



## **Factors Associated with Exclusive Breastfeeding Practices among Mothers in Syria: A Cross-sectional Study**

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### **Authors' contributions**

*This work was carried out in collaboration between all authors. Author NAA designed the study and conducted statistical analysis, writing manuscript and provided supervision. Author AO conducted statistical analysis and made significant intellectual contributions. Author RTA designed the study, collected the data and writing manuscript. All authors revised the manuscript and have agreed on the final version of this manuscript.*

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### **ABSTRACT**

**Background:** Exclusive breastfeeding is the situation where the infant has received only breast milk from his/her mother for the first 6 months after birth. Research had found that factors associated with exclusive breastfeeding practices in different countries are varied. Little is known about exclusive breastfeeding in Syria.

**Objective:** To identify factors associated with exclusive breastfeeding practices among mothers in Syria.

**Methodology:** A cross-sectional study on feeding practices during the first 6 months of infant's life was conducted in Lattakia City, the northwest of Syria from July through October 2012. A total sample of 334 Syrian mothers of infants aged between 0 and 12 months were studied on socio-demographic variables, reproductive factors, sources of breastfeeding support, and exclusive breastfeeding practices.

**Results:** About 83.5% of mothers were breastfeeding at the time of the study. At 4

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months, 68.6% (229) of mothers were still exclusively breastfeeding, and 18.6% (62) continued to do so at 5 months. By 6 months, the breastfeeding prevalence rate fell to 12.9% (43). Binary logistic analysis for mothers who exclusively breastfed at 6 months and more showed that mothers who received husbands' ( $P=0.027$ ) and relatives' ( $P=0.007$ ) advice not to add formula to breastfeeding were significantly associated with continuation of exclusive breastfeeding. Mothers of husbands with lower education ( $P=0.029$ ) and mothers who did not smoke ( $P=0.002$ ) were more likely to complete exclusive breastfeeding.

**Conclusions:** By 6 months of age, a large ratio of infants was not exclusively breastfed. Lower husband education, smoker mothers, husbands' and relatives' advice not to add formula to breastfeeding were identified as significant factors associated with exclusive breastfeeding among mothers in the study area in Syria.

*Keywords: Breastfeeding; exclusive breastfeeding; predictors; prevalence; Syria.*

## 1. INTRODUCTION

The World Health Organization (WHO) recommends that the breastfeeding as the appropriate method of infant feeding [1-2]. Exclusive breastfeeding should be practiced for the first six months after birth, and it could be continued with supplementary foods until two years or more [2]. Exclusive breastfeeding provides health benefits for children [3,4] and mothers [5]. One and half million infants' deaths can be avoided each year by exclusive breastfeeding [6-8]. Children are exclusively breastfed have protection from several acute and chronic diseases such as, otitis media, respiratory tract infections, atopic dermatitis, gastroenteritis, type 2 diabetes, sudden infant death syndrome, and obesity and asthma during childhood [3-4]. There is also evidence that exclusive breastfeeding protects mothers by reducing risks of breast and ovarian cancer [5]. The prevalence and duration of exclusive breastfeeding vary among countries [9-17]. In some countries, it is as low as 1.9% [17], while in other countries as high as 62% [15]. In Syria, the 2007-2011 census showed that the proportion of early initiation of breastfeeding was 46%, the rate of exclusive breastfeeding in the period between 1 and 6 months after births was 43% and the rate of breastfeeding was 25% at the age of 2 years [18]. Also, the percentage of children who received solid, semi-solid or soft foods and breastfeeding at 6-9 months was 37% [19]. Little studies were conducted about breastfeeding in Syria [20]. Earlier work [9-17] had found that the factors associated with exclusive breastfeeding practices in different countries are varied. Studies demonstrated that maternal age and education, multiparity (three or more children), and vaginal delivery were positively associated with exclusive breastfeeding [9-12,21], while smoking during pregnancy, low birth weight, pacifier use, caesarean birth, infant's admission to the intensive care unit and maternal employment status before 6 months of infant's age were negatively associated with exclusive breastfeeding [9-12,21] There are no studies that investigated factors associated with exclusive breastfeeding in Syria. The objective of this study was to examine factors associated with exclusive breastfeeding among mothers in Syria. Our study framework is built around the relationship between mothers' reproductive health and breastfeeding practices. The authors assumed that exclusive breastfeeding as the main outcome of this study is affected by various factors related to support of family including the husband, the mother and the mother in-laws. Investigating the relationship among reproductive health, source of breastfeeding support and breastfeeding practices and exclusive breastfeeding could help decision makers to implement appropriate educational programs to enhance education for all women in the reproductive age group.

## **2. METHODOLOGY**

### **2.1 Study Design and Participants**

A cross-sectional study was conducted on feeding practices during the first 6 months of infant's life. Mothers were enrolled from the all 6 maternal and child health centers in Lattakia City, the northwest of Syria from July through October 2012. Stevens [22] formula was used to determine the study sample size, which recommends that "for social science research, about 15 subjects per predictor are needed for a reliable equation". In the present study, twenty-two predictors were studied; according to this formula, the required sample to detect exclusive breastfeeding predictors at 0.05 level of significant is 330. In this study, mothers aged between 18 or older, had infants aged between 0 and 12 months, who breastfed their infants, were recruited to participate in the study. The sample was selected using the "proportionate to size" method. The proportion was based on constant ratio among the selected maternal and child health centers. This ratio was selected to be 5% for each health center. Using systematic random sampling technique including selecting of every other five woman, a total of 400 mothers attending the selected health centers were recruited to participate in the study. Sixty-six mothers were excluded because they did not breastfeed their infants or due to incomplete questionnaires. A total of 334 mothers were finally included in the analysis.

#### **2.1.1 Measurements**

A self-administered questionnaire was used to collect information on participants' socio-demographic characteristics, obstetric histories, infant feeding practices, and breastfeeding support system. Data on breastfeeding practices were asked retrospectively; mothers were asked to report previous breastfeeding experience, and the initiation of breast-feeding after delivery, the frequency of breast-feeding in the first 24 hours was also examined, duration of exclusive breastfeeding, reasons for stopping exclusive breastfeeding during the first 6 months following delivery, and the pacifier use. Breastfeeding support was assessed among husband, family, and relatives. Exclusive breastfeeding was defined as the situation where the infant has received only breast milk for the first six months following infant birth [1]. Participants were asked for answer "For how long did the infant feed only on breast milk"? The prevalence of exclusive breastfeeding was calculated as the ratio of infants below 6 months who were received only breast-milk [23].

##### **2.1.1.1 Data collection procedure**

Ethical approval for the research was awarded by the Institutional Review Board from Jordan University of Science and Technology, as well as by the Ministry of Health, Syria. All mothers were appropriately informed about the study and signed a consent form. Confidentiality and anonymity of the mothers were assured. A team of three trained nursing midwives and primary researcher were responsible for identifying mothers who met the eligible criteria for participating in the study. The questionnaires took approximately 10-15 minutes to be completed.

##### ***2.1.1.1.1 Data analysis***

Descriptive statistics was used to demonstrate the percentages of mothers who exclusively breastfed their infants according to socio-demographic and relevant characteristics. Chi-

square analysis was used to examine the associations between the selected factors (socio-demographic variables, reproductive health factors, sources of breastfeeding support and breastfeeding practices) and exclusive breastfeeding. Three categories were selected to be included in the Chi-square analysis: Mothers of infants who fed only on breast milk in the period between 1 and 4 months, at 5 months and at 6 months after births. Further analysis of a binary logistic regression was performed to determine the factors were associated with mothers who exclusively breastfed at 6 months and more (who completed exclusive breastfeeding) and the mothers who exclusively breastfed less than 6 months (who did not completed exclusive breastfeeding). Significant level of 0.05 or less was considered as statistically significant.

### **3. RESULTS**

#### **3.1 Chi-Square Analysis of Socio–Demographic Characteristics for Mothers and Infants and Exclusive Breastfeeding**

Three hundred and thirty-four Syrian mothers participated in this study. Chi-square analysis of socio–demographic characteristics for mothers and infants is shown in Table 1. About 55% (182) of participants aged between 20 - 29 years. More than 71% (238) of mothers and 77.2% (258) of husbands had high school education or less. The majority of participants (86.8%, n = 290) had ≤ US\$ 250 as a total family income per month. About 83.5% (287) of the mothers attempted breastfeeding. At 4 months, 68.6% (229) of mothers were still exclusively breastfeeding, and 18.6% (62) of them continued to do so at 5 months. By 6 months, the breastfeeding prevalence rate fell to 12.9% (43). Chi-square analysis showed that smoking was the only variable was significantly associated with exclusive breastfeeding (P=0.001). In this analysis maternal age, maternal education, husband education, monthly income, mothers' and fathers' employment status, household composition, infant's gender, and infant's birth weight did not have any significance association with exclusive breastfeeding.

##### **3.1.1 Chi-square analysis of mothers' reproductive health and sources of breastfeeding support and exclusive breastfeeding**

The majority of participants (67.4%, n = 225) were multiparous. Two hundred and eighty-one (84.1%) mothers had three and less children. More than 54% (n = 181) of mothers had caesarean section delivery in their last birth. The majority of mothers (88.6%, n = 296) received husbands' support to breast-feed their infants. Almost 69% (n = 230) of mothers received breastfeeding education. Most of mothers had breastfeeding experiences (79.3%, n = 265). Chi-square analysis of mothers' reproductive health and sources of breastfeeding support and exclusive breastfeeding is shown in Table 2. The analysis showed a significant association between parity (P=0.035), advice not to add formula to breastfeeding (P=0.001), relatives' advice not add formula to breastfeeding, and husbands' advice not to add formula to breastfeeding (P=0.027) and exclusive breastfeeding.

**Table 1. Chi-square analysis of socio-demographic characteristics for mothers and infants and exclusive breastfeeding (n = 334)**

Variables	N (%) (n = 334)	Exclusive Breastfeeding			P-value
		1-4 months N (%) ( 68.6%)	5 months N (%) 62 (18.6%)	≥6 months N (%) 43 (12.9%)	
<b>Mothers age (years)</b>					<b>0.386</b>
20-29	182 (54.5)	127 (69.8)	35 (19.2)	20 (11.0)	
30-39	129 (38.6)	85 (65.9)	22 (17.1)	22 (17.1)	
≥ 40	23 (6.9)	17 (73.9)	5 (21.7)	1 (4.3)	
<b>Education</b>					<b>0.861</b>
Primary	148 (44.3)	103 (69.6)	28 (18.9)	17 (11.5)	
Secondary	90 (26.9)	60 (66.7)	18 (20.0)	12 (13.3)	
Diploma	17 (5.1)	12 (70.6)	4 (23.5)	1 (5.9)	
University	79 (23.7)	54 (68.4)	12 (15.2)	13 (16.5)	
<b>Husband education</b>					<b>0.308</b>
Primary	162 (48.5)	113 (69.8)	31 (19.1)	18 (11.1)	
Secondary	96 (28.7)	62 (64.6)	23 (24.0)	11 (11.5)	
Diploma	8 (2.4)	6 (75.0)	1 (12.5)	1 (12.5)	
University	68 (20.4)	48 (70.6)	7 (10.3)	13 (19.1)	
<b>Monthly income US\$</b>					<b>0.369</b>
20-90	40 (12.0)	32 (80.0)	3 (7.5)	5 (12.5)	
100-140	90 (26.9)	61 (67.8)	21 (23.3)	8 (8.9)	
150-250	160 (47.9)	108 (67.5)	29 (18.1)	23 (14.4)	
>250	44 (13.2)	28 (63.6)	9 (20.5)	7 (15.9)	
<b>Occupation</b>					<b>0.749</b>
working	97 (29.0)	67 (69.1)	16 (16.5)	14 (14.4)	
Not working	237 (71.0)	162 (68.4)	46 (19.4)	29 (12.2)	
<b>Household composition</b>					<b>0.191</b>
With husband only	286 (85.6)	191 (66.8)	55 (19.2)	40 (14.0)	
With family in law	48 (14.4)	38 (79.2)	7 (14.6)	3 (6.3)	
<b>Smoking</b>					<b>0.001</b>
Yes	72 (21.6)	62 (86.1)	3 (4.2)	7 (9.7)	
No	262 (78.4)	167 (63.7)	59 (22.5)	36 (13.7)	
<b>Infant gender</b>					<b>0.124</b>

**Table 1. Continued.....**

Male	167 (50.0)	106 (63.5)	35 (21.0)	26 (15.6)	
Female	167 (50.0)	123 (73.7)	27 (16.2)	17 (10.2)	
<b>Infant birth weight</b>					<b>0.911</b>
<2500 g	42 (12.6)	30 (71.4)	7 (16.7)	5 (11.9)	
≥2500 g	292 (87.4)	199 (68.2)	55 (18.8)	38 (13.0)	

**Table 2. Chi-square analysis of mothers' reproductive health and sources of breastfeeding support and exclusive breastfeeding (n = 334)**

Variables	N (%) N=334	Exclusive Breastfeeding			Chi-square P-value
		1-4 months N (%) 229 (68.6%)	5 months N (%) 62 (18.6%)	≥ 6 months N (%) 43 (12.9%)	
<b>Type of delivery</b>					<b>0.473</b>
Caesarean section	181 (54.2)	127 (70.2)	32 (17.7)	22 (12.2)	
Normal	153 (45.8)	102 (66.7)	30 (19.6)	21 (13.7)	
<b>First baby</b>					<b>0.035*</b>
Yes	109 (32.6)	83 (76.1)	19 (17.4)	7 (6.4)	
No	225 (67.4)	146 (64.9)	43 (19.1)	36 (16.0)	
<b>Number of live children</b>					<b>0.471</b>
≤ 3	281 (84.1)	195 (69.4)	49 (17.4)	37 (13.2)	
> 3	53 (15.9)	34 (64.2)	13 (24.5)	6 (11.3)	
<b>Stay with mother</b>					<b>0.444</b>
With mother in the same room	317 (94.9)	215 (67.8)	60 (18.9)	42 (13.2)	
Neonatal intensive care unit	17 (5.1)	14 (82.4)	2 (11.8)	1 (5.9)	
<b>Advice to add formula to breastfeeding</b>					<b>0.001*</b>
Yes	134 (40.1)	107 (79.9)	10 (7.5)	17 (12.7)	
No	200 (59.9)	122 (61.0)	33 (16.5)	45 (22.5)	
<b>Husband support to breastfeeding</b>					<b>0.185</b>
Yes	296 (88.6)	198 (66.9)	58 (19.6)	40 (13.5)	
No	38 (11.4)	31 (81.6)	4 (10.5)	3 (7.9)	
<b>Family /peer support to breastfeeding</b>					<b>0.407</b>
Yes	300 (89.8)	203 (67.7)	56 (18.7)	41 (13.7)	
No	34 (10.2)	26 (76.5)	6 (17.6)	2 (5.9)	

**Table 2. Continued.....**

<b>Breastfeeding education</b>					<b>0.833</b>
Yes	230 (68.9)	160 (69.6)	41 (17.8)	29 (12.6)	
No	104 (31.1)	69 (66.3)	21 (20.2)	14 (13.5)	
<b>Relatives' advice to add formula to breastfeeding</b>					<b>0.001*</b>
Yes	134 (40.1)	107 (79.9)	17 (12.7)	10 (7.5)	
No	200 (59.9)	122 (61.0)	45 (22.5)	33 (16.5)	
<b>Husband's advice to add formula to breastfeeding</b>					<b>0.027*</b>
Yes	62 (18.6)	51 (82.3)	5 (8.1)	6 (9.7)	
No	272 (81.4)	178 (65.4)	57 (21.0)	37 (13.6)	
<b>Previous breastfeeding experience</b>					<b>0.261</b>
Yes	265 (79.3)	180 (67.9)	47 (17.7)	38 (14.3)	
No	69 (20.7)	49 (71.0)	15 (21.7)	5 (7.2)	
<b>The pacifier use</b>					<b>0.080</b>
Yes	97 (29.0)	75 (77.3)	12 (12.4)	10 (10.3)	
No	237 (71.0)	154 (65.0)	50 (21.1)	33 (13.9)	
<b>Intention to return work</b>					<b>0.862</b>
Yes	244 (73.1)	166 (68.0)	47 (19.3)	31(12.7)	
No	90 (29.9)	63 (70.0)	15 (16.7)	12 (13.3)	

**3.1.2 Binary regression analysis of factors associated with exclusive breast-feeding among Syrian mothers**

Binary logistic analysis of factors associated with mothers who exclusively breastfed at 6 months and more and mothers who exclusively breastfed less than 6 months was conducted. The analysis showed that mothers who received husbands' (OR=3.34, CI 1.136-8.099, P=0.027) and relatives' (OR=13.790, CI 2.046-92.934, P=0.007) advice not to add formula to breastfeeding were significantly associated with continuation of exclusive breastfeeding. Mothers of husbands with high school and less were 2.595 times more likely to complete exclusive breastfeeding than mothers of husbands with more than high school (OR=2.595, CI 1.100 - 6.120, P=0.029). Mothers who did not smoke were 6.578 times more likely to complete exclusive breastfeeding than others who smoked (OR=6.578, CI 1.965 - 22.022, P=0.002). Table 3 presents the binary logistic regression analysis of factors associated with exclusive breastfeeding.

**Table 3. Binary logistic regression analysis of factors associated with exclusive breast-feeding among Syrian mothers (n = 334)**

Variables	OR (95% CI)	P - value
Husband education	2.595 (1.100 - 6.120)	0.029
Smoking (no vs yes)	6.578 (1.965 - 22.022)	0.002
Husbands' advice not to add formula with breastfeeding	3.034 (1.136 - 8.099)	0.027
Relatives' advice not to add formula to breastfeeding	13.790 (2.046 - 92.934)	0.007

**4. DISCUSSION**

The findings of this study showed that the rate of exclusive breastfeeding at 6 months was 12.9% among Syrian mothers. This finding is similar to that reported in Saudi Arabia (12.2%) [11]. However, this finding is higher than that reported in other countries such as Lebanon (1.9%) [17] and Kuwait (10%) [12], while it is lower than others such as United Emirates Arabia (25%) [14] and Jordan (21.8 %) [13]. Nabulsi [24] studied why Lebanese mothers did not breastfeed exclusively their children. Those mothers who did not exclusively breastfeed their infants may be explained by understanding the cultural backgrounds and mothers' concerns in Arab communities. Common believes were that breastfeeding may cause weight gain or breast sagging, sleep deficiency, or weakness.

In the present study, mothers of husbands with lower level of education were more likely to complete exclusive breastfeeding than mothers of husbands with higher education. This finding is inconsistent with the findings of a prospective cohort study in Brazil [21] which evaluated the prevalence of exclusive breastfeeding during the first 3 months of life of babies concluding that very well educated father had more information and awareness about benefits of breastfeeding. Our finding could be explained by the fact that fathers with lower level of education have less chances of employment and lower monthly income, which necessitate them to ask their wives to continue breastfeeding and not to purchase formula-feed, which is relatively expensive. However, a recent study from Bangladesh [25] found that duration of exclusive breastfeeding was not associated with parents' education.



Another important finding, mothers who did not smoke were more likely to complete exclusive breastfeeding than mothers who smoked. One explanation for this finding could be that mothers were aware about various harmful effects of smoking such as medical complications on their health and their babies. In an experimental study to determine how smoker mothers affected their breastfeeding practices, found that smoker mothers tend to wean earliest and had lower milk production [26].

In this study, mothers were more likely to continue exclusive breastfeeding if they received husbands' and relatives' advice not to add formula to breastfeeding. Research found that husbands' support for breastfeeding at discharge from hospital was positively associated with fully breastfeeding [12]. In Kuwait, mothers identified their husbands as a major source of support regarding breastfeeding decision [12]. Previous work demonstrated that advices by village elders and families to add supplementation with breastfeeding recognized as cultural factors that affecting their decision to breastfeed their babies [26-27]. In Colombia, Hernández and Vásquez [28] found that family counseling was very strong factor to encourage mothers to continue their breastfeeding.

Our study findings indicated that maternal age, maternal educational level, monthly income, and mothers' employment status did not show any significant association with exclusive breastfeeding. These findings are in agreement with the findings of other authors in India [15] who found no association between continuation of exclusive breastfeeding and socioeconomic status, maternal education and maternal age, number of antenatal visits and maternal employment. In contrast, studies from Brazil [21] and Iceland [29] reported mothers' educational level was significantly associated with exclusive breastfeeding. However, In Netherlands [30] mothers' educational level was not related to breastfeeding continuation between 2 and 6 months. In our study, maternal education was not related to more awareness about breastfeeding which might indicates there is a need for more intensive health education program about breastfeeding among Syrian mothers. At the other hand, the reason might be that the educated mothers may have more opportunity to be employed, hence they are more financially independent to purchase formula- feed and may be they will not follow the advice of their husbands mothers, families, and friends or the advice of health care professionals to breastfeed their babies. Studies have demonstrated that employed mothers had shorter exclusive breastfeeding duration [23,28]. A study from Lebanon [24] found older mothers were positively associated with the duration of exclusive breastfeeding, while in Saudi Arabia [31] young mothers had closely positive relationship with exclusive breastfeeding.

The current study indicated that there were no relationships among reproductive variables type of delivery, number of live children, and infants' stay with mother after delivery or admission to neonatal intensive care unit and exclusive breastfeeding. In USA, Koosha et al. [32] found that the type of delivery was not associated with exclusive breastfeeding. The present study indicated no relationship between infants' admission to neonatal intensive care unit or stay with mother in the same room after delivery and exclusive breastfeeding. In contrast, other studies [12,21] have identified lower exclusive breastfeeding indexes with infants' admission to neonatal intensive care unit.

#### **4.1 Study Strengths and Limitations**

This is the first study to examine factors associated with exclusive breastfeeding among mothers in Syria .Sample of this study was limited to mothers of infants' age to a maximum of 12 months would have reduced the risk of recall bias of the outcome variables. This study

was a cross-sectional and asking on retrospective breastfeeding practices. Other prospective and longitudinal studies should be implemented to check for additional factors that reduce the duration of exclusive breastfeeding among Syrian mothers. Although the study was conducted in one of the largest cities of Syria, However, the participants were recruited from the all maternal and child health centers of the city. Replicate the study at national level represents all health sectors in Syria is needed.

## **5. CONCLUSIONS**

By 6 months of age, a large ratio of infants were not exclusively breastfed. Lower husband education, smoker mothers, husbands' and relatives' advice not to add formula to breastfeeding were identified as significant factors associated with exclusive breastfeeding among mothers in the study area in Syria. Health care providers (including doctors and nurses) should fulfill educational programs to educate mothers and their husbands about exclusive breastfeeding benefits. Interventions can be implicated at many levels, focus groups, programs advertising the various benefits of exclusive breastfeeding through using teaching tools (such as books, pamphlets, slides, tapes, films, and computerized questionnaire). There is a needed to conduct further qualitative studies to explore reasons for mothers infant feeding choices and to give information on mother's knowledge and opinion on exclusive breastfeeding.

## **CONSENT**

Informed consents were obtained from all mothers were recruited for the study.

## **ETHICAL APPROVAL**

Ethical approval for the research was awarded by the Institutional Review Board from Jordan University of Science and Technology, as well as by the Syria Ministry of Health.

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## **COMPETING INTERESTS**

Authors have declared that no competing interests exist.

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