

# A Review of the Factors Associated With the Timely Initiation of Breastfeeding and Exclusive Breastfeeding in the Middle East

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## ABSTRACT:

**BACKGROUND:** Breastfeeding supplies all the nutrients that infants need for their healthy development. Breastfeeding practice is multifactorial, and numerous variables influence mothers' decisions and ability to breastfeed. This review identifies the factors potentially affecting the timely initiation of breastfeeding within an hour after birth and exclusive breastfeeding in the first 6 months in Middle Eastern countries.

**METHODS:** The Medline, ScienceDirect, and Web of Science databases were keyword-searched for primary studies meeting the following inclusion criteria: (1) publication in the English language between January 2001 and May 2017, (2) original research articles reporting primary data on the factors influencing the timely initiation of breastfeeding and/or exclusive breastfeeding, (3) the use of World Health Organization definitions, and (4) Middle Eastern research contexts. A random effect model was used to establish the average prevalence of the timely initiation of breastfeeding and exclusive breastfeeding in the Middle East.

**RESULTS:** The review identified 19 studies conducted in Saudi Arabia (7), Iran (3), Egypt (2), Turkey (2), Kuwait (1), the United Arab Emirates (1), Qatar (1), Lebanon (1), and Syria (1). The meta-analysis established that 34.3% (confidence interval [CI]: 20.2%–51.9%) of Middle Eastern newborns received breastfeeding initiated within an hour of birth, and only 20.5% (CI: 14.5%–28.2%) were fed only breast milk for the first 6 months. The 8 studies exploring breastfeeding initiation most commonly associated it with the following: delivery mode, maternal employment, rooming-in, and prelacteal feeding. The 17 studies investigating exclusive breastfeeding most frequently linked it to the following: maternal age, maternal education, maternal employment, and delivery mode.

**CONCLUSIONS:** Middle Eastern health care organizations should fully understand all the determinants of breastfeeding identified by this review to provide suitable practical guidance and advice to help new mothers to overcome barriers where possible and to contribute to improving infant and maternal health in the region.

**KEYWORDS:** breastfeeding, timely initiation, exclusive breastfeeding, risk factors, infants, Middle East

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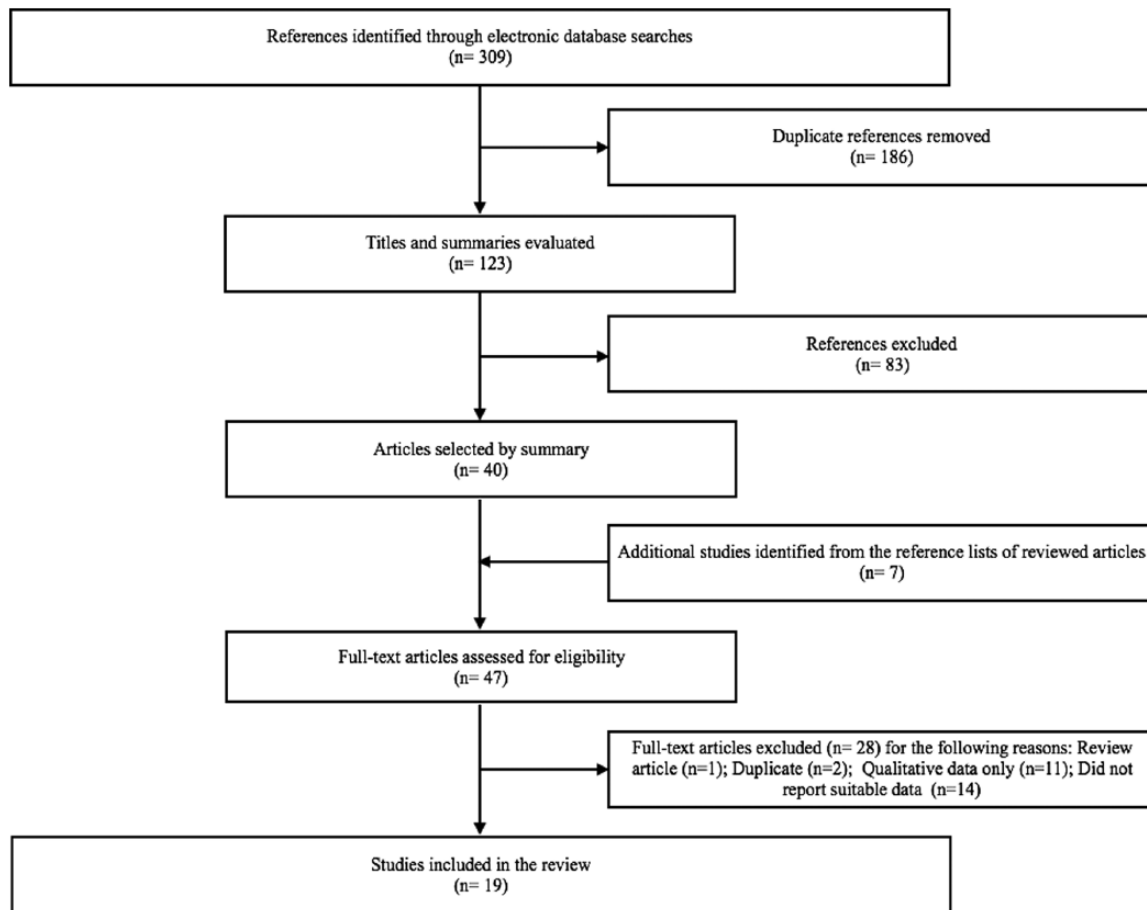
## Introduction

Breastfeeding is a vital area of public health because it has a direct influence on the wider population's overall quality of health and mortality levels.<sup>1–3</sup> As well as being the key source of sufficient nutrition for breastfed infants, it offers well-known short-term benefits in lowering the risk of mortality and infectious diseases.<sup>2,4</sup> Furthermore, breastfed infants have a lower chance of contracting allergic diseases<sup>5</sup> and a lower risk of suffering sudden infant death syndrome.<sup>6</sup> Prior studies have also confirmed the long-term protection breastfeeding offers against noncommunicable diseases.<sup>7–9</sup> For these reasons, and on the basis of strong, long-established evidence, the World Health Organization (WHO) and the United Nations Children's Fund (UNICEF) have both recommended that new mothers initiate breastfeeding within 1 hour of giving birth, then exclusively breastfeed their infants for the first 6 months of life, and continue breastfeeding up to the age of 2 years and beyond.<sup>10,11</sup> Similarly, the American Academy of Pediatrics

(AAP) has also recommended that infants should be exclusively breastfed for the first 6 months of life,<sup>12</sup> and the European Society for Paediatric Gastroenterology, Hepatology and Nutrition (ESPGHAN) has specified an optimal level of 6 months of exclusive breastfeeding with a delayed introduction of complementary foods until after the infant is at least 17 weeks old.<sup>13</sup>

Although the benefits of breastfeeding have been established beyond doubt by a large body of research, average breastfeeding rates in most countries remain below the global recommendations.<sup>2</sup> A nationally representative survey in the United States which can be taken as an example found that only 16.8% of infants had been exclusively breastfed for 6 months.<sup>14</sup> Similarly, Dop and Benbouzid<sup>15</sup> reported a mean rate of 24% of infants exclusively breastfed at the age of 4 months in a combination of Middle Eastern countries and Pakistan, having combined data drawn from Lebanon (7%),





**Figure 1.** Flowchart of the present review's search strategy.

Yemen (15%), Pakistan (16%), Jordan (32%), and Iran (48%). Breastfeeding practice is affected by a complicated combination of influencing factors such as family and maternal socio-demographics, biomedical factors, health care, psychosocial factors, the type and availability of social support, local community attitudes, and public policy.<sup>16–18</sup> However, these factors do not exert a consistent influence when different cultures are compared. For example, it has been found that in developed countries, more highly educated women have a higher likelihood of initiating breastfeeding and of breastfeeding for longer than their less-educated peers, whereas in developing countries, the opposite is the case.<sup>19</sup>

Identifying and understanding breastfeeding's determinants is necessary to support the planning of targeted interventions which aim to promote breastfeeding practice as well as in the wider design of national public health policy.<sup>20</sup> However, to date, no review study has brought together the existing evidence on the factors encouraging or preventing the timely initiation and continuation of exclusive breastfeeding in the context of the Middle Eastern region. The present review therefore seeks to outline the factors associated in the past Middle Eastern research with timely breastfeeding initiation within the first hour of an infant's life and with exclusive breastfeeding for the first 6 months of life.

## Methods

The Medline, ScienceDirect, and Web of Science databases were searched using the following keywords: “timely initiation” OR “delayed initiation” OR “first hour” OR “exclusive” AND “breastfeeding” OR “breast-feeding” OR “breast feeding” AND “factor(s)” OR “determinant(s).” When a study was deemed potentially relevant because it reported data on breastfeeding practices in a Middle Eastern country, the full text was obtained. The reference lists in the full texts were then used as further sources of possibly relevant studies. The PRISMA diagram (see Figure 1) illustrates the study selection process used in this review.<sup>21</sup>

The inclusion criteria for studies in this review were as follows: (1) publication in the English language between January 2001, when the last revision of the global breastfeeding recommendations occurred, and May 2017; (2) original research articles presenting primary data on the determinants of the timely initiation of breastfeeding and/or exclusive breastfeeding; (3) use of the WHO's definitions, rather than any alternative definitions, of timely initiation and/or exclusive breastfeeding, which are as follows: the timely initiation of breastfeeding is defined as when a newborn infant is put to breast within the first hour of life<sup>22</sup> and exclusive breastfeeding is defined as when an infant has only received breast milk

(including expressed milk or milk from a wet nurse) to the exclusion of all other food or drink (including water) in the first 6 months of life<sup>23</sup>; and (4) Middle Eastern research contexts. Studies were excluded from the review if they matched any of the following criteria: (1) their primary focus was on the knowledge, beliefs, and attitudes of women toward the timely initiation of breastfeeding and/or exclusive breastfeeding; (2) neither the timely initiation of breastfeeding nor exclusive breastfeeding was treated as an outcome; and/or (3) they took a qualitative research approach.

Data extraction using a preestablished form was performed on the final sample to gather the following data: each study's complete references, location (country/city), period of research, design, sample size, prevalence of breastfeeding reported, primary outcome measure and focus topic, variables analyzed, and results. Two tables were created and arranged alphabetically by the surname of the first author of each study based on the data extraction process, the first listing the studies which had examined the factors associated with the initiation of breastfeeding in the first hour after birth (Table 1), and the second listing the studies which had examined the factors associated with exclusive breastfeeding for the first 6 months of life (Table 2). A forest plot was generated using the Comprehensive Meta-Analysis software version 3.0 to estimate the prevalence in the Middle East of both the timely initiation of breastfeeding (Figure 2) and of exclusive breastfeeding (Figure 3).

## Results

A total of 19 studies were included in the final analysis, with the following country breakdown: Saudi Arabia (7), Iran (3), Egypt (2), Turkey (2), Kuwait (1), the United Arab Emirates (1), Qatar (1), Lebanon (1), and Syria (1).

### *Timely initiation of breastfeeding*

Table 1 lists the 8 studies identified as exploring the factors associated with the initiation of breastfeeding in the first hour after birth in a Middle Eastern context. Two were conducted in Saudi Arabia,<sup>26,27</sup> 2 in Turkey,<sup>30,31</sup> and 1 each in the United Arab Emirates,<sup>29</sup> Qatar,<sup>24</sup> Lebanon,<sup>25</sup> and Iran.<sup>28</sup> All were cross-sectional studies, and their sample sizes ranged between 200 and 906. The age ranges of the sampled infants at the time of interview (and, thus, the length of recall in each study) varied widely, between immediately after delivery and children aged up to 5 years.

*Timely initiation of breastfeeding rates.* The studies reported a wide-ranging prevalence of breastfeeding in the first hour of life, the lowest rate being 11.4% in a province of Saudi Arabia,<sup>27</sup> and the highest 63.8% in Iran.<sup>28</sup> The combined results of the 8 studies revealed the pooled prevalence of timely initiation of breastfeeding in the Middle Eastern region to be 34.3% (confidence interval [CI]: 20.2%-51.9%; Figure 2).

### *Factors associated with the timely initiation of breastfeeding*

*Mode of delivery.* Of the 8 studies, 7 studies which investigated the association between mode of delivery and timely breastfeeding initiation established that caesarean section deliveries are a risk factor inhibiting the initiation of breastfeeding within the first hour of life.<sup>24-26,28-31</sup> Delivery by caesarean section was therefore identified as a significant barrier to the initiation of breastfeeding within the first hour of life.

*Maternal employment.* Of the 8 studies, 6 studies identified by this review explored the relationship between the mother's employment status and the timely initiation of breastfeeding, and 3 of those 6 identified a statistically significant association.<sup>24,26,29</sup> More specifically, those 3 found that a higher proportion of working mothers than nonworking mothers delayed the initiation of breastfeeding for more than an hour after birth.

*Rooming-in.* The WHO defines rooming-in care as a mother staying in the same room night and day with her newborn infant, without any limit on the direct contact between them.<sup>41</sup> A positive association between rooming-in care and timely breastfeeding initiation within the first hour after giving birth was observed by 3 of the 4 studies which explored the relationship between the two.<sup>24,25,29</sup>

*Parity.* Of the 8 papers, 3 papers identified in this review as examining the possible relationship between parity and breastfeeding initiation found a positive association between greater parity and timely breastfeeding initiation in the first hour after giving birth.<sup>27,29,30</sup> For example, a study in the United Arab Emirates found that multiparous mothers had more than double (2.3 times) the likelihood of starting to breastfeed within the first hour of life than primiparous mothers.<sup>29</sup>

*Prelacteal feeding.* Prelacteal feeding involves food or drink other than human breast milk being given to newborns prior to breastfeeding initiation.<sup>42</sup> Three of the studies included in the present review examined the impact of prelacteal feeding on timely breastfeeding initiation,<sup>26-28</sup> and they all agreed that feeding a newborn infant prelacteal food may be associated with the delayed initiation of breastfeeding to beyond an hour after birth.

*Other factors.* Several additional factors influencing timely breastfeeding initiation within the first hour of life have also been explored by prior studies in Middle Eastern countries, including place of residence, place of delivery, pregnancy planning, previous breastfeeding history, paternal education level, infant's sex, infant's birth weight, advertisements for breast milk substitutes or teats, and night feeding. However, although these factors received little attention in terms of their effects on timely breastfeeding initiation across the 8 studies, as usual only 1 paper examined each of them; their limited investigation does not necessarily imply that they are unimportant.

Table 1. Middle Eastern studies examining the factors associated with the timely initiation of breastfeeding within the first hour after birth.

AUTHORS	YEAR OF PUBLICATION	PLACE OF PUBLICATION	PERIOD OF STUDY	STUDY DESIGN	SAMPLE SIZE, N	AGE OF THE CHILD AT INTERVIEW	BREASTFEEDING INITIATION RATE, %	STATISTICAL ANALYSIS	FACTORS EVALUATED WITH STATISTICAL SIGNIFICANCE	FACTORS EVALUATED WITHOUT STATISTICAL SIGNIFICANCE
Al-Kohji et al <sup>24</sup>	2012	Qatar	June-October, 2009	Cross-sectional	770	<24 mo	57	$\chi^2$	Maternal age ( $P = .021$ ) Maternal employment ( $P = .009$ ) No. of children ( $P = .02$ ) Mode of delivery ( $P = .001$ ) Advertisements for breast milk substitutes or teats ( $P < .001$ ) Rooming-in ( $P < .001$ )	Maternal nationality ( $P = .456$ ) Maternal education ( $P = .503$ ) Income ( $P = .087$ ) Infant's sex ( $P = .505$ ) Planned method of feeding ( $P = .074$ ) Maternal beliefs about colostrum ( $P = .926$ ) Feeding advice during antenatal care ( $P = .394$ ) Guidance on proper position during breastfeeding ( $P = .229$ ) Birth facility ( $P = .808$ ) Support for feeding problems after delivery ( $P = .229$ )
Batal et al <sup>25</sup>	2005	Lebanon	More than 10mo	Cross-sectional	830	1-5y	18.3% within half an hour	Multivariate logistic regression	Mode of delivery ( $P = .000$ ) Rooming-in ( $P = .000$ ) Night feeding ( $P = .000$ ) Mother-infant interaction ( $P = .000$ )	Not reported
Dorgham et al <sup>26</sup>	2014	Saudi Arabia (Taif)	2013	Cross-sectional	400	<6mo	22	Multivariate logistic regression	Prelacteal feeding (OR = 12.02, $P = .000$ ) Maternal employment (OR = 5.559, $P = .004$ ) Father's education (2y education: OR = 6.99, $P = .000$ ; university: OR = 1.019, $P = .968$ ) Mode of delivery (OR = 7.195, $P = .002$ )	Not reported
El-Ghany et al <sup>27</sup>	2012	Saudi Arabia (Al-Hasa)	June-July, 2009	Cross-sectional	906	Within 2 wk of birth	11.4	Multivariate logistic regression	Place of residence (OR = 4.2, $P < .001$ ) Parity (2 or 3: OR = 2.9, $P < .003$ ; >4: OR = 2.4, $P = .02$ ) Prelacteal feeding (OR = 13.7, $P < .001$ ) Breast problems (OR = 3.4, $P = .011$ )	Maternal age ( $P > .05$ ) Maternal education ( $P > .05$ ) Maternal employment ( $P > .05$ ) Income ( $P > .05$ ) Infant's sex ( $P > .05$ ) Gestational age ( $P > .05$ ) Birth weight ( $P > .05$ ) Place of delivery ( $P > .05$ ) Mode of delivery ( $P > .05$ ) Admission to neonatal care unit ( $P > .05$ ) Rooming-in ( $P > .05$ )
Haghighi and Taheri <sup>28</sup>	2015	Iran (Shiraz)	January-June, 2015	Cross-sectional	257	In the time of study for delivery	63.8	Multivariate logistic regression	Place of delivery (OR = 0.28, $P = .011$ ) Mode of delivery (OR = 21.6, $P < .011$ ) Previous history of breastfeeding (OR = 2.24, $P = .033$ ) Lack of hospitalization in the neonatal intensive care unit (OR = 0.03, $P < .011$ ) Prelacteal feeding (OR = 0.14, $P = .016$ )	Maternal education (< diploma: OR = 2.02, $P = .171$ ; university: OR = 2.36, $P = .159$ ) Gestational age (OR = 0.946, $P = .402$ )

Table 1. (Continued)

AUTHORS	YEAR OF PUBLICATION	PLACE OF PUBLICATION	PERIOD OF STUDY	STUDY DESIGN	SAMPLE SIZE, N	AGE OF THE CHILD AT INTERVIEW	BREASTFEEDING INITIATION RATE, %	STATISTICAL ANALYSIS	FACTORS EVALUATED WITH STATISTICAL SIGNIFICANCE	FACTORS EVALUATED WITHOUT STATISTICAL SIGNIFICANCE
Radwan <sup>29</sup>	2013	United Arab Emirates (Abu Dhabi, Dubai, and Al Ain)	Not reported	Cross-sectional	587	<24 mo	19.4	Binary logistic regression	Maternal employment (OR=1.090, <i>P</i> =.011) Parity (OR=2.26, <i>P</i> =.000) Mode of delivery (OR=2.188, <i>P</i> =.001) Rooming-in (OR=17.64, <i>P</i> =.000) Birth weight (2.5-3.0 kg: OR=1.93; 3.1-4.0 kg: OR=2.90; >4.0 kg: OR=0.87, <i>P</i> =.011)	Maternal age (25-30y: OR=0.98; 30-35y: OR=0.64; >35y: OR=0.68, <i>P</i> =.291) Maternal education (illiterate: OR=2.17; primary: OR=1.16; high school: OR=1.43, <i>P</i> =.248) Infant's sex (OR=1.23, <i>P</i> =.898)
Yilmaz et al <sup>30</sup>	2017	Turkey (Ankara)	March-October, 2015	Cross-sectional	341	Not reported	60.1	Multivariate logistic regression	Planned pregnancy (OR=2.019, <i>P</i> =.037) Mode of delivery (OR=0.304, <i>P</i> <.001)	Maternal age ( <i>P</i> >.05) Maternal education ( <i>P</i> >.05) Maternal employment ( <i>P</i> >.05) Parity ( <i>P</i> >.05) Health security ( <i>P</i> >.05) Family structure ( <i>P</i> >.05) Antepartum care ( <i>P</i> >.05) Antepartum breastfeeding education ( <i>P</i> >.05) Infant's sex ( <i>P</i> >.05) Birth weight ( <i>P</i> >.05)
Yilmaz et al <sup>31</sup>	2016	Turkey	July-December, 2015	Cross-sectional	200	6-24 mo	45.5	Multivariate logistic regression	Planned pregnancy (OR=5.373, <i>P</i> =.005) Mode of delivery (OR=48.332, <i>P</i> <.001) Infant's sex (OR=29.248, <i>P</i> <.001)	Maternal age (OR=0.967, <i>P</i> =.867) Maternal education (OR=1.037, <i>P</i> =.943) Maternal employment (OR=3.030, <i>P</i> =.103) Smoking status (OR=1.111, <i>P</i> =.862) Breastfeeding education (OR=2.330, <i>P</i> =.087) Gestational age (OR=5.984, <i>P</i> =.058) Birth weight (OR=0.607, <i>P</i> =.450)

Abbreviation: OR, odds ratio.

Eight studies identified as exploring the factors associated with the initiation of breastfeeding in the first hour after birth in a Middle Eastern context: 2 were conducted in Saudi Arabia,<sup>26,27</sup> 2 in Turkey,<sup>30,31</sup> and 1 each in the United Arab Emirates,<sup>29</sup> Qatar,<sup>24</sup> Lebanon,<sup>25</sup> and Iran.<sup>28</sup>

**Table 2.** Middle Eastern studies examining the factors associated with exclusive breastfeeding at 6 months.

AUTHORS	YEAR OF PUBLICATION	PLACE OF PUBLICATION	PERIOD OF STUDY	STUDY DESIGN	SAMPLE SIZE, N	AGE OF THE CHILD AT INTERVIEW	BREASTFEEDING INITIATION RATE, %	STATISTICAL ANALYSIS	FACTORS EVALUATED WITH STATISTICAL SIGNIFICANCE	FACTORS EVALUATED WITHOUT STATISTICAL SIGNIFICANCE
Al-Akour et al <sup>32</sup>	2014	Syria	July-October, 2012	Cross-sectional	334	0-12 mo	12.9	Binary logistic regression	Father's education (OR=2.595, P=.029) Smoking status (OR=6.578, P=.002) Father's advice (OR=3.034, P=.027) Relatives' advice (OR=13.790, P=.007)	Not reported
Al Ghwass et al <sup>33</sup>	2011	Egypt (Al Der village)	January-June, 2010	Cross-sectional	1059	6-24 mo	9.7	Multivariate logistic regression	Infant's sex (OR=2.04, P=.002) Antenatal care visits (OR=2.8, P<.001) Breastfeeding initiation (first hour: OR=2.2, P=.018; 2-24 h: OR=0.96, P=.026) Breastfeeding difficulty (OR=1.8, P<.013) Maternal age (<20 y: OR=2.9, P<.118; 20-30 y: OR=2.03, P=.045)	Maternal education (P>.05) Maternal employment (P>.05) Paternal education (P>.05) Social class (P>.05) Parity (P>.05) Last interdelivery (P>.05) Place of delivery (P>.05) Mode of delivery (P>.05) Birth weight (P>.05) Use of a pacifier (P>.05)
Al-Kohji et al <sup>24</sup>	2012	Qatar	June-October, 2009	Cross-sectional	770	<24 mo	18.9	$\chi^2$	Maternal nationality (P<.001) Maternal employment (P=.001) Income (P=.012) Planned method of feeding (P=.003) Feeding patterns (P=.025) Advertisements for breast milk substitutes or teats (P=.005)	Maternal age (P=.346) Maternal education (P=.462) No. of children (P=.351) Infant's sex (P=.434) Mode of delivery (P=.269) Knowledge about exclusive breastfeeding (P=.066) Feeding advice during antenatal care (P=.351) Guidance on proper position during breastfeeding (P=.693) Birth facility (P=.162) Rooming-in (P>.99) Support for feeding problem after delivery (P=.222)
Alyousef et al <sup>34</sup>	2017	Saudi Arabia (Riyadh)	February-March, 2015	Cross-sectional	322	6-24 mo	13.7	Multivariate logistic regression	Planned method of feeding (OR=37.009, P<.001) Night feeding (OR=0.298, P=.006) Previous history of breastfeeding (OR=0.223, P<.019)	Frequency of feeding (OR=0.931, P=.54)

Table 2. (Continued)

AUTHORS	YEAR OF PUBLICATION	PLACE OF PUBLICATION	PERIOD OF STUDY	STUDY DESIGN	SAMPLE SIZE, N	AGE OF THE CHILD AT INTERVIEW	BREASTFEEDING INITIATION RATE, %	STATISTICAL ANALYSIS	FACTORS EVALUATED WITH STATISTICAL SIGNIFICANCE	FACTORS EVALUATED WITHOUT STATISTICAL SIGNIFICANCE
Alzaheb <sup>35</sup>	2017	Saudi Arabia (Tabuk)	May-September, 2015	Cross-sectional	589	6-24 mo	31.4	Multivariate logistic regression	Maternal nationality (OR=0.52, P=.039) Maternal employment (OR=0.04, P=.001) Mode of delivery (OR=0.53, P=.005) Knowledge about exclusive breastfeeding (OR=2.21, P<.001) Birth weight (OR=0.42, P=.011)	Maternal age (<25y: OR=0.653, P=.128; 25-35y: OR=0.66, P=.084) Maternal education (OR=1.04, P=.823) Living with partner (OR=3.29, P=.118) Income (<5000 SR: OR=1.03, P=.952; 5000-10000 SR: OR=0.75, P=.479; 10001-15000 SR: OR=0.93, P=.859) No. of children (OR=0.72, P=.081) Gestational age (OR=0.75, P=.491) Infant's sex (OR=1.12, P=.534)
Amin et al <sup>17</sup>	2011	Saudi Arabia (Al-Hasa)	Not reported	Cross-sectional	641	At 24 mo	12.2	Multivariate logistic regression	Maternal age (OR=1.14, P=.034) Place of residence (OR=1.74, P=.008) Maternal education (OR=0.61, P=.026) Maternal employment (OR=0.61, P=.010) No. of children (OR=0.146, P=.035) Income (OR=0.53, P=.020)	Mode of delivery (OR=0.78, P>.05) Oral hormonal contraception (OR=0.95, P=.071) Breastfeeding initiation (OR=0.84, P=.121) Infant's sex (OR=0.94, P>.05) Antenatal care visits (OR=1.00, P>.05) Maternal illness (OR=0.92, P=.163)
Batal et al <sup>25</sup>	2005	Lebanon	More than 10 mo	Cross-sectional	830	1-5y	10.1	Multivariate logistic regression	Maternal education (OR=2.2471, P=.034) Nonpregnancy weight (OR=0.9502, P=.040) Maternal place of birth (OR=0.9490, P=.012) Place of residence (OR=0.3580, P=.006) No. of children (OR=1.2397, P=.010) Painkiller use (OR=0.8564, P=.040) Breastfeeding initiation (OR=0.9502, P=.025)	Not reported

(Continued)

Table 2. (Continued)

AUTHORS	YEAR OF PUBLICATION	PLACE OF PUBLICATION	PERIOD OF STUDY	STUDY DESIGN	SAMPLE SIZE, N	AGE OF THE CHILD AT INTERVIEW	BREASTFEEDING INITIATION RATE, %	STATISTICAL ANALYSIS	FACTORS EVALUATED WITH STATISTICAL SIGNIFICANCE	FACTORS EVALUATED WITHOUT STATISTICAL SIGNIFICANCE
Dashti et al <sup>19</sup>	2014	Kuwait	October, 2007-October, 2008	Prospective cohort study	345	26 wk postpartum	2	Multivariate logistic regression	Maternal place of birth (other Arab countries: OR=0.65; other non-Arab countries: OR=0.93, P<.001) Maternal education (OR=0.74, P=.030) Maternal employment within 6 mo postpartum (OR=0.76, P=.022) Breastfeeding problems in hospital (OR=0.80, P=.046) Breastfeeding on demand in hospital (OR=1.28, P=.040) Infant's father feeding preference (OR=1.33, P=.045)	Parity (OR=0.63, P>.05) Use of a pacifier (<4wk: OR=1.66; at or after 4wk: OR=1.25, P>.05) Prelacteal feeding (OR=0.59, P>.05) Maternal grandmother's infant feeding preference (OR=2.11, P>.05)
Dorgham et al <sup>26</sup>	2014	Saudi Arabia (Taif)	2013	Cross-sectional	400	Up to 6 mo	19	Multivariate logistic regression	Maternal education (2y education: OR=10.270, P=.009; university: OR=1.440, P=.233) Father's education (2y education: OR=2.707, P=.193; university: OR=0.596, P=.093) Mode of delivery (OR=2.260, P=.019) Infant's age (<1 mo: OR=2.704, P=.000; 2-3 mo: OR=4.759, P=.998)	Not reported
El-Gilany et al <sup>36</sup>	2011	Saudi Arabia (Al-Hasa)	June-July, 2009	Cross-sectional	1904	At 6 mo	24.4	Multivariate logistic regression	Place of residence (OR=2.2, P<.05) Maternal employment (OR=4.7, P<.05) Birth weight (OR=1.9, P<.05) Mode of delivery (OR=1.7, P<.05) Prelacteal feeding (OR=3.1, P<.05) Breastfeeding initiation (OR=2.0, P<.05) Feeding patterns (OR=3.4, P<.05)	Maternal education (less than secondary: OR=1.9, P>.05; secondary: OR=2.1, P>.05) Income (OR=0.9, P>.05) Maternal age (<20y: OR=1.1; 20-35y: OR=1.1, P>.05) Parity primipara: OR=1.1; 2 and 3: OR=1.1, P>.05) Infant's sex (OR=1.0, P>.05) Gestational age (OR=0.5, P>.05)



Table 2. (Continued)

AUTHORS	YEAR OF PUBLICATION	PLACE OF PUBLICATION	PERIOD OF STUDY	STUDY DESIGN	SAMPLE SIZE, N	AGE OF THE CHILD AT INTERVIEW	BREASTFEEDING INITIATION RATE, %	STATISTICAL ANALYSIS	FACTORS EVALUATED WITH STATISTICAL SIGNIFICANCE	FACTORS EVALUATED WITHOUT STATISTICAL SIGNIFICANCE
El Shafei and Labib <sup>37</sup>	2014	Egypt	February-May, 2012	Cross-sectional	187	<24 mo	29.9	Multivariate logistic regression	Maternal age (OR=3.4, P=.02) No. of children (OR=0.3, P=.02) Health education about breastfeeding (OR=9.4, P=.001) Knowledge about breastfeeding (OR=2.2, P=.005)	Maternal education (OR=1.5, P=.44) Maternal employment (OR=1.4, P=.31) Antenatal care visits (OR=1.0, P=.90) Pregnancy-related problems (OR=1.5, P=.40) History of contraception (OR=1.8, P=.10) Mode of delivery (OR=1.056, P=.80) Infant's sex (OR=14, P=.30) Lactational problems (OR=0.8, P=.60)
Mahfouz et al <sup>38</sup>	2014	Saudi Arabia (Jazan)	November, 2012	Cross-sectional	400	<5y	26.9	Multivariate logistic regression	None	Infant's sex (OR=1.27, P=.313) Maternal age (25-34y: OR=1.80, P=.050; more than 35y: OR=1.25, P=.413) Maternal education (OR=1.01, P=.984) Maternal employment (OR=1.01, P=.960) Place of residence (OR=1.23, P=.495) Parity (2-4 children: OR=1.49, P=.277; more than 4: OR=0.85, P=.606) Use of contraception (OR=1.03, P=.925)
Noughabi et al <sup>39</sup>	2014	Iran (Tehran)	June-July, 2011	Cross-sectional	538	6-24 mo	46.5		Infant put to the breast (0-5 min: OR=1.76; 6-30 min: OR=2.35; 30 min to 2h: OR=1.89; 2-12h: OR=1.37, P<.05) Mother's intention to breastfeed before childbirth (OR=5.85, P<.05) Formula supplementation at hospital after birth (OR=0.41, P<.05) Mother receiving conflicting feeding advice (OR=0.53, P<.05)	Maternal age (P>.05) Maternal education (P>.05) Maternal employment (P>.05) Maternal ethnicity (P>.05) Mother's return to work after delivery (P>.05) Parity (P>.05) Father's age (P>.05) Father's education (P>.05) Father's employment (P>.05) Father's ethnicity (P>.05) Income (P>.05) Place of residence (P>.05) Mode of delivery (P>.05) Infant's sex (P>.05) Birth weight (P>.05) Infant's birth age (P>.05) Infant's birth health (P>.05) Health problems in the 6 mo after delivery (P>.05) Postnatal depression (P>.05) Antenatal care visits (P>.05) Skin to skin contact (P>.05)

(Continued)

Table 2. (Continued)

AUTHORS	YEAR OF PUBLICATION	PLACE OF PUBLICATION	PERIOD OF STUDY	STUDY DESIGN	SAMPLE SIZE, N	AGE OF THE CHILD AT INTERVIEW	BREASTFEEDING INITIATION RATE, %	STATISTICAL ANALYSIS	FACTORS EVALUATED WITHOUT STATISTICAL SIGNIFICANCE	FACTORS EVALUATED WITH STATISTICAL SIGNIFICANCE
Radwan <sup>29</sup>	2013	United Arab Emirates (Abu Dhabi, Dubai, and Al Ain)	Not reported	Cross-sectional	587	<24 mo	25	Binary logistic regression	Breastfeeding on demand ( $P > .05$ ) Clinician help with breastfeeding ( $P > .05$ ) Clinician counseling on breastfeeding ( $P > .05$ ) Husband's support of breastfeeding ( $P > .05$ ) Family and friends' support of breastfeeding ( $P > .05$ ) Use of a pacifier ( $P > .05$ ) Enough time for breastfeeding ( $P > .05$ ) Previous breastfeeding ( $P > .05$ )	Infant's sex (OR = 0.69, $P = .058$ ) Maternal age (26-30y: OR = 0.91; 30-35y: OR = 1.66; >35y: OR = 1.43, $P = .099$ ) Nipple problems (OR = 1.41, $P = .072$ ) Use of contraception (none-hormonal: OR = 1.18; hormonal: OR = 0.83, $P = .262$ )
Vafaei et al <sup>40</sup>	2010	Iran (Mashhad)	2007	Cross-sectional	1450	7-12 mo	56.4	Binary logistic regression	Maternal education (illiterate: OR = 2.12; primary: OR = 2.12; high school: OR = 1.90, $P = .010$ ) Maternal employment (OR = 1.89, $P = .009$ ) Parity (OR = 1.83, $P = .002$ ) Mode of delivery (OR = 2.20, $P = .001$ ) Rooming-in (OR = 5.87, $P = .000$ ) Night feeding (1-3 times: OR = 1.97; 4-6 times: OR = 2.19, $P = .006$ ) Frequency of feeding (OR = 2.76, $P = .006$ )	Maternal education (elementary school: OR = 0.210, $P = .01$ ; guidance school: OR = 0.310; high school: OR = 0.190, $P = .004$ ; university: OR = 0.160, $P = .005$ ) Maternal chronic illness (OR = 0.064, $P = .103$ ) Frequency of feeding (none: OR = 0.500, $P = .018$ ; afternoon: OR = 1.190, $P = .700$ ; night: OR = 0.770, $P = .330$ ; midnight: OR = 0.890, $P = .500$ )

Table 2. (Continued)

AUTHORS	YEAR OF PUBLICATION	PLACE OF PUBLICATION	PERIOD OF STUDY	STUDY DESIGN	SAMPLE SIZE, N	AGE OF THE CHILD AT INTERVIEW	BREASTFEEDING INITIATION RATE, %	STATISTICAL ANALYSIS	FACTORS EVALUATED WITH STATISTICAL SIGNIFICANCE	FACTORS EVALUATED WITHOUT STATISTICAL SIGNIFICANCE
Yilmaz et al <sup>30</sup>	2017	Turkey	March-October, 2015	Cross-sectional	329	Not reported	38.9	Multivariate logistic regression	Antepartum breastfeeding education (OR=7.172, P<.001)	Maternal age (P>.05) Maternal education (P>.05) Father's education (P>.05) Father's employment (P>.05) Health security (P>.05) Planned pregnancy (P>.05) Antenatal care visits (P>.05) Frequency of feeding (P>.05) Night breastfeeds (P>.05) Nipple problems (P>.05) Use of a pacifier/bottle (P>.05) Maternal employment within 6mo postpartum (P>.05) Parity (P>.05) Family structure (P>.05) Social support (P>.05) Mode of delivery (P>.05) Infant's sex (P>.05) Birth weight (P>.05)
Yilmaz et al <sup>31</sup>	2016	Turkey	July-December, 2015	Cross-sectional	200	6-24 mo	Not reported		Maternal age (OR=2.451, P=.040) Planned pregnancy (OR=2.495, P=.046) Postpartum education (OR=2.782, P=.031) Nipple problems (OR=5.984, P=.058) Night feeding (OR=3.142, P=.001) Formula initiation (OR=37.790, P=.001)	Maternal education (OR=1.159, P=.775) Maternal employment (OR=3.731, P=.235) Mode of delivery (OR=1.825, P=.167) Infant's sex (OR=0.615, P=.268)

Abbreviation: OR, odds ratio.

Seventeen studies identified as exploring the factors associated with the practice of exclusive breastfeeding at 6 months of age in a Middle Eastern context: 6 were conducted in Saudi Arabia<sup>17,26,34-36,38</sup>, 2 each in Turkey,<sup>30,31</sup> Egypt,<sup>33,37</sup> and Iran<sup>39,40</sup>, and 1 each in Kuwait,<sup>19</sup> the United Arab Emirates,<sup>29</sup> Qatar,<sup>24</sup> Lebanon,<sup>25</sup> and Syria.<sup>32</sup>

*Exclusive breastfeeding*

Table 2 lists the 17 studies which explored the factors linked to the practice of exclusive breastfeeding at 6 months of age in a Middle Eastern context. In all, 6 were conducted in Saudi Arabia<sup>17,26,34–36,38</sup>; 2 each in Turkey,<sup>30,31</sup> Egypt,<sup>33,37</sup> and Iran<sup>39,40</sup>; and 1 each in Kuwait,<sup>19</sup> the United Arab Emirates,<sup>29</sup> Qatar,<sup>24</sup> Lebanon,<sup>25</sup> and Syria.<sup>32</sup> All except one (16 in total) were cross-sectional surveys, the other being a prospective cohort design. The maximum ages of the children in their samples ranged between 6 months and 5 years at the time of the interviews. The smallest study sample consisted of 200 participants, and the largest sample contained 1904 participants.

*Exclusive breastfeeding rates.* The reported prevalence of exclusive breastfeeding at 6 months widely ranged from a low of 2% in Kuwait<sup>19</sup> to a high of 56.4% in Iran.<sup>40</sup> The combined results of 17 studies revealed that the pooled prevalence of exclusive

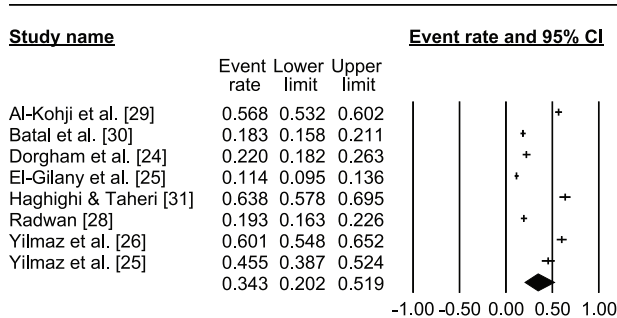
breastfeeding at 6 months in the Middle Eastern region was 20.5% (CI: 14.5%-28.2%; Figure 3).

*Factors associated with exclusive breastfeeding*

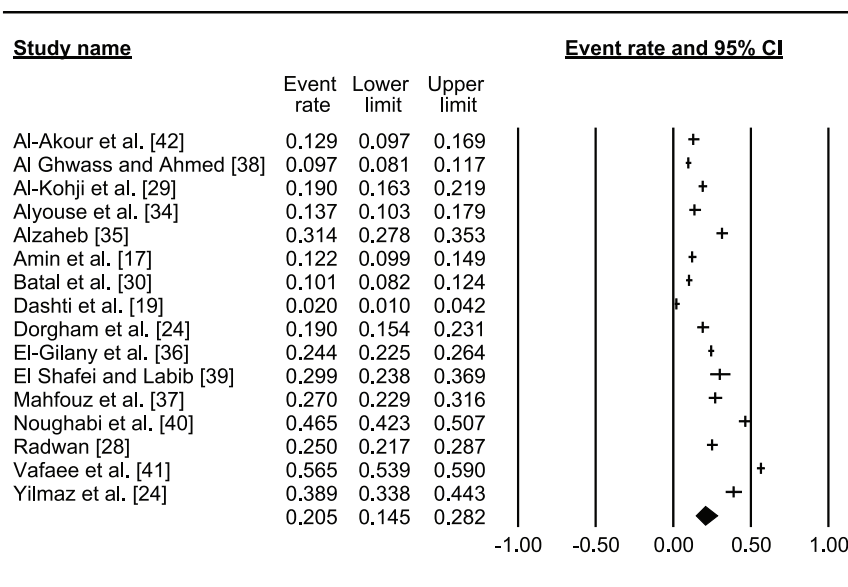
*Maternal education.* The factor most commonly examined by the identified papers was the level of maternal education, which 15 of the 17 studies explored in relation to its possible association with exclusive breastfeeding for the first 6 months of an infant’s life. However, these studies reached inconsistent conclusions; specifically, 2 reported a significant positive association,<sup>19,26</sup> whereas 3 found a significant negative association,<sup>17,25,29</sup> and the remaining 10 established no association in either direction.<sup>24,30,31,33,35–40</sup>

*Maternal employment.* Most (12) of the 17 identified studies explored the possible link between maternal employment and exclusive breastfeeding for the first 6 months of life, and 7 of these 12 reported a statistically significant association between the two.<sup>17,19,24,29,30,35,36</sup> More specifically, 6 of the studies (3 of which were performed in Saudi Arabia, with the others performed in Kuwait, Qatar, and the United Arab Emirates, respectively) concluded that mothers who were formally employed or working outside their homes were less likely to exclusively breastfeed at 6 months.<sup>17,19,24,29,30,35,36</sup> The remaining study among the 7 which found an association reported the opposite conclusion among a sample of Turkish mothers, finding a positive association between exclusive breastfeeding at 6 months and maternal employment.<sup>30</sup>

*Maternal age.* A total of 12 studies explored the impact of maternal age on exclusive breastfeeding for the first 6 months of the infant’s life. Seven found no statistically significant association between maternal age and exclusive breastfeeding.<sup>24,29,30,35,36,38,39</sup> However, the remaining 5 reported a statistically significant



**Figure 2.** Forest plot of the pooled prevalence of the timely initiation of breastfeeding within the first hour after birth in the Middle East region. 95% CI indicates 95% confidence interval.



**Figure 3.** Forest plot of the pooled prevalence of exclusive breastfeeding at 6 months in the Middle East region. 95% CI indicates 95% confidence interval.

association between the two and found that intermediate ages have a raised likelihood of exclusive breastfeeding.<sup>17,31,33,37,40</sup>

*Mode of delivery.* Similarly, 12 of the 17 studies explored the possible association between the mode of delivery and exclusive breastfeeding, and 4 of them found a statistically significant link between caesarean births and lower exclusive breastfeeding rates at 6 months of age.<sup>26,29,35,36</sup> For instance, a recent study in Saudi Arabia reported an inverse association between caesarean section delivery and exclusive breastfeeding.<sup>35</sup>

*Other factors.* Associations were found by 3 different studies between exclusive breastfeeding and the following factors: number of children,<sup>17,25,37</sup> place of residence,<sup>17,25,36</sup> night feeding,<sup>39,31,34</sup> breastfeeding initiation,<sup>25,33,36</sup> and maternal knowledge of exclusive breastfeeding.<sup>35,37,40</sup> Furthermore, 2 different studies associated the following factors with exclusive breastfeeding practice: total family income,<sup>17,24</sup> maternal birth-place,<sup>19,25</sup> paternal education level,<sup>26,32</sup> maternal nationality,<sup>24,35</sup> planned feeding method,<sup>25,34</sup> birth weight,<sup>35,36</sup> advertisements for breast milk substitutes or teats,<sup>34,39</sup> prelacteal feeding,<sup>36,39</sup> and advice from relatives.<sup>32,40</sup> A single study associated exclusive breastfeeding with each of the following variables: the infant's age,<sup>26</sup> planned (rather than unplanned) pregnancy,<sup>31</sup> rooming-in,<sup>29</sup> the mother's previous history of breastfeeding,<sup>34</sup> antenatal care visits,<sup>33</sup> the infant's sex,<sup>33</sup> and maternal smoking status.<sup>32</sup> A few of the studies also explored the possible associations between other factors and exclusive breastfeeding, such as instances of maternal illness, mothers cohabiting with partners, contraceptive usage, gestational age, and pacifier use, but no significant associations were found with any of these factors.

## Discussion

Despite the WHO's 2 recommendations that (1) mothers should initiate breastfeeding of their newborn infants in the first hour of life and (2) infants should be exclusively breastfed until they reach 6 months of age,<sup>11</sup> this study's meta-analysis found that only 34.3% (CI: 20.2%-51.9%) of newborn infants in the Middle East received early initiated breastfeeding, and only 20.5% (CI: 14.5%-28.2%) exclusively received breast milk for the first 6 months of their lives. The WHO's infant and young children feeding rates stipulate that 0% to 29% is a poor rate of early breastfeeding initiation, whereas 30% to 49% is considered fair, 50% to 89% good, and 90% to 100% very good; meanwhile, the WHO infant and young children feeding rate defines exclusive breastfeeding rates as follows: 0% to 11% is poor, 12% to 49% fair, 50% to 89% good, and 90% to 100% very good.<sup>43</sup> The present review's findings therefore indicate a generally fair prevalence of both the timely initiation of breastfeeding and of exclusive breastfeeding in the Middle East region. However, the respective rates which the present meta-analysis revealed for the Middle East region are each considerably below the global average, which for breastfeeding initiation within the first hour after birth is 45%<sup>44</sup> and for exclusive breastfeeding of infants in the first 6 months of life is 41%.<sup>45</sup>

A deeper knowledge of the factors which influence the initiation and continuation of exclusive breastfeeding of newborn and young infants may support the planning of health strategies designed to boost rates of breastfeeding in line with the WHO's recommendations. The present review has thus sought to identify the factors which may affect both timely breastfeeding initiation in the first hour of life and exclusive breastfeeding for the first 6 months of life in countries in the Middle East.

Timely breastfeeding initiation in the first hour after birth and exclusive breastfeeding for the first 6 months of life are each potentially affected by many factors, ranging from economic to sociocultural, and the direction and strength of their associations differ across different countries and over time.<sup>17,19</sup> This review found that several factors could predict Middle Eastern mothers' breastfeeding practices. Of these, delivery mode was one of the most widely investigated factors in the prior research, with 7 of the 8 previous studies investigating its association with timely breastfeeding initiation and 12 of the 17 studies investigating its association with exclusive breastfeeding. All 7 of the studies which investigated the association between the mode of delivery and timely breastfeeding initiation identified caesareans as a risk factor for failing to initiate breastfeeding in the first hour after birth,<sup>24-26,28-31</sup> and caesarean delivery was also found to be a risk factor inhibiting exclusive breastfeeding for the first 6 months of life by 4 of the 12 studies which explored the possible link between delivery mode and exclusive breastfeeding.<sup>26,29,35,36</sup> Caesarean section delivery has therefore been established as a significant potential barrier to the timely initiation and continuation of breastfeeding, most likely because infants born this way are usually moved straight away to a nursery so that their mother can rest and recover from her operation, meaning that the first breastfeed happens after more time has elapsed, and the onset of lactation is therefore significantly delayed, along with an increased chance of supplementation.<sup>19</sup> Furthermore, even though the WHO advocates that the rate of caesarean deliveries should not exceed 10.0% to 15.0%,<sup>46</sup> far higher levels were reported by most of the studies in the present review, ranging from the lowest level of 12.3%, found in Saudi Arabia,<sup>17</sup> to the highest, 60.2%, in Iran.<sup>39</sup> A clear need therefore exists for appropriate guidelines for caesarean deliveries to minimize delays in, and/or avoid the prevention of, the establishment of exclusive breastfeeding.

Another potential influencing factor which many of the studies examined was maternal employment; however, they reached no consensus regarding its effect. More specifically, 3 of the 6 studies that investigated the impact of maternal employment status on timely breastfeeding initiation found it to be a risk factor potentially delaying initiation,<sup>24,26,29</sup> whereas 6 of the 12 studies<sup>17,19,24,29,35,36</sup> that examined the possible association between maternal employment and exclusively breastfeeding for the first 6 months of an infant's life found it to be a risk factor, and a single study found it to be a protection factor;<sup>30</sup> the other 5 studies which investigated a possible link found no association. The negative association found in these prior studies

between employment and breastfeeding practices may be universal for the simple reason that mothers who are able to spend enough time with their newborn and very young infants are more likely to exclusively breastfeed them easily than mothers who lack sufficient time in their daily schedules due to their jobs or for any other reasons.<sup>47</sup> Moreover, working mothers in countries in the Middle East are generally only allowed 2 months of maternity leave on full pay by law, and breastfeeding facilities in their workplaces are often not available. It is therefore obvious why many working mothers may struggle to initiate and maintain exclusive breastfeeding, whereas mothers staying at home are less affected by some of the restricting factors. In contrast, the Turkish study in the present review established a positive association between maternal employment and exclusive breastfeeding, which the authors explained by observing that the higher exclusive breastfeeding rates they had found among working mothers had probably been caused by returning to work after spending the first 6 months with their infants at home, as mothers who usually work outside their homes and who can legally claim maternity leave usually have more ideal conditions to exclusively breastfeed during their leave from work.<sup>30</sup> This finding means that improved, guaranteed maternity leave entitlement and increased flexibility in working terms and conditions would be likely to support improvements in breastfeeding rates across Middle Eastern countries.

Breastfeeding rates may also be linked to parity and maternal age.<sup>16</sup> Regarding parity, all 3 of the studies that explored its possible association with timely breastfeeding initiation confirmed a positive relationship between higher parity and the likelihood of the timely initiation of breastfeeding<sup>27,29,30</sup>; meanwhile, a positive association between exclusive breastfeeding and parity was only reported by 2 of the 7 studies which had investigated the possible relationship between the two.<sup>29,30</sup> Moving on, most studies in this review found no significant link between maternal age and either the timely initiation of breastfeeding (4 of the 5 which examined this factor found no association) or exclusive breastfeeding (7 of the 12 found no association). However, a minority of studies did find an association between breastfeeding practices and maternal age, and in these cases, mothers of intermediate ages seem to have had a higher likelihood of breastfeeding.<sup>17,31,33,37,40</sup> As an example, an Egyptian study found that mothers in the 20 to 30 years age group had a significantly higher chance of breastfeeding exclusively for the first 6 months of their infant's life, with an odds ratio of 2.9.<sup>33</sup> A possible reason for this is that younger (teenage) mothers and those who are in the 35 years or older age group more often prematurely interrupt their breastfeeding.<sup>16</sup>

Maternal education was the most explored variable in the prior studies included in the review, as 6 of the 8 studies investigated its possible association with timely breastfeeding initiation and 15 of the 17 studies examined its potential link with exclusive breastfeeding. None of the 6 studies identified any significant association between maternal education level and the timely initiation of breastfeeding.<sup>24,27-31</sup> However, varying

results were found regarding its association with exclusive breastfeeding; 2 studies found a significant positive association,<sup>19,26</sup> another 3 revealed a significant negative association,<sup>17,25,29</sup> and the remaining 10 could not confirm an association in either direction.<sup>24,30,31,33,35-40</sup> The authors of the 3 papers which did establish a negative association between exclusively breastfeeding for the first 6 months of an infant's life and maternal education all offered the explanation that higher education is usually associated with more modern thinking in developing countries, thus possibly discouraging lifestyle practices deemed "traditional," including breastfeeding.<sup>48</sup> In contrast, one of the papers which observed a positive association offered the possible reason that more highly educated mothers are more likely to be aware of the health benefits of breastfeeding.<sup>49</sup> The inconsistent results arising from the prior studies investigating the influence of various factors on breastfeeding practices mean that there is a definite need for further research to establish a clearer understanding of the association between potential risk factors and breastfeeding practices.

The present review has some limitations which should be discussed. First, although broad search strategies were deployed, the possibility of missing some prior studies which would have been relevant cannot be fully discounted. Second, only articles written in English were considered for inclusion in the present review. Third, almost all the studies included in the review were cross-sectional in design (18/19 = 94.7%), and this means they must be regarded as weak in determining causality as they are unable to guarantee a temporal cause-effect relationship. Fourth, there is a potential issue of information validity concerning the variables. Because data were gathered from mothers for up to 5 years after they gave birth, the risk of measurement error and recall bias is relatively high in many of the studies we reviewed. Fifth, some of the studies lacked a multivariate analysis and those that included it did not consistently use the same covariates for adjustment. Finally, this literature review only covers studies in Middle Eastern contexts, so its synthesized framework may not necessarily be applicable elsewhere in the world.

## Conclusions

Overall, the rates of breastfeeding initiation and exclusivity reported by the reviewed studies' samples of mothers in different Middle Eastern countries are significantly lower than the present WHO recommendations. Breastfeeding practice is shaped by various sociocultural and physiological factors which can impact, either alone or in combination, on a mother's choice and ability to successfully initiate and maintain exclusive breastfeeding of her infant. The present review has found that the factors most frequently reported as influential on timely breastfeeding initiation in the first hour after giving birth were the mode of delivery, maternal employment, rooming-in, and prelacteal feeding. The review has also established that the factors most frequently associated with breastfeeding exclusively for the first 6 months of an infant's life were maternal employment, maternal education, maternal age, and mode of delivery. The present research therefore recommends

that Middle Eastern health care providers understand these determinants of breastfeeding so that they can provide detailed practical guidance to help mothers to overcome barriers where possible and, in doing so, assist in improving maternal and infant health outcomes in the region. Future research should examine the possible causations between key influencing factors and breastfeeding patterns and practices in the Middle East region by deploying more appropriate research designs, such as cohort studies, which are able to analyze follow-up data, and can therefore produce more accurate and insightful results.

### Author Contributions

RAA performed the literature search, and wrote and revised the manuscript.

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