The Determinants of Breastfeeding Practices in Indonesia:
Evidence from Demographic and Health Survey 2012

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Acknowledgement

"Perfection is attained by slow degrees; it requires the hand of time"

~Voltaire~

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Abstract

Objective: The present study aims to assess factors that influence Indonesian mothers to practice breastfeeding, exclusively or not exclusively.

Methods: The capability approach framework was used as a basic assumption to determine and analyze factors that influence breastfeeding practices during the first three days of infants's lives, i.e. endowment and conversion factors. The data source for the analysis was the Indonesia Demographic and Health Survey (IDHS-12). 6,568 samples of 45,607 mothers were included in the analysis. Seventeen variables were examined using descriptive analysis and logistics regression. Analysis of interaction was done to determine the effects of endowment and conversion factors toward exclusive breastfeeding (EBF) and non-EBF practices.

Results: The most important endowment factors was individual factor i.e. biological factor. BF initiation explained around 35.2% variability (R^2) of EBF and non-EBF practices among Indonesian mothers. Mothers who initiated breastfeeding later were less likely to practice EBF. Another important endowment factor was household factor i.e. wealth resource. The richer the household status, the lower the likelihood of mothers to practice EBF. Among the conversion factors, we found interaction of region and residence. For mothers who lived in the urban and western regions of Indonesia, the likelihood of EBF practices decreased.

Conclusions: Several endowment and conversion factors significantly and positively/ negatively affected the practice of EBF and non-EBF [i.e. biological factor (BF initiation) and the environmental factor (region by residence)]. The capability approach framework was applicable in explaining the function of EBF. However, more complex data are required to perform it.

Keywords:*Capability approach, IDHS 2012, logistics regressions with interaction, EBF practice and non-EBF practice.*

List of Tables and Figures

Acronyms

ANC	:	Ante Natal Care
AOR	:	Adjusted Odds Ratio
BF	:	Breastfeeding
BPS	:	Badan Pusat Statistik/ Statistics-Indonesia
CI	:	Confidence Interval
EBF	:	Exclusive breastfeeding
IDHS	:	Indonesia Demographic and Health Survey
IBM	:	International Business Machines
NFPCB	:	National Family Planning Coordinating Board
Non EBF	:	Not Exclusive Breastfeeding
OR	:	Odds Ratio
MDGs	:	Millennium Development Goals
MOH	:	Ministry of Health
SPSS	:	Statistical Product and Service Solutions
USAID	:	United States Agency for International Development
VIF	:	Variation Inflation Factor
WHO	:	World Health Organizations

Chapter 1. Introduction

1.1 Background

Human breast milk is an essential nutrition source for infants because it provides lots of energy, vitamin, protein, and minerals. Breast milk also protects them from many diseases (WHO, 2002). The benefits of breastfeeding for infants include enhancing immunity against infectious diseases, and increasing infants' survival in their first period of their lives and boosting the cognitive ability of infants when they grow up (Kramer and Kakuma, 2002, Jones *et al*, 2003 and Kramer *et al*, 2008). These benefits could only occur when mothers breastfeed exclusively, i.e. when infants receive only breast milk without any supplement food or drink, not even water. (WHO, 2001). This is known as exclusive breastfeeding (EBF).

Evidence has shown that EBF has protective effects against gastrointestinal infections, respiratory infections, allergic diseases (including asthma) and non–communicable chronic diseases that appear during later life, such as obesity, diabetes mellitus type I, Crohn's disease and lymphoma (Santo *et al*, 2007). Moreover, EBF reduces infant mortality due to common childhood illnesses such as diarrhea or pneumonia and helps to recover quickly after illness (Kramer *et al.,* 2001). Furthermore, EBF does not only give benefits for children but also for mothers. It could prevent them from diseases, such as breast and ovarian cancers and also cardiovascular diseases (Stanley *et al*., 2007 cited by McQueen, 2009 and Schwarz *et al*., 2009). It could also be a natural contraceptive method for a mother. (Kramer and Kakuma, 2002, Becker and Ahmed, 2001).

Despite the importance of EBF for infants and mothers, there is still a high percentage of mothers who do not practice it correctly according to the WHO recommendation. Worldwide, WHO estimated that only 35 percent infants obtain EBF (WHO, 2002). Thus, it becomes a high priority of WHO to improve EBF practices to achieve the best outcomes for mother and children.

1.2 Breastfeeding in Indonesia

Breastfeeding is culturally accepted in all parts of Indonesia (McNicoll and Singarimbun, 1982 and Muhidin, 2002), but the actual rate of EBF practices is still low. The latest Indonesian Demographic and Health Survey (IDHS) showed that almost 96 percent of Indonesian mothers practice breastfeeding with an average duration of around 20 months. Unfortunately, only around 40 percent practice EBF (BPS *et al*., 2012). Previous IDHS 1997 and 2002 also showed a declining rate of EBF practices from 42.4 percent to 39.5 percent in 1997 and 2002, respectively (BPS *et al*., 2007).

Chapter 1. Introduction

The decrease in EBF rate has become a concern of the Indonesian government for over a decade, especially as EBF practice is considered an essential element to support one of the Millennium Development Goals (MDGs), namely reducing the child mortality. Therefore, The Ministry of Health of Indonesia has recommended to "only feed breast milk to infants until six months and continue it until two years old with complementary foods" through books, media and internet to increase the awareness of mothers to practice EBF (Ministry of Health – MOH, 2003). The goal of this intervention is to achieve the WHO recommendation to attain optimal growth, development and health of the infants.

1.3 Problem statement

The present study aims to answer the issue as mentioned earlier, by assessing factors that influence Indonesian mothers to practice breastfeeding (either EBF or non-EBF). Determinants of breastfeeding practices have been found to the personal (mother), family, societal, and also organizational level (Abada *et al.*, 2001 and Yngye and Sjostrom, 2001). Different internal or external resources of mothers will give a different effect on their capability to practice breastfeeding. For instance, a study in Brazil has identified some factors that affect EBF such as: mothers' education level, age of mother under 25 years, first child, use of public or private health care system, caesarean delivery, sex of baby, place of delivery, etc (Santo *et al.*, 2007, Shahla *et al.*, 2010).

In Indonesia, previous studies have attempted to determine factors affecting the EBF practices. For example, Februhartanty *et al.* (2006) in a study in Jakarta found that husband's support on breastfeeding influence breastfeeding practice of mothers. Age of mother and birth interval were found to be important factors in a study in Jakarta (Joesoef *et al.*, 1989). Another study in Java revealed that employment status of mother and birth order of child affected breastfeeding (Senarath *et al.*, 2001). Susiloretni*et al.* (2013) in a study in rural Java found that BF initiation, education level of mothers, decision on mothers' health care and education level of husband and place of delivery of baby influenced breastfeeding practices.

However, there are many factors or variables that have not been assessed in Indonesia. Moreover, most studies only covered a small part of Indonesia and did not represent Indonesia as a whole. Therefore, the present study aims to gain more insight into factors that influence Indonesian mothers to practice breastfeeding (EBF or non-EBF) using representative samples of all regions in Indonesia. This study explored 17 independent variables that have been derived from mothers' resources by applying the "capability approach framework".

Furthermore, there are three reasons making the present study to be important and to fill the gap in previous studies. These are: 1) there has been no study that assessed breastfeeding (EBF or non-EBF)

practices' factors by applying the theory of capability approach. 2) In most studies, researchers use the theory of behavior change to assess the EBF practices and many studies utilized qualitative methods. 3) Despite the high breastfeeding rate among Indonesian mothers, only less than half of mothers practice EBF, the high rate of breastfeeding does not correspond to the rate of EBF.

1.4 Objective and research questions

Based on the problem statement, the present study aims to assess factors that influence Indonesian mothers to practice breastfeeding either EBF or non-EBF. These factors evaluated through capability approach framework and classified into endowment and conversion factors.

Endowment factor in capability approach was known as the amount (and quality) of resources (things) available to individuals. As for conversion factor, it includes people's different personal, social and environmental characteristics which affect the capability to efficiently access and convert their condition into effective functioning/ goals (Chiappero – Martinetti and Venkatapuram, 2014 p. 711).

Based on the objectives, two research questions were formulated, which are:

a. What endowment factors affect the Indonesian mothers to practice breastfeeding (EBF and non-EBF)?
b. What conversion factors affect the Indonesian mothers to practice breastfeeding (EBF and non-EBF)?

1.5 Scientific and societal relevance

The present study added knowledge to the existing body of evidence on factors that affected Indonesian mothers to practice BF. Furthermore, by introducing the capability approach, the present study could enrich the method to conduct studies on BF practices and give an insight on how part of capabilities function within the capability approach. The present study's results could be a breakthrough in explaining the determinants/ factors that affected BF [EBF and non EBF].

The present study contributed new knowledge and information of societal relevance, especially in terms the factors that affected BF practices among Indonesian mothers. It will be useful information for the stakeholders particularly the Ministry of Health of Indonesia to realize the WHO recommendation and the MDGs target on breastfeeding practice.

1.6   Structure of the research

There are five chapters in this present study. The first chapter is the introduction. The theories and literature as the foundation of the present study presented in Chapter 2. Subsequently, Chapter 3 describes the data and methods used in the present study. Next, Chapter 4 contains the results that can answer the research questions, and lastly Chapter 5 describes the discussions, conclusions, and also recommendations based on the results.

Chapter 2. Theoretical Framework

2.1 Breastfeeding practices and WHO recommendation

Breast milk (breastfeeding) is an important nutrition for infants to avoid morbidity. Related to this issue, WHO recommends breastfeeding should be given to infants as early as possible and should be done exclusively until six months. Then continue it until two years by adding appropriate complementary foods/ substances (WHO, 2003). WHO also highlighted the importance of the early breastfeeding for infants i.e. colostrum in first breast milk. Colostrum considers necessary for infants because it contains high-quality nutrition and antibody that can protect infants from morbidity (BPS et al., 2012). Therefore, the present study will assess the first three days of breastfeeding practice of the mothers.

2.2 Framework of Capability Approach

The theoretical framework of the present study derived from the framework of capability approach by Amartya Sen (The 1970's) and Chiappero-Martinetti and Venkatapuram's model (2014). The theory of human capabilities firstly introduced by Amartya Sen in the late 1970s. This theory has been brought up to criticize the existing measurement of economic indicators i.e. inequality, poverty and well-being that mainly focused only on income or resources, basic needs, happiness, etc. Sen showed that these indicators also depend on the capabilities of the people to achieve their goals, for example, to be not poor or not happy, etc. (Sen, 2004). Sen also pointed out the mechanism of "doings" and "choosing" through functioning, which depends on the resources people have and their surroundings/ environment that could improve their capabilities to achieve their goals (Sen, 2004).

Since its conceptualization, the theory of human capabilities has been used in various research fields, such as welfare policy analysis, development project analysis, living standards assessments, population studies, etc. (Robeyns, 2005 and Chiappero–Martinetti and Venkatapuram, 2014). However, there are still debates on how to operationalize the theory into empirical use, especially on defining the capability itself (Nussbaum, 2003 and Sen, 2004).

To overcome this problem, Chiappero–Martinetti and Venkatapuram (2014) attempted to operate this theory in the demographic field. Based on the work of Nussbaum and Sen, they conceptualized a framework that can operate the capability approach theory more clearly. According to this framework, there are five elements included in the framework: 1) capability, 2) functioning, 3) agency, 4) endowment factors, and 5) conversion factors (Chiappero-Martinetti and Venkatapuram's model 2014). They defined these elements as follow.

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Definitions

Capability: the possible opportunity of a person to act or to be able to achieve his/ her final goal. It constructed by the interaction between endowment (internal) factors and environment (external) factors.

Functioning: the realization of capabilities to achieve the final goal.

Agency: the ability to pursue the goals. Someone who acts it called as an agent.

Endowment factors: the amount and quality of resources (things) that an individual possesses such as biology, skill, experience, knowledge, etc.,

Conversion factors: external factors of an individual (personal, social/ familial, environmental characteristics, etc.), that affect an individual's capabilities, such as material, technologies, social life, and so forth.

The relationship between these elements presented in Figure 1. In empirical research, these elements can be tested using statistical tools by defining the appropriate proxy variables that constitute the elements (Chiappero–Martinetti and Venkatapuram, 2014).

Figure1. The framework of capability approach
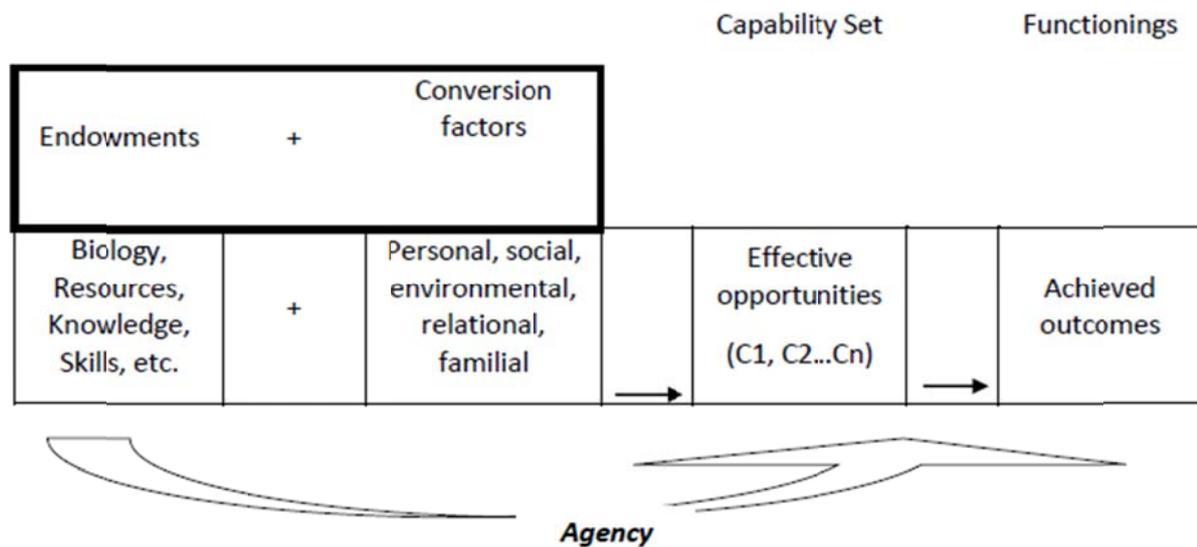
Source: Chiappero–Martinetti and Venkatapuram, 2014 p. 712

We used this model to interpret the results on practicing breastfeeding. The proxy variable for the achieved outcome (functioning) defined as "practices breastfeeding within first three days" with the extension of "EBF and non-EBF practices". Due to the limitation of data, the present study did not assess the agency and capability set. Capability itself was made up by the combined interaction of endowment (internal) and conversion (external) factors (Chiappero–Martinetti and Venkatapuram, 2014).

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Therefore, the present study only focused on the endowment and conversion factors that affect the practice of exclusive breastfeeding. To determine variables that should be included in endowment or conversion factors, some literature were reviewed and presented in the next subchapters revealed it.

2.3 Factors that influence breastfeeding (EBF or non-EBF) practices.

From some previous literature, there has not been any study that used the framework of the capability approach to assessing factors that affect breastfeeding. In order to classify the variables into components of the framework, the information from the paper of "The Capability Approach: A Framework for Population Studies" by Chiappero–Martinetti and Venkatapuram (2014) was used as the basic assumption.

2.3.1 Endowment factors that influence breastfeeding (EBF or non-EBF) practices.

Endowment factors are the amount and quality of resources (things) available to the individuals that include: 1) biological features, 2) wealth, 3) knowledge, 4) skills, and 5) experience, etc.(Chiappero–Martinetti and Venkatapuram, 2014). In the present study, endowment factors of BF were defined as internal resources the mothers have which can support them to practice BF.

The biology factors

It is defined as the morphology, physiology, anatomy, or behavior of living organisms, in this case that related to biology factors of mothers that can improve their ability to practice EBF (Oxford Thesaurus, 2015a). Based on this definition, the included proxy variable are 1)birth interval, 2) mode of delivery and 3)BF initiation. Birth interval and mode of delivery represent physiology factor while BF initiation represents behavior factor.

The birth interval was found to be associated with EBF practice. Infants born in less than two years birth interval are less likely to obtain exclusive breastfeeding than infants that born with a birth interval longer than two years (Shahla et al., 2010 and Bbaale, 2014). Mothers who experienced two deliveries within two years would do unfinished practice breastfeeding for her previous child in which could affected the EBF or non-EBF practice the next child (Bbaale, 2014).

It has been evident from the literature that there was a relationship between mode of delivery and EBF practices. Mothers are less likely to practice EBF when they deliver their child by caesarean section, because physiologically, they were not prepared to practice EBF and would practice non EBF (Prior et al., 2004 and Ssenyonga et al., 2012).

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It has been evident from the literature that there was a relationship between mode of delivery and EBF practices. Mothers are less likely to practice EBF when they deliver their child by caesarean section, because physiologically, they were not prepared to practice EBF and would practice non EBF (Prior *et al.*, 2004 and Ssenyonga *et al.*, 2012).

As for BF initiation, previous studies showed there is a relationship between early initiation with EBF practices. Infants that immediately put on breasts of mothers after delivered were more likely to practice EBF than infants that put on it later (Chandrashekhara *et al.*, 2007 and Chunga *et al.*, 2008).

The wealth resource

It is defined as a stock or supply of money, materials and other assets that can be drawn on by Indonesian mother to achieve EBF practice effectively (Oxford Thesaurus, 2015e). Proxy variables included in this factor are 1) socioeconomic status of the household, 2) access to media, which represents the asset of mothers have, and 3) antenatal care (ANC) visits in last trimester of pregnancy, which represent the money that mothers have.

Earlier studies have found out the association between socioeconomic status and EBF. Mothers who had poor socio–economic status, which implies that they have low wealth resources, are more likely to practice EBF (Chandrashekhara *et al.*, 2007, and Mihrshahi *et al.*, 2010). As for access to media, some researchers found out that mothers who have access to media (TV, Radio, Books or Internet) have better knowledge about EBF. As a result, they have higher likelihood practice exclusive breastfeeding than a mother who have less or no access to media (Arora *et al.*, 2000 and Alemayehu *et al.*, 2009).

EBF practice is also shown to be strongly associated with ANC visits. The more mothers do ANC visits, the more likely they practice EBF (Tender *et al.*, 2009 and Agho *et al.*, 2011). With more frequentANC visit by mothers during pregnancies, the more information of practice EBF they can obtain, which also could improve the their ability to practice EBF (Tender *et al*, 2009 and Agho *et al*, 2011).

The knowledge factors

It is defined as theoretical or practical understandings toward EBF practice, mostly through education of the Indonesian mothers (Oxford Thesaurus, 2015b). In the present study, we examined whether mothers' education level associated with EBF. Previous study showed that mothers with higher education attainment had better knowledge or understanding of EBF and higher ability to practice EBF than those with lower education attainment (Senarath *et al.*, 2001 and Shahla *et al.*, 2010).

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The skill factors

It is defined as the ability to practice EBF well (Oxford Thesaurus, 2015c). We assessed whether 1) decision on mothers' healthcare and 2) mothers' employment status are significant factors of EBF practice.

Mothers who work would have less likelihood of practicing EBF than mothers who do not work because they spend more time to work outside the home (Chunga *et al.*, 2008). In results, working mothers will have reduced the chance to practice EBF. Furthermore, a mother who has autonomy in their health care, i.e. skill to decide on health care, she can also decide whether she will practice EBF or not. Labbok (2006) mentioned that the practice of EBF has been one of health rights of mothers, and mothers can gain health by practicing it. Based on this statement, if mothers have the autonomy or skill to decide on their health care, they would prefer to practice EBF.

The experience factors

It is defined as the practical contact with EBF and observation of Indonesian mothers towards EBF practice (Oxford Thesaurus, 2015d). Based on the definition, the proxy variables that we assessed are: 1)age of mother at birth, and 2) the birth order of the child. With these variables, the present study presumed that by time (age) and having more children (birth order) would increase their experience toward EBF practice.

An evidence review found out that older mothers who giving birth had a better experience to practice EBF than younger mothers. Moreover, mothers who experienced for a first child, tend to have lower chance to practice EBF because of lack of experience of it. (Mihrshahi *et al.*, 2010 and Shahla *et al.*, 2010).

From the literatures above, we determined the proxy variables for individual endowment factors were birth interval, BF initiation, mode of delivery, mother's education level, mother's employment status, decision maker on mother's healthcare, age of mother at last birth of child and birth order of child. As for household endowment factors were wealth status of the household, access to media, and ANC visits.

2.3.2   Conversion factors influence breastfeeding (EBF or non-EBF) practices.

Chiappero–Martinetti and Venkatapuram (2014) mentioned that conversion factors explain the diversity of relevant aspects of people, which reflect the differences in personal, familial, social, and environmental characteristics. Together with endowment factors, it could help them achieve the goal. In simple words, the conversion factor is those factors that come from the external environment of people. The present

study would be focus on the conversion factors as the family and environmental factors that support mothers to practice EBF, i.e. the fathers/ partners/ family's role, social community, health facilities, etc.

Family factors

It is defined as the role of a person or a group of people that are related by blood or marriage i.e. father/ partner/ parent who support the mother to practice EBF (Oxford Thesaurus, 2015f). In the present study, we included:1) husband's education level, 2) husband's employment status and 3) sex of the child. Februhartanty *et al*. (2006) and Machado *et al*. (2014) stated that the role of husband/ partner could increase the chance of mother to practice EBF. They also found out that fathers with tertiary education attainment would show better support to EBF than fathers who have lower education. A husband with higher education have a better understanding towards the benefit of practice exclusive breastfeeding than do husband with a lower education (Februhartanty *et al*. 2006 and Shahla *et al*. 2010).

Furthermore, it was also found that husbands who work tend to neglect the support for mothers to practice EBF, which also decrease the chance of mothers toward practicing EBF Februhartanty *et al*. (2006). As for association between sex of child and mother who practice EBF discovered by Shahla *et al.* (2010) and Agho *et al.* (2014), they figured out that mothers who have female infants tend to have higher chance to practice EBF than when they have male infants. This condition happens due to the belief that female infants were weaker than male infants (Shahla *et al*., 2010).

Environment factors

It is defined as the role of setting or conditions or surroundings where the mother lives and supports her to practice EBF (Oxford Thesaurus, 2015g). Proxy variables included in this factor are:1) place of delivery, 2) type of place of residence, and 3)region of Indonesia.

A previous study found that mothers were more likely to practice EBF if the infants delivered in hospitals, which showed the influence of place of delivery to EBF (Bbaale, 2014). However, Tender *et al*. (2009) found that lack of knowledge among health providers in the hospitals towards the practice of EBF increased the use of infant formula, which consequently decreased the EBF practice among mothers.

The importance of place of residence was asserted by Victor *et al*. (2013), who found out that mothers who lived in the rural areas were more likely to practice EBF than mothers who lived in urban areas. Most of the rural areas are located in central and eastern regions of Indonesia (BPS *et al*., 2012). Therefore, the present study would expect a higher chance of mother to practice EBF in the central and eastern region of Indonesia.

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2.4 Conceptual model

The following conceptual model derived from the framework of capability approach proposed by Chiappero–Martinetti and Venkatapuram (2014) and proxy variables found in the literature.

The present study elaborated the endowment and conversion factors of mothers to perform their capability to be able to breastfeed. When mothers can breastfeed, they can achieve the function of it, to practice exclusively or not. At this point, the present study differentiated the practice of breastfeeding into exclusive breastfeeding (breastfeeding practices without other foods or substances) and not exclusive breastfeeding (breastfeeding practices with other food or substances).

Furthermore, the present study only assessed some components of the capability approach theory. It did not assess the agency and the capability set, for example, the ability to breastfeed due to the unavailability of the data. With this limitation, the present study assumed that if a mother to practice breastfeeding, it probably meant that she was able to breastfeed. On the contrary, if a mother did not practice breastfeeding, it probably meant that she was not able to breastfeed.

Figure 2. Conceptual model: "The determinants of breastfeeding practices in Indonesia".
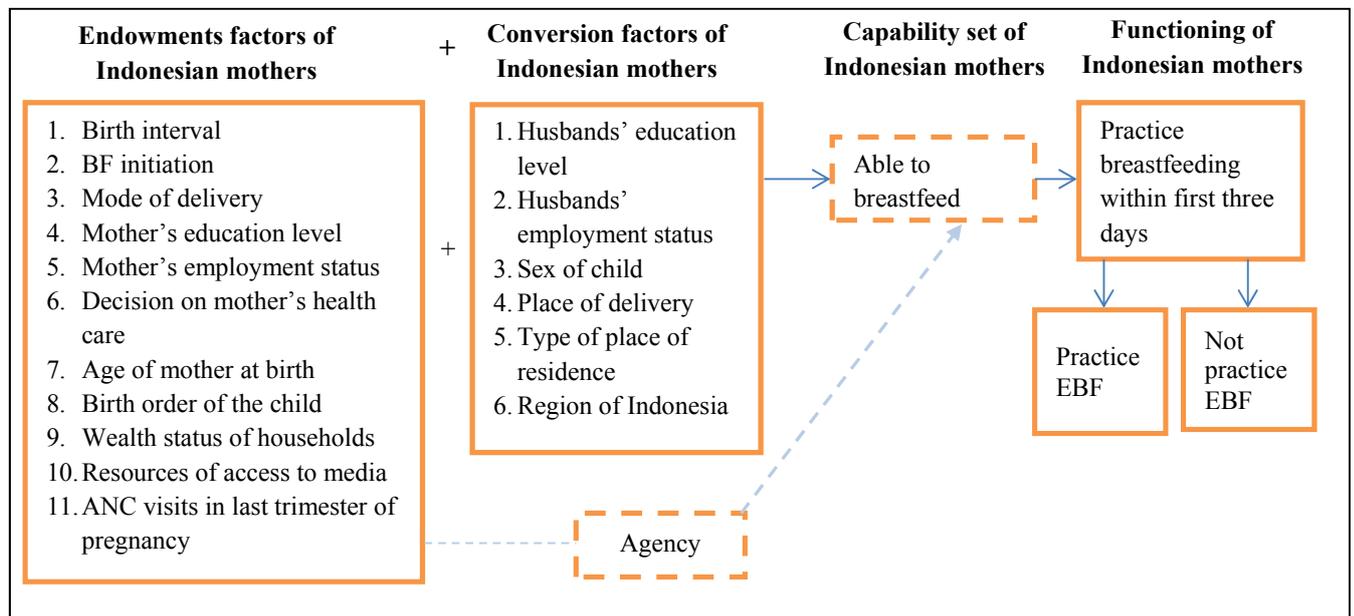
Source model: Chiappero – Martinetti and Venkatapuram, 2014
Note: dashed line is not the focus of this study.

2.5 Hypothesis

Based on the existing literature and the breastfeeding situation in Indonesia, we hypothesized that:

a. There are strong relationships (negative or positive) between endowment factors and Indonesian mothers who practice EBF and non-EBF.

b. There are strong relationships (negative or positive) between conversion factors and Indonesian mothers who practice EBF and non-EBF.

Chapter 3. Data and Methods

3.1 Type of research

The present study was a descriptive and explanatory research. It described the characteristics of Indonesian mothers who practice EBF and explained the determinants that affecting the function of Indonesian mothers to practice breastfeeding either EBF or non-EBF.

3.2 Data Source

This study used secondary data from Indonesia Demographic and Health Survey (IDHS) 2012, which is a 5-yearly survey conducted to provide individual and indicator data for estimating demographic events (i.e. fertility and mortality),data on reproductive health (i.e. contraceptive use, breastfeeding etc.) and the related socio–economic factors indicators in Indonesia. IDHS-12 was the seventh IDHS conducted in Indonesia.

This survey conducted by the government institutions of Indonesia responsible for developing population policies such as the Ministry of Health and National Family Planning Coordinating Board (NFPCB) and Statistics of Indonesia – BPS. There are also external agencies providing expertise and fund such as USAID, an American institution that concerns with population problems (BPS *et al.*, 2012). Supporting by this institution can assure that the survey conducted very carefully and result in a precise outcome.

The IDHS 2012 had collected two different types of unit analysis, i.e. all women age 15–49 years old and all men aged 15–54 years old. The sample size of women aged 15-49 was 45,607 and the response rate for this unit analysis was around 96 percent (BPS *et al.*, 2012). Considering this high response rate, the estimation of indicators in this survey was assured and indicated the high quality of estimation. The present research used the dataset of IDHS 2012 with the sample of all women aged 15–49 years old. This dataset can be obtained and downloaded from www.measureddhs.com.

From this data set, the indicator of infant feeding had been the most important data. Missing value of this variable may occur because, during the reference period of the question of breastfeeding, mothers might not be taking care their infants themselves. So that they might not recall the type of food that had been fed to their infants by other people (BPS et al., 2012). However, the percentage of the missing data were reasonably low, i.e. only around 1 percent (BPS et al., 2012).

3.3 The selection of sample

We used the IDHS women's dataset that contained all women age group 15–49 years old. We excluded women who had never had a child nor breastfed by selecting the datasets. There were two types of selection of data sets: the first was the selection of the women who ever had a child, and the second was the selection of women who had ever breastfed. The steps of the selection presented in Figure 3.

Figure 3. Selection of IDHS-12 women dataset
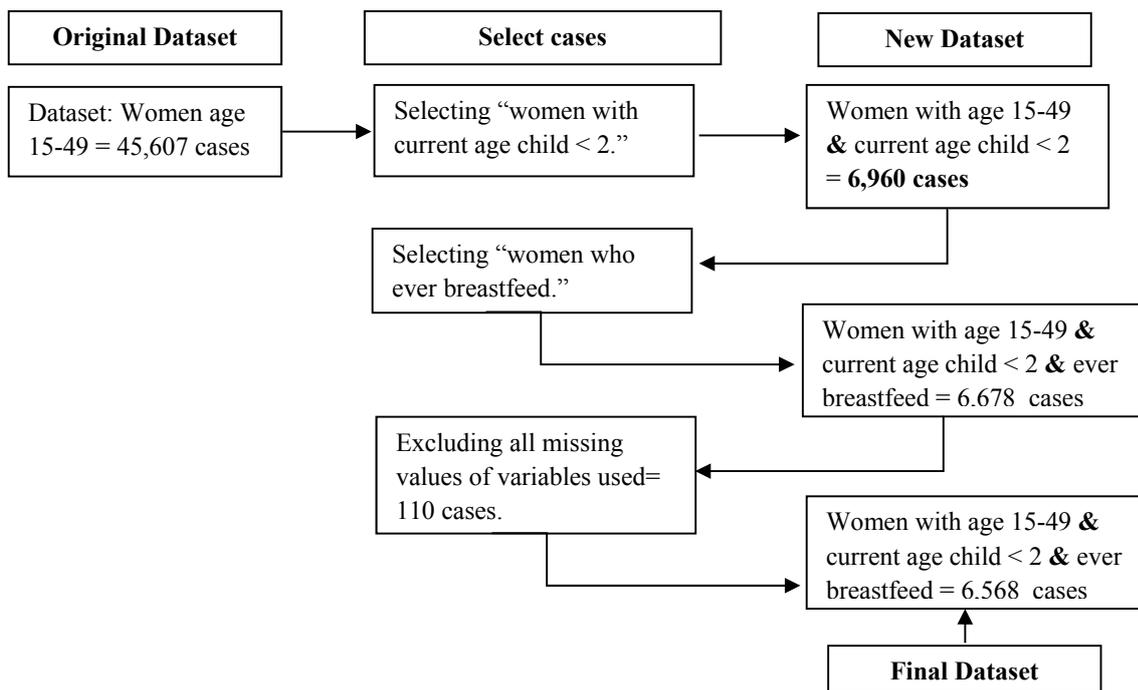
The outcome of this selection was a data set of mothers who had children aged younger than two years old and had ever practiced breastfeeding. This selection based on the IDHS-12 report, which included the report of infants younger than two years old who are fed on a particular type of breastfeeding (BPS et al., 2012). The selection resulted in a data set containing 6.568 cases of mothers aged 15–49.

3.4 Definitions and operationalization of concepts and variables

The present study used the framework of the capability approach to defining the concepts. The definition of variables derived from IDHS. Both the definitions of concepts and variables as well as the operationalization are tabulated in Table 1.

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Table 1. Definition of concepts and variables in the present study.

Concepts/ variables	Definition	Operationalization
Unit analysis		
Indonesian mothers	Indonesian women who have delivered infants (BPS *et al*., 2012).	
Dependent variable		
Practice exclusive breastfeeding (EBF)	Indonesian mothers who practice EBF (feed their infants only with breast milk, without other food or substances) within first three days (WHO, 2002).	Recoded from variable ever breastfeed and first three days given nothing and the result is dichotomous variable EBF with response value 1= practice EBF within three first days and 0= practice non-EBF within first three days.
Independent variable		
Endowment factors	Resources of Indonesian mothers that influence the capability of EBF to achieve either EBF or non-EBF (Chiappero – Martinetti and Venkatapuram, 2014).	
Birth interval	The birth interval is an interval between two births (BPS *et al*., 2012). This variable represents the biology factor	Recoded from variable preceding birth interval into a categorical variable of BirthIntgroup with response value 0= less than 24 months[@]; 1= 24 months and more.
BF initiation	The time when the child breastfed for the first time (WHO, 2002). This variable represents the biology factor.	Recoded from the variable time when put to breast into a categorical variable of TPB with response value 0= immediately[@]; 1= within a day; 2= more than a day.
Mode of delivery	Mode of delivery using caesarean section (BPS *et al*., 2012). This variable represents the biology factor.	A dichotomous variable with response value of 0= normal delivery[@]; 1= caesarean section delivery.
Mother's education level	The highest level of education that a mother has finished (BPS *et al*., 2012). This variable represents the knowledge factor.	A categorical variable with response value of 0= no education; 1= primary education[@]; 2= secondary and higher education.
Mother's employment status	The working status of the mothers (BPS *et al*., 2012). This variable represents the skill factor.	A dichotomous variable with response value of 0= not working[@]; 1= working.
Decision maker on mother's healthcare	The person who decides the mother's health care (BPS *et al*., 2012). This variable represents the skill factor.	A categorical variable with response value of 1= mother alone[@]; 2= joint mother and other persons; 3= other person alone.
Age of mothers at birth	The current age of the mothers at the moment of the survey (BPS *et al*., 2012). This variable represents the experience factor.	Recode from the variable current age of mother – current age of child and the result transform into a categorical variable with response value of 1=15–24; 2=25–34[@]; 3=35–49.

Table 1. Continued…(1)

Concepts/ variables	Definition	Operationalization
Birth order of the child	The parity of the mothers (BPS *et al.*, 2012). This variable represents the experience factor.	Recoded from variable birth order into a categorical variable with response value of 1= 1st,2nd, and 3rd; 2= 4th and more.
Wealth status of households	An index that IDHS generated from the belonging of the household and the employment status of the member of the household that picture the wealth of the household (BPS *et al.*, 2012). This variable represents the resources factor.	Categorical variable with response value 1= poorest[@]; 2= poorer; 3= middle; 4= richer; 5= richest.
Access to media	The accessibility level of mothers to the three types of media (BPS *et al.*, 2012). It reflects the resources factor.	Recoded from the variable frequency of access TV, radio and magazine into a dichotomous variable with response value 0= do not have access to media[@]; 1= have access to media.
ANC visits in last trimester of pregnancy	Whether or not mothers visit ANC in their last trimester of pregnancy (BPS *et al.*, 2012). It reflects the resources factor.	Recoded from the variable number of ANC visit btw 7 until delivery into a dichotomous variable with response value 0= do not do ANC visit[@]; 1= do ANC visit.
Conversion factors	Conversion factors defined as the environment and external factors that influence the practices of EBF (Chiappero – Martinetti and Venkatapuram, 2014).	
Husband's education level	The highest education level attainment of a husband (BPS *et al.*, 2012). This variable represents the family factor.	Categorical variable with response value of 0= no education; 1= primary education; 2= secondary and higher education[@].
Husband's employment status	The working status of the husband/ partner (BPS *et al.*, 2012). This variable represents the family factor.	Recoded from variable husband's occupation into a dichotomous variable of HW with response value of 0= not working[@]; 1= working.
Sex of child	The gender of the child (BPS *et al.*, 2012). This variable represents the family factor.	A dichotomous variable with response value of 1= male[@]; 2= female.
Place of delivery	The place where the mothers deliver the infants (BPS *et al.*, 2012). This variable represents the environment factor.	Recoded from variable place of delivery into categorical variable of POD with response value of1= home[@]; 2= public health facilities; 3= private health facilities.
Type of place of residence	The status of the place where the mother lived (BPS *et al.*, 2012). This variable represents the environment factor.	A dichotomous variable with response value of 1= urban; 2= rural[@].
Region part of Indonesia	The regions where Indonesian mother lived (BPS *et al.*, 2012). This variable represents the environment factor.	Recoded from variable region into categorical variable of Treg with response value of 1= western Indonesia[@]; 2= central Indonesia; 3= eastern Indonesia.

Note: @ = refference category

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After defining the variables, the next step was the assessment of the missing value of the variables.

3.5 Missing values report

The report of missing data has been an important instrument for performing an empirical test to verify the hypotheses. If the missing value is too many or has a pattern, it might influence the results of the empirical test, which caused bias or ecological fallacy (Norusis, 2008). In the women's dataset of IDHS 2012, there were nine variables that showed missing values. Missing data percentages are presented in Table 2.

Table 2. Percentages of missing values of each variable

Variables	N (total cases)	Missing Cases	
		Count	(%)
Dependent variable:			
Practice exclusive breastfeeding (EBF)	6,678	49	(0.73)
Independent variable:			
a. Birth interval	6,678	9	(0.13)
b. BF initiation	6,678	48	(0.72)
c. Mode of child delivery	6,678	5	(0.07)
d. Mother's employment status	6,678	3	(0.04)
e. Decisions on mother's healthcare	6,678	4	(0.06)
f. Resources of access to media	6,678	2	(0.03)
g. ANC visits in last trimester of pregnancy	6,678	1	(0.01)
h. Husband's education level	6,678	20	(0.30)
i. Husband's employment status	6,678	11	(0.16)
All variables (multivariate model)	6,678	110	(1.65)

Source data: Indonesia Demographic Health Survey/ IDHS (2012)

Table 2 showed that the percentage of missing values of these variables were small, i.e. around 1%. A missing value of more than 1% was only found in the adjusted multivariate model. The data reduction technique was applied as a treatment for dealing with the missing values in the dataset. It is a technique to reduce the cases of the missing values when operating variables in the empirical test (Norusis, 2008).

After ensuring the availability and the quality of the data, the empirical tests of hypotheses using statistical tools were performed.

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3.6   Methods of Analysis

The methods of analysis in the present study consisted of two types, namely descriptive and explanatory analysis. In this study, descriptive analysis was used to describe the characteristics of the variables. For examples, frequencies were used to describe categorical variables and mean, median and standard deviation were used to explain continuous variables.

Furthermore, the explanatory analysis was used to explain the relationship between the dependent and the independent variables. In the present study, the main interest would be the relationship between practicing exclusive breastfeeding and the endowment factors as well as the conversion factors. The results of the explanatory analysis were used to determine the answer to the research questions.

The IBM SPSS (20.0) was used to analyze the data, and MS Excel (2010) was used to generate tables and plot graphs.

3.6.1   Descriptive analysis

The results of the descriptive analysis were yielded through the frequency and descriptive tools. The frequency tools were used to determine the counts, percentages and missing values of each categorical variables, while the descriptive tools were used to determine the basic statistics of all variables in the research, such as mean, median, standard deviation, etc. Also, these tools could also provide the missing value of the variables.

3.6.2   Explanatory analysis

The explanatory analysis was performed to assess the determinants that influence Indonesian mothers to practice exclusive breastfeeding that is one of the objectives of the present study. Some statistics methods as the following were used: ***Cross tabulation tools*** were used to define the frequencies of the independent variables and the dependent variable separately (Norusis, 2008). After the frequencies had been obtained, a regression model could be generated by considering the likelihood ratio test statistics (Agresti, 1990).

a. ***Binary logistics regression*** was used because the dependent variables in the present study contained binary numbers that were:0= practicing non-EBF and 1= practice EBF. This tool provided the regression model and its statistical tests through tables and graphs. The univariate and the multivariate logistic regression analyses have been done.

- Univariate analysis were performed to determine the singular relationship between the dependent variable and each of the independent variable without being adjusted by other independent

variables. The effect of a particular independent variable on the dependent variable reflected by odds ratio (OR) and 95% confidence interval (CI).

- Multivariate analysis were presented to determine the relationship between dependent variable and independent variables by adjusting to the other independent variables. The effect of an independent variable on the dependent variable can be observed using adjusted odds ratio (AOR) and 95% confidence interval (CI). The method used in this analysis was Step Forward using Likelihood ratio of the variables. This method would identify the fittest variables that could explain the EBF and non-EBF practices among Indonesian mothers.

- Analysis of interaction effects were performed to determine a simultaneous relationship between two or more variables and to describe which variable as the additive or not (Fienberg, 1978). The effect of interaction between one variable and other variables was interpreted together. If the main effect of the variables was not significant, then the interpretation of this variable was made through the interaction.

3.6.3   Multicollinearity test

Multicollinearity and confounding tests were conducted because there were possibilities of correlations between independent variables. This condition may result in confounding in the multivariate analysis. As a result, the model would inaccurately estimate the coefficients, which might result in false values. For example, the sign of the coefficients in the model estimate might give different results from the previous literature.

Multicollinearity was examined using the variation inflation factor (VIF) in the regression model. If the VIF is more than 5, it can be inferred that the independent variables had multicollinearity with other independent variables (Agresti, 1990). This analysis was performed using the linear regression tools.

3.7 Ethical considerations

IDHS data is valid and reliable to predict the capability of Indonesian mothers toward practicing exclusive breastfeeding because it was held by trustworthy government institutions. A macro analysis was conducted; therefore, the identity of respondents were kept confidential. There was no direct impact on them. Furthermore, in conducting the present study both positive and negative results were presented and all bias or unclear results were discussed.

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4.1 Breastfeeding practices among Indonesian mothers

Out of 6,960 samples, around 96% had practiced breastfeeding, whereas the remaining 4% had never practiced breastfeeding. After all missing values of the variable were excluded, **6,568 mothers** were included in the analysis. The results presented in this chapter are based on these samples

Table 3. Descriptive of breastfeeding practices among Indonesian mothers

Descriptive of breastfeeding practices	N	%
From N = 6,960		
Women: age 15 – 49, having child < 2 years old, & who practice breastfed	6,678	96
Women: age 15 – 49, having child < 2 years old, & who never practice breastfed	279	4
Total	**6,957**	**100**
Missing	3	0
From N = 6,678		
Mothers practice EBF	2,604	40
Mothers practice non-EBF	3,964	60
Total	**6,568**	**100**
Missing	110	1

Source data: Indonesia Demographic Health Survey/ IDHS (2012)

Table 3. shows that there were 2,604 mothers (40%) who practiced EBF. This proportion referred to mothers who only breastfeed their children without any other fluids or substances within the first three days of their children's lives. Henceforth in this study, these mothers were classified as mothers who practiced EBF. There were 3,964 mothers (60%) who breastfeed, but also give other fluids or substances to their children within the first three days of their children's lives. Henceforth in this study, these mothers were classified as mothers who practiced non-EBF.

Figure 4. Type of liquids and substances given to infants within the first three days of children's lives by mothers who practiced non-EBF (%)
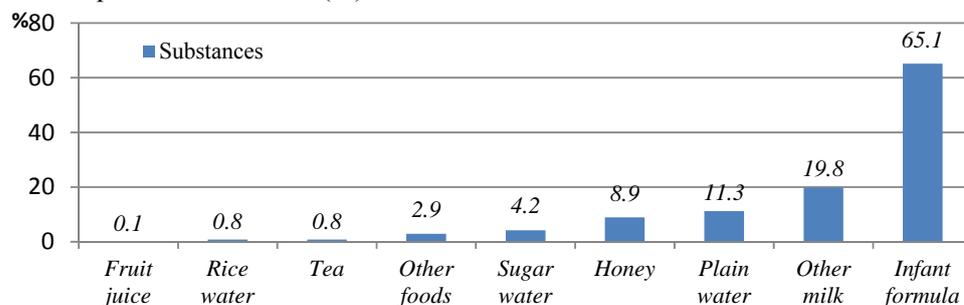
Source data: Indonesia Demographic Health Survey/ IDHS (2012)

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Out of all mothers who practiced non-EBF, there were nine liquids or substances that were given to their infants. The majority of mothers chose to feed their children with infant formula within the first three days of their children's lives (65.1%). The second choice was other types of milk (19.8%), followed by fruit juice (0.1%). These results are shown in figure 4.

4.2 Endowment factors and breastfeeding practice among mothers

The first two endowment factors were the biology and the knowledge factors. These factors were measured by birth interval, mode of delivery, breastfeeding initiation and mothers' education level variables. The distribution of these variables and other endowment factors and the relationship of these variables with breastfeeding practice are shown in Table 4.

Table 4. Distribution of endowment factors of mothers and cross tabulation of practicing EBF and non-EBF

Variables	Frequency		Crosstabs			
	Mothers Breastfeed (N= 6,568)		EBF (N= 2,604)		Non-EBF (N= 3,964)	
	n	%	n	%	n	%
A. *Biology factors*						
Birth interval						
Below 24 months	2,898	44.12	1,056	40.55	1,842	46.47
24 months and above	3,670	55.88	1,548	59.45	2,122	53.53
Mode of child delivery						
Normal delivery	5,707	86.89	2,403	92.28	3,304	83.35
Caesarean section delivery	861	13.11	201	7.72	660	16.65
Breastfeeding initiation						
Immediately	3,249	49.47	2,014	77.34	1,235	31.16
Within a day	1,185	18.04	468	17.97	717	18.09
More than a day	2,134	32.49	122	4.69	2,012	50.76
B. *Knowledge factor*						
Mother's education level						
No education	189	2.88	129	4.95	60	1.51
Primary	1,857	28.27	805	30.91	1,052	26.54
Secondary and higher	4,522	68.85	1,670	64.13	2,852	71.95
C. *Experience factors*						
Age of mother at birth						
15 – 24	2,128	32.40	848	32.57	1,280	32.29
25 – 34	3,292	50.12	1,285	49.35	2,007	50.63
35 – 49	1,148	17.48	471	18.09	677	17.08

Table 4. Continued

Variables	Frequency		Crosstabs			
	Mothers Breastfeed (N= 6,568)		EBF (N= 2,604)		Non-EBF (N= 3,964)	
	n	%	n	%	n	%
Birth order of child						
1st, 2nd, and 3rd	5,480	83.43	2,088	80.18	3,392	85.57
4th and above	1,088	16.57	516	19.82	572	14.43
D. Skill factors						
Mother's employment status						
Not working	3,935	59.91	1,597	61.33	2,338	58.98
Working	2,633	40.09	1,007	38.67	1,626	41.02
Decision on mother's healthcare						
Mother alone	2,209	33.63	839	32.22	1,370	34.56
Joint mother and another person	3,291	50.11	1,313	50.42	1,978	49.90
Another person alone	1,068	16.26	452	17.36	616	15.54
E. Wealth resource factor						
Wealth status of household						
Poorest	1,907	29.03	922	35.41	985	24.85
Poorer	1,427	21.73	590	22.66	837	21.12
Middle	1,157	17.62	416	15.98	741	18.69
Richer	1,124	17.11	393	15.09	731	18.44
Richest	953	14.51	283	10.87	670	16.90
Resource of access to media						
No access to any media	351	5.34	232	8.91	119	3.00
Have access to media	6,217	94.66	2,372	91.09	3,845	97.00
ANC visits in last trimester of pregnancy						
No antenatal visits	531	8.08	268	10.29	263	6.63
Yes, do ANC visits	6,037	91.92	2,336	89.71	3,701	93.37

Source data: Indonesia Demographic Health Survey/ IDHS (2012)

Table 4 shows that most of the mothers (56%) gave birth within the interval of 24 months or more, whereas the rest of the them gave birth within the interval of below 24 months. Furthermore, the majority of mothers who practiced EBF (59%) gave birth within the interval of 24 months or more. As for mothers who practiced non-EBF, most of them (53%) gave birth within the interval of 24 months or more.

The majority of Indonesian mothers (87%) delivered their children with normal delivery. Moreover, most of the mothers who practiced EBF and non-EBF delivered their children by normal delivery (92% and 83% respectively) while the rest delivered by caesarean section. In breastfeeding initiation, half of mothers put their children to the breast immediately. A similar result also found among mothers who

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practiced EBF. Most of them (77%) put their children to the breast immediately. However, among mothers who practiced non-EBF, half of them put their children to the breast later than a day (51%).

Regarding knowledge factor, around 69% of total mothers had a secondary high school or higher level of education. The high proportion of mothers with secondary high school or higher also found in mothers who practiced EBF (64%) and mothers who practice non-EBF (72%) respectively. The proportion of mothers who had no education was very small, with the percentage of 5% among mothers who practiced EBF and 2% among mothers who practiced non-EBF.

Analysis of experience factors showed that most mothers gave birth at the age of 25 – 34 years old (50%), followed by 15-24 years old age group (32%) and 35 – 49 years old age group (17%). The 25-34 years age group accounted for the highest proportion of mothers who practiced EBF (49%) and practiced non-EBF (51%). The majority of mothers (83%) gave birth to the first, second and third child. Only 17% mothers gave birth to the 4th children and more. A similar pattern of this result occurred for mothers who practiced EBF and mothers who practiced non-EBF.

The skill factor represented by mother employment status and decision on mother's health care variables. Table 5 shows that more than 60% of Indonesian mothers did not work, and half of the mothers decided their health care jointly with other persons (husband or family). The same pattern also observed in either mother who practiced EBF or practiced non-EBF.

More than 51% of mothers had low wealth status. However, most of the mothers had access to media (books, radio, and TV) with the proportion around 95%. In terms of ANC visit in the last trimester of pregnancy, around 92% of Indonesian mothers did ANC visit/s. Thus, the highest proportion of Indonesian mothers who practiced EBF was found among mothers who were considered in poorest wealth status of household (35%), mothers who had resource on accessing the media (91%) and mothers who did ANC visit in last trimester of pregnancy (90%). These patterns also occurred among mothers who practiced non-EBF with the proportion of 25% (poorest wealth), 97% (had resource on accessing the media) and 93% (did ANC visit/s).

4.3 Conversion factors and breastfeeding practice among mothers

We assessed conversion factors using family and environment factors. The family factor was measured using the variables of husband/ partner education level, husband/ partner employment status and sex of the child, while the environment factor was measured using the variables of place of delivery, the types of place of residence and region of Indonesia (Table 5).

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Table 5. Distribution of conversion factors of mothers and cross tabulation of practicing EBF and non-EBF

Variables	Frequency		Crosstabs			
	Mothers (N= 6,568)		EBF (N= 2,604)		Non-EBF (N= 3,964)	
	n	%	N	%	n	%
A. *Family factors*						
Husband education level						
No education	116	1.77	74	2.84	42	1.06
Primary	1,948	29.66	872	33.49	1,076	27.14
Secondary and higher	4,504	68.57	1,658	63.67	2,846	71.80
Husband employment status						
No	134	2.04	68	2.61	66	1.66
Yes	6,434	97.96	2,536	97.39	3,898	98.34
Sex of child						
Male	3,417	52.02	1,313	50.42	2,104	53.08
Female	3,151	47.98	1,291	49.58	1,860	46.92
B. *Environment factors*						
Place of delivery of the child						
Home	2,659	40.48	1,146	44.01	1,513	38.17
Public health facilities	1,481	22.55	632	24.27	849	21.42
Private health facilities	2,428	36.97	826	31.72	1,602	40.41
Type of place of residence						
Urban	2,944	44.82	1,052	40.40	1,892	47.73
Rural	3,624	55.18	1,552	59.60	2,072	52.27
Region of Indonesia						
Western of Indonesia	3,448	52.50	1,207	46.35	2,241	56.53
Central of Indonesia	2,410	36.69	1,020	39.17	1,390	35.07
Eastern of Indonesia	710	10.81	377	14.48	333	8.40

Source data: Indonesia Demographic Health Survey/ IDHS (2012)

Table 5 showed that 69% of mothers had a husband who finished education until secondary level and around 98% had husband/ partner who worked. The majority of mothers had male children (52%). These patterns also occurred for mothers who practiced EBF and mothers who practiced non-EBF.

The information in Table 5 showed that most of the mothers lived in the Western parts of Indonesia (53%), and the most of them lived in the rural part of Indonesia (55%). These patterns also found among mothers who practiced EBF and mothers who practiced non-EBF. Around 40% of mothers who practiced EBF delivered their baby at home. While for those who practiced non-EBF, the majority of them delivered their baby at private health facilities (40%).

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4.4 Univariate logistics regression of endowment factors that affect EBF and non-EBF practice

This subchapter elaborates the univariate effect of the endowment factors of in mothers who practiced EBF and non-EBF. Table 6 showed that there were three variables that explain the significance of EBF and non-EBF practices, i.e. age of mother at birth, mother's employment status and decision on mothers healthcare.

Table 6. The univariate logistic regressions of endowment factors with EBF and non-EBF practice.

Variables	EBF practice		p – value	Nagelkerke R^2 (%)
	OR [EXP(β)]	CI (95%)		
A. Biology factors				
Birth interval			0.00[***)]	0.46
Below 24 months[@]	1			
24 months and above	1.27	(1.15 – 1.41)		
Mode of child delivery			0.00[***)]	2.39
Normal delivery[@]	1			
Caesarean section delivery	0.42	(0.36 – 0.50)		
Breastfeeding initiation			0.00[***)]	35.23
Immediately[@]	1			
Within a day	0.4	(0.35 – 0.46)		
More than a day	0.04	(0.03 – 0.05)		
B. Experience factors				
Age of mother at birth			0.48	0.03
15 – 24	1.04	(0.93 – 1.16)		
25 – 34[@]	1			
35 – 49	1.09	(0.95 – 1.25)		
Birth order of child			0.00[***)]	0.67
1st, 2nd, and 3rd[@]	1			
4th and above	1.47	(1.29 – 1.67)		
C. Knowledge factor				
Mother's education level			0.00[***)]	1.79
No education	2.81	(2.04 – 3.87)		
Primary[@]	1			
Secondary and higher	0.77	(0.69 – 0.85)		
D. Skill factors				
Mother's employment status			0.06[*)]	0.07
Not working[@]	1			
Working	0.91	(0.82 – 1.00)		

Table 6. Continued

Variables	EBF practice		p – value	Nagelkerke R² (%)
	OR [EXP(β)]	CI (95%)		
Decision on mother's healthcare			0.05[*)]	0.12
Mother alone[@]	1			
Joint mother – another person	1.08	(0.97 – 1.21)		
Another person alone	1.2	(1.03 – 1.39)		
E. Wealth resources factor				
Wealth status of household			0.00[***)]	2.43
Poorest[@]	1			
Poorer	0.75	(0.66 – 0.87)		
Middle	0.59	(0.52 – 0.70)		
Richer	0.57	(0.49 – 0.67)		
Richest	0.45	(0.38 – 0.52)		
Resource of access to media			0.00[***)]	2.16
No access to any media[@]	1			
Have access to media	0.32	(0.25 – 0.40)		
ANC visits in last trimester of pregnancy			0.00[***)]	0.57
No antenatal visits[@]	1			
Yes, do ANC visits	0.62	(0.52 – 0.74)		

Source data: Indonesia Demographic Health Survey/ IDHS (2012)
Note: @ = reference category; ***) = significant at level 1%; **) = significant at level 5%; and *) = significant at level 10%.
The effect on practice non-EBF is reciprocal to the effect on practice EBF = 1/[EXP(β)].

The effects of the biological factors were explained by the birth interval, mode of delivery and breastfeeding initiation. On the univariate analysis, these variables exerted strong effects on EBF practice and non-EBF practice, with significance α level below 1% and percentage of variability of the practiced EBF and practiced non-EBF explained (R^2) around 0.5% (birth interval), 2.4% (mode of delivery) and 35.2% (breastfeeding initiation).

The information in table 6 showed that mothers who delivered two last children with 24-months and above interval were 27% more likely of practicing EBF compared to those who delivered two last children with the interval of less than 24 months. As for mothers who delivered baby using caesarean section were 58% less likely to practice EBF compared to those who delivered the baby normally. Furthermore, Table 6 showed that mothers who did breastfeeding initiation immediately had a higher likelihood of practicing EBF than mothers who did breastfeeding initiation later (within a day and more than a day).

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The effects of these variables toward mothers who did practice non-EBF are as follows: mothers who delivered two last children with 24-months and above interval were less likely to practice non-EBF compared to those who delivered two last children with the interval of less than 24 months [OR=1/1.27]. Then, mothers who delivered baby used caesarean section were more likely to practice non-EBF compared to those who delivered the baby normally [OR=1/0.42]. As for mothers who did immediately breastfeeding initiation had a lower likelihood of practicing non-EBF than mothers who did breastfeeding initiation later.

Table 6 showed that knowledge factor strongly and negatively associated with EBF and non-EBF practice at 1% with R^2 around 1.8%. It showed that mothers who have the education (primary, secondary or higher) tended to have a lower likelihood of practicing EBF than Indonesian mothers who had no education. On the contrary mothers who have no education tended to have a lower likelihood of practicing non-EBF than Indonesian mothers who have the education.

Age of mother at birth variable was not significant at all levels of α. However, it showed that Indonesian mothers in age group of $25 - 34$ years old were less likely to practice EBF than mothers in the younger age group $(15 - 24)$ and the older age group $(35 - 49)$ with $OR_{15 - 24} = 1.04$ (CI95% = 0.93 – 1.16) and $OR_{35 - 49} = 1.09$ (CI95% = 0.95 – 1.25) respectively. It meant that mothers in the age group of $25 - 34$ years old were more likely to practice non-EBF than mothers in the younger age group $(15 - 24)$ [$OR_{35 - 49}$=1/1.04] and the older age group $(35 - 49)$ [$OR_{15 - 24}$=1/1.09].

On the contrary, birth order was found to be strong and positively affected EBF and non-EBF practice at a level of 1% with R^2 around 0.7%. Mothers who had higher children's birth order, i.e. higher than third, were more likely to practice EBF with OR = 1.47 (CI95% = 1.29 - 1.68). This result also meant that mothers who had lower children's birth order i.e. first, second or third, were more likely to practice non-EBF than mothers who had children's birth order higher than third [OR=1/1.47].

Furthermore, skill factors were not significant at 5% and had R^2 around 0.7% (mother's employment status) and 0.12%(decision on mother's health care). However, we also found that mothers who worked were 9% less likely to practice EBF than Indonesian mothers who did not work. Moreover, Indonesian mothers who had the autonomy to decide their health care were less likely to practice EBF than mothers who made joint decisions concerning their health care with another person with $OR_{joint} = 1.08$(CI95% = 0.97 – 1.21) and $OR_{other} = 1.20$(CI95% = 1.03 – 1.39). These results also meant that for mothers who worked and for mothers who had the autonomy to decide their health care were more likely to practice non-EBF compared to their counterparts.

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The last endowment factor is wealth resources represented by the wealth status of the household, the source of access to media and the ANC visit in last trimester of pregnancy. The effect of these variables was strong and negative to the EBF and non-EBF practice with significance level at 1% with R^2 around 2.4% (wealth), 2.16% (media) and 0.5% (ANC). The following paragraphs explain these effects.

The effect of the wealth status of the household was evident in our analysis. The richer the wealth status of the household, the less likely they practiced EBF. In particular, the highest negative effect was found among mothers who had the richest status of the household (OR= 0.45). With a closer examination on the 95% CI, only poorer (0.66–0.87) and richest (0.38–0.52) categories gave significant different effects toward EBF practice, whereas other categories did not give different effects. This result also showed that the richer the status of the household, the more likely they practiced non-EBF.

Analysis on other variables related to resources factors showed that mothers who had resources of access to media were 68% less likely to practice EBF as compared to mothers who did not have access to any media. Among mothers who did ANC visit/s in the last trimester of pregnancy, there was a 38% less likelihood of practicing EBF compared to mothers who did not do ANC visit/s in last trimester. On the contrary mothers, who had resources of access to media and mothers who did ANC visit/s in the last trimester of pregnancy were more likely to practice non-EBF.

4.5 Univariate logistics regression of conversion factors that affect EBF and non-EBF practice

Table 7 showed that most variables of conversion factors were highly significant to explain the EBF and non-EBF practice among Indonesian mothers, with significance level at 1%. Only sex of child variable was significant at 5%.

The effects of the family factor toward EBF and non-EBF practice explained (R2) by the variable of husband's education level around 1.3%, husband's employment status (0.1%) and sex of the child (0.1%). Table 7 informed that mothers whose husbands had less education than secondary or higher education exhibited a higher likelihood of practicing EBF. Mothers whose husbands worked were 37% less likely to practice EBF compared to those whose husbands did not work respectively [OR= 0.63; CI(0.45 – 0.89)]. It also showed that mothers who delivered female babies were 11% more likely to practice EBF as compared to those who delivered male babies [OR= 1.11; CI(1.00 – 1.23)]. These results also showed that mothers whose husbands have higher education than no education. Mothers whose husbands worked exhibited a higher likelihood of practicing non-EBF [OR= 1/0.63]. As for mothers who delivered male babies tended to have a higher likelihood of practicing non-EBF [OR= 1/1.11].

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Table 7. The univariate logistic regressions of conversion factors with EBF and non-EBF practice.

Variables	EBF practice		p – value	Nagelkerke R^2 (%)
	OR [EXP(β)]	CI (95%)		
A. Family factors				
Husband education level			0.00[***)]	1.31
No education	3.02	(2.06 – 4.44)		
Primary	1.39	(1.25 – 1.55)		
Secondary and higher[@]	1			
Husband employment status			0.00[***)]	0.14
Not working[@]	1			
Working	0.63	(0.45 – 0.89)		
Sex of child			0.04[**)]	0.09
Male[@]	1			
Female	1.11	(1.00 – 1.23)		
B. Environment factors				
Place of delivery of the child			0.00[***)]	1.06
Home[@]	1			
Public health institution	0.98	(0.86 – 1.12)		
Private health institution	0.68	(0.61 – 0.76)		
Type of place of residence			0.00[***)]	0.7
Urban	0.74	(0.67 – 0.82)		
Rural[@]	1			
Region of Indonesia			0.00[***)]	1.86
Western of Indonesia[@]	1			
Central of Indonesia	1.36	(1.23 – 1.52)		
Eastern of Indonesia	2.1	(1.79 – 2.48)		

Source data: Indonesia Demographic Health Survey/ IDHS (2012)
Note: @ = reference category; ***) = significant at level 1%; **) = significant at level 5%; and *) = significant at level 10%.
     The effect on practice non-EBF is reciprocal to the effect on practice EBF = 1/[EXP(β)].

Environment factors i.e. place of delivery of the child, the type of place of residence and the region of Indonesia showed high and significant effects to explain EBF and non-EBF practice with significance level at 1%. The R^2's were around 1% (place of delivery), 0.7%(residence) and 1.8% (region).

Table 7 showed that mothers who delivered their babies at home tended to have a higher likelihood of practicing EBF compared to those who delivered their babies at health institution. Our analysis also showed that mothers who lived in urban areas were 26% less likely to practice EBF as compared to those who lived in rural areas [OR= 0.74; CI(0.69 – 0.81)]. Furthermore, the present study found that

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Indonesian mothers who lived outside the western region of Indonesia have a higher likelihood of practicing EBF compared to those who lived in the western region of Indonesia.

These results also showed that mothers who delivered their babies at home tended to have a lower likelihood of practicing non-EBF compared to those who delivered their babies at health institution. Mothers who lived in urban areas and for mothers who lived in the western region of Indonesia tended to have a higher likelihood of practicing non-EBF compared to their counterparts.

4.6 Detecting and fixing collinearity problems

Before analyzing the multivariate effects of endowment and conversion factors toward the EBF practice among Indonesian mothers, we attempted to detect whether collinearity or confounding problems exist among the explanatory variables. The results of these analyzes described in the following paragraphs.

Table 8. Variation inflation factor (VIF) test of endowment and conversion factors of Indonesian mothers

Variables	Collinearity Statistics		Variables	Collinearity Statistics	
	Tolerance	VIF		Tolerance	VIF
Endowment factors					
Dummy Birtint>24	0.69	1.46	Dummy Decision joint	0.79	1.26
Dummy Delivery by caesarean section	0.85	1.18	Dummy decision Other	0.79	1.26
Dummy BF initiation within a day	0.88	1.14	Dummy Have access to media	0.80	1.25
Dummy BF initiation more than a day	0.86	1.17	Dummy do ANC during last trimester	0.83	1.21
dummy Mother No education	0.77	1.30	*Conversion factors*		
Dummy mother secondary and higher edu	0.68	1.47	Dummy husband no education	0.82	1.22
Dummy age of mother 35 – 49	0.73	1.36	Dummy husband primary education	0.72	1.39
Dummy age of mother 15 – 24	0.65	1.54	Dummy Husband's working	0.97	1.03
Dummy Birth order 4th and above	0.70	1.42	Dummy sex of child female	1.00	1.00
Dummy mother working	0.94	1.06	Dummy place of delivery-public health	0.66	1.51
Dummy wealth index poorer	0.63	1.59	Dummy place of delivery-private health	0.53	1.89
Dummy wealth index middle	0.59	1.71	Dummy type of place of residence urban	0.72	1.39
Dummy wealth index richer	0.52	1.93	Dummy central Indonesia region	0.79	1.26
Dummy wealth index richest	0.48	2.08	Dummy eastern Indonesia region	0.74	1.36

Source data: Indonesia Demographic Health Survey/ IDHS (2012)

Collinearity detected through the variation inflation factors (VIF). Test for every dummy category of the independent variables was conducted. Table 8 showed that all of the VIF values of the dummy variables were below 5, which can be interpreted that there was no multicollinearity between categories of the

variables included in the model. Hence, it can be inferred that there were no multicollinearity problems in the regression model of Indonesian mothers practice EBF with the mentioned independent variables.

As for eliminating the confounding factors that may occur, we used the method of the forward likelihood ratio in SPSS. This method was used to exclude non-significant and possible confounding or collinear variables. As the result was the fittest model, that contained variables that best explained the practice EBF and non-EBF.

4.7 Multivariate model of logistics regression of EBF and non-EBF practice of Indonesian mothers with interaction

This subchapter elaborates the final multivariate (adjusted) model of EBF practice among Indonesian mothers and introduces the "interaction". The interaction variables were being added to make the insignificant variables significant. These interactions had also strengthened the analysis of the variables in the model. There were two interactions included in the model as shown in Table 9.

Before interpreting the results of the final model, we elaborated the goodness of fit of the model. The first test of goodness of fit was the omnibus test, where the χ^2 test showed the value of 2,268.77 with p–value = 0.00. It interpreted that the logistics regression model of EBF and non-EBF practice would be better when including the independent variables, rather than the constant model. Furthermore, the inclusion of the independent variables could explain the variability of EBF and non-EBF practice among Indonesian mothers with proportion around 39.5% (NagelkerkeR^2).

The next test was the Hosmer-Lemeshow test. This test showed the χ^2 value of 8.38 with p–value = 0.40, which could be interpreted the model could estimate the value similar to the observed value. To test how much the model can correctly estimate the observed value, the classification table was examined. This table showed that in overall, the model can correctly estimate the observed value at around 74.2%. The model can also predict the Indonesian mother's EBF practice correctly at around 74.5%, whereas, for Indonesian mother non-EBF practice, the model predicted correctly at around 73.9%.

Therefore, considering the goodness of fit tests results [appendix], the logistic regressions model for EBF and non-EBF practice among Indonesian mothers were confirmed. Also, the present study could interpret the effect of the endowment factors and conversion factors without any doubt of bias or false conclusions.

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Table 9. Final multivariate (adjusted) model of EBF and non-EBF practice with interactions

Variables	EBF practice		
	AOR [EXP(β)]	CI (95%)	p – value
1. Endowment factors			
A. Biology factors			
Birth interval			0.04[**)]
Below 24 months[@]	1		
24 months and above	1.14	(1.01 – 1.28)	
Mode of child delivery			0.00[***)]
Normal delivery[@]	1		
Caesarean section delivery	0.69	(0.36 – 0.50)	
Breastfeeding initiation			0.00[***)]
Immediately[@]	1		
Within a day	0.39	(0.35 – 0.46)	
More than a day	0.04	(0.03 – 0.05)	
B. Skill factors			
Decision on mother's healthcare			0.02[**)]
Mother alone[@]	1		
Joint mother and another person	1.13	(0.99 – 1.29)	
Another person alone	1.28	(1.07 – 1.53)	
C. Wealth resources factor			
Wealth status of household			0.00[***)]
Poorest[@]	1		
Poorer	0.93	(0.78 – 1.11)	
Middle	0.72	(0.59 – 0.88)	
Richer	0.77	(0.62 – 0.95)	
Richest	0.60	(0.47 – 0.76)	
Resource of access to media			0.14
No access to any media[@]	1		
Have access to media	1.47	(0.88 – 2.45)	
ANC visits in last trimester of pregnancy			0.00[***)]
No antenatal visits[@]	1		
Yes, do ANC visits	2.39	(1.36 – 4.19)	
2. Conversion factors			
A. Family factors			
Husband education level			0.01[**)]
No education	1.89	(1.13 – 3.15)	
Primary	1.16	(1.00 – 1.33)	
Secondary and higher[@]	1		

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<u>**Table 9.**</u> Continued …(1)

Variables	EBF practice		
	AOR [EXP(β)]	CI (95%)	p – value
Sex of child			0.05[**)]
Male[@]	1		
Female	1.13	(1.00 – 1.27)	
B. Environment factors			
Place of delivery of the child			0.00[***)]
Home[@]		1	
Public health institution	1.35	(1.14 – 1.61)	
Private health institution	0.97	(0.82 – 1.15)	
Type of place of residence			0.15
Urban	1.14	(0.95 – 1.36)	
Rural[@]	1		
More than a day	0.04	(0.03 – 0.05)	
B. Skill factors			
Decision on mother's healthcare			0.02[**)]
Mother alone[@]	1		
Joint mother and another person	1.13	(0.99 – 1.29)	
Another person alone	1.28	(1.07 – 1.53)	
C. Wealth resources factor			
Wealth status of household			0.00[***)]
Poorest[@]	1		
Poorer	0.93	(0.78 – 1.11)	
Middle	0.72	(0.59 – 0.88)	
Richer	0.77	(0.62 – 0.95)	
Richest	0.60	(0.47 – 0.76)	
Resource of access to media			0.14
No access to any media[@]	1		
Have access to media	1.47	(0.88 – 2.45)	
ANC visits in last trimester of pregnancy			0.00[***)]
No antenatal visits[@]	1		
Yes, do ANC visits	2.39	(1.36 – 4.19)	
Region of Indonesia			0.00[***)]
Western of Indonesia[@]	1		
Central of Indonesia	1.38	(1.15 – 1.64)	
Eastern of Indonesia	2.42	(1.83 – 3.19)	

Table 9. Continued …(2)

Variables	EBF practice		
	AOR [EXP(β)]	CI (95%)	p – value
3. Interactions			
ANC visits in last trimester by **resource of access to media**			0.00[***)]
Do ANC visits by having access to media	0.28	(0.15 – 0.52)	
Region of Indonesia by type of place of residence			0.00[***)]
Central of Indonesia by urban	0.65	(0.50 – 0.84)	
Eastern of Indonesia by urban	0.55	(0.36 – 0.85)	

Source data: Indonesia Demographic Health Survey/ IDHS (2012)
Note: @ = reference category; ***) = significant at level 1%; **) = significant at level 5%; and *) = significant at level 10%.
   The effect on practice non-EBF is reciprocal to the effect on practice EBF = 1/[EXP(β)].

Information in table 9 showed that the factors affecting Indonesian mothers to practice EBF and non-EBF were biology, skill and resource represented endowment factors and family and environment represented conversion factors. The proxy variables representing these factors were mostly significant at least at 5%. Only resource of access to media and residence that were not significant in the model.

Table 9 also showed there were two interaction factors that are significant at 1%, i.e. interaction of ANC visits and resource of access to media and the interaction of region and residence. With these interactions, the insignificant variables can be analyzed in the model and the analysis of the variables depended on the other variables, i.e. the analysis of ANC visits depended on the analysis of resources of access to media.

The interpretation of the model was generated by examining the biology factors through the variable of the birth interval, mode of child delivery and breastfeeding initiation. Table 9 showed that the EBF practice was 14% more likely to occur among mothers who gave birth at the interval of 24 months or more between to babies as compared to the reference category respectively. On the contrary, the EBF practice was 30% less likely to occur among mothers who delivered their children by caesarean section as compared to the reference category respectively. Moreover, mothers who immediately breastfed their children were more likely to practice EBF than mothers who breastfed their child later with $AOR_{within\ a\ day}$ = = 0.39(CI 95% = 0.35 – 0.46) and $AOR_{more\ than\ a\ day}$ = 0.03(CI95% = 0.03 – 0.04) respectively.

Previous results showed that mothers who practiced non-EBF were less likely to occur among mothers who gave birth at the interval of 24 months or more. But it was more likely to occur among mothers who delivered their babies through caesarean section method. Furthermore, mothers who later breastfed their children were more likely to practice non-EBF than mothers who breastfed their child immediately respectively.

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The effects of the resource factors measured through the wealth status of the household, the resources of access to media and the ANC visit/s in the last trimester of pregnancy. The effect of the wealth status of household on EBF practice was evident because the wealthier the household status of Indonesian mothers, the less likely they practiced EBF. A significant effect of wealth status on EBF practiced found in poorer status and richest status.

EBF practice was more likely to occur among Indonesian mothers who had access to media and also among Indonesian mothers who had resources to do ANC visits in the last trimester of pregnancy (main effect). These results also meant that those mothers were less likely to practice non-EBF. However, different results emerged in the interaction between these variables [figure5]. The interaction showed that mothers who had both or none of the resources were less likely to practice EBF than mothers who had access at least one of the resources. These results also meant that those mothers were more likely to practice non-EBF.

Figure 5. Interaction of access to media and ANC visits in last trimester of pregnancy [adjusted(e^{β})].
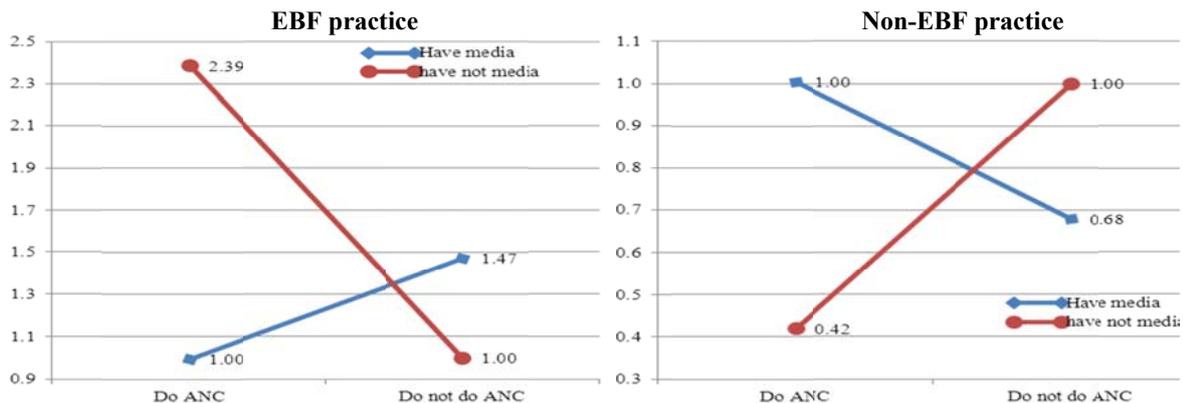
Source data: Indonesia Demographic Health Survey/ IDHS (2012)

The last endowment factor is the skill factor, which represented by the variable of mother's health care decision. EBF practice was less likely to occur among women who decided on their health care alone with $AOR_{joint} = 1.13(CI95\% = 0.99 - 1.29)$ and $AOR_{other} = 1.28(CI95\% = 1.07 - 1.53)$. which also meant that the non-EBF practice was more likely occurred among women who decided on their healthcare alone with $AOR_{joint} = 1/1.13$ and $OR_{other} = 1/1.28$. These results showed that autonomy (skill to decide) of mothers toward their healthcare did not improve the possibility to practice EBF but increased the practice of non-EBF. Furthermore, these results also showed that the role of other people (e.g. husband or family) enhanced the possibility of Indonesian mother to practice EBF.

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Family factor that represented by husband's education level and sex of the child showed two different effects on practice EBF. The effect of husband's education level was negative toward EBF practice. Mothers whose husband had education level less than secondary and higher were more likely to practice EBF. Mothers who delivered female baby were 13% more likely to practice EBF compared to mothers who delivered the male baby. These results also showed that the mothers whose husband had education more than no education were more likely to practice non-EBF. As for Mothers who delivered male baby were (1/1.13)% less likely to practice non-EBF compared to mothers who delivered a female baby.

The effect of environmental factors i.e. the place of delivery, types of the place of residence and region are shown in Table 9. It shows that the best environment to deliver a child that increase the likelihood of practicing EBF was at public health facilities with AOR = 1.35 [CI95% = (1.14 - 1.61)]. As for the worst environment to deliver a child that decrease the likelihood of practicing EBF was at private health facilities with AOR= 0.97 [CI95%(0.82 – 1.15)]. These results also meant that mothers who delivered their baby at public health facilities were less likely to practice non-EBF but mothers who delivered their baby at private health facilities were more likely to practice non-EBF [AOR_{public}= 1/1.35 and $AOR_{private}$= 1/0.97].

The other two variables were interpreted in the interaction between them and shown in figure 6. It showed that the likelihood of practicing EBF was higher in the rural residence and the region outside western of Indonesia. Figure 6 also informed that the highest odds ratio of Indonesian mothers that practiced EBF occurred in the rural residence of eastern Indonesia (AOR = 2.41). The least odds ratio of Indonesian mothers that practiced EBF occurred in the urban residence of central Indonesia and rural residence of western Indonesia (AOR = 1.00). These results also showed that mothers who lived in the urban residence and western region were more likely to practice non-EBF. The highest odds ratio of mothers to practice non-EBF occurred in urban residence of central Indonesia and rural residence of western Indonesia (AOR = 1.00) and the lowest was in the rural residence of eastern Indonesia (AOR = 0.41).

Figure 6. Interaction of type of place of residence and region of Indonesia [adjusted(e^{β})]
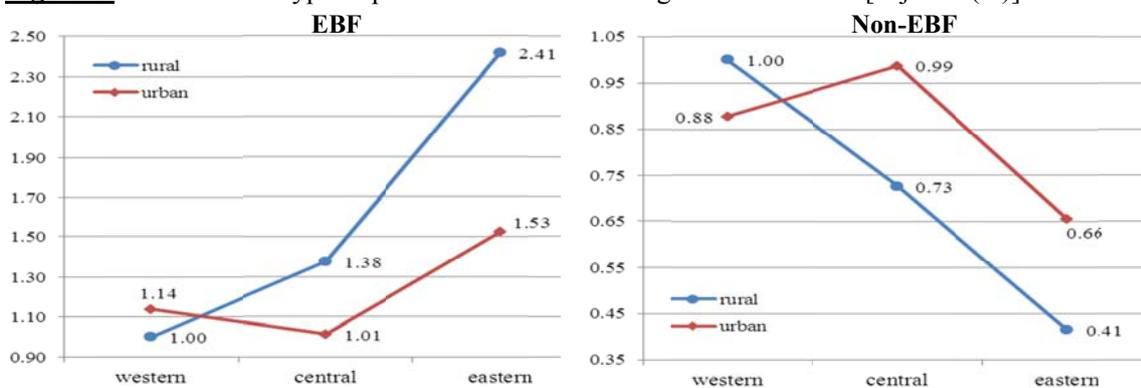
Source data: Indonesia Demographic Health Survey/ IDHS (2012)

Chapter 5. Discussions and Conclusions

5.1 Discussions of the results

The present study examined the determinants of practice breastfeeding of 6,568 Indonesian women aged 15 – 49 who had children under two years old and had ever breastfed their children. Data derived from Indonesian Demographic Health Survey (IDHS) 2012 and can be retrieved at www.measuredhs.com. The capability approach framework was utilized to determine the endowment and conversion factors that affected the breastfeeding practices among Indonesian mothers. With this framework, the present study could capture the mechanism of the existing variables that explained how the endowment and conversion factors affecting the final goal (function) of breastfeeding practices (EBF and non-EBF practice).

The present study found that around 60% of Indonesian mothers did not practice EBF in the first three days of the children's life, while around 40% practiced EBF. These results confirmed the IDHS 2012 results (BPS *et al*., 2012). Most Indonesian mothers who practiced non-EBF chose to feed their children with "infant formula" and other types of milk. It could be due to most of the Indonesian mothers who practiced non-EBF were socio-economically better off and recognized the use of infant formula as a substitute of breastfeeding (Chandrashekhara *et al*., 2007).

From the univariate logistic regressions, this study found that the highest factors that explained the variability (R^2) of EBF and non-EBF practice were from endowment factors (biological and wealth resource factors). The biological factors through variable breastfeed initiation (35.2%) and wealth resource factors through variable wealth status of the household (2.4%) considered as the highest R^2 in this study. Even though not directly indicating the same things, these results were also found in studies by Chandrashekhara *et al.* (2007), Mihrshahi *et al.* (2010) and Ssenyonga *et al.* (2012).

From the multivariate logistic regressions, this study found that there were three factors and seven proxy variables of endowment factors that significantly influenced Indonesian mothers to practice EBF and non-EBF. Among the conversion factors, there were two factors and four proxy variables that significantly affected EBF and non-EBF practice. The effects of these variables toward mothers who practice EBF were reciprocal of mothers who practice non-EBF.

Individual endowment factors represented by biological factors with proxy variables of birth interval, breastfeeding initiation, and mode of child delivery were strongly and negatively affected mothers to practice EBF. This result meant that these factors were strongly and positively affected mothers to practice non-EBF. Indonesian mothers who underwent normal delivery, chose to initiate breastfeeding

immediately and had birth interval ≥24 months interval had a higher opportunity to practice EBF. These results are similar to previous studies which investigated similar factors, such as those conducted in Nigeria, Ghana, Uganda, South Korea, and Nepal (Prior *et al*., 2004, Chandrashekhara *et al*, 2007, Chunga *et al*, 2008, Shahla *et al*, 2010, Ssenyonga *et al*, 2012 and Bbaale, 2014).

It was argued when a mother delivered a child by caesarean section, the recuperate time after delivery would be longer than normal delivery, which restricted the mother to initiate breastfeeding early to their child. As a result, the child may be given something other than breastmilk (Prior *et al*., 2004 and Chandrashekhara *et al*., 2007).

Breastfeeding initiation considers as the primary determinants of EBF or non-EBF practice. Early breastfeeding initiation by mothers implies that they wanted or chose to feed their infants with breast milk. It also gives an opportunity to infants to get used to the taste of breast milk (Chandrashekhara *et al.*, 2007, Chunga *et al.*, 2008 and Ssenyonga *et al.*, 2012).

The birth interval may influence EBF or non-EBF practice because a mother who had birth interval below 24 months may not be able to complete EBF. Mothers who are pregnant with the subsequent child before the previous child weaned may have to give their child with non-breast milk liquid because pregnancy may stop breastfeeding (Bbaale, 2014).

The present study also found that household endowment factors influence EBF practice through wealth resource factors. These factors represented by wealth status of the household, the resource of access to media and ANC visits in last trimester of pregnancy. Wealth status of the household strongly and negatively affected the EBF practice. Mothers from a household with high wealth status were significantly less likely to practice EBF. These mothers may have low education and poor knowledge about the importance of EBF. Moreover, mothers with high wealth status may be able to purchase and understand the use of infant formula as substitute food for breastmilk. Therefore, it lead them to practice non-EBF and vice versa (Chandrashekhara *et al*., 2007, and Mihrshahi *et al.*, 2010).

Resource of access to media and ANC visits in last trimester of pregnancy showed strong and positive effect toward EBF practice. Indonesian mothers who had access to one of these resources were more likely to practice EBF than mothers who did not have any. These outcomes confirmed the findings of previous researchers who argued that if mothers have access to media or did ANC visit/s they would get information and understand the benefit of EBF. These resources increased the awareness to practice EBF. Those who do not have access to these resources would not get the information nor understand the benefit

of EBF. This situation could lead to the practice of non-EBF (Arora *et al.,* 2000 and Alemayehu *et al.*, 2009; Tender *et al.*, 2009 and Agho *et al.*, 2011).

Another individual endowment factor was the skill factor, which represented by decision on mother's health care. The present study found that if mothers had the skill to decide their health care on their own, the lower the opportunity for them to practice EBF compared to mothers who jointly decide their health care. It is possible that mothers who noticed their autonomy when decided their health care still did not understand the benefits of practicing EBF, which made them practice non-EBF (Labbok,2006). Furthermore, this finding also meant that the support of another person (husband or family) contributed a significant role for the mother to practice EBF (Februhartanty et al., 2006 and Machado et al., 2014).

Among conversion factors that tested in this study, the family factor that represented by the role of the husband (husband's education level) and sex of the child were important for EBF practice. The effect of husband's education level showed negative effect toward EBF practice. Mothers whose husband had a lower education than secondary and higher tended to have a higher likelihood of practicing EBF. Husbands with lower education level may have less chance to work, which means that they have more time to support the mothers to practice EBF (Februhartanty *et al.*, 2006 and Machado *et al.*, 2014). The effect of this variable toward non-EBF practice was reciprocal of the mentioned effects.

Another variable that represented the family factor was the sex of children. The result showed that having female children tended to increase the chance to practice EBF. This result confirmed the previous research by Shahla *et al.* (2010) and Agho *et al.* (2014).

The last conversion factor that affected Indonesian mothers to practice EBF and non-EBF was the environmental factor. This factor represented by the place of delivery, type of place of residence and region of Indonesia. In terms of place of delivery, public health facilities as the place of delivery supported the mothers to achieve the function of practice EBF. On the contrary, private health facilities and home as the place of delivery supported mothers to practice non-EBF.

These results were similar to previous studies from Tender *et al.* (2009) and Bbaale (2014). At home, there is no person who understands the importance of breastfeeding initiation. Consequently, this could make the mothers practice non-EBF (Chunga *et al.*, 2008 and Bbaale, 2014). Health personnel such as nurses and midwives at private health facilities may have poor knowledge or less motivation to provide information on breastfeeding to mothers. Meanwhile, in public health facilities, exclusive breastfeeding has been intensively promoted especially in the last few decades. As a result, mothers who delivered at

private health facilities were less encouraged for mothers to practice EBF, or even use infant formula (Tender *et al.*, 2009).

The effects of type of place of residence and region of Indonesia toward the EBF and non-EBF practice discovered through the interaction effect of these variables. The results showed that better-supported place in Indonesia for mothers to practice EBF located in the eastern regions of Indonesia, in rural and urban residence. Meanwhile, better-supported place in Indonesia for mothers to practice non-EBF were located in the rural residence of western Indonesia and urban residence of central Indonesia.

These results confirmed the previous researchers who said that EBF practice would occur among mothers who lived in rural parts (Victor *et al.*,2013).With these results, spatial intervention toward EBF practice could be implemented by the government of Indonesia to increase the prevalence of EBF practice in Indonesia, which can reduce the infant mortality and achieve the MDGs.

5.2 Conclusions of the research

This study aims to assess endowment and conversion factors that influence the breastfeeding practices among Indonesian mothers using the capability approach framework. The results of the present study identified endowment and conversion factors that affect breastfeeding practice.

The results of the present study showed that the proportion of EBF practice among Indonesian mothers is reasonably low when compared to mothers who practice non-EBF (40% vs. 60%). The majority of mothers who did not practice EBF preferred to feed their children with infant formula or other types of liquid. The multivariate logistic regressions was used with interaction to answer the research questions. The results were as follows.

a. The endowment factors that had significant and positive effect towards EBF practice but had negative effect toward non EBF practice were 1) the biological factor with proxy variables of birth interval; and 2) wealth resources factor with proxy variable of interaction of resource of access to media and ANC visits in the last trimester of pregnancy.

b. The endowment factors that had significant negative effect toward EBF practice but had positive effect toward non EBF practice were 1) biological factor with proxy variables of breastfeeding initiation and mode of child delivery; skill factor with proxy variable of decision on mother's healthcare (autonomy of mothers); and 2) wealth resources factor with proxy variable of wealth status of household.

c. The conversion factors that had significant negative effect toward EBF practice but had positive effect toward non EBF practice were 1) family factors with proxy variable of husband's education

level and sex of child; and 2) environment factor with proxy variable of place of delivery, interaction of type of place of residence and regions of Indonesia.

Even though the endowment and conversion factors in the present study had significant effects toward EBF practice, but the present study highlighted the most important factors that significantly influenced the practice of EBF and non EBF. These factors were 1) biology factors i.e. breastfeeding initiation; 2) wealth resources factor i.e. wealth status of household; and 3) environment factors i.e. place of delivery and interaction of type of place of residence and regions of Indonesia.

5.3 Limitations of the research

Even though the present study has successfully answered the research questions and achieved the objectives of the study, there are still some limitations inherent in the present study. Firstly, the study is limited by the incomplete use of framework capability approach due to the limitation of the IDHS2012 dataset. Consequently, the present study could not predict two elements of this framework, namely, agency and capability set. Nevertheless, it has attempted to give the first insight into endowments and conversion factors that influence the function of breastfeeding within the capability approach. Secondly, the limitation on IDHS 2012 dataset did not allow the study to explore the duration of the breastfeeding practice. As a result, the present study could only define the EBF and non-EBF practice using the indicator of the first three days of the children's live.

5.4 Recommendation of the research

Based on the outcomes of the present study, there are some recommendations that could be given:

a. To increase the proportion of Indonesian mothers who practice EBF, the government of Indonesia should promote the benefit of EBF practice to Indonesian mothers. This effort should be done to all mothers from all socio-economic levels, and also to health practitioners who work at private health facilities. As for the region of priority, the government of Indonesia should promote the practice EBF in the urban residence of Indonesia, and specifically in the western Indonesia.

b. For next researchers who are interested in continuing this study especially using the capability approach framework, they should try to use other datasets. The use of primary data that can provide information on agency and capabilities should be considered to operationalize the capability approach better.

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APPENDIX

1. The goodness of fit tests of model EBF and non EBF practices

Omnibus Tests of Model Coefficients

		Chi-square	df	Sig.
Step 1	Step	33.743	5	.000
	Block	33.743	5	.000
	Model	2268.765	23	.000

Model Summary

Step	-2 Log likelihood	Cox & Snell R Square	Nagelkerke R Square
1	6552.761a	.292	.395

a. Estimation terminated at iteration number 6 because parameter estimates changed by less than .001.

Hosmer and Lemeshow Test

Step	Chi-square	df	Sig.
1	8.380	8	.397

Contingency Table for Hosmer and Lemeshow Test

		Practice non ebf = Practice Exclusive BF		Practice non ebf = Practice Non Exclusive BF		
		Observed	Expected	Observed	Expected	Total
Step 1	1	510	517.390	148	140.610	658
	2	447	445.498	211	212.502	658
	3	414	406.794	245	252.206	659
	4	372	370.391	285	286.609	657
	5	333	333.531	331	330.469	664
	6	253	269.530	404	387.470	657
	7	184	163.880	474	494.120	658
	8	50	46.415	606	609.585	656
	9	23	30.718	634	626.282	657
	10	18	19.853	626	624.147	644

Classification Table[a]

	Observed		Predicted		
			Practice non ebf		Percentage Correct
			Practice Exclusive BF	Practice Non Exclusive BF	
Step 1	Practice non ebf	Practice Exclusive BF	1941	663	74.5
		Practice Non Exclusive BF	1033	2931	73.9
	Overall Percentage				74.2

a. The cut value is .500

2. Syntax of the selection sample:

USE ALL.
COMPUTE filter_$=(B8$01 <= 1 & M4$1 = 93 | 95).
VARIABLE LABEL filter_$ 'B8$01 <= 1 & M4$1 = 93 | 95 (FILTER)'.
VALUE LABELS filter_$ 0 'Not Selected' 1 'Selected'.
FORMAT filter_$ (f1.0).
FILTER BY filter_$.
EXECUTE .

Then

USE ALL.
COMPUTE filter_$=(EBF >= 0 &BirthIntgroup>= 0 &Ceasarean>= 0 & TPB >= 0 & V714 >= 0
& DMHC2 >= 0 & HMedia2 >= 0 & ANC92
>= 0 & HW >= 0 & Hedu2 >= 0).
VARIABLE LABEL filter_$ 'EBF >= 0 &BirthIntgroup>= 0 &Ceasarean>= 0 & TPB >= 0 & V714
>= 0 & DMHC2 >= 0 & HMedia2 >= 0 &'+
' ANC92 >=... (FILTER)'.
VALUE LABELS filter_$ 0 'Not Selected' 1 'Selected'.
FORMAT filter_$ (f1.0).
FILTER BY filter_$.
EXECUTE .

3. Syntax of the logistics regression with interaction:

LOGISTIC REGRESSION EBF
/METHOD = FSTEP(LR) BirthIntgroupCeasarean TPB AM@birthGR Bord3 V1062 V714 DMHC2 HMedia2 ANC92 HW Hedu2 B4$01 POD2 V102
*Tregs V190 /METHOD = ENTER Tregs*V102 ANC92*HMedia2 ANC92 V102*
/CONTRAST (BirthIntgroup)=Indicator(1) /CONTRAST (Ceasarean)=Indicator(1) /CONTRAST (TPB)=Indicator(1) /CONTRAST
(AM@birthGR)=Indicator(1) /CONTRAST (Bord3)=Indicator(1) /CONTRAST (V1062)=Indicator(1) /CONTRAST (V714)=Indicator(1)
/CONTRAST (DMHC2)=Indicator(1) /CONTRAST (HMedia2)=Indicator(1) /CONTRAST (ANC92)=Indicator(1) /CONTRAST (HW)=Indicator(1)
/CONTRAST (Hedu2)=Indicator /CONTRAST (B4$01)=Indicator(1) /CONTRAST (POD2)=Indicator(1) /CONTRAST (V102)=Indicator
/CONTRAST (Tregs)=Indicator(1) /CONTRAST (V190)=Indicator(1)
/PRINT = GOODFIT CI(95)
/CRITERIA = PIN(.05) POUT(.10) ITERATE(20) CUT(.5) .