Prevalence and Determinants of Exclusive Breastfeeding Practice among Mothers of Children Aged 6–24 Months in Hail, Saudi Arabia

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Background. The WHO recommends that infants should be exclusively breastfed for the first six months of life to achieve optimal growth, development, and health. Nonadherence to exclusive breastfeeding (EBF) depends largely on the individual, sociocultural context, and institutional factors. The aim of this study is to estimate coverage and factors associated with adherence to EBF among mothers in the urban Hail region, Saudi Arabia.

Methods. A cross-sectional study was carried out during February–June 2019 among 450 mothers of children aged 6–24 months attending immunization and well-baby clinics in 6 primary healthcare centers in Hail city. A pretested structured questionnaire was used to interview the consented participants.

Results. The majority of mothers (72.9%) were aware of EBF; 24% reported initiation of breastfeeding within one hour after delivery; however, 71.1% did during the first 24 hours. The majority (76.8%) fed colostrum to their newborn; nevertheless, 50.1% had given a prelacteal feeding. Mothers who reported EBF practice were 50.7% (CI 45.9–55.4). The adjusted logistic regression analysis revealed that mother’s awareness about EBF (aOR 3.03; 95% CI 1.78–5.18), antenatal care received at the governmental facility (aOR 2.63; 95% CI 1.28–5.41), breastfeeding a previous child (aOR 2.42; 95% CI 1.46–4.03), counseling received after delivery (aOR 2.47; 95% CI 1.34–4.53), and colostrum feeding given (aOR 4.24; 95% CI 2.31–7.77) were positively associated with EBF practice. On the other hand, mother’s education (OR 0.39; 95% CI 0.15–0.99), higher family income (aOR 0.04; 95% CI 0.00–0.31), and practice prelacteal feeding (aOR 0.61; 95% CI 0.38–0.97) were negatively associated with EBF practice.

Conclusion. EBF rate in urban Hail is still far below WHO recommendations. Efforts to strengthen mothers’ counseling/support during antenatal care and immediately after delivery are needed to promote EBF practice, especially in the private sector.

1. Introduction

Breastfeeding is an investment in health, not just a lifestyle decision. It provides unmatched health benefits for babies and mothers. Infants who are breastfed have reduced risks of asthma, obesity, Type 1 diabetes, severe lower respiratory disease, acute otitis media, sudden infant death syndrome, gastrointestinal infections, and necrotizing enterocolitis for preterm infants [1, 2]. Studies have shown also an inverse relationship between exclusive breastfeeding (EBF) and infant mortality rates in developing countries [3], so that WHO described EBF as the single most effective intervention to improve the survival of children [4]. Women who breastfeed also have a reduced risk of high blood pressure, Type 2 diabetes, ovarian cancer, and breast cancer [1, 2].

The WHO and the United Nations Children’s Fund (UNICEF) recommend that children be exclusively breastfed for the first 6 months of life—meaning no other foods or liquids are provided, including water [1]. However, the global picture falls short of these standards, as only about 40% of infants aged 0–6 months old are exclusively breastfed [5]. This is far below the widely accepted “universal coverage” target.
recommended by WHO/UNICEF that there should be 90% EBF in children less than 6 months in developing countries [6, 7].

The WHO in the Eastern Mediterranean region set a regional strategy on nutrition 2010–2019 that the percentage of women exclusively breastfeeding for the first 6 months increased by 50% [8]. The World Health Assembly (WHA) in 2012 set this target to be reached at the global level by 2025 [9].

There is insufficient data available on breastfeeding in Saudi Arabia. An earlier study in 2009 reported a declining trend of exclusive breastfeeding from 90% to 30% at the age of 3 months [10]. To estimate the EBF rate in Saudi Arabia, a systematic review published in 2014 found high variation among studies, which ranged from 0.8% to 43.9%, and clinched that the EBF rate could not be accurately determined due to the lack of clear definitions and the nature of study design [11]. Furthermore, the WHO does not report any breastfeeding data in the country profile because there are no national data on breastfeeding [12].

Although there are several studies identifying rates and factors influencing EBF, still there is a need to assess rates and understand the specific factors that impact the promotion of breastfeeding at the local level. This area of knowledge is recognized by the WHO as a gap and considered it a research priority [13]. Therefore, this study aimed to identify the prevalence and factors associated with the practice of EBF among mothers in Hail city, Saudi Arabia.

2. Materials and Methods

2.1. Setting. A cross-sectional study was carried out between February and June 2019 in Hail city, in the north of Saudi Arabia, among mothers taking their children to one of six governmental primary healthcare (PHC) centers. PHC centers were selected at random between 24 centers covering all neighborhoods of Hail city. Among other services provided by PHC centers, well-baby and vaccination services are principal services provided free of charge. Vaccination of children is mandatory in Saudi Arabia, with coverage rates of 96–98% for all vaccines in children aged one to two years [14]. Therefore, the selected mothers can be considered a representative sample.

2.2. Participants. The sample was selected using a two-stage sampling method. In the first stage; from the list of 24 PHC centers, 25% of centers (six centers) were selected systematically with the first one at random. In the second stage, mothers of children 6–24 months, who visited the selected PHC centers seeking vaccination or routine checkup of their children, were randomly selected and invited to undergo an interview. Mothers were eligible if they were aged 18 years or over, with no medical condition preventing them or their children from breastfeeding.

2.3. Sample Size. The sample size was determined assuming that 50% of mothers practice EBF breastfeeding for up to six months to maximize sample size, a 95% confidence level, and a 5% margin of error. The nonresponse rate was considered at 10%; therefore, the final sample size was calculated to comprise 440 mothers.

2.4. Data Collection. Preparing for conducting the study, the authors visited the assigned PHC centers and met the directors of those centers, introduced the study objectives, and showed the official letters of the regional health authority to facilitate the study conduction and the letter of ethical approval. All centers approached agreed to participate. Data were collected through face-to-face interviews with the eligible mothers at random during the study period. One female researcher carried out all interviews with mothers who agreed to participate and gave their consent. The interviews were carried out privately for about 15 minutes.

2.5. Data Collection Tool. The interviews were carried out, guided by a questionnaire prepared by the study authors. Inquiries included in the questionnaire were based on previous relevant literature: international [15, 16], Middle East [17, 18], and Saudi Arabia [11, 19–21]. Other items that authors considered important to address the aims of the study were included. The questionnaire consisted of 4 parts: (1) sociodemographic characteristics of the participant mother; (2) mother’s medical and obstetrical history, care received during pregnancy, labor, and puerperium; (3) information about the child characteristics and details about breastfeeding practice; and (4) mother’s awareness, knowledge of breastfeeding, and source of information.

The face validity and content validity of the questionnaire were reviewed by a panel of 4 experts (pediatrician, nutritionist, family medicine, and public health). A pilot study done on 20 eligible mothers (not included in the final sample) was carried out before commencing the study; accordingly, the questionnaire was revised and modified to its final form.

2.6. Ethics. The study protocol was approved by the Bioethical Committee of the General Directorate of Health Affairs, Hail region, Saudi Arabia, with the ethical approval number being 2019–17. Agreed participants signed the study consent form.

2.7. Statistical Analysis. Data was entered, cleaned, and analyzed using Epi Info 7 (CDC, Atlanta, Georgia, US). Data was summarized using proportions for categorical data and mean and standard deviation for continuous data. The relationship was determined using chi-square for categorical variables and T-test or ANOVA test for continuous variables or nonparametric tests as applicable if data were not normally distributed.

Multivariable analysis was carried out using logistic regression analysis to find out factors independently associated with EBF practice among mothers. Mothers who practiced EBF (no = 0; yes = 1) were tested with predictor variables being assumed to affect this practice. Variables of the final model were determined using a stepwise backward
removal method, deleting variables with a p value above 0.25
in order to exclude the nonimportant variables from the
model until the minimum adequate model was reached.
Odds ratios (ORs) as well as their 95% confidence intervals
(CIs) were calculated for the predictor variables in the
analyses. All statistical tests were two-tailed, and differences
were considered to be statistically significant at a p value
≤0.05.

3. Results

3.1. Mothers’ Sociodemographic Characteristics. A total of
450 successful interviews out of 480 mothers asked to
participate in the study, which yielded a response rate of
93.8%. The main characteristics of the sample are described
in Table 1. In particular, the average age of participating
mothers was 30.2 ± 7.48 years. About half (45.6%) attained
a university degree or higher, while illiterate women constitute
a small percent (5.8%). Working mothers accounted for 30%
of the participants.

3.2. Obstetric History and Health Service-Related Factors.
The majority (79.1%) of mothers were multigravida; 78.8%
of them had more than one live child. About 62.5%
received postnatal care. The majority (77.7%) received
breastfeeding counseling during pregnancy and 79.9% im-
mEDIATELY after delivery. Nearly all had given birth at full
term (94.4%) and delivered normally (93.8%) at public
hospitals (90.7%). Most of them (88.1%) breastfed their
previous children (Table 1).

3.3. Awareness and Sources of Knowledge about Breastfeeding.
Although 80.4% of mothers were aware of the concept of
EBF and 72.9% of them correctly identified that exclusive
breastfeeding means that the baby should receive only breast
milk without any other supplements of any kind, only 21.6%
of them correctly identified that the duration of EBF is for 6
months (Table 1). The main sources of the participants’
knowledge about breastfeeding were Internet sites (80.7%),
social media (74.0%), family and friends (55.3%), posters
and pamphlets (32.7%), healthcare staff (13.1%), television
and radio (10.7%), and school (4.4%) (Figure 1).

3.4. Breastfeeding Practice. The pattern of newborn feeding
during the hospital stay and after discharge was explored
among participants (Table 1). According to the participants’
responses, only 24% of mothers reported that they put their
newborn on breast within one hour after delivery; however,
71.1% did during the first 24 hours. About half of the
participants (46.8%) initiated breastfeeding during their
hospital stay, and 76.8% of them reported that they fed their
newborn the colostrum; however, 50.1% had given their
newborn a prelacteal feeding. The prevalence of EBF practice
was 50.7% (95% CI 45.9, 55.4%). About 34.3% of the mothers
were still breastfeeding their children during the study
period.

3.5. Factors Associated with Exclusive Breastfeeding Practices.
Results of the bivariate analysis to find the association be-
tween EBF and factors that might have influence are pre-
sented in Table 2. Factors that are found to be significantly
associated with EBF and other important factors of interest
are subsequently included in the multivariate logistic analysis
to capture independent associations (Table 3). According to
the multivariable logistic regression analysis, the following
factors were positively associated with EBF practice: (i)
mother’s awareness about EBF (odds ratio (OR) 3.03; 95%
confidence interval (CI) 1.78–5.18), (ii) antenatal care re-
ceived at governmental healthcare setting (OR 2.63; 95% CI
1.28–5.41), (iii) history of breastfeeding of the previous child
(OR 2.42; 95% CI 1.46–4.03), (iv) breastfeeding counseling
received after delivery (OR 2.47; 95% CI 1.34–4.53), and (v)
colostrum feeding given for the baby (OR 4.24; 95% CI
2.31–7.77). On the other hand, (i) mother’s education (OR
0.39; 95% CI 0.15–0.99), (ii) higher family income (OR 0.04;
95% CI 0.00–0.31), and (3) practice of prelacteal feeding (OR
0.61; 95% CI 0.38–0.97) were negatively associated with EBF
breastfeeding practice.

4. Discussion

Breastfeeding is an unequaled way of providing ideal food
for the healthy growth and development of infants; it is also
an integral part of the reproductive process with important
implications for the health of mothers [1, 2, 22]. In 2012, the
World Health Assembly (WHA) set a global target to in-
crease the rate of EBF in the first 6 months up to at least
50% by 2025 [9]. The results of our study (50.7% EBF rate)
indicate that this target has been achieved in the urban
community of the Hail region, Saudi Arabia. However, it is
still far away from the widely accepted “universal coverage”
target recommended by WHO/UNICEF that there should
be 90% EBF in children less than 6 months in developing
countries [6, 7]. The prevalence of EBF in our study is
higher than some other recent reports in Saudi Arabia as
shown in Tabouk (31.4%; 2017) [19], Rabigh, at western
region (27.6%; 2019) [23], and Taif (16.3%; 2019) [24] and
as high as 37.0% (2018) in the capital Riyadh and Dammam
main cities [21]. This wide variation in the rates of EBF was
also reported in earlier regional reports in Saudi Arabia,
which ranged from 0.8 to 43.9% [11]. The noticeable
variation between studies indicates the importance of
carrying out standardized national surveys covering all
regions in the country to find out the national rate of EBF
and to map the actual disparities between regions. National
surveys should be conducted on a regular basis to observe
the progress of the national strategies for breastfeeding
promotion.

The relatively higher rate of EBF in our study challenges
the conclusion that the EBF trend in Saudi Arabia is in
decline [11], coping with the reported rising trend in de-
veloped countries [25].

Awareness about the concept of EBF among participants
in our study was somewhat commendable (80.4%). Mothers
who were aware of EBF were independently three times more
likely to exclusively breastfeed their children, irrespective of
Table 1: Sociodemographic, maternal, child, and health service characteristics reported by the study participants in Hail city, Saudi Arabia, 2019.

| Sociodemographic characteristics of the mother | n   | (%)       | 95% CI         |
|------------------------------------------------|-----|-----------|----------------|
| Mothers’ age in years mean ± SD (range)        | 30.16 ± 7.48 (18–48) |
| <25                                            | 110 | 24.4      | 20.6–28.7      |
| 25–29                                          | 128 | 28.4      | 24.4–32.9      |
| 30–39                                          | 128 | 28.4      | 24.4–32.9      |
| 40+                                            | 84  | 18.7      | 15.2–22.6      |
| Mothers’ education                             |     |           |                |
| Illiterate                                     | 26  | 5.8       | 3.9–8.5        |
| Primary                                        | 22  | 4.9       | 3.2–7.4        |
| Middle                                         | 60  | 13.3      | 10.4–16.9      |
| Secondary                                      | 137 | 30.4      | 26.3–35.0      |
| University/higher                              | 205 | 45.6      | 40.9–50.3      |
| Mothers’ employment status                     |     |           |                |
| Working                                        | 135 | 30.0      | 25.8–34.5      |
| Housewife                                      | 269 | 59.8      | 55.1–64.3      |
| Student                                        | 46  | 10.2      | 7.7–13.5       |
| Family income (SR)                             |     |           |                |
| <3000                                          | 16  | 3.6       | 2.1–5.8        |
| 3000–4999                                      | 55  | 12.2      | 9.4–15.7       |
| 5000–9999                                      | 148 | 32.9      | 28.6–37.5      |
| 10000–14999                                    | 169 | 37.6      | 33.1–42.2      |
| ≥15000                                         | 62  | 13.8      | 10.8–17.4      |
| Obstetric history and health service-related factors |     |           |                |
| Number of pregnancies mean ± SD (range) 3.37 ± 2.12 (1–12) |     |           |                |
| <3                                             | 67  | 15.2      | 12.0–18.9      |
| 3–4                                            | 260 | 58.8      | 54.1–63.4      |
| ≥5                                             | 115 | 26.0      | 22.0–30.4      |
| Number of children under 5 years mean ± SD (range) 1.56 ± 0.62 (1–5) |     |           |                |
| ≤1                                             | 227 | 50.4      | 45.7–55.2      |
| ≥2                                             | 223 | 49.6      | 44.8–54.3      |
| Sex of the child                               |     |           |                |
| Male                                           | 293 | 53.1      | 48.4–57.8      |
| Female                                         | 211 | 46.9      | 42.2–51.6      |
| Birth order of the child                       |     |           |                |
| First born                                     | 107 | 23.8      | 20.0–28.0      |
| Second born                                    | 106 | 23.6      | 19.8–27.8      |
| Third and above                                | 237 | 52.7      | 47.9–57.3      |
| No. of antenatal visits mean ± SD (range) 3.97 ± 1.68 (1–9) |     |           |                |
| <3                                             | 75  | 16.7      | 13.4–20.5      |
| 3–4                                            | 260 | 57.8      | 53.1–62.4      |
| 5+                                             | 115 | 25.6      | 21.6–29.9      |
| Breastfeeding counseling received during antenatal care |     |           |                |
| Yes                                            | 349 | 77.7      | 73.5–81.4      |
| No                                             | 100 | 22.3      | 18.6–26.5      |
| Breastfeeding counseling received immediately after delivery |     |           |                |
| Yes                                            | 358 | 79.9      | 75.8–83.5      |
| No                                             | 90  | 20.1      | 16.5–24.2      |
| Mode of delivery                               |     |           |                |
| CS                                             | 28  | 6.2       | 4.3–9.0        |
| Vaginal delivery                               | 421 | 93.8      | 91.0–95.7      |
| Place of delivery                              |     |           |                |
| Governmental hospital                          | 402 | 89.3      | 86.0–92.0      |
| Private hospital                               | 41  | 9.1       | 6.7–12.3       |
| Postnatal follow-up during puerperium           |     |           |                |
| Yes                                            | 280 | 62.5      | 57.8–67.0      |
| No                                             | 168 | 37.5      | 33.0–42.2      |
| Awareness and knowledge about breastfeeding    |     |           |                |
| Heard about exclusive breastfeeding (yes)       | 362 | 80.4      | 76.4–83.9      |
| Know the meaning of EBF (breastfeeding only)    | 328 | 72.9      | 68.5–76.9      |
| Know the duration of EBF (6 months)             | 97  | 21.6      | 17.9–25.7      |
| What should be done with the colostrum (should be given) | 337 | 74.9      | 70.6–78.8      |
their education level. Similar findings have been reported by previous research [19] and indicate the importance of health education campaigns and other awareness programs to convey a clear message about the importance of EBF. Utilizing modern means of mass communication is of value since it is easily applicable and easily utilisable and will ensure a good diffusion of health education messages to a larger number of the target population and creates a positive norm toward breastfeeding in the community. Health information-seeking behavior among participants in our study indicated the heavy utilization of this means (80.7% navigated Internet sites and 74.0% of them used social media to get information about breastfeeding).

Even though it is a natural act, breastfeeding is also a learned behavior. Virtually, all mothers can breastfeed provided that they have accurate information and support within their families and communities and from the healthcare system [22]. Our results showed that mothers who received breastfeeding counseling immediately after delivery were two and half times more likely to exclusively breastfeed their children compared to those who did not receive such counseling. This confirms the findings of other studies [26, 27]. Breastfeeding counseling during antenatal care and immediately after delivery together with other elements of the baby-friendly hospitals [28] is important institutional practice universally followed in maternity hospitals and other maternity departments in general.

Table 1: Continued.

| Sociodemographic characteristics of the mother | n     | (%) | 95% CI     |
|-----------------------------------------------|-------|-----|------------|
| Breastfeeding practice of the current child   |       |     |            |
| Time of initiation of breastfeeding           |       |     |            |
| During 1st hour of delivery                   | 108   | 24.0| 20.2–28.3  |
| 2–24 hours                                    | 212   | 47.1| 42.4–51.8  |
| >24 hours                                     | 122   | 27.1| 23.1–31.5  |
| Not breastfed at all                          | 8     | 1.8 | 0.8–3.6    |
| Place of initiation of breastfeeding          |       |     |            |
| At the hospital                               | 210   | 46.8| 42.1–51.5  |
| At home                                       | 239   | 53.2| 48.5–57.9  |
| Colostrum given to the newborn                |       |     |            |
| Yes                                           | 345   | 76.8| 72.6–80.6  |
| No                                            | 104   | 23.2| 19.4–27.4  |
| Prelacteal feeding given to the newborn       |       |     |            |
| Yes                                           | 225   | 50.1| 45.4–54.8  |
| No                                            | 224   | 49.9| 45.2–54.6  |
| Practiced exclusive breastfeeding              |       |     |            |
| Yes                                           | 226   | 50.7| 45.9–55.4  |
| No                                            | 220   | 49.3| 44.6–54.1  |

Figure 1: Frequency of use (%) of different sources of knowledge about breastfeeding among participants. Participants may report more than one source of knowledge.
| Variables                                                                 | Exclusive breastfeeding | OR (95% CI) | p value |
|--------------------------------------------------------------------------|-------------------------|-------------|---------|
| **Sociodemographic characteristics of the mother**                       |                         |             |         |
| **Mother's age (years)**                                                 |                         |             |         |
| <25                                                                      | 71 (65.1)               | 38 (34.9)   | 1.00 [ref]   | 0.005  |
| 25–29                                                                    | 56 (44.8)               | 69 (55.2)   | 0.43 (0.26–0.74) | 0.002  |
| 30–39                                                                    | 57 (44.5)               | 71 (55.5)   | 0.43 (0.25–0.73) | 0.002  |
| 40+                                                                      | 42 (50.0)               | 42 (50.0)   | 0.54 (0.30–0.96) | 0.035  |
| **Mother's education**                                                   |                         |             |         |
| Illiterate                                                               | 14 (53.8)               | 12 (46.2)   | 1 [ref]   | 0.033  |
| Primary                                                                  | 12 (54.5)               | 10 (45.5)   | 1.03 (0.33–3.22) | 0.961  |
| Middle                                                                   | 23 (38.3)               | 37 (61.7)   | 0.53 (0.21–1.35) | 0.185  |
| Secondary                                                                | 59 (44.0)               | 75 (56.0)   | 0.67 (0.29–1.57) | 0.360  |
| University/higher                                                        | 118 (57.8)              | 86 (42.2)   | 1.18 (0.52–2.67) | 0.698  |
| **Mother's employment status**                                           |                         |             |         |
| Working                                                                  | 76 (56.3)               | 59 (43.7)   | 1 [ref]   | 0.005  |
| Housewife                                                                | 119 (44.9)              | 146 (55.1)  | 0.63 (0.42–0.96) | 0.032  |
| Student                                                                  | 31 (67.4)               | 15 (32.6)   | 1.60 (0.79–3.24) | 0.188  |
| **Family income (SR)**                                                   |                         |             |         |
| <3000                                                                    | 14 (93.3)               | 1 (6.70)    | 1 [ref]   |         |
| 3000–4999                                                                | 26 (48.1)               | 28 (51.9)   | 0.07 (0.01–0.54) | 0.011  |
| 5000–999                                                                 | 65 (44.2)               | 82 (55.8)   | 0.06 (0.01–0.44) | 0.006  |
| 10000–14999                                                              | 89 (53.0)               | 79 (47.0)   | 0.08 (0.01–0.63) | 0.016  |
| ≥15000                                                                  | 32 (51.6)               | 30 (48.4)   | 0.08 (0.01–0.62) | 0.016  |
| **Obstetric history and health service-related factors**                 |                         |             |         |
| No. of pregnancies                                                       |                         |             |         |
| <3                                                                       | 37 (55.2)               | 30 (44.8)   | 1 [ref]   |         |
| 3–4                                                                      | 139 (53.9)              | 119 (46.1)  | 0.95 (0.55–1.63) | 0.844  |
| 5+                                                                       | 46 (40.7)               | 67 (59.3)   | 0.56 (0.30–1.02) | 0.060  |
| No. of children under 5 years                                           |                         |             |         |
| ≤1                                                                       | 123 (55.2)              | 100 (44.8)  | 1 [ref]   |         |
| ≥2                                                                       | 103 (46.2)              | 120 (53.8)  | 0.70 (0.48–1.01) | 0.059  |
| History of breastfeeding the previous child                              |                         |             |         |
| Yes                                                                      | 79 (63.7)               | 113 (40.1)  | 2.63 (1.70–4.06) | <0.001 |
| No                                                                       | 45 (36.3)               | 169 (59.9)  |         |         |
| Information about the child under investigation                          |                         |             |         |
| Facility where antenatal care received                                   |                         |             |         |
| Governmental                                                             | 210 (54.3)              | 177 (45.7)  | 3.19 (1.74–5.86) | <0.001 |
| Private                                                                  | 16 (27.1)               | 43 (72.9)   |         |         |
| No. of antenatal visits                                                  |                         |             |         |
| <3                                                                       | 37 (55.2)               | 30 (44.8)   | 1 [ref]   |         |
| 3–4                                                                      | 139 (53.9)              | 119 (46.1)  | 0.95 (0.55–1.63) | 0.844  |
| 5+                                                                       | 46 (40.7)               | 67 (59.3)   | 0.56 (0.30–1.02) | 0.060  |
| Breastfeeding counseling received during antenatal care visits            |                         |             |         |
| Yes                                                                      | 184 (53.3)              | 161 (46.7)  | 1.58 (1.01–2.48) | 0.046  |
| No                                                                       | 42 (42.0)               | 58 (58.0)   | 1 [ref]   |         |
| Place of delivery                                                        |                         |             |         |
| Governmental hospital                                                    | 206 (51.8)              | 192 (48.2)  | 1.68 (0.87–3.23) | 0.120  |
| Private hospital                                                         | 16 (39.0)               | 25 (61.0)   | 1 [ref]   |         |
| Mode of delivery                                                         |                         |             |         |
| CS                                                                       | 12 (42.9)               | 16 (57.1)   | 1 [ref]   |         |
| Normal delivery                                                          | 213 (51.1)              | 204 (48.9)  | 1.39 (0.64–3.02) | 0.401  |
| Sex of the child                                                         |                         |             |         |
| Male                                                                     | 118 (50.2)              | 117 (49.8)  | 1 [ref]   |         |
| Female                                                                   | 108 (51.2)              | 103 (48.8)  | 1.04 (0.72–1.51) | 0.838  |
| Birth order of the child                                                 |                         |             |         |
| First born                                                               | 62 (58.5)               | 44 (41.5)   | 1 [ref]   |         |
| Second born                                                              | 59 (56.2)               | 46 (43.8)   | 0.91 (0.53–1.57) | 0.736  |
| Third and above                                                          | 105 (44.7)              | 130 (55.3)  | 0.57 (0.36–0.91) | 0.019  |
| Breastfeeding counseling received immediately after delivery              |                         |             |         |
| Yes                                                                      | 199 (56.2)              | 155 (43.8)  | 3.34 (2.01–5.54) | <0.001 |
hospitals in the Hail region, applying the initiative of baby-friendly hospitals. However, adherence to these regulations is not tightly followed in private healthcare facilities, as revealed from the analysis of our study, where mothers who received antenatal care in governmental healthcare facilities were independently more than two and half times more likely to exclusively breastfeed their children compared to those who received antenatal care in private facilities. This indicates that governmental healthcare facilities are more compliant with the guidelines of WHO/UNICEF and the Ministry of Health regarding breastfeeding promotion compared to private healthcare facilities. It implies also that the private healthcare facilities should be supervised well to comply with the initiative of baby-friendly hospitals and training of healthcare staff and tightly apply the code of marketing human milk substitutes.

There should be compliance with breastfeeding promotion guidelines regarding initiating breastfeeding early after delivery, giving colostrum to the newborn, and not giving any prelacteal feeds which were independent predictors of EBF practice among our study participants. Mothers who initiated breastfeeding early by giving colostrum to their newborns were more than 4 times more likely to exclusively breastfeed their children, and those who did not give a prelacteal feeding were one and half times independently more likely to exclusively breastfeed their children. This finding supports reports of other research studies [20]. These practices mostly occur after delivery while the mother is still in the hospital so that maternal counseling and support are two crucial approaches to promote EBF among mothers to be emphasized.

In our analysis, we found that educated mothers were independently more likely to discontinue EBF compared to illiterate ones. Educated mothers in general were 60% less likely to exclusively breastfeed their children as revealed by logistic regression analysis compared to illiterate ones. This finding is also reported in some other research studies from

| Variables                      | Exclusive breastfeeding | OR (95% CI) | p value |
|--------------------------------|-------------------------|-------------|---------|
|                                | Yes (n = 266; 50.7%)    | No (n = 220; 49.3%) |         |
| No                             | 25 (27.8)               | 56 (72.2)   | 1 [ref] |
| Initiation of breastfeeding     |                         |             |         |
| 1st hour                       | 71 (67.0)               | 35 (33.0)   | 2.42 (1.53–3.83) | <0.001 |
| >1 hour                        | 155 (45.6)              | 185 (54.4)  | 1 [ref] |
| Received colostrum             |                         |             |         |
| Yes                            | 204 (59.6)              | 138 (40.4)  | 5.51 (3.28–9.25) | <0.001 |
| No                             | 22 (21.2)               | 82 (78.8)   | 1 [ref] |
| Prelacteal feeding             |                         |             |         |
| Yes                            | 100 (44.8)              | 123 (55.2)  | 1 [ref] |
| No                             | 125 (56.3)              | 97 (43.7)   | 1.59 (1.09–2.30) |
| Postnatal follow-up during puerperium |             |             |         |
| Yes                            | 149 (62.3)              | 35 (29.4)   | 3.97 (2.48–6.38) | <0.001 |
| No                             | 90 (37.7)               | 84 (70.6)   | 1 [ref] |
| Awareness and knowledge about breastfeeding |             |             |         |
| Heard about EBF                |                         |             |         |
| Yes                            | 77 (63.1)               | 143 (44.1)  | 2.17 (1.41–3.32) | <0.001 |
| No                             | 45 (36.9)               | 181 (55.9)  | 1 [ref] |
| Know the meaning of EBF        |                         |             |         |
| Breastfeeding only             | 185 (51.5)              | 174 (48.5)  | 1.19 (0.75–1.91) | 0.460 |
| Other options                  | 41 (47.1)               | 46 (52.9)   | 1 [ref] |
| What should be done with the colostrum |             |             |         |
| Should be given                | 193 (57.8)              | 141 (42.2)  | 3.28 (2.07–5.20) | <0.001 |
| Should be discarded            | 33 (29.5)               | 79 (70.5)   | 1 [ref] |

Table 3: Multivariate logistic regression model for independent predictors of practice exclusive breastfeeding among mothers in Hail city, Saudi Arabia, 2019.

| Variables                      | aOR | 95% CI | p value |
|--------------------------------|-----|--------|---------|
| Education (educated/illiterate) | 0.39| 0.15–0.99 | 0.047 |
| Family income (≤3000/>3000 SR)  | 0.04| 0.00–0.31 | 0.002 |
| Aware about exclusive breastfeeding (yes/no) | 3.03| 1.78–5.18 | <0.001 |
| History of breastfeeding the previous child (yes/no) | 2.42| 1.46–4.03 | <0.001 |
| Facility where antenatal care received (governmental/private) | 2.63| 1.28–5.41 | 0.009 |
| Breastfeeding counselling/support received immediately after delivery (yes/no) | 2.47| 1.34–4.53 | 0.004 |
| Colostrum feed given (yes/no) | 4.24| 2.31–7.77 | <0.001 |
| Prelacteal feeding given (yes/no) | 0.61| 0.38–0.97 | 0.038 |

Abbreviations: aOR = adjusted odds ratio; SE = standard error; CI = confidence interval; SR = Saudi riyal, equivalent to 0.27 US $. Final –2 * log-likelihood: 450.2881; cases included: 402; likelihood ratio: 105.5686; p value <0.001.
Saudi Arabia and developing countries [11, 20, 29–32]. However, education in the bivariate analysis in our study showed a U-shaped association (Figure 2), where mothers who were illiterate or just have primary schooling (EBF 54.2%) and those with university or higher level of education (EBF 57.8%) were more adherents to EBF, compared to mothers with middle (EBF 38.3%) or secondary schooling (EBF 44.0%). A possible explanation for these findings for the illiterate/low educated mothers is the more intimacy to the traditional life, where breastfeeding is seen as the main role and the responsibility of motherhood and is a translation of what was seen and practiced by their mothers. Mothers with university or higher education might potentially have higher breastfeeding literacy and be convinced of the importance of breastfeeding for child and mother’s health as seen in developed countries [33–36]. The U-shaped effect of a mother’s education on adherence to breastfeeding might explain in part the conflicting results of studies that reported a positive association and those that reported a negative one.

Poorer mothers in our study with the least monthly family income were more adherent to EBF than those with higher family income. Similar findings have been described by previous studies, which point to the fact that the higher the family income, the less preference toward breastfeeding [11, 20, 37, 38]. This may be explained in part by not having the choice of paying for formula milk and may be less exposed to the adverse effect of formula milk advertising which targets the more privileged mothers.

Limitations in this study include the cross-sectional design, which limits the ability to infer the causation between predictor variables and EBF practice. Using an interview survey may lead to social desirability bias and also recall bias cannot be eliminated. Study participants in our study were completely from the urban population in Hail city, so the generalizability of the result cannot be extended to the rural population in the region. However, the current study provides insight into the rate and factors affecting the adoption of EBF among mothers in the region. Understanding these factors will provide a guide for policymakers and healthcare staff to plan effective breastfeeding health promotion programs to enhance EBF among mothers in the region.

5. Conclusion

Our study revealed a relatively higher EBF rate among mothers in Hail region urban community compared to some other regions in Saudi Arabia. Results, also, revealed a number of important modifiable individual and institutional risk factors affecting EBF practice that may be informative when planning for breastfeeding promotion in the region. Adherence to WHO/UNICEF and MOH guidelines for breastfeeding promotion appears to be of value, especially in the private sector.

Data Availability

The data used to support the findings of this study are available from the corresponding author upon request.

Conflicts of Interest

The authors declare no conflicts of interest.

Authors’ Contributions

MA conceived the study idea, participated in the development of the data collection tool, carried out the interviews with the participants, and participated in the interpretation of the study results. HH adapted the study idea, developed...
the study protocol and data collection tool, carried out data analysis and interpretation of results, and wrote the manuscript. All authors critically revised and approved the final version of the manuscript.

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