

# Patterns of Breastfeeding Practices among Mothers in Two Urban Cities in Vietnam

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## ABSTRACT

**INTRODUCTION:** Breastfeeding is associated with lower risk of child morbidity and mortality and foster overall child development. However, suboptimal breastfeeding practices have been reported in many countries. This study aims to describe patterns of breastfeeding from birth to 24 months in Vietnam and examine factors associated with the maintenance of breastfeeding at 12 months. **MATERIALS AND METHODS:** 573 mothers whose infants aged from 12 to 24 months in a multi-centre cross-sectional study were recruited. **RESULTS:** The prevalence of initiation of breastfeeding within the first hour post-partum was 52.9%, between 1 to 24 hours was 21.9%, after the 24 hours was 25.2% and none not initiated by the 7<sup>th</sup> day after birth. The prevalence of delayed initiation of breastfeeding was significantly higher in caesarean section than in vaginal births ( $p=0.0001$ ). Prevalence of infants ever breastfed was 100%; exclusively breastfed at 6 months was 19.7%, continued breastfeeding at 12 months was 92.5%, and continued breastfeeding at 20-24 months was 43.5%. There were 16.4% of mothers had breastfeeding problems. Correctly describing the recommended duration of exclusive breastfeeding and not using a bottle to give expressed milk to the infants were factors associated with the higher prevalence of breastfeeding maintenance for 12 months. **CONCLUSION:** Early initiation of breastfeeding and exclusive breastfeeding prevalence at 6 months in our study earn rating of “good” and “fair” respectively according to World Health Organization (WHO) recommendation. Improving mothers’ knowledge of exclusive breastfeeding recommendations and educating about breast milk expression may improve the prevalence of breastfeeding maintenance at 12 months.

## Keywords

breastfeeding; associated factors; early initiation breastfeeding; 12 months; breastfeeding problem

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Received: 15<sup>th</sup> Dec 2022; Accepted: 14<sup>th</sup>  
March 2023

Doi: <https://doi.org/10.31436/imjm.v22i3>

## INTRODUCTION

The optimal nutrition for the first 2 years of a child's life is critical as it could reduce child morbidity and mortality and foster overall child development.<sup>1</sup> The World Health Organization (WHO) and United Nations International Children's Emergency Fund (UNICEF) recommend initiating breastfeeding within one hour of birth, exclusive breastfeeding for 6 months, and continuing breastfeeding for at least 2 years.<sup>1</sup> The global analysis of breastfeeding shows that breastfeeding is one of the few positive health

behaviours that is more common in poor populations than in rich populations.<sup>2</sup> Rich mothers had a lower rate of exclusive breastfeeding and less prevalence of continued breastfeeding than poor mothers. Therefore, promoting breastfeeding should be prioritized to reduce health gaps between rich and poor children.

According to WHO, early initiation of breastfeeding is defined as putting babies to the breast within one hour of

birth.<sup>1</sup> In the 21<sup>st</sup> century, of the global population, only about 50% of neonates initiate breastfeeding within the first hour of life.<sup>2</sup> A limited number of studies reported rates of early initiation of breastfeeding in Vietnam. This rate varied from 74% in a study conducted in 2004 to 40.5% in a study conducted in 2012.<sup>3,4</sup> There is also data showing an alarming decline in early initiation of breastfeeding between 2006 and 2011 in Vietnam, from 60% to 40%.<sup>5</sup> Early initiation of breastfeeding gives infants the best possible start in life and determines a longer duration of exclusive breastfeeding.<sup>6</sup>

Globally, between 1993 and 2013, the rate of exclusive breastfeeding for the first 6 months of life increased slightly from 24.9% to 35.7%.<sup>2</sup> In low-income and middle-income countries, only about one-third of those aged younger than 6 months were exclusively breastfed.<sup>2</sup> In high-income countries, this rate is even lower. In Vietnam, most studies reported rates of exclusive breastfeeding are below 50%.<sup>7-8</sup> A study in 2018 of a large cohort of 6076 mothers showed a prevalence of exclusive breastfeeding at 6 months was lower than 1%.<sup>9</sup>

Continued breastfeeding at age one and 2 years is another global challenge. A decreasing trend of continued breastfeeding rate at one year was observed over a period of 20 years globally.<sup>2</sup> Notably, the prevalence of continued breastfeeding decreased with increasing national wealth.<sup>2</sup> The highest rate of breastfeeding at 12 months up to 95% was observed in south Asia and sub-Saharan Africa. While the lowest rate of less than 20% was reported in most high-income countries. A systematic review in 2018 concluded that factors which influence significantly the maintenance of breastfeeding for 12 months are socioeconomic and demographic characteristics. These factors include older women, higher level of education, married women, a higher number of children, and lower family income.<sup>10</sup> Information about continued breastfeeding at 12 months and 24 months is uncommon in Vietnam. A study in 2012 reported a prevalence of 21% of mothers who breastfed their infants for 24 months or more.<sup>11</sup> However, the possible association of socioeconomic and demographic characteristics on the duration of breastfeeding among Vietnamese women is not well studied.<sup>11,12</sup> Vietnam's economy has developed

rapidly over the past few years, it currently falls in the group of lower middle-income countries according to the World Bank classification, but it may become upper-income country by 2023.<sup>13</sup> Along with economic development, women's socio-demographic has changed. In this study, we describe the current breastfeeding pattern for 24 months in Vietnam and examine factors that influence the maintenance of breastfeeding at 12 months.

## MATERIALS AND METHODS

This is a cross-sectional survey using a structured questionnaire completed by the mothers. Data collection was conducted from March to May 2021.

Vietnam is a lower-middle income country in Western Pacific Region. In 2017, per capita income levels in Vietnam were 2.160 USD and the proportion of people living on less than 1.90 USD per day was 2%.<sup>14</sup>

This study is a sub-group analysis of the data collected from a survey conducted in Da Nang City and Thai Nguyen City, Vietnam in 2021.<sup>15</sup> Da Nang City, located in the Central region, ranks in the group of 5 largest cities in Vietnam in terms of population. The crude birth rate was 18 per 1000 people in 2020 which is slightly higher than the national average.<sup>16</sup> Women accounted for 50.7% of the city population in 2019. There were 319.505 women aged 15 to 49. Among women aged 15 to 49 years old, the proportion of mothers who had lower than primary school level of education was 1.3%, of primary school was 7.1%, of secondary school was 25.0%, of high school/intermediate degree was 44.2%, and of university/postgraduate was 22.4%.<sup>17</sup> Thai Nguyen City is located in the Northern region, and it is the ninth largest city in Vietnam. Women accounted for 51.1% of the city population in 2019. There were 338.154 women aged 15 to 49. Among women aged 15 to 59 years old, the proportion of mothers who had education level of lower than primary school was 2.9%, of primary school was 13.4%, of secondary school was 35.9%, of high school/intermediate degree was 37.2%, and of university/postgraduate was 10.6%.<sup>17</sup>

### **Eligibility criteria and methods of selection of participants**

Recruitment was conducted at 18 commune health centres (CHCs) in 2 cities, Thai Nguyen and Da Nang. All mothers who had infants aged under 30 months were invited to join the original study when they brought their children to the CHCs to get vaccinated in monthly immunization services of the Expanded Program on Immunization.<sup>15</sup> After providing informed consent, mothers were distributed printed self-administered questionnaires. Mothers who had infants aged from 12 to 24 months were eligible to be included in the analysis.

### **Sample size calculation**

The sample size calculation was performed in the original study to estimate exclusive breastfeeding during the maternity hospital stay.<sup>15</sup>

### **Breastfeeding data collection**

Breastfeeding practices were assessed using multiple-choice question questionnaire which was developed after reviewing literature and has not been published before. Breastfeeding practices were assessed on i) ever breastfed (yes/no), ii) currently breastfeed – the time when the mothers complete the questionnaire (yes/no), iii) type of feeding that infant received in the first 6 months of life included breast milk (yes/no), iv) formula (yes/no), v) colostrum milk powder (yes/no), vi) water (yes/no), and vii) fruit juices (yes/no). Open-ended questions were used to ask i) time of initiation of first breastfeeding, ii) stopping breastfeeding, and iii) providing babies with complementary foods.

### **Operational definitions**

i. *Exclusive breastfeeding during the first 6 months*: if the infants were fed only breast milk during the first 6 months of age, except for medicines and vitamins.<sup>18</sup> We asked mothers about foods that they gave to their babies when the babies were under 6 months of age including breast milk, formula milk, colostrum milk powder, water, fruit juices/ honey, and complementary foods.

- ii. *Breastfeeding maintenance for 12 months*: As we included mothers who had infants aged from 12 to 24 months in this analysis, the maintenance of breastfeeding for 12 months was identified in one of the following situations: breastfeeding at the time of the interview or stopping breastfeeding after 12 months.
- iii. *Early initiation of breastfeeding*: We asked mothers how long after giving birth she first breastfed their babies. Early initiation of breastfeeding was identified when mothers started breastfeeding within the first hour after childbirth.<sup>18</sup>
- iv. *Ever breastfed*: Mothers were asked if they had ever breastfed their babies.
- v. *Continued breastfeeding at 20-24 months*: Among 573 mothers who had infants aged from 12 to 24 months, 108 mothers had infants aged from 20 to 24 months. Maintenance of breastfeeding for 20-24 months was identified in one of the following situations: breastfeeding at the time of the interview or stopping breastfeeding after 20 months.

### **Data analysis**

R programming version 3.6.1 was used to perform the statistical analysis. Descriptive analysis was performed for all variables in this analysis and presented as frequency and percentage for qualitative variables or mean and standard deviation (SD) for quantitative variables.

Prevalence of early initiation of breastfeeding was calculated as the total number of mothers who started breastfeeding within the first hour after childbirth per total number of mothers who had infants aged from 12 to 24 months (573 mothers). Similarly, the prevalence of ever-breastfed and exclusive breastfeeding during the first 6 months were calculated based on the denominator of 573 mothers. On the other hand, the prevalence of the maintenance of breastfeeding for 12 months was calculated based on the denominator of 535 mothers as there was lack of information to identify the maintenance of breastfeeding for 12 months in 38 mothers. The prevalence of mothers who continued breastfeeding their babies at 20-24 months was calculated based on the denominators of 108 mothers who had infants aged from 20 to 24 months.

Univariate logistic regression and multivariable logistic regression were used to identify factors associated with the maintenance of breastfeeding for 12 months. Crude Odds Ratio (OR) and adjusted OR (aOR) were reported in the results. These factors included age of mothers, mother education level, infant's sex, supplying formula milk for babies during their hospital stay, using a bottle to give expressed milk, having breastfeeding problems, knowing what exclusive breastfeeding is, and knowing recommended duration of exclusive breastfeeding. These factors were chosen based on the theoretical model of the variables evaluated for possible association with maintenance of breastfeeding for  $\geq 12$  months of age in a study by Santana et al.<sup>19</sup> Multivariable logistic regression with complete-case analysis was applied.

### Ethical approval and informed consent

The study was conducted according to the guidelines of the Declaration of Helsinki and approved by the Institutional Review Board of The University of Medicine and Pharmacy at Ho Chi Minh City according to Decision No. 990/HĐĐĐ-ĐHYD date 11/01/2020. This is an anonymous survey.

## RESULTS

### Characteristic of mothers and their infants

In total, 573 mothers with infants aged from 12 to 24 months were recruited. Among those, 58.8% lived in urban areas and 41.2% lived in semi-urban areas. 87.7% of the mothers at least had high school education. Characteristics of mothers and their infants are presented in Table 1.

### Breastfeeding practice

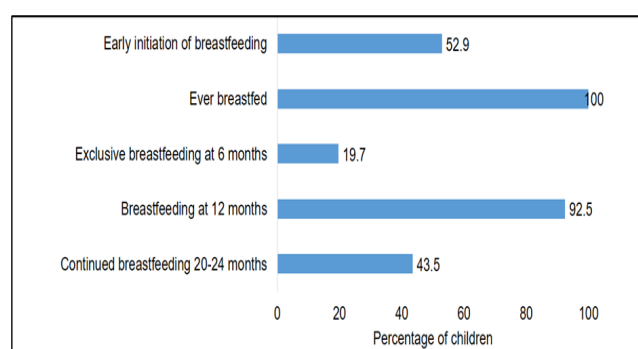
Mothers initiated breastfeeding within the first hour after delivery were 295 (52.9%) (Figure 1). The proportion of breastfeeding initiation within 1 to 24 hours was 21.9% and after the 24 hours was 25.2% and no one not initiated by the 7<sup>th</sup> day after birth. The prevalence of delayed initiation of breastfeeding was significantly higher in

**Table 1.** Characteristic of included mothers and their infants

Characteristic	Summary statistics n (%)
<b>Maternal characteristics</b>	
Age, years, mean $\pm$ SD	30.1 $\pm$ 4.9
Education qualification (n=573)	
Primary school & Secondary school	12.3)
High school/intermediate degree	320 (55.9)
University/postgraduate	182 (31.8)
Place of residence (n=558)	
Urban	328 (58.8)
Semi-urban	230 (41.2)
Number of children (including this current child)	
1	187 (32.6)
2	286 (49.9)
$\geq 3$	100 (17.5)
Family monthly income (million VND), mean $\pm$ SD (n=552)	12.3 $\pm$ 6.3
Supply formula milk for babies during their hospital stay	243 (42.4)
Having breastfeeding problems	94 (16.4)
<b>Infant characteristics</b>	
Sex, female	279 (48.8)
Caesarean section	280 (49.0)
<b>Breastfeeding practices</b>	
First breastfeeding within one hour of birth	295 (52.9)
Use a bottle to offer babies expressed breast milk	192 (33.5)
<b>Breastfeeding knowledge</b>	
Correctly defined exclusive breastfeeding	283 (49.4)
Correctly identified recommended duration of exclusive breastfeeding	346 (60.5)

SD (standard deviation)

caesarean section births than in vaginal births ( $p=0.0001$ ). All infants were breastfed at some point; exclusively breastfed at 6 months were 113 (19.7%), continued breastfeeding at 12 months were 496 (92.5%) (Figure 1), at 20-24 months were 47/108 (43.5%). Prevalence of breastfeeding indicators is shown in Figure 2. Most mothers (84.1%) introduced complementary food at the age of 5 to 6 months (Figure 3).



**Figure 1.** Breastfeeding indicators of Vietnamese children in 2021

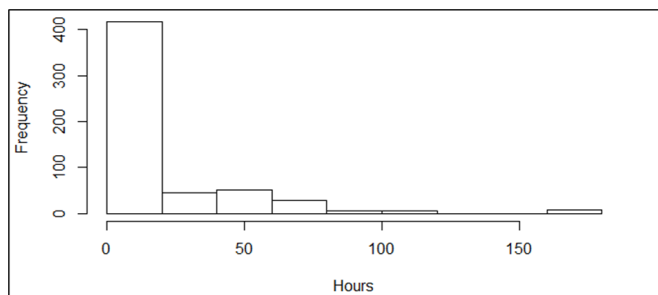


Figure 2. Timing of initiation of breastfeeding

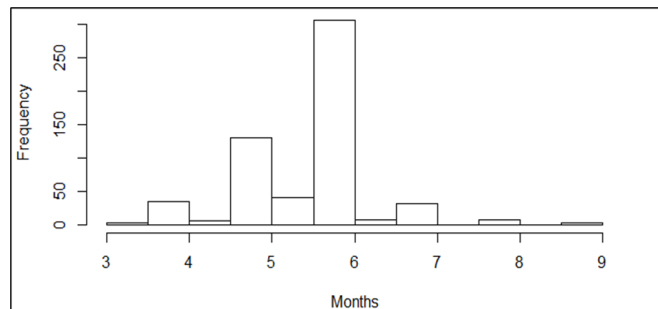


Figure 3. Timing of introduction of complementary feeding

## Breastfeeding problems

94 out of 573 mothers reported having breastfeeding problems, corresponding to a prevalence of 16.4%. Sore or cracked nipples were the most common problems with 51%, blocked milk duct mastitis with 14.9%, and mastitis with 12.8% (Table 2).

Table 2. Breastfeeding problems among included mothers

Breastfeeding problems	n (%)
<b>Having problem (Yes)</b>	<b>94 (16.4)</b>
Mastitis	12 (12.8)
Sore or cracked nipples	48 (51.0)
Blocked milk duct	14 (14.9)
Not enough breast milk	7 (7.4)
Inverted, flat, large and long nipples	6 (6.4)
Infants refused to suck	1 (1.1)
Did not tell specific problem	6 (6.4)

## Factors associated with breastfeeding maintenance for 12 months

In multivariable logistic regression analysis, after adjusting for factors in Table 3, correctly identified recommended duration of exclusive breastfeeding and not using a bottle to give expressed milk to the infants were factors associated with a higher prevalence of the maintenance of breastfeeding for 12 months. The aOR (95% CI) of mothers who correctly identified recommended duration of exclusive breastfeeding as 6 months was 2.21 (1.09 to 4.49) compared to mothers who did not. The aOR (95%

CI) of mothers who used a bottle to give expressed milk to the infants was 0.44 (0.22 to 0.88) compared to those who did not (Table 3).

Table 3. Factors associated with breastfeeding maintenance for 12 months

Characteristics	Breastfeeding maintenance for 12 months (NO)	Breastfeeding maintenance for 12 months (YES)	Unadjusted OR (95% CI)	P value	Adjusted OR (95% CI)	P value
<b>Age of mother, mean (SD)</b>						
	29.8 ± 4.2	30.2 ± 4.9	1.02 (0.95 to 1.09)	0.598	1.00 (0.93 to 1.08)	0.832
<b>Mother education level</b>						
Primary & Secondary	4 (6.2)	61 (93.8)	Reference		Reference	
High school/ Intermediate degree	26 (8.7)	274 (91.3)	0.69 (0.23 to 2.05)	0.506	0.81 (0.26 to 2.55)	0.718
University/ Postgraduate	10 (5.9)	160 (94.1)	1.05 (0.32 to 3.47)	0.937	1.21 (0.34 to 4.29)	0.773
<b>Mode of delivery</b>						
Caesarean section	19 (7.3)	243 (92.7)	Reference		Reference	
Vaginal delivery	21 (7.7)	252 (92.3)	0.94 (0.49 to 1.79)	0.846	0.92 (0.46 to 1.82)	0.809
<b>Infant's sex (male)</b>						
Female	27 (9.7)	250 (90.3)	Reference		Reference	
Male	13 (5.0)	245 (95.0)	2.04 (1.03 to 4.04)	0.036	1.98 (0.98 to 4.00)	0.058
<b>Supply formula milk for babies during their hospital stay</b>						
No	22 (7.1)	287 (92.9)	Reference		Reference	
Yes	18 (7.9)	209 (92.1)	0.89 (0.47 to 1.70)	0.725	0.88 (0.43 to 1.78)	0.718
<b>Using a bottle to give expressed milk</b>						
No	20 (5.6)	340 (94.4)	Reference		Reference	
Yes	20 (11.4)	156 (88.6)	0.46 (0.24 to 0.88)	0.020	0.44 (0.22 to 0.88)	0.021
<b>Breastfeeding problems</b>						
No	30 (6.7)	420 (93.3)	Reference		Reference	
Yes	10 (11.8)	75 (88.2)	0.54 (0.25 to 1.14)	0.122	0.66 (0.30 to 1.44)	0.297
<b>Correctly defined exclusive breastfeeding</b>						
No	20 (7.6)	244 (92.4)	Reference		Reference	
Yes	20 (7.4)	252 (92.6)	1.05 (0.54 to 1.97)	0.922	0.81 (0.41 to 1.61)	0.555
<b>Correctly identified recommended duration of exclusive breastfeeding</b>						
No	21 (10.3)	182 (89.7)	Reference		Reference	
Yes	19 (5.7)	313 (94.3)	1.90 (1.00 to 3.65)	0.052	2.21 (1.09 to 4.49)	0.028

In univariate logistic regression analysis, male infants were associated with a 2.04 (95% CI: 1.03 to 4.04) times higher prevalence of breastfeeding maintenance for 12 months compared with female infants.

## DISCUSSION

This multi-center cross-sectional survey allowed us to identify the patterns of breastfeeding practices among mothers in Vietnam across different geographical locations and socio-economical backgrounds. More than half (52.9%) of the infants were introduced to breastfeeding within one hour after birth, 19.7% exclusively breastfeed at 6 months, 92.5% continued breastfeeding at 12 months, and 43.5% continued breastfeeding at 20-24 months. In addition, the prevalence

of breastfeeding problems among interviewed mothers was 16.4%. Mother's knowledge of the recommended duration of exclusive breastfeeding was associated with increased odds of continued breastfeeding at 12 months. On the other hand, using a bottle to give expressed milk to the infants was associated with decreased odds of continued breastfeeding at 12 months.

In the current study, the rate of breastfeeding initiation within the first hour of delivery was 52.9%. This rate is defined as "good" according to the WHO infant and young child feeding indicators.<sup>20</sup> Exclusive breastfeeding at 6 months (19.7%) was considered "fair" according to the WHO indicator. Hajeebhoy et al. (2014) observed similar data from a study conducted in Vietnam where half of the children were breastfed within the first hour after birth and 20.2% received exclusive breastfeeding under 6 months.<sup>21</sup> According to a similar study in Vietnam conducted by Thu et al. (2012), many factors were associated with early breastfeeding initiation, including living in an urban area, high birth weight, and living in households with a large number of assets.<sup>22</sup> On the other hand, the rural area had a longer duration of exclusive breastfeeding and any breastfeeding compared with its urban counterpart.<sup>22</sup> In addition, this study result showed that most (92.5%) mothers continued breastfeeding their babies at 12 months, but only a half of them (43.5%) maintained breastfeeding at 20-24 months. Doma et al. (2021), from their study in Vietnam, reported that only 20.9% of women continued feeding their children with breastmilk at 24 months.<sup>11</sup>

Another key finding of this study was that delayed breastfeeding initiation was higher in caesarean section than in vaginal births. Nguyen et al. (2020) also found a similar result, reporting the prevalence of early breastfeeding of only 4.4% in mothers who had undergone a caesarean section. While 54.5% of babies delivered vaginally received breastmilk within the first hour after birth.<sup>23</sup> There are many postulated hypotheses for this association. First, maternal distress secondary to limited physical activity, fasting, analgesia and/or anesthesia for pain, post-operational mother-newborn separation as well as the lack of oxytocin augmentation.

Additionally, caesarean section hinder milk production by the disruption of the hormonal pathway stimulating lactogenesis.<sup>24</sup> Different studies by Evan et al. (2003) and Cohen et al. (2018) showed that the daily volume of breastmilk transferred to infants delivered by caesarean section for the first 5 days is also a barrier to early breastfeeding initiation.<sup>25,26</sup> Secondly, the use of antibiotics in caesarean section from 5 to 7 days after the operation is a common practice in Vietnam which might influence the mother's decision to initiate breastfeeding.<sup>27</sup> Due to the general perception of milk contamination with administered antibiotics, mothers delay breastfeeding to avoid transferring the medications in breastmilk to the newborns.<sup>3</sup> Furthermore, caesarean section was also associated with shortened duration of breastfeeding, early pre-lacteal food introduction, a lower rate of exclusive breastfeeding, and any breastfeeding.<sup>23,28</sup> Unfortunately, the caesarean section rate in Vietnam are as high as 50% which are showed in both current study and previous studies.<sup>29,30</sup>

The results of our study showed that using bottle feeding of expressed breast milk to an infant was associated with decreased odds of continued breastfeeding at 12 months. In recent years, the prevalence of expressing breast milk has been increasing. The reason for this could be health-related issues or early returning to work or convenience sake.<sup>31</sup> Our results are in line with previous results.<sup>31,32</sup> Jiang et al.' study (2015) concluded that exclusive expressing at 6 weeks postpartum was associated with a shorter duration of breastfeeding and Felice et al.'s study (2016) showed that higher pumping frequency shortens breastfeeding duration significantly.<sup>31,32</sup> These results are also in agreement with Muelbert et al.'s study (2018) showed that using pacifiers lowers the possibility of being able to maintain breastfeeding for at least 12 months.<sup>33</sup> Bottle-feeding might also lead to greater milk demand by an infant compared to breastfeeding. This causes an increase in mother's anxiety about milk supply insufficiency and results in a higher likelihood of earlier supplementation of complementary foods.<sup>31</sup> Moreover, exclusive expressing implies less mother-infant skin-to-skin contact which might have a negative effect on the mother-infant psychosocial bond.<sup>34</sup> Therefore, beside

breastfeeding education, new mothers should be provided more effective advice regarding breast milk expression.

We also found that mothers' knowledge of exclusive breastfeeding recommendations was associated with increased odds of breastfeeding maintenance for 12 months. This finding is consistent with previous results in Wallenborn et al's study (2017).<sup>35</sup> Mothers who were not aware of the recommended 6-month exclusive breastfeeding duration had a shorter mean duration of breastfeeding compared to those who were knowledgeable about breastfeeding recommendations.<sup>36</sup> The reason for stopping breastfeeding during the first year may vary. Continuing to breastfeed after returning to work from maternal leave is an additional challenge for working mothers. In addition, a quick drop in milk supply is another concern that many women complained about when they continued breastfeeding by expressing milk at workplace. Therefore, besides education about breastfeeding, more support from health professionals, families, and workplaces are crucial to improve the duration of breastfeeding.

This study has some limitations. First, since the study was conducted by distributing the survey to the mothers of infants up to 2 years old, missing or inaccurate information recall on breastfeeding practices is unavoidable. Second, as our study was limited to mothers who brought their children to the CHCs for routine immunization, hence mothers who brought their children to the paid private vaccination centres were missed. Third, the estimated rate of continuing breastfeeding at 20-24 months may be less precise as there was a low number of participants in this category. Although the findings in the current study cannot be representative of the whole population, women were recruited from different health services in various geographical areas making the sample likely to represent urban areas in Vietnam.

## CONCLUSION

Findings from this study show that some breastfeeding indicators are far below the prevalence recommended by

WHO. Improving mothers' knowledge of exclusive breastfeeding recommendations and educating about breast milk expression may improve the prevalence of breastfeeding maintenance at 12 months.

## FUNDING

This research is funded by Funds for Science and Technology Development of the University of Danang under project number B2020-DN01-28. The funders had no role in study design, data collection and analysis, decision to publish, or preparation of the manuscript.

## COMPETING INTERESTS

The authors have declared that no competing interests exist.

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