

# Breastfeeding Among Working Mothers in Beijing: Challenges, Awareness Gaps, and Awareness-Practice Gaps

Yunuo Xiao<sup>1</sup> and Sunny Mewati<sup>#</sup>

<sup>1</sup>Beijing SMIC Private High School

<sup>#</sup>Advisor

## ABSTRACT

For the health and development of mothers and children, the World Health Organisation (WHO) recommends that mothers breastfeed their children. According to guidelines published by the WHO, it is suggested that mothers exclusively feed their children breastmilk for six months after birth. In China, low breastfeeding, especially in urban areas, has been a concern that the government and health organizations have had for decades. Data collected in 2008 reveals that the exclusive breastfeeding rate of infants under 6 months in urban China is only around 15.8% and the trend continues to decrease. This paper examines the factors contributing to the awareness and awareness-practice gaps of breastfeeding among first-time, working mothers in urban Beijing. In total, 50 postnatal (within two years since given birth), first time, working mothers in urban Beijing, China were recruited. A self-administered survey was conducted for all participants and five in-depth interviews were held among the 50 participants. An awareness gap was identified among 50 working mothers in Beijing, with income loss, COVID-19, and scarce hospital resources as its three main determinants. The main factors of awareness-practice gap are TV commercials, IF promotion, self-perception, partner's involvement, and workplace experience.

## Introduction

### An Introduction to Breastfeeding

For the health and development of mothers and children, the World Health Organisation (WHO) recommends that mothers breastfeed their children. According to guidelines published by the WHO, it is suggested that mothers exclusively feed their children breastmilk for six months after birth. WHO also highly encourages continuing breastfeeding until their infants reach the age of two years, while introducing complementary foods and liquids that are “nutritionally adequate” after 6 months.<sup>1</sup> In China, low breastfeeding, especially in urban areas, has been a concern that the government and health organizations have had for decades. Data collected in 2008 reveals that the exclusive breastfeeding rate of infants under 6 months in urban China is only around 15.8% and the trend continues to decrease.<sup>2</sup>

There is an array of breastfeeding types. Thus, simply “breastfeeding” might not be adequate and effective enough according to WHO guidelines. The three main types of breastfeeding consist of *any breastfeeding*, *exclusive breastfeeding*, and *full breastfeeding*. *Any breastfeeding* refers to the infant being breastfed at some point with or without other drinks, formulas, or complementary foods. *Exclusive breastfeeding* is breastfeeding infants and feeding

<sup>1</sup> Jiang, Hou, Mu Li, and Dongling Yang. “Awareness, Intention, and Needs Regarding Breastfeeding: Findings from First-Time Mothers in Shanghai, China.” <https://doi.org/10.1089/bfm.2011.0124>.

<sup>2</sup> Ibid.

no other liquids (including water) or foods (vitamins, mineral supplements, medicines are exceptions). *Full breastfeeding* refers to almost exclusive breastfeeding, including small amounts of other liquids.<sup>3</sup>

There is extensive research on the positive impacts of breastfeeding on both child and maternal health. Binns et al.'s (2003) research results have shown breastfed children turned out lighter in infancy and were more likely to be protected from obesity, which would most likely follow them until adulthood. As obesity stands to induce or contribute to small illnesses as well as severe diseases, breastfeeding can be the most direct measure to prevent overweight, infant morbidity, and long-term health issues, and to promote public health.

Research has also shown that breastfeeding has substantial benefits on maternal health, including the prevention of cancers. A meta-analysis conducted by Chowdhury et al.<sup>4</sup> concludes that mothers who have ever breastfed and who breastfed for a longer duration have substantially lower risk of having breast and ovarian carcinoma. Breastfeeding mothers also have a lower risk of having type 2 diabetes. However, in terms of short-term health outcomes, the same study has also shown that the more a mother breastfeeds, the higher the possibility of continued lactational amenorrhoea.<sup>5</sup>

## Working Mothers

Working mothers face more challenges as they need to have a balance between taking care of their infants and performing at their workplace. Many barriers have been identified for working mothers to breastfeed. Financially, breastfeeding is hardly as cost-free as many claim it to be. The longer mothers choose to breastfeed their children, the more significantly their incomes stand to be negatively impacted.<sup>6</sup> Other significant barriers to breastfeeding, first systematically researched in 1987, include lack of work time flexibility, lack of legal protections (especially for informally employed mothers), self-efficacy (the belief that one's capacity to carry out certain behaviors to attain specific goals<sup>7</sup>), and familial support, along with the perceptions of others.<sup>8</sup>

Different occupational fields also affect mothers' initiation and continuation of breastfeeding. Mothers' employment in agricultural industries is positively related to the early initiation of breastfeeding, ever having breastfed, current breastfeeding, exclusive breastfeeding, and predominant breastfeeding. Business and white collar occupations are positively related with early initiation and ever having breastfed, but inversely associated with predominant breastfeeding. Industry related and business and white collar occupations are negatively related to current breastfeeding.<sup>9</sup>

## Breastfeeding in Urban China

Aside from the challenges all urban mothers face, China has its own culturally unique causes for its low rate of breastfeeding. Similar to many non-Western countries, senior women play important roles in the caring and feeding of

<sup>3</sup> Qiu, Liqian, Colin W. Binns, Yun Zhao, Andy H. Lee, and Xing Xie. "Breastfeeding Practice in Zhejiang Province, PR China, in the Context of Melamine-Contaminated Formula Milk." *Journal of Health, Population and Nutrition* 28, no. 2 (2010): 189–98. <http://www.jstor.org/stable/23499806>.

<sup>4</sup> Chowdhury, Ranadip, Bireshwar Sinha, Mari Jeeva Sankar, Sunita Taneja, Nita Bhandari, Nigel Rollins, Rajiv Bahl, and Jose Martines. "Breastfeeding and Maternal Health Outcomes: A Systematic Review and Meta-Analysis." *Acta Paediatrica* 104 (November 4, 2015): 96–113. <https://doi.org/10.1111/apa.13102>.

<sup>5</sup> Ibid.

<sup>6</sup> Rippeyoung, Phyllis L. F., and Mary C. Noonan. "Is Breastfeeding Truly Cost Free? Income Consequences of Breastfeeding for Women." *American Sociological Review* 77, no. 2 (2012): 244–67. <http://www.jstor.org/stable/23102570>.

<sup>7</sup> Bandura, Albert. *Self-Efficacy: The Exercise of Control*, 1972.

<sup>8</sup> Barber-Madden, Rosemary, Marybeth Albanese Petschek, and Jean Pakter. "Breastfeeding and the Working Mother: Barriers and Intervention Strategies." *Journal of Public Health Policy* 8, no. 4 (1987): 531. <https://doi.org/10.2307/3342277>.

<sup>9</sup> Chen, Jiawen, Tong Xin, Junjian Gaoshan, Qihong Li, Kaiyue Zou, Shihui Tan, Yuhua Cheng, et al. "The Association between Work Related Factors and Breastfeeding Practices among Chinese Working Mothers: A Mixed-Method Approach." *International Breastfeeding Journal* 14, no. 1 (June 27, 2019). <https://doi.org/10.1186/s13006-019-0223-z>.

infants. Grandmothers, often with their traditional beliefs and lack of knowledge of the WHO guidelines, tend to intervene in the breastfeeding process of infants. Grandmothers tend to introduce complementary foods to infants earlier than 6 months of birth.<sup>10</sup>

Moreover, the massive, often unregulated infant formula (IF) advertisements in China can affect mothers' perceptions on feeding.<sup>11</sup> Wu et al.'s study reveals that mothers believe IF are easier to quantify (thus knowing if they are feeding their children enough), have clearly labeled ingredients (unlike breastmilk), and hold just the same nutrition as breastmilk<sup>12</sup>.

## Related Research and Gaps in the Literature

I have found two papers that have similar research methods and topics that I intend to study for my own research. The first one, titled "Awareness, Intention, and Needs Regarding Breastfeeding: Findings from First-Time Mothers in Shanghai, China," by Jiang et al. (2012) explored the awareness of the WHO guidelines for breastfeeding and the intention to breastfeed among first-time mothers, and identifies the gap between mothers' needs and perinatal care provisions regarding breastfeeding promotion.<sup>13</sup> The study involved 635 mothers in three groups, divided by gestation periods. The first group of women, who were between 5-22 weeks of gestation, filled out questionnaires. The second group consisted of mothers in their third-trimester, who participated in focus group discussions. The third group consisted of postpartum mothers, who were involved in in-depth interviews. The results revealed that there were not clear awareness differences between the three groups, because the majority of the mothers were either unaware of the WHO guidelines or lacked a comprehensive understanding of the benefits of breastfeeding.<sup>14</sup>

However, a study done in Vietnam revealed that there are awareness-practice gaps between mothers, mainly determined by the lack of support from health facilities, and perceptions from the sociocultural environment.<sup>15</sup> Awareness-practice gap, in this context, is when mothers are aware of the suggested guidelines but do not act accordingly to them.

To date, literature exploring the discrepancy between breastfeeding awareness and practice in China has been limited to the Jiang (2012) paper. However, as Jiang et al. (2012) did not originally identify a discrepancy due to a lack of awareness among mothers, I plan to modify the subject and methodologies in order to conduct a study in urban Beijing. The purpose of this study is to analyze potential determinants of the awareness-practice gap, if any, of breastfeeding among first-time, working mothers in urban Beijing. Moreover, although Jiang et al. (2012) investigates working mothers in Shanghai, the population focuses on prenatal mothers and their intentions of breastfeeding. This paper intends to fill this gap by modifying the population to postnatal mothers to investigate the determinants of awareness gap and awareness-practice gap in the context of returning to the workplace.

This paper examines the factors contributing to the awareness and awareness-practice gaps of breastfeeding among first-time, working mothers in urban Beijing. The following research questions have been developed based on

<sup>10</sup> Aubel, Judi. "The Role and Influence of Grandmothers on Child Nutrition: Culturally Designated Advisors and Caregivers." *Maternal & Child Nutrition* 8, no. 1 (September 28, 2011): 19–35. <https://doi.org/10.1111/j.1740-8709.2011.00333.x>.

<sup>11</sup> Qiu, Liqian, Colin W. Binns, Yun Zhao, Andy H. Lee, and Xing Xie. "Breastfeeding Practice in Zhejiang Province, PR China, in the Context of Melamine-Contaminated Formula Milk." *Journal of Health, Population and Nutrition* 28, no. 2 (2010): 189–98. <http://www.jstor.org/stable/23499806>.

<sup>12</sup> Wu, Wei, Jian Zhang, Irma Silva Zolezzi, Lisa R. Fries, and Ai Zhao. "Factors Influencing Breastfeeding Practices in China: A Meta-aggregation of Qualitative Studies." *Maternal & Child Nutrition* 17, no. 4 (August 6, 2021). <https://doi.org/10.1111/mcn.13251>.

<sup>13</sup> Jiang, Hong, Mu Li, Dongling Yang, Li Ming Wen, Cynthia Hunter, Gengsheng He, and Xu Qian. "Awareness, Intention, and Needs Regarding Breastfeeding: Findings from First-Time Mothers in Shanghai, China." *Breastfeeding Medicine* 7, no. 6 (December 2012): 526–34. <https://doi.org/10.1089/bfm.2011.0124>.

<sup>14</sup> Ibid.

<sup>15</sup> Tuan, Nguyen T., Phuong H. Nguyen, Nemat Hajeeshoy, and Edward A. Frongillo. "Gaps between Breastfeeding Awareness and Practices in Vietnamese Mothers Result from Inadequate Support in Health Facilities and Social Norms." *The Journal of Nutrition* 144, no. 11 (November 2014): 1811–17. <https://doi.org/10.3945/jn.114.198226>.

the research topic: Are there gaps in awareness of the WHO breastfeeding guidelines and benefits to begin with? If so, what are the barriers preventing mothers from knowing the WHO's guidelines? If mothers were aware of the guidelines, what factors contribute to working mothers in Beijing risking potential health issues to act against World Health Organization (WHO) guidelines when feeding their infants? This study seeks to investigate the determinants of gaps between breastfeeding awareness and the practices of first-time, working mothers in urban Beijing.

$H_0$  = There is no breastfeeding awareness gap and awareness-practice gap.

$H_1$  = If an awareness gap is identified, the possible barriers that prevent mothers from understanding the benefits of breastfeeding and WHO guidelines are the advertisement of IF, advice from others (predominantly elder family members), and lack of health support (lack of baby-friendly hospitals, lack of advice from health workers). The determinants of the awareness-practice gaps of breastfeeding among first-time, working mothers in Beijing are personal (self-efficacy & self perception), social (familial & workplace support, employers' expectations/attitude), and financial (income).

## Methodology

### Design

This study employs a mixed-methods design to explore the possible determinants of the awareness-practice gap, if any, of breastfeeding among first-time, working mothers in urban Beijing. To incorporate the strengths of both, qualitative and quantitative data analysis and collection have been used to generate a more comprehensive understanding on this issue. The Institutional Review Board (IRB) of Beijing SMIC Private School approves this study. Signed informed consent forms were obtained from each participant.

The participants in this study, as mentioned earlier, consists of first-time, working mothers in Urban Beijing who have given birth within two years. For the preliminary recruitment stage (February to March), participants were recruited online through the Chinese social media application We-Chat, through stratified sampling and snowball sampling. After 62 mothers showed interest in the study, they sifted for the eligibility for the study. 12 were excluded as they did not fulfill the subject requirements for this study. In a study with a sample size, stratified sampling ensures that the study consists of a statistically representative data set.<sup>16</sup> Stratified sampling ensured that this study consists of a diverse representation of mothers from different income ranges, backgrounds, and demographics. Within each stratum, snowball sampling was conducted to recruit more participants. As I reached 10 eligible, diverse participants, they were each asked to assist me to conduct further recruitment through snowball sampling. This technique involved the initial 10 respondents identifying and referring potential participants from their social networks, who in turn identified and referred others. This process continued until the desired sample size (50) was achieved. As a high school student, accessing working mothers can be challenging. Snowball sampling, then, helps to reach out to susceptible participants as this topic of research can be a private issue to many.<sup>17</sup>

### Quantitative Study

In the quantitative section of this study, a cross-sectional survey design is employed. Participants were identified through a combination of stratified and snowball sampling.

A self-administered survey of 45 questions was used to collect data on the awareness of breastfeeding benefits, the practice of breastfeeding, and the potential gap between the two. Questions included the topics of mothers'

<sup>16</sup> Trost, Jan E. "Statistically Non Representative Stratified Sampling: A Sampling Technique for Qualitative Studies." *Qualitative Sociology* 9, no. 1 (1986): 54–57. <https://doi.org/10.1007/BF00988249>.

<sup>17</sup> Naderifar, Mahin, Hamideh Goli, and Fereshteh Ghaljaie. "Snowball Sampling: A Purposeful Method of Sampling in Qualitative Research." *Strides in Development of Medical Education* 14, no. 3 (September 30, 2017). <https://doi.org/10.5812/sdme.67670>.

prenatal and postnatal awareness of WHO's breastfeeding benefits, workplace experiences, self-perception of breastfeeding, and mothers' intention of breastfeeding. All questions were closed-ended questions with yes/no choices, multiple choice questions, or scaled questions (1-5) on how much mothers' agree with certain statements to capture quantitative data. If a mother's answer did not appear in one of the choices provided, they were allowed to specify their results in the open-ended section. The survey was distributed online for participants' convenience.

## Qualitative Study

In the qualitative section of this study, semi-structured, in-depth, one-on-one interviews were employed. Participants were randomly selected from the subset of mothers who participated in the survey. The semi-structured interviews were designed to make the results from the survey more plausible and in-depth.<sup>18</sup> I intended to use semi-structured interviews to elicit participants' experiences, elaborations on their survey responses, and their insights in detail into the potential gaps between breastfeeding awareness and practice. This design also ensures the flexibility and depth of the interviews. After an open-ended question was asked based on the mothers' response in the survey, adjusted follow-up questions could be asked depending on the mothers' response in the interview. For in-depth interviews, mothers were approached via WeChat with scheduled online meetings, the audio was recorded, and transcribed verbatim for later analysis.

The qualitative data from the interviews are analyzed here using thematic analysis, a method that involves identifying, analyzing, and reporting patterns or themes within the data.<sup>19</sup> The process includes the familiarization with the data, generating codes, searching for themes, reviewing themes, defining themes, and producing the final report. This analysis ensures that I develop a nuanced understanding of the determinants of gaps in breastfeeding awareness and practices among first-time, working mothers in urban Beijing.

## Data

### Data Analysis for Quantitative Study

This study interprets survey results using Ordinary Least Squares (OLS), Multiple Logistic Regression (MLR), and Ordered Logistic Regression (OLR) to determine the factors that contribute to the awareness gap and awareness-practice gap. The study's dataset includes dependent variables for both gaps, which can be affected by independent variables that are further classified into two categories: ordinal and cardinal variables. Ordinal variables are questions answered on a relative scale, where the higher or lower of an ordinal variable can have a positive or negative effect on the final dependent variable. Cardinal variables are questions that can be answered on a binary scale (-1, 0, 1). I calculated odds ratios (OR) to understand the significant characteristics of participants and factors that contribute to the practice of exclusive breastfeeding and the intention to continue breastfeeding after six months. The statistical analyses of this study are carried out using Stata SE16<sup>20</sup> for MacOS.

To identify the sources of awareness gaps in WHO's breastfeeding guidelines, I conducted a regression analysis using selected cardinal (reg) and ordinal (ologit) variables. This analysis identified significant characteristics and factors associated with the awareness gap. Next, I conducted another regression analysis to determine the sources of awareness-practice gaps using selected variables. Then, to measure the strength of the association between mothers' responses and their practice of exclusive breastfeeding and their intention to continue, I employed logistic regressions

<sup>18</sup> Kallio, Hanna, Anna-Maija Pietilä, Martin Johnson, and Mari Kangasniemi. "Systematic Methodological Review: Developing a Framework for a Qualitative Semi-Structured Interview Guide." *Journal of Advanced Nursing* 72, no. 12 (December 2016): 2954–65. <https://doi.org/10.1111/jan.13031>.

<sup>19</sup> Braun, Virginia, and Victoria Clarke. "Thematic Analysis." *American Psychological Association EBooks*, January 1, 2012, 57–71. <https://doi.org/10.1037/13620-004>.

<sup>20</sup> Baum, Christopher F. *An Introduction to Stata Programming*. Stata Press, 2016.

and calculated the Odds Ratios (OR).<sup>21</sup> Based on a given dataset of independent variables, in this case, mothers' characteristics, responses to the survey, and self-reported factors, this regression is able to estimate the probability of the occurrence of the practice of exclusive breastfeeding and continuation of breastfeeding after six months.<sup>22</sup>

When running the regressions, a few independent variables (one age range of mothers and one income range of mothers) were shown to be perfectly collinear or multicollinear as one predictor variable can be linearly predicted from the others with a high degree of accuracy.<sup>23</sup>

## Data Analysis for Qualitative Study

All mothers were questioned regarding their breastfeeding experiences, knowledge of the WHO breastfeeding recommendations, difficulties they had while breastfeeding, reasons they chose not to breastfeed, thoughts on the breastfeeding support provided during prenatal care, and anticipated duration of breastfeeding, if they were doing so<sup>24</sup>.

After conducting interviews, I transcribed them verbatim and stored them as Google Documents. The transcripts were then thoroughly analyzed for recurring themes, which were subsequently coded for patterns and interpretations. I employed content analysis to categorize recurring themes from the interview transcripts and underwent a de-identification process to remove any personal identifiable information.<sup>25</sup>

## Results

### Quantitative: Determinants of Awareness Gap

**Table 1**

CHARACTERISTICS OF PARTICIPANTS AND FACTORS RELATED WITH BREASTFEEDING AWARENESS GAP ON OLR AND OLS ( $N = 50$ )

$$Awareness\ Gap = \beta_0 + \beta_1 Elder\ Relatives'\ Intervention + [\beta_x Control\ Variables_x]$$

<i>Variables</i>	<i>Awareness Gap</i>	
	<i>Coefficient</i>	<i>p-value</i>
Elder Relatives' Intervention	-0.317	0.308
Television Commercials	-0.534	0.128
Healthcare Workers	0.256	0.432
Medical Professionals	-0.001	1.000
Advertisement of IF	-0.762	0.326

<sup>21</sup> Bland, J. M. (2000, May 27). Statistics Notes: The odds ratio. *BMJ*, 320(7247), 1468–1468. <https://doi.org/10.1136/bmj.320.7247.1468>

<sup>22</sup> Ibid.

<sup>23</sup> Ibid.

<sup>24</sup> All questions were drawn from validated questionnaires.

<sup>25</sup> Green, Judith, and Nicki Thorogood. *Qualitative Methods for Health Research*. Introducing Qualitative Methods. London: SAGE Publications, 2004.

Lack of Information from Hospitals 0.076 0.792

---

*Awareness Gap*

---

<u>Variables</u>	<u>Coefficient</u>	<u>p-value</u>
<i>Monthly Income (in CNY)</i>		
3,000-12,000	<b>-0.722</b>	<b>0.099*</b>
12,000-25,000	-0.560	0.210
25,000-35,000	-0.679	0.151
35,000-55,000	-1.080	0.236
Conflicting Advice	-0.156	0.236
<i>Factors That Prevented Awareness</i>		
Family's Advice	0.423	0.142
Lack of Advice from Hospitals	0.423	0.313
Promotion of IF	-0.004	0.708
Others	0.341	0.107
<i>Main Source of Knowledge</i>		
Media	0.170	0.240
Family Members	0.162	0.313
Doctors	-0.060	0.708
Others	-0.013	0.948

---

Note: \*\*\*, \*\*, and \* denote statistically significant outcomes at the 1%, 5%, and 10% level respectively.  
Significant values are marked **bold**.

---

According to the survey results, 76% of the participants were aware of the WHO breastfeeding guidelines. Thus, an awareness gap is identified as the other 24% participants respond that they were not aware. Table 1 demonstrates determinants of mothers' breastfeeding awareness gaps for this study. The table suggests that the only determining characteristic for the awareness gap is income. This data implies that an increase in the range of 3,000-12,000 RMB income among the participants increases the awareness gap (coefficient -0.722,  $p = 0.099$ ). Among the mothers who participated in this questionnaire, 36% participants' monthly income fell in the range of 3,000-12,000 RMB, suggesting that participants of this range are least aware of WHO's breastfeeding guidelines.

Quantitative: Determinants of Awareness-Practice Gap

**Table 2**

CHARACTERISTICS OF PARTICIPANTS AND FACTORS RELATED WITH BREASTFEEDING AWARENESS-PRACTICE GAP ON OLS AND OLR ( $N = 50$ )

---


$$Awareness\ Practice\ Gap = \beta_0 + \beta_1 Elder\ Relatives'\ Intervention + [\beta_x Control\ Variables_x]$$


---

<i>Awareness-practice gap</i>		
<u>Variables</u>	<u>Coefficient</u>	<u>p-value</u>
Elder Relatives' Intervention	-0.077	0.785
Television Commercials	<b>1.494</b>	<b>0.000***</b>
Healthcare Workers	-0.256	0.434
Medical Professionals	-0.034	0.919
Promotion of IF	<b>1.724</b>	<b>0.037**</b>
Inadequate Advice from Hospitals	0.036	0.898
Enjoyment	-0.266	0.383
Negative Effect on Career	-0.007	0.981
IF Benefit Outweighs Breastmilk	-0.060	0.841
Cost Performance	-0.188	0.582
Partner's Involvement	<b>1.211</b>	<b>0.014**</b>
Self Efficacy/Perception	<b>-0.616</b>	<b>0.062*</b>
Social Environment	<b>-0.903</b>	<b>0.010***</b>

---

<i>Awareness-practice gap</i>		
<u>Variables</u>	<u>Coefficient</u>	<u>p-value</u>
Beijing Residence (registered household)	-0.214	0.506
Monthly Income (in CNY)		



3,000-12,000	1.050	0.394
12,000-25,000	0.370	0.762
25,000-35,000	1.183	0.390
35,000-55,000	0.885	0.523
Intention of Breastfeeding Before Giving Birth	0.178	0.869
Breastfeed Child Within 3 Hours after Delivery	0.134	0.641
Ever Breastfed	-1.124	0.103
Lactation Room in Workplace	-0.216	0.438
Workplace Experience	0.592	0.148
Income	-0.338	0.266
Decreased Efficiency	0.051	0.865
Increased Efficiency	0.428	0.473
Conflicting Advice	0.082	0.781
Health Reasons	0.460	0.159
Lack of Familial Support	-0.915	0.401
Self Efficacy and Self Perception	-0.518	0.482
Financial Challenges	-0.413	0.635
Attitudes from Workplace	0.310	0.642
Lack of Breastmilk/Child's Preference	0.071	0.853
Others	1.089	0.149

---

Note: \*\*\*, \*\*, and \* denote statistically significant outcomes at the 1%, 5%, and 10% level respectively. Significant values are marked **bold**.

---

The main reasons that contribute to the practice gap of breastfeeding among participants despite the awareness of WHO's guidelines consist of TV commercials (coeff. 1.494,  $p = 0.000$ ), promotion of IF (coeff. 1.724,  $p = 0.037$ ), partner's involvement (coeff. 1.211,  $p = 0.014$ ), self efficacy/perception (coeff. -0.616,  $p = 0.062$ ), and social environment (coeff. -0.903,  $p = 0.010$ ).

TV commercials hold the highest significance among all variables in this table. Promotion of IF also shows to have statistical significance in widening awareness-practice gaps with the coefficient and dependent variable having

a direct relationship. In addition, partner involvement in the child-rearing process has an even higher significance in relation to the awareness-practice gap. An increase in the absence of partners' involvement in the child rearing process also widens the awareness practice gap. Self efficacy/perception and participants' social environment have an inverse relationship with mothers' awareness-practice gap.

### Quantitative: Reasons for Mothers to Exclusively Breastfeed and Intention to Continue after Six Months of Exclusive Breastfeeding

**Table 3**

CHARACTERISTICS OF PARTICIPANTS AND FACTORS RELATED WITH EXCLUSIVE BREASTFEEDING AND INTENTION TO CONTINUE ON MLS ( $N = 50$ )

$$Exclusive\ Breastfeeding/Intention\ to\ Continue = \beta_0 + \beta_1 Age\ Range + [\beta_x Control\ Variables_x]$$

<u>Variable</u>	<u>Exclusive Breastfeeding</u>		<u>Intention to Continue Breastfeeding after 6 Month</u>	
	<u>Odds Ratio (OR)</u>	<u>p-value (p)</u>	<u>Odds Ratio (OR)</u>	<u>p-value (p)</u>
Age (years)				
25-32	<b>0.005</b>	<b>0.029**</b>	1.895	0.736
32-40 <sup>[+]</sup>	1		1	
Age When Giving Birth				
25-30	13.910	0.135	0.106	0.288
30-35	<b>64.204</b>	<b>0.044**</b>	0.142	0.449
35-40 <sup>[+]</sup>	1		1	
Beijing Residence (registered household)	0.252	0.276	-	-
Workplace Experience	0.656	0.747	0.915	0.950
Income	0.286	0.288	4.436	0.224
Conflicting Advice	2.119	0.482	3.400	0.361

Awareness of Breastfeeding Benefits on Maternal Health	<b>108.027</b>	<b>0.052*</b>	0.096	0.138
Awareness of Breastfeeding Benefits on Infant Health	0.852	0.857	0.792	0.834
Elder Relatives' Intervention	0.841	0.695	0.878	0.815
Television Commercials	<b>0.139</b>	<b>0.026**</b>	1.314	0.663
Healthcare Workers	<b>12.698</b>	<b>0.067*</b>	0.749	0.690
Advice from Hospitals	<b>0.001</b>	<b>0.034**</b>	1.733	0.760
Lactation Room in Workplace	-	-	<b>12.219</b>	<b>0.090*</b>
Decreased Efficiency	-	-	<b>0.041</b>	<b>0.043**</b>
Increased Efficiency <sup>[+]</sup>	-	-	1	1

Note: \*\*\*, \*\*, and \* denote statistically significant outcomes at the 1%, 5%, and 10% level respectively.

Significant values are marked **bold**.

<sup>[+]</sup>represents variables that were omitted due to multicollinearity.

The main reasons mothers chose to exclusively breastfeed their children, as shown in Table 1, are the awareness of breastfeeding's benefits on maternal health, television commercials, healthcare workers, and advice from hospitals/doctors. The main age range of mothers in this study who chose to exclusively breastfeed for the first six months are between 25-32. Most mothers who chose to exclusively breastfeed were in the range of 30-35 when they gave birth. The three variables: lactation room in the workplace, decreased efficiency, and increased efficiency were not coded to test for this dependent variable.

This data suggests that when participants are aware of the breastfeeding benefits on their own short-term and long-term health (OR 108.027,  $p = 0.052$ ) such as the prevention of cancers and hyperplasia of mammary glands<sup>26</sup>, they are more likely to make the choice of exclusively breastfeeding their children for six months. This variable is a statistically significant determinant of mothers' practice of exclusive breastfeeding as the OR value shows a strong numerical association between health awareness and practice. Media, specifically TV commercials and promotions of breastfeeding (OR 0.139,  $p = 0.026$ ) positively affect mothers' choices of exclusively breastfeeding. Additionally, this data suggests that the advice from healthcare workers (OR 12.698,  $p = 0.067$ ) and hospitals (OR 0.001,  $p = 0.034$ ) also hold a significant impact on mothers' decisions. While both healthcare workers and hospitals hold significance to mothers' decisions, the advice from healthcare workers has a stronger correlation with the dependent variable with a significantly higher OR value.

<sup>26</sup> Gao, Hanlu, Chao Yang, Jinqing Fan, Li Lan, and Da Pang. "Hereditary and Breastfeeding Factors Are Positively Associated with the Aetiology of Mammary Gland Hyperplasia: A Case-Control Study." *International Health*, April 27, 2021. <https://doi.org/10.1093/inthealth/ihaa028>.

For mothers to have the intention to continue breastfeeding after six months of exclusive breastfeeding, the availability of lactation rooms in the work environment (OR 12.219,  $p = 0.090$ ) and decreased working efficiency and flexibility (OR 0.041,  $p = 0.043$ ) are two major determinants. While decreased efficiency is more significant than lactation rooms when associated with the participants' intention to continue breastfeeding after 6 months, lactation rooms have a stronger correlation with mother's intention to continue breastfeeding.

### Qualitative: Reasons of Awareness Gaps

**Table 4**

MAIN REASONS GIVEN BY MOTHERS WHO WERE NOT AWARE OF WHO BREASTFEEDING GUIDELINES AND BREASTFEEDING BENEFITS ( $N = 5$ )

<i>Reasons</i>	<i>Selected Quotes</i>
COVID-19 decreased interactions with doctors and appointments	<p>“Because of the COVID-19 pandemic, I basically never went to the hospital during my pregnancy. Even when I did go, the doctors and nurses were unavailable. A lot of human resources were transferred to the fever clinic. I received little to none information from the hospital about breastfeeding.”</p> <p>“During the epidemic, we were afraid to go to the hospital for a maternity checkup. Because of the risk of being infected and pandemic restrictions, we lost many opportunities to meet with doctors.”</p>
Difficult to access hospital resources	<p>“Although the public hospitals in Beijing are professional, there is basically no time to communicate with doctors. The resources and advice available to each mom are also minimal. Private hospitals are too expensive.”</p>
Family's advice	<p>“I grew up being formula fed by my mother, so my family was straight up telling me to wean as soon as possible.”</p>
Media and social media's advice that do not align with WHO's suggestions	<p>“I have always relied more on social media. I would browse a lot of other mothers' breastfeeding experiences. So I didn't learn about WHO's breastfeeding guidelines.”</p>

As shown in Table 4, the main reasons given by 5 mothers during semi-structured, in-depth interviews regarding the reasons for the awareness gaps are categorized into the COVID-19 context, difficulty when accessing hospital resources, family's advice, media, and the promotion of IF.

**Table 5**

MAIN REASONS GIVEN BY MOTHERS WHO WERE AWARE OF WHO BREASTFEEDING GUIDELINES AND BREASTFEEDING BENEFITS BUT DID NOT BREASTFEED ( $N = 5$ )

<i>Reasons</i>	<i>Examples of What Mothers Said</i>
Baby's preference	<p>"Sometimes you can't help it, you want to breastfeed, but your child doesn't cooperate with suckling, or doesn't like it."</p> <p>"My baby wouldn't suckle, causing me to have less and less breast milk."</p>
Workplace experiences	<p>"If I am breastfeeding, I need to spend at least two hours a day pumping. And if my body reacts, I have to stop working and pump immediately."</p> <p>"If other mothers at my workplace choose not to breastfeed, I would more likely choose not to as well because of peer pressure."</p> <p>"Breastfeeding is not normalized in the workplace."</p>
Child sent to live with grandparents	<p>"Because of financial pressure, I sent my children to my parents' house. Because of the distance, I was unable to exclusively breastfeed."</p>
Income loss	<p>"I have colleagues who were laid off because they chose breast milk."</p> <p>"I worry that if I continue breastfeeding, my boss will give the opportunity to another colleague. Because it will be inconvenient to do a lot of work."</p> <p>"You have no guarantee that the company will protect your job if you continue to breastfeed."</p>
Policies	<p>"Maternity leaves are too short."</p> <p>"The government needs to strengthen regulation of milk powder advertisements."</p> <p>"Maternity leave is not long enough. If the mother has maternity leave, the husband should also have paternity leave."</p>

Table 5 displays recurring reasons for the awareness-practice gap among 5 participants. The five main reasons for the awareness-practice gaps are childrens' preference for IF over breastmilk, workplace experiences, long-term separation from the child, income loss, and policies.

## Discussion

When compared with the initial hypothesis, an awareness gap is identified within this study. With 12 mothers among the 50 total participants reporting to be unaware of the WHO breastfeeding guidelines. This study found that participants who earn a monthly income between 3,000-12,000 RMB (36%) are the least aware of WHO's breastfeeding guidelines within the 24% awareness gap population among all 50 mothers. Further interviews in the qualitative section with 5 mothers explored factors that prevented mothers from the exposure to WHO's guidelines. Conversations with mothers 1 & 4 identified a possible significant variable that widened this awareness gap. In the context of the COVID-19 outbreak, according to one of the mothers, "I basically never went to the hospital during my pregnancy. Even when I did go, the doctors and nurses were unavailable [or]...transferred to the fever clinic [for COVID-19 cases]. I received zero to little information from the hospital about breastfeeding." The mother added that they were unable to visit hospitals because of "the risk of being infected and pandemic restrictions from the government", making her lose "many opportunities to meet with doctors." Another mother mentioned that the difficulty to access hospital resources due to scarcity of health professionals in Beijing's public hospitals also contributed to her awareness gap, "although public hospitals in Beijing are professional, there is basically no time to communicate with doctors...Private hospitals are too expensive." These findings align with the quantitative results from Table 3, where data suggests that the advice from healthcare workers and visits to the hospital hold a significant impact on mothers' decisions to exclusively breastfeed with high OR values. As mothers decrease their visits to the hospitals and their access to medical resources, an awareness gap emerges. This time-specific challenge suggests that the pandemic outbreak directly impacted mothers' awareness of breastfeeding knowledge. Mother 3 revealed during the interview that her family members' experience greatly affected her breastfeeding decisions, "I grew up being formula-fed by my mother, so my family was straight up telling me to wean as soon as possible." Her family's advice, then, became her main source of information regarding child-feeding, preventing her from knowing WHO's guidelines. Mother 5 describes her information acquiring process to be dependent on media and social media where "[she] would browse a lot of other mothers' breastfeeding experiences. So [she] didn't learn about WHO's breastfeeding guidelines."

Table 2 provides the main reasons for the awareness-practice gap in this study. Television commercials hold the highest significance value that is near zero where television commercials (often for IF) positively correlates to the awareness-practice gap. In addition, the other variable, promotion of IF, has an even stronger correlation with awareness-practice gap but a less significant p value. This data aligns with the previous interview conversations, suggesting that the promotion of IF impacts both, awareness gap and awareness-practice gap. Moreover, it is shown that a decrease in self efficacy and self perception will lead to greater association with the awareness-practice gap as mothers are more conscious of their image and efficacy in the workplace and social environment when considering the option of breastfeeding. This data is substantiated during the interview with mother 5 as she mentioned "breastfeeding is still not normalized in the workplace, and that is why many mothers feel embarrassed when they have to go pump during the middle of the day." This suggests that as breastfeeding is yet to be normalized among the workplace of the participants in this study, how mothers see themselves significantly impacts their decision of breastfeeding despite awareness of its benefits. Similarly, mothers' social environments' attitudes is another significant variable to express the variation in awareness-practice gap. Mother 2 responded that "if other mothers at my workplace choose not to breastfeed, I would more likely to quit breastfeeding as well because of peer pressure." Another factor that did not appear to be significant in Table 2 but recurred during interviews and Table 3 is income loss. A mother expressed her concerns as she told me that, "I have colleagues who were laid off because they chose to breastfeed" and that she "[worries] that if [she] continues to breastfeed, [her] boss will give promotion opportunities to another colleague." This also connects with another reason why mothers choose not to follow WHO's guidelines, that is, policies that do not guarantee them an adequate amount of paid maternity leave. When asked about what can be done to change such challenges, mothers suggest increasing the length of maternity and paternity leaves (with the government's subsidy to companies). Income loss and inadequate policies also appear in Table 3 as significant factors that prevent mothers in

this study from continuing breastfeeding after 6 months. As most maternity leaves end after 3-4 months of delivery,<sup>27</sup> their experience in the workplace greatly affects their decision of the continuation of breastfeeding. As shown in Table 3, workplace experience such as participants' work efficiency and workplace facility (lactation rooms) are two main determinants for them to continue breastfeeding.

The strength of this study is the implementation of both quantitative and qualitative designs (mixed-methods) where the awareness and awareness-practice gaps among working mothers in Beijing were being examined in the context of low breastfeeding rates. The qualitative section was able to offer potential missed variables that were not expressed in the quantitative section. The quantitative section offered empirical analysis of the relationship between independent variables and the awareness and awareness-practice gaps. In addition, the strength of association between mothers' responses and their practice and intentions were also calculated. The qualitative section offered contextual meanings and missed variables through semi-structured interviews. For example, the COVID-19 societal context was not taken into account in the quantitative questionnaire but found to have potential significance during the qualitative interviews.

## Limitations

There are several limitations in the study. As a cross-sectional study, no causal connections can be drawn from the results. In other words, only significance and strength of correlations can be drawn, but no direct conclusions of cause-effect were achieved. Moreover, most participants in this paper have received a high degree of education with a high mean income. Although Beijing is a high-paying and competitive city, my choice of participants can cause selection bias, particularly a possible underplay of the role of income effects on breastfeeding. Last but not least, with the limited time as an individual student researcher, the sample size for in-depth interviews is small, making the results non-representative for generalization.

## Conclusion

An awareness gap was identified among 50 working mothers in Beijing, with income loss, COVID-19, and scarce hospital resources as its three main determinants. The main factors of awareness-practice gap are TV commercials, IF promotion, self-perception, partner's involvement, and workplace experience. While the determinants of the awareness gap differs somewhat from the original hypothesis ( $H_1$ ), the determinants of awareness-practice gap were accurately predicted and aligned with existing literature.

To improve breastfeeding rates for the health of both mothers and children in urban Beijing, it is important to promote the health benefits of breastfeeding among mothers and their families. Moreover, the challenges working mothers face as they return to their workplace should be addressed by policymakers and companies to ensure the basic needs for pumping and flexible work schedules. Maternity leaves should also be subsidized and increased in duration by policymakers, to assure mothers that their jobs are secured. It also lies in society to normalize the practice of breastfeeding as a whole to combat negative self-perceptions mothers have for breastfeeding their children as they return to work.

## Bibliography

Aubel, Judi. "The Role and Influence of Grandmothers on Child Nutrition: Culturally Designated Advisors and Caregivers." *Maternal & Child Nutrition* 8, no. 1 (September 28, 2011):

<sup>27</sup> "Paid Maternity Leave and Breastfeeding in Urban China." <https://www.tandfonline.com/doi/epdf/10.1080/13545701.2017.1380309?needAccess=true&role=button>.

19–35. <https://doi.org/10.1111/j.1740-8709.2011.00333.x>.

Bandura, Albert. *Self-Efficacy: The Exercise of Control*, 1972.

Barber-Madden, Rosemary, Marybeth Albanese Petschek, and Jean Pakter. “Breastfeeding and the Working Mother: Barriers and Intervention Strategies.” *Journal of Public Health Policy* 8, no. 4 (1987): 531. <https://doi.org/10.2307/3342277>.

Baum, Christopher F. *An Introduction to Stata Programming*. Stata Press, 2016.

Bland, J. M. (2000, May 27). Statistics Notes: The odds ratio. *BMJ*, 320(7247), 1468–1468. <https://doi.org/10.1136/bmj.320.7247.1468>

Braun, Virginia, and Victoria Clarke. “Thematic Analysis.” *American Psychological Association EBooks*, January 1, 2012, 57–71. <https://doi.org/10.1037/13620-004>.

Chen, Jiawen, Tong Xin, Junjian Gaoshan, Qiuhong Li, Kaiyue Zou, Shihui Tan, Yuhan Cheng, et al. “The Association between Work Related Factors and Breastfeeding Practices among Chinese Working Mothers: A Mixed-Method Approach.” *International Breastfeeding Journal* 14, no. 1 (June 27, 2019). <https://doi.org/10.1186/s13006-019-0223-z>.

Chowdhury, Ranadip, Bireswar Sinha, Mari Jeeva Sankar, Sunita Taneja, Nita Bhandari, Nigel Rollins, Rajiv Bahl, and Jose Martines. “Breastfeeding and Maternal Health Outcomes: A Systematic Review and Meta-Analysis.” *Acta Paediatrica* 104 (November 4, 2015): 96–113. <https://doi.org/10.1111/apa.13102>.

Gao, Hanlu, Chao Yang, Jinqing Fan, Li Lan, and Da Pang. “Hereditary and Breastfeeding Factors Are Positively Associated with the Aetiology of Mammary Gland Hyperplasia: A Case–Control Study.” *International Health*, April 27, 2021. <https://doi.org/10.1093/inthealth/ihaa028>.

Green, Judith, and Nicki Thorogood. *Qualitative Methods for Health Research*. Introducing Qualitative Methods. London: SAGE Publications, 2004.

Jiang, Hou, Mu Li, and Dongling Yang. “Awareness, Intention, and Needs Regarding Breastfeeding: Findings from First-Time Mothers in Shanghai, China.” <https://doi.org/10.1089/bfm.2011.0124>.

Kallio, Hanna, Anna-Maija Pietilä, Martin Johnson, and Mari Kangasniemi. “Systematic Methodological Review: Developing a Framework for a Qualitative Semi-Structured Interview Guide.” *Journal of Advanced Nursing* 72, no. 12 (December 2016): 2954–65. <https://doi.org/10.1111/jan.13031>.

Naderifar, Mahin, Hamideh Goli, and Fereshteh Ghaljaie. “Snowball Sampling: A Purposeful Method of Sampling in Qualitative Research.” *Strides in Development of Medical Education* 14, no. 3



(September 30, 2017). <https://doi.org/10.5812/sdme.67670>.

“Paid Maternity Leave and Breastfeeding in Urban China.”

<https://www.tandfonline.com/doi/epdf/10.1080/13545701.2017.1380309?needAccess=true&role=button>.

Qiu, Liqian, Colin W. Binns, Yun Zhao, Andy H. Lee, and Xing Xie. “Breastfeeding Practice in Zhejiang Province, PR China, in the Context of Melamine-Contaminated Formula Milk.” *Journal of Health, Population and Nutrition* 28, no. 2 (2010): 189–98. <http://www.jstor.org/stable/23499806>.

Rippeyoung, Phyllis L. F., and Mary C. Noonan. “Is Breastfeeding Truly Cost Free? Income Consequences of Breastfeeding for Women.” *American Sociological Review* 77, no. 2 (2012): 244–67. <http://www.jstor.org/stable/23102570>.

Trost, Jan E. “Statistically Non Representative Stratified Sampling: A Sampling Technique for Qualitative Studies.” *Qualitative Sociology* 9, no. 1 (1986): 54–57. <https://doi.org/10.1007/BF00988249>.

Tuan, Nguyen T., Phuong H. Nguyen, Nemat Hajeebhoy, and Edward A. Frongillo. “Gaps between Breastfeeding Awareness and Practices in Vietnamese Mothers Result from Inadequate Support in Health Facilities and Social Norms.” *The Journal of Nutrition* 144, no. 11 (November 2014): 1811–17. <https://doi.org/10.3945/jn.114.198226>.

Wu, Wei, Jian Zhang, Irma Silva Zolezzi, Lisa R. Fries, and Ai Zhao. “Factors Influencing Breastfeeding Practices in China: A Meta-aggregation of Qualitative Studies.” *Maternal & Child Nutrition* 17, no. 4 (August 6, 2021). <https://doi.org/10.1111/mcn.13251>.