00-Inf.	0.991
Don't know	1.02	0.00-Inf.	0.993

***Odds ratios (OR) and 95%, Confidence Intervals(95%CI) are based on the logistic regression model.*

***EBF: Exclusive Breastfeeding*

Table 3. Presents the logistic regression estimates of odds ratio (OR) that associated EBF with specific maternal occupations. The OR for working mothers was stratified by their reported occupations. The covariate logistic regression analysis revealed that primary education is more likely to practice EBF in the OR [95% confidence interval (CI)] of 0.82 [0.23–2.92] compared to secondary and higher education, respectively. Based on the wealth index, mothers from poorer households were more likely to practice EBF (OR, 0.77; 95% CI, 0.15–3.89). The richest households had the lowest EBF percentage (OR, 0.06; 95% CI,

0.01–0.21) and are statically significant (p<0.001). Additionally, mothers who had cesarean deliveries (OR, 0.20; 95% CI, 0.10-0.38) were less likely practices EBF than those who had vaginal deliveries and statically significant (p<0.001). Maternal occupations like agriculture (OR, 5.43; 95%CI, 1.24-23.84) were associated with higher practices of EBF five times more than other jobs. Those with managerial jobs (OR, 0.17; 95%CI, 0.06-0.47) and sale jobs (OR, 0.30; 95%CI, 0.14-0.62) are less likely to practice EBF and are statically significant (p<0.001).

Table 4. Multivariable logistic regressions of demographic characteristics of Cambodian mothers' EBF practices, CDHS 2014

Characteristics	OR	95% CI	P-value
Mother's age (y)			
15-19	1.00	Ref.	
20-29	0.38	0.05-2.87	0.349
30-39	0.21	0.02-1.69	0.144
40-49	0.22	0.01-4.06	0.315
Maternal education level			
No education	1.00	Ref.	
Primary education	0.82	0.23-2.92	0.762
Secondary education	0.30	0.08-1.01	0.054
Higher education	0.11	0.02-0.48	**0.003**
Wealth index			
Poorest	1.00	Ref.	
Poorer	0.77	0.15-3.89	0.753
Middle	0.56	0.12-2.56	0.459
Richer	0.35	0.09-1.40	0.140
Richest	0.06	0.01-0.21	**0.001**
Mode of delivery			
Natural	1.00	Ref.	
Cesarean	0.20	0.10-0.38	**0.001**
Maternal occupation			
Not working	1.00	Ref.	
Working	0.65	0.36-1.19	0.166
ANC visit (times)			
< 4	1.00	Ref.	
≥ 5	1.62	0.81-3.22	0.165
Early Initiation of breastfeeding			
1 h	1.00	Ref.	
>1h	0.61	0.30-1.26	0.184
Place of residence			
Rural	1.00	Ref.	
Urban	0.12	0.06-0.22	**0.001**

Table 4. Presents the association of demographic characteristics of EBF mothers in Cambodia. The mothers between 20–29 years old were more involved in EBF than other groups (groups 3 and 4) (OR, 0.38; 95% CI, 0.05-2.87). Based on the maternal education levels, those with primary education were more likely to practice EBF than mothers who had secondary and higher education (OR, 0.82; 95% CI, 0.23-2.92). Moreover, based on the wealth index quantiles, the poorer mothers were also more likely practices EBF than the middle-income and high-income mothers (OR, 0.77; 95% CI, 0.15-3.89). Those in the richest wealth quantiles are less likely to practice EBF (OR, 0.06; 95% CI, 0.01-0.21) and are statically significant ($p<0.001$). Regarding modes of deliveries, those who delivered via c-section were less likely to practice EBF than those who experienced vaginal delivery (OR, 0.20; 95% CI, 0.10-0.38) and is statically significant ($p<0.001$). Furthermore, working mothers were less likely to practice EBF than non-working mothers (OR, 0.65; 95% CI, 0.36-1.19). Regarding ANC visit times, mothers who had five or more visits were more likely to practice EBF one and a half more times than those who had less than four ANC visits (OR, 1.62; 95% CI, 0.30-3.22). Additionally, mothers who practiced early initial breastfeeding more than an hour after delivery (OR, 0.61; 95% CI, 0.31-1.26) were less likely to be successful in EBF compared to those who practiced EIBF within an hour after delivery. Concerning the place of residence, those in urban areas were less likely to practice EBF (OR, 0.12; 95% CI, 0.06-0.22) compared to those in rural areas and they were statically significant ($p<0.001$).

CHAPTER V Discussion

This study presents the EBF practice among Cambodian mothers by age, education, income, mode of delivery, and occupation. It focuses on maternal education, wealth index, mode of delivery, and place of residence, which have statistically significant ($p<0.001$) EBF. Other factors such as early initial breastfeeding, ANC, and place of delivery were also considered.

In our study, the percentage of EBF was (64.2%). This would be considered a good percentage according to the classification of the WHO. The WHOs classifications are as follows: poor (0-29%), fair (30%-49%), good (50%-89%), and very good (90%-100%) (WHO, 2008). Based on the data from UNICEF, the percentage of EBF in Cambodia is higher than the EBF percentage in Bangladesh (65%), India (58%), Indonesia (52.3%), Vietnam (30%), and Thailand (19%) (UNICEF, 2019). The Royal Government of Cambodia (RGC) published the Sub degree on the Marketing of Infant and Child Feeding products in 2007. The Ministry of Health established policies and provided appropriate information on feeding infants and small children to families and officials performing their work related to the field of infant and small child nutrition to create awareness of the ways to feed infants and small children through information dissemination and education. The Ministry of Health 2019 issued the guidelines for the implementation of the service package of Antenatal Care delivery and Postnatal Care to implement continued service delivery in health facilities if they hinder the success of the EBF Program.

EBF is key in the first six months of a baby's life. Ensuring that all women can practice EBF is essential to ensure the growth, development, and health of children. The WHO has recommended continuing breastfeeding with complementary feeding from six months up to 2 years or beyond (WHO, 2017).

Relevant associations of sociodemographic factors namely, maternal age, maternal education level, maternal occupation, mode of delivery, household wealth index, early initial breastfeeding, place of residence, and ANC have been noted in this study. The results of this study are similar to studies that highlight the multivariate as a positive association with EBF (Nkoka et al., 2019).

Despite its benefits, mothers in different regions of the world do not practice EBF for several reasons and maternal work is one of them (Al-Ruzaihan et al., 2017). Previous studies found that there were positive associations between non-working mothers and the practice of EBF (Tadesse F et al., 2019). Non-working mothers can stay longer with their infants, thus, they can practice EBF frequently (Chekol et al., 2017). However, working mothers have been associated with short EBF durations (Tan, 2011). Working mothers can be separated from their babies because they have to get back to work. A study in Depok, Indonesia, found that after returning to their occupations, some mothers believe that their breastmilk production decreases due to the impact of increasing stress in the workplace (Februhartanty et al., 2012). Working mothers face some challenges in sustaining EBF such as conflict with work commitments, limited support in the workplace, and lack of breastfeeding facilities (Dun-Dery et al., 2015). Working mothers should try to balance their work and family life. In the current study, about one-third of working women who practice EBF were still on leave and worked in trades/business with statistically significant association.

According to our results, in Ghana, a three-month maternity leave or longer was significantly associated with EBF practice (Dun-Dery et al., 2016). Similarly, in India, the majority of working mothers (94.4%), who did not exclusively breastfeed their children returned to work within six months after delivery (Boralingiah et al., 2016). Among the factors contributing to low EBF rates globally is inadequate maternity leave legislation and other workplace policies that reinforce women's breastfeeding ability upon returning to work (WHO, 2018).

It is important to provide targeted breastfeeding support for working women. Workplaces should provide a private and safe place (lactation room) for pumping, the equipment necessary for breastmilk preservation, and breastfeeding breaks. Additionally, previous studies have shown that longer maternity leave contributed to a longer duration of EBF among working mothers who have infants under six months old (Monteiro FR et al., 2019). Another study has also shown similar results of a positive association between maternity leave on breastfeeding practice (Steurer, 2017). This regulation makes the practice of EBF for six months after delivery challenging for working mothers. Therefore, the strengthening of the existing regulation is recommended by extending maternity leave to facilitate EBF in the workplace. A woman's ability to breastfeed is noticeably reduced when she returns to work if breastfeeding breaks, quality infant care near her workplace, and facilities for pumping or storing milk are inaccessible or unaffordable (Heymann et al., 2013). Among Indonesian mothers, agricultural workers were more likely to practice EBF compared to professional workers, industrial workers, and non-working mothers (Berlian, 2007). In Malaysia, maternity leave of more than two months and the absence of adequate workplace breastfeeding facilities were risk factors for breastfeeding discontinuation (Amin et al., 2011).

The results of this study show that mothers from lower socio-economic groups are more likely to practice EBF than mothers from middle and rich families, which is similar to another research (Ogbo et al., 2019). Probably, the reason is that poor families have limited resources to buy other infant food (Tadesse et al., 2019). Working mothers are less likely to practice EBF, especially when they do not have support from their husbands and the workplace to enable them to breastfeed their babies occasionally (Ogbo et al., 2019).

The results of this study presented that rural residence was associated with increased odds of EBF, which is to the results of previous studies (Sinha et al., 2015). Mothers who delivered via cesarean section were less likely to practice EBF compared to mothers who had a vaginal delivery (Seid et al., 2013). The lower rate of EBF among mothers who delivered via C-section was related to the diminished practice of EIBF

compared to mothers who delivered via vaginal delivery (Hashim et al., 2020). Other reasons for low rates of EBF may be the pain and discomfort of breastfeeding after a cesarean section (Al-Sahab et al., 2010). In this study, the EBF rate was lower among women who delivered their babies via c-sections than among those who gave birth vaginally, however, it was statistically significant.

In this study, Mothers who had five or more ANC visits to the health facility before childbirth showed higher odds of EBF practice compared to those who attended four or less than ANC visits. This finding is similar to cross-sectional studies carried out in sub-Saharan Africa (Yalçinet al., 2016) and Bangladesh (Agho et al., 2011). The increased odds of EBF in the current study may be attributed to breastfeeding counseling received through the Baby-Friendly Hospital Initiative (BFHI) program during the ANC visits, which may have improved mothers' knowledge and benefits of EBF practice. This is supported by previous evidence from regional Egypt and Ethiopia (Mekuria et al., 2015), which showed that breastfeeding counseling during ANC was positively related to EBF practice. Similar conclusions were found in previous studies (Jama et al., 2020). Information and education provided by healthcare workers during ANC visits have improved the practice of EBF. An exploratory study among Swedish women suggests that husbands should be involved in counseling sessions on breastfeeding during ANC visits so that mothers can experience satisfaction with the family's support, which could strengthen their confidence to continue breastfeeding for six months (Blixt et al., 2019). Having an unsupportive partner was associated with the early discontinuation of EBF (Ogbo et al., 2017). Therefore, counseling during ANC visits is important to improve confidence and provide a positive breastfeeding experience (Lenja et al., 2016).

Furthermore, the practice of EIBF has a strong influence on the practice of early initial breastfeeding. This finding is similar to a previous study (Lenja et al., 2016). Individual attitudes in initiating breastfeeding are associated with breastfeeding intentions (Lenja et al., 2016). EIBF occurs during the critical time after birth, especially for women who are experiencing motherhood for the first time.

This study is the national representative sample procedure which supports the extension of the results to Cambodian women. Moreover, this survey was conducted using a standard method of data collection from demographic and health surveys as well as the training program for fieldworkers (interviewers, editors, and supervisors) to ensure the success of the survey and to obtain high-quality data. The study was based on information provided by mothers about their experience of breastfeeding in the last six months that is subject to recall bias. Because the study design is cross-sectional, it cannot determine the cause-and-effect relationship between outcomes and predictors. Future studies are needed to analyze the influence of cultural perceptions and traditional practices on EBF across communities in Cambodia. This can help explore the local variation of EBF practices based on local culture, women's beliefs on EBF, and family attitudes in supporting EBF.

5.1. Limitations of the Study

During the research process, the researcher found several limitations:

1. The data used for the study was outdated. The recent CDHS data in 2018 or 2021 was not available at the time of this study.

2. Responses from mothers were self-reported. Some of the data might not be reliable.

5.2. Future Research

1. A cross-sectional study can result in biases in association analysis. Therefore, a cohort study that can identify the precedence association is needed.

2. Research based on the data from a larger sample size is necessary.

CHAPTER VI

6.1. Conclusion

In this study, negative associations were identified among working mothers and babies born via cesarean section. Education and public service advertisements improve knowledge and practice of the importance of breast milk and breastfeeding techniques among more educated women, women in urban areas, and those within higher wealth index categories.

6.2 Suggestions

Most educated women do not stay at home with their babies. They have to go to work and may not have enough support from their husbands, partners, or parents at home. Working mothers face some challenges in sustaining EBF such as conflict of commitment in the workplace, limited support in the workplace, and lack of breastfeeding facilities. Moreover, maternity leave is limited to only three months. Mothers need to get back to work after delivery, their workplaces may be far from home and they may not provide a private and safe place (lactation room) for pumping, or the necessary equipment for breastmilk preservation and breastfeeding breaks.

Conversely, women with no education, those who are unemployed, and women who live in the poorest rural areas are more likely to use natural birth methods and have more ANC visits, and have higher EBF practices. Mothers can experience satisfaction from family support, which could strengthen their confidence to continue breastfeeding for six months. Another contributory factor may be that poor families have limited resources to buy other infant food, thus, they focus on breastfeeding their infants. Mothers in this category stay in the house with their babies for the whole day.

1. Workplaces should provide mothers who return to work postpartum with

enough facilities for breastfeeding to feed their babies. These facilities should include private and safe places (lactation rooms) for pumping, the equipment necessary for breastmilk preservation (refrigerators), and breastfeeding breaks. Adequate breaks should be provided to employees during the workday to care for and feed their babies and express breast milk. New legislation is needed to extend paid maternity leave for six months in both governmental and private sectors.

2. At the community level, BFHI program during

The ANC visits should be established to ensure that mothers improve their knowledge and the benefits of EBF. A test run of these visits should be implemented to educate the community on better nutrition and health improvement of children, as well as to test its effectiveness. These are crucial messages that could be spread by community-level campaigns, including peer support and community interventions for young mothers who are vulnerable and have lower rates of EBF. However, to ensure mothers get full benefits of breastfeeding practices, enlightenment campaigns should target mothers with a high school or higher education and medium occupational status and fathers with high occupational status. These may assist the policymakers in reviewing healthcare and emphasize adherence to the WHO guidelines on infants and young child feeding practices.

References

Alzaheb, R. A. (2017). Factors influencing exclusive breastfeeding in Tabuk, Saudi Arabia. *Clin Med Insights Pediatr*, *11*, 1179556517698136. https://doi.org/10.1177/1179556517698136

Arif, S., Khan, H., Aslam, M., & Farooq, M. (2021). Factors influencing exclusive breastfeeding duration in Pakistan: a population-based cross-sectional study. *BMC Public Health*, *21*(1), 1998. https://doi.org/10.1186/s12889-021-12075-y

Ahmed, A. H., & Rojjanasrirat, W. (2021). Breastfeeding outcomes, self-efficacy, and satisfaction among low-income women with late-preterm, early-term, and full-term infants. *J Obstet Gynecol Neonatal Nurs*, *50*(5), 583-596. https://doi.org/10.1016/j.jogn.2021.06.010

Alves, V., Mota, M. C., & Pagliari, C. (2021). Sociodemographic characterisitcs related to knowing the benefits of breastfeeding. *Rev Paul Pediatr*, *39*, e2020101. https://doi.org/10.1590/1984-0462/2021/39/2020101

Gayatri, M. (2021). Exclusive Breastfeeding Practice in Indonesia: A Population-Based Study. *Korean J Fam Med*, *42*(5), 395-402. https://doi.org/10.4082/kjfm.20.0131

Ghaffari, M., Rakhshanderou, S., Harooni, J., Mehrabi, Y., & Ebrahimi, A. (2019). Prenatal interventional program about mothers' behavior related to exclusive breast feeding: Findings of planned behavior theory-based research. *J Lifestyle Med*, *9*(2), 143-149. https://doi.org/10.15280/jlm.2019.9.2.143

Hossain, M., Islam, A., Kamarul, T., & Hossain, G. (2018). Exclusive breastfeeding practice during first six months of an infant's life in Bangladesh: a country based cross-sectional study. *BMC Pediatr*, *18*(1), 93. https://doi.org/10.1186/s12887-018-1076-0

Hadi, H., Fatimatasari, F., Irwanti, W., Kusuma, C., Alfiana, R. D., Asshiddiqi, M. I. N., Nugroho, S., Lewis, E. C., & Gittelsohn, J. (2021). Exclusive breastfeeding

protects young children from stunting in a low-income population: A study from eastern Indonesia. *Nutrients*, *13*(12). https://doi.org/10.3390/nu13124264

Mensah, K. A., Acheampong, E., Anokye, F. O., Okyere, P., Appiah-Brempong, E., & Adjei, R. O. (2017). Factors influencing the practice of exclusive breastfeeding among nursing mothers in a peri-urban district of Ghana. *BMC Res Notes*, *10*(1), 466. https://doi.org/10.1186/s13104-017-2774-7

Nuampa, S., Tilokskulchai, F., Patil, C. L., Sinsuksai, N., & Phahuwatanakorn, W. (2019). Factors related to exclusive breastfeeding in Thai adolescent mothers: Concept mapping approach. *Matern Child Nutr*, *15*(2), e12714. https://doi.org/10.1111/mcn.12714

Saffari, M., Pakpour, A. H., & Chen, H. (2017). Factors influencing exclusive breastfeeding among Iranian mothers: A longitudinal population-based study. *Health Promot Perspect*, *7*(1), 34-41. https://doi.org/10.15171/hpp.2017.07

Suárez-Cotelo, M. D. C., Movilla-Fernández, M. J., Pita-García, P., Arias, B. F., & Novío, S. (2019). Breastfeeding knowledge and relation to prevalence. *Rev Esc Enferm USP*, *53*, e03433. https://doi.org/10.1590/s1980-220x2018004503433 (Spain)

Wu, W., Zhang, J., Silva Zolezzi, I., Fries, L. R., & Zhao, A. (2021). Factors influencing breastfeeding practices in China: A meta-aggregation of qualitative studies. *Matern Child Nutr*, *17*(4), e13251. https://doi.org/10.1111/mcn.13251

Yilmaz, E., Doga Ocal, F., Vural Yilmaz, Z., Ceyhan, M., Kara, O. F., & Kucukozkan, T. (2017). Early initiation and exclusive breastfeeding: Factors influencing the attitudes of mothers who gave birth in a baby-friendly hospital. *Turk J Obstet Gynecol*, *14*(1), 1-9. https://doi.org/10.4274/tjod.90018

Zhang, Z., Zhu, Y., Zhang, L., & Wan, H. (2018). What factors influence exclusive breastfeeding based on the theory of planned behaviour. *Midwifery*, *62*, 177-182. https://doi.org/10.1016/j.midw.2018.04.006

Zhu, Y., Zhang, Z., Ling, Y., & Wan, H. (2017). Impact of intervention on breastfeeding outcomes and determinants based on theory of planned behavior. *Women Birth*, *30*(2), 146-152. https://doi.org/10.1016/j.wombi.2016.09.011

Doma, H., Tran, T. D., Tran, T., Hanieh, S., Tran, H., Nguyen, T., Biggs, B. A., & Fisher, J. (2021). Continuing breastfeeding for at least two years after birth in rural Vietnam: prevalence and psychosocial characteristics. *Int Breastfeed J*, *16*(1), 78. https://doi.org/10.1186/s13006-021-00427-8

Magnano San Lio, R., Maugeri, A., La Rosa, M. C., Cianci, A., Panella, M., Giunta, G., Agodi, A., & Barchitta, M. (2021). The Impact of Socio-Demographic Factors on Breastfeeding: Findings from the "Mamma & Bambino" Cohort. *Medicina (Kaunas)*, *57*(2).

Mathew, A. C., Benny, J. K., Philip, D. M., Dhanya, C., Joy, M., Sandhiya, V., Ramesh, S., & Neelakandan, K. (2019). Socio-Demographic and clinical correlates of exclusive breastfeeding practices up to six months of Age. *Nepal J Epidemiol*, *9*(3), 772-780. https://doi.org/10.3126/nje.v9i3.21179

Shohaimi, N. M., Mazelan, M., Ramanathan, K., Meor Hazizi, M. S., Leong, Y. N., Cheong, X. B., Ambigapathy, S., & Cheong, A. T. (2022). Intention and practice on breastfeeding among pregnant mothers in Malaysia and factors associated with practice of exclusive breastfeeding: A cohort study. *PLoS One*, *17*(1), e0262401. https://doi.org/10.1371/journal.pone.0262401

Tang, K., Wang, H., Tan, S. H., Xin, T., Qu, X., Tang, T., Wang, Y., Liu, Y., & Gaoshan, J. (2019). Association between maternal education and breast feeding practices in

China: A population-based cross-sectional study. *BMJ Open*, *9*(8), e028485. https://doi.org/10.1136/bmjopen-2018-028485

Agho, K. E., Ezeh, O. K., Ghimire, P. R., Uchechukwu, O. L., Stevens, G. J., Tannous, W. K., Fleming, C., Ogbo, F. A., Global, M., & Child Health Research Collaboration Glo, M. (2019). Exclusive breastfeeding rates and associated factors in 13 "Economic Community of West African States" (ECOWAS) countries. *Nutrients*, *11*(12). https://doi.org/10.3390/nu11123007

Camier, A., Chabanet, C., Davisse-Paturet, C., Ksiazek, E., Lioret, S., Charles, M. A., Nicklaus, S., & de Lauzon-Guillain, B. (2020). Characterization of infant feeding practices and related-family characteristics in the French nationwide ELFE Birth Cohort. *Nutrients*, *13*(1). https://doi.org/10.3390/nu13010033

Chen, C., Cheng, G., & Pan, J. (2019). Socioeconomic status and breastfeeding in China: an analysis of data from a longitudinal nationwide household survey. *BMC Pediatr*, *19*(1), 167. https://doi.org/10.1186/s12887-019-1551-2

Gianni, M. L., Bettinelli, M. E., Manfra, P., Sorrentino, G., Bezze, E., Plevani, L., Cavallaro, G., Raffaeli, G., Crippa, B. L., Colombo, L., Morniroli, D., Liotto, N., Roggero, P., Villamor, E., Marchisio, P., & Mosca, F. (2019). Breastfeeding difficulties and risk for early breastfeeding cessation. *Nutrients*, *11*(10). https://doi.org/10.3390/nu11102266

Habibi, M., Laamiri, F. Z., Aguenaou, H., Doukkali, L., Mrabet, M., & Barkat, A. (2018). The impact of maternal socio-demographic characteristics on breastfeeding knowledge and practices: An experience from Casablanca, Morocco. *Int J Pediatr Adolesc Med*, *5*(2), 39-48. https://doi.org/10.1016/j.ijpam.2018.01.003

Karim, F., Billah, S. M., Chowdhury, M. A. K., Zaka, N., Manu, A., Arifeen, S. E., & Khan, A. N. S. (2018). Initiation of breastfeeding within one hour of birth and its determinants among normal vaginal deliveries at primary and secondary health

facilities in Bangladesh: A case-observation study. *PLoS One*, *13*(8), e0202508. https://doi.org/10.1371/journal.pone.0202508

Mogre, V., Dery, M., & Gaa, P. K. (2016). Knowledge, attitudes and determinants of exclusive breastfeeding practice among Ghanaian rural lactating mothers. *Int Breastfeed J*, *11*, 12. https://doi.org/10.1186/s13006-016-0071-z

Nukpezah, R. N., Nuvor, S. V., & Ninnoni, J. (2018). Knowledge and practice of exclusive breastfeeding among mothers in the tamale metropolis of Ghana. *Reprod Health*, *15*(1), 140. https://doi.org/10.1186/s12978-018-0579-3

Alzaheb, R. A. (2017). Factors Influencing Exclusive Breastfeeding in Tabuk, Saudi Arabia. *Clin Med Insights Pediatr*, *11*, 1179556517698136. https://doi.org/10.1177/1179556517698136

Arif, S., Khan, H., Aslam, M., & Farooq, M. (2021). Factors influencing exclusive breastfeeding duration in Pakistan: a population-based cross-sectional study. *BMC Public Health*, *21*(1), 1998. https://doi.org/10.1186/s12889-021-12075-y

Ahmed, A. H., & Rojjanasrirat, W. (2021). Breastfeeding Outcomes, Self-Efficacy, and Satisfaction Among Low-Income Women With Late-Preterm, Early-Term, and Full-Term Infants. *J Obstet Gynecol Neonatal Nurs*, *50*(5), 583-596. https://doi.org/10.1016/j.jogn.2021.06.010

Alves, V., Mota, M. C., & Pagliari, C. (2021). SOCIODEMOGRAPHIC CHARACTERISTICS RELATED TO KNOWING THE BENEFITS OF BREASTFEEDING. *Rev Paul Pediatr*, *39*, e2020101. https://doi.org/10.1590/1984-0462/2021/39/2020101

Gayatri, M. (2021). Exclusive Breastfeeding Practice in Indonesia: A Population-Based Study. *Korean J Fam Med*, *42*(5), 395-402. https://doi.org/10.4082/kjfm.20.0131

Ghaffari, M., Rakhshanderou, S., Harooni, J., Mehrabi, Y., & Ebrahimi, A. (2019). Prenatal Interventional Program about Mothers' Behavior Related to Exclusive Breast Feeding: Findings of Planned Behavior Theory-Based Research. *J Lifestyle Med*, *9*(2), 143-149. https://doi.org/10.15280/jlm.2019.9.2.143

Hossain, M., Islam, A., Kamarul, T., & Hossain, G. (2018). Exclusive breastfeeding practice during first six months of an infant's life in Bangladesh: a country based cross-sectional study. *BMC Pediatr*, *18*(1), 93. https://doi.org/10.1186/s12887-018-1076-0

Hadi, H., Fatimatasari, F., Irwanti, W., Kusuma, C., Alfiana, R. D., Asshiddiqi, M. I. N., Nugroho, S., Lewis, E. C., & Gittelsohn, J. (2021). Exclusive Breastfeeding Protects Young Children from Stunting in a Low-Income Population: A Study from Eastern Indonesia. *Nutrients*, *13*(12). https://doi.org/10.3390/nu13124264

Mensah, K. A., Acheampong, E., Anokye, F. O., Okyere, P., Appiah-Brempong, E., & Adjei, R. O. (2017). Factors influencing the practice of exclusive breastfeeding among nursing mothers in a peri-urban district of Ghana. *BMC Res Notes*, *10*(1), 466. https://doi.org/10.1186/s13104-017-2774-7

Nuampa, S., Tilokskulchai, F., Patil, C. L., Sinsuksai, N., & Phahuwatanakorn, W. (2019). Factors related to exclusive breastfeeding in Thai adolescent mothers: Concept mapping approach. *Matern Child Nutr*, *15*(2), e12714. https://doi.org/10.1111/mcn.12714

Saffari, M., Pakpour, A. H., & Chen, H. (2017). Factors influencing exclusive breastfeeding among Iranian mothers: A longitudinal population-based study. *Health Promot Perspect*, *7*(1), 34-41. https://doi.org/10.15171/hpp.2017.07

Suárez-Cotelo, M. D. C., Movilla-Fernández, M. J., Pita-García, P., Arias, B. F., & Novío, S. (2019). Breastfeeding knowledge and relation to prevalence. *Rev Esc Enferm USP*, *53*, e03433. https://doi.org/10.1590/s1980-220x2018004503433 (Spain)

Wu, W., Zhang, J., Silva Zolezzi, I., Fries, L. R., & Zhao, A. (2021). Factors influencing breastfeeding

practices in China: A meta-aggregation of qualitative studies. *Matern Child Nutr*, *17*(4), e13251.

https://doi.org/10.1111/mcn.13251

Yilmaz, E., Doga Ocal, F., Vural Yilmaz, Z., Ceyhan, M., Kara, O. F., & Kucukozkan, T. (2017). Early initiation and exclusive breastfeeding: Factors influencing the attitudes of mothers who gave birth in a baby-friendly hospital. *Turk J Obstet Gynecol*, *14*(1), 1-9. https://doi.org/10.4274/tjod.90018

Zhang, Z., Zhu, Y., Zhang, L., & Wan, H. (2018). What factors influence exclusive breastfeeding based on the theory of planned behaviour. *Midwifery*, *62*, 177-182. https://doi.org/10.1016/j.midw.2018.04.006

Zhu, Y., Zhang, Z., Ling, Y., & Wan, H. (2017). Impact of intervention on breastfeeding outcomes and determinants based on theory of planned behavior. *Women Birth*, *30*(2), 146-152. https://doi.org/10.1016/j.wombi.2016.09.011

Doma, H., Tran, T. D., Tran, T., Hanieh, S., Tran, H., Nguyen, T., Biggs, B. A., & Fisher, J. (2021). Continuing breastfeeding for at least two years after birth in rural Vietnam: prevalence and psychosocial characteristics. *Int Breastfeed J*, *16*(1), 78. https://doi.org/10.1186/s13006-021-00427-8

Magnano San Lio, R., Maugeri, A., La Rosa, M. C., Cianci, A., Panella, M., Giunta, G., Agodi, A., & Barchitta, M. (2021). The Impact of Socio-Demographic Factors on

Breastfeeding: Findings from the "Mamma & Bambino" Cohort. *Medicina (Kaunas)*, *57*(2). https://doi.org/10.3390/medicina57020103

Mathew, A. C., Benny, J. K., Philip, D. M., Dhanya, C., Joy, M., Sandhiya, V., Ramesh, S., & Neelakandan, K. (2019). Socio-Demographic and Clinical Correlates of Exclusive Breastfeeding practices up to Six Months of Age. *Nepal J Epidemiol*, *9*(3), 772-780. https://doi.org/10.3126/nje.v9i3.21179

Shohaimi, N. M., Mazelan, M., Ramanathan, K., Meor Hazizi, M. S., Leong, Y. N., Cheong, X. B., Ambigapathy, S., & Cheong, A. T. (2022). Intention and practice on breastfeeding among pregnant mothers in Malaysia and factors associated with practice of exclusive breastfeeding: A cohort study. *PLoS One*, *17*(1), e0262401. https://doi.org/10.1371/journal.pone.0262401

Tang, K., Wang, H., Tan, S. H., Xin, T., Qu, X., Tang, T., Wang, Y., Liu, Y., & Gaoshan, J. (2019). Association between maternal education and breast feeding practices in China: a population-based cross-sectional study. *BMJ Open*, *9*(8), e028485. https://doi.org/10.1136/bmjopen-2018-028485

Agho, K. E., Ezeh, O. K., Ghimire, P. R., Uchechukwu, O. L., Stevens, G. J., Tannous, W. K., Fleming, C., Ogbo, F. A., Global, M., & Child Health Research Collaboration Glo, M. (2019). Exclusive Breastfeeding Rates and Associated Factors in 13 "Economic Community of West African States" (ECOWAS) Countries. *Nutrients*, *11*(12). https://doi.org/10.3390/nu11123007

Camier, A., Chabanet, C., Davisse-Paturet, C., Ksiazek, E., Lioret, S., Charles, M. A., Nicklaus, S., & de Lauzon-Guillain, B. (2020). Characterization of Infant Feeding Practices and Related-Family Characteristics in the French Nationwide ELFE Birth Cohort. *Nutrients*, *13*(1). https://doi.org/10.3390/nu13010033

Chen, C., Cheng, G., & Pan, J. (2019). Socioeconomic status and breastfeeding in China: an analysis of data from a longitudinal nationwide household survey. *BMC Pediatr*, *19*(1), 167. https://doi.org/10.1186/s12887-019-1551-2

Gianni, M. L., Bettinelli, M. E., Manfra, P., Sorrentino, G., Bezze, E., Plevani, L., Cavallaro, G., Raffaeli, G., Crippa, B. L., Colombo, L., Morniroli, D., Liotto, N., Roggero, P., Villamor, E., Marchisio, P., & Mosca, F. (2019). Breastfeeding Difficulties and Risk for Early Breastfeeding Cessation. *Nutrients*, *11*(10). https://doi.org/10.3390/nu11102266

Habibi, M., Laamiri, F. Z., Aguenaou, H., Doukkali, L., Mrabet, M., & Barkat, A. (2018). The impact of maternal socio-demographic characteristics on breastfeeding knowledge and practices: An experience from Casablanca, Morocco. *Int J Pediatr Adolesc Med*, *5*(2), 39-48. https://doi.org/10.1016/j.ijpam.2018.01.003

Karim, F., Billah, S. M., Chowdhury, M. A. K., Zaka, N., Manu, A., Arifeen, S. E., & Khan, A. N. S. (2018). Initiation of breastfeeding within one hour of birth and its determinants among normal vaginal deliveries at primary and secondary health facilities in Bangladesh: A case-observation study. *PLoS One*, *13*(8), e0202508. https://doi.org/10.1371/journal.pone.0202508

Mogre, V., Dery, M., & Gaa, P. K. (2016). Knowledge, attitudes and determinants of exclusive breastfeeding practice among Ghanaian rural lactating mothers. *Int Breastfeed J*, *11*, 12. https://doi.org/10.1186/s13006-016-0071-z

Nukpezah, R. N., Nuvor, S. V., & Ninnoni, J. (2018). Knowledge and practice of exclusive breastfeeding among mothers in the tamale metropolis of Ghana. *Reprod Health*, *15*(1), 140. https://doi.org/10.1186/s12978-018-0579-3

Appendix1. Variable used in this research, taken from the fourth Cambodia Demographic and Health Survey, 2014.

No	Variable	Description of the variables in the dataset, and caseid (case identification)
01	Exclusive breastfeeding	RECODE OF nt_ebf
02	Maternal age	RECODE OF v012
03	Maternal education level	RECODE OF v106
04	Wealth index	RECODE OF v190
05	Mode of delivery	RECODE OF m17_1
06	Maternal occupation	RECODE OF v717
07	Antenatal care (ANC)	RECODE OF anc4
08	Early Initiation Breastfeeding (EIBF)	RECOE OF initial breast
09	Place of residence	RECODE OF v025