A Longitudinal Study on Breastfeeding Practice among Women Living in Western Saudi Arabia

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Abstract: This paper presents a longitudinal study of breastfeeding at two private hospitals in Jeddah, Saudi Arabia. Soliman Fakeeh (SF) follows the WHO's baby-friendly hospital initiative (BFHI), Saudi Germany Hospital (SGH) does not. Participants were 102 women in both hospitals (52 BFHI, 50 non-BFHI). Two semi-quantitative questionnaires, translated into Arabic, were used at baseline and one month postpartum. Results showed that most women in the study have initiated breastfeeding but turned to mixed feedings after one month. We also found that self-efficacy has the biggest influence on breastfeeding practice at one month, measured by the Breastfeeding Self-Efficacy Scale (BSES) and regardless of other variables. The BFHI made breast milk the first nutritive substance infants received and had a higher percentage of early initiation of breastfeeding than the non-BFHI. The BFHI hospital supported women to breastfeed practically and educationally. Support was provided by books, internet, and educational sessions. Yet, any effects no longer existed at one month postpartum, at which point most women had shifted to mixed feeding. There was no relationship between the BSES and BFHI status. Thus, we recommend developing breastfeeding promotion programs before delivery and at least a six-months follow-up after delivery, in addition to peer counselling approaches.

Keywords: Breastfeeding practice, Baby-Friendly Hospital Initiative (BFHI), self-efficacy, attitude towards infant feeding.

INTRODUCTION

Breastfeeding plays a major role in maternal and child health [1] and mothers worldwide need support and guidance. As a result, UNICEF and WHO launched the baby-friendly hospital initiative (BFHI) in 1991 [2]. In Saudi Arabia, over 90% of the population results in mixed feedings, breast milk and infant formula [3-5]. In 1991, the WHO reported that 55% of Saudi mothers were exclusively breastfeeding infants under four months old [6]. Other old nationwide studies report similar exclusive breastfeeding rates: 53% at five months or less [7]. Few studies have defined breastfeeding categories [8], but many have not [9-11]. This makes it difficult to review and distinguish breastfeeding patterns in Saudi Arabia. In general, it has been reported that Saudi Arabia has a high breastfeeding initiation rate, which implies the willingness of Saudi women to breastfeed [4], which is considered a great step towards health and wellness for both mothers and children [12] However, despite Saudi Arabia's initiation rate exceeding 90%, exclusive breastfeeding drops to approximately 49% at one month, 36% at two months, 20.5% at four months, 10% at six months, and any breastfeeding with 1.8% at 12 month [13]. Many studies conducted in Saudi Arabia have suggested that Saudi women need breastfeeding education [4, 14], partly to correct misperceptions about breastfeeding. It has also been reported that Saudi women lack knowledge and information about the nutritional benefits of breastfeeding, which if supplied may motivate mothers to breastfeed their babies. This study is a longitudinal study of infant feeding at two private hospitals in Jeddah, Saudi Arabia, which was conducted to investigate breastfeeding patterns in hospitals following the baby-friendly hospital initiative (BFHI) and those who are not following baby-friendly hospital initiative (non-BFHI). Furthermore, we also assessed both self-efficacy towards infant feeding regarding breastfeeding for the first time in Saudi Arabia.

MATERIAL & METHODS

Study Design

A longitudinal study of infant feeding at two private hospitals in Jeddah, Saudi Arabia. Soliman Fakeeh (SF) follows the WHO's baby-friendly hospital initiative (BFHI), Saudi Germany Hospital (SGH) does not. Women who; give birth prematurely or multiples, had a

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baby with congenital abnormalities, did not plan to breastfeed were excluded. Ultimately, 102 women (52 BFHI, 50 non-BFHI) participated. At one month, 24.5% dropped out, leaving 77 (36 BFHI, 41 non-BFHI). Two semi-quantitative questionnaires were used, at baseline and one month postpartum. These questionnaires are characterized by 8 topics which were; demographics, birth, initial, current and future feeding plans, support and discouragement, previous experience, knowledge, attitudes, and self-efficacy. Types of feeding were defined based on the WHO definitions.

Ethics

A low-risk ethical notification was filed with the Massey University Human Ethics Committee. King Abdul-Aziz University Human Ethics Committee and Suliman Fakeeh Hospital Research Ethics Committee gave ethical approval. Hospital staff permitted to interview patients, who gave informed consent.

Attitudes Towards Infant Feeding Scale

The Iowa Infant Feeding Attitude Scale (IIFAS), developed by De la Mora *et al*. (1999) to assess mothers' attitudes towards infant feeding, has been used worldwide [15-17]. It was translated, modified and validated in Saudi Arabia [9]. This study used a modified Arabic version of the IIFAS, taking seven questions from the scale and adding two, to cover misperceptions identified elsewhere [18]. The attitudes towards infant feeding scale included nine questions, scoring one (strongly disagree) to five (strongly agree).

Breastfeeding Self-Efficacy Scale

The breastfeeding self-efficacy scale (BSES) measures mothers' self-confidence around breastfeeding. Created in 1999 by Cindy-Lee Dennis, who shortened it into the Breastfeeding Self-Efficacy Scale Short Form (BSES-SF) in 2006. It uses a five-point Likert scale from one (not at all confident) to five (very confident) and has been used internationally [19-22]. The BSES-SF was translated into Arabic using back-translation. Both English and Arabic versions of the questionnaire were pre-tested.

Data Collection and Management

Baseline interviews were in hospitals on the day or day after vaginal delivery, two to three days after caesarean. One month postpartum interviews were by phone. All questions were coded and entered into the Statistical Package for Social Science (SPSS). The attitudes towards infant feeding scale included negative and positive questions, so a reverse code ranging from one to five points was used when required.

Coding and Analysis

Closed-ended questions were coded zero=no or one=yes, or via sequence for multiple options. Open-ended questions were coded by examining all answers, concerning the literature.

Time of first breast milk was coded in by looking at all times reported, then categorized. Reasons for introducing formula were categorized, as were knowing when to feed, ascertaining baby had enough milk, factors influencing feeding choice and problems with breastfeeding initiation Reasons to cease breastfeeding were categorized like [23], and types of support categorized were coded according to [24]. Data were analyzed using SPSS20, with identifying significance at p-value ≤ 0.05. *chi*-square test assessed differences between expected and observed frequencies [25], the Bonferroni test [26] was applied to prevent false-positive results. *chi*-square testing was not conducted for groups below five. Data were sometimes combined for *chi*-square testing, to eliminate expected values below five. Some continuous data scores were categorized to permit *chi*-square testing. One-way Anova and a t-test were used for continuous normally-distributed variables and parametric tests for normal data. Logistic regression analysis was used to identify relationships between multiple independent variables and dichotomous dependent variables**.** Logistic regression with ci 95% and significance at p-value ≤ 0.05 was set, forward wald stepwise regression found the best statistical model.

RESULTS

Baseline Description

Participants were 64 Saudi, 38 non-Saudi women. Nationality group and type of hospital were associated (p= 0.001). Saudi women were 73% of BFHI patients, 52% of non-BFHI. Most (94%) Egyptian women attended the non-BFHI. Respondents were aged 17–46, most often 26–30. Young women (≤25 years) were three times more likely to deliver in the BFHI (X^2= 10.356, p= 0.006). Most were housewives (74.5%), graduates (61.8%), married (100%), non-smokers (92.2%). About one third had a monthly family income of 5000–8000 Saudi Riyal. There was no difference in

family income between hospitals (p= 0.487). The non-BFHI had more caesareans (X^2= 7.92, p= 0.005). Percentage of boys and girls born was similar in both (p= 0.820). There was no association between parity and hospital type (p=0.116), nor a significant difference between numbers of children raised by multiparous women in each (p= 0.071).

Ethnicity and Demographics

Table **1** shows that Breastfeeding practice varied significantly between ethnic groups (p< 0.0001). All Egyptian mothers (100%) were fully breastfeeding at one month postpartum, most Saudi mothers (70%) were mixed feeding; 13% exclusively/fully breastfeeding. No association was found between feeding methods at one month and mother's age (p= 0.926), education (p= 0.621), occupation (p= 0.174), family income (p= 0.192), parity (p= 0.115), delivery mode (p= 0.061) or number of children (p= 0.197).

Feeding in Hospital

Breastfeeding Practice during One Month

Table **2** shows feeding practice (exclusive, full, predominant and mixed) and also shows patterns and changing occurring a one month follow up. There is a significant association between feeding method and type of hospital (p< 0.0001), with exclusive breastfeeding commoner in the BFHI.

Table 1: Demographic

Demographics	BFHI N=52		Non-BFHI N=50		Total N=102	
	N	%	N	%	N	%
Saudi	38_a	73.1	26_b	52.0	64	62.7
Egyptian	1_a	1.9	15_b	30.0	16	15.7
Others	13_a	25.0	9_a	18.0	22	21.6
≤25 years	22_a	42.3	9_b	18	31	30.4
26- 30 years	19_a	36.5	17_a	34	36	35.3
>30 years	11_a	21.2	24_b	48	35	34.3
Primiparous	20_a	38.5	12_a	24	32	31
Multiparous	32_a	61.5	38_a	76	70	69
Education level						
lower than high school	6	11.5	6	12	12	11.8
high school	13	25	11	22	24	23.5
University undergraduate	32	61.5	31	62	63	61.8
postgraduate	1	2	2	4	3	2.9
Occupation						
working full time	3_a	6	11_b	22	14	13.7
student	11_a	21	0_b	0	11	10.8
housewife	37_a	71	39_a	78	76	74.5
other	1	2	0	0	1	1.0
Number of children						
2	18	56	11	29	29	41
3-4	12	38	18	47	30	43
5-6	2	6	8	21	10	14
more than 6	0	0	1	3	1	2
Delivery mode						
Normal	30_a	58	15_b	30	45	44
Caesarean	22_a	42	35_b	70	57	56
Baby's gender						
boy	29_a	56	29_a	58	58	57
Girl	23_a	44	21_a	42	44	43

Each subscript letter denotes a subset of hospital categories whose proportions do not differ significantly from each other at the.05 level.

Table 2: Breastfeeding Pattern during Hospitalisation and 1 Month

Breastfeeding during hospitalisation	BFHI		Non-BFHI		Total	
Exclusive	21_a	40.3	1_b	2	22	21.5
Full	8_a	15.3	2_b	4	10	9.8
Predominant	3_a	5.7	0_a	0	3	2.9
Mixed-feeding	19_a	36.5	29_b	58	48	47
Exclusive formula	1_a	1.9	18_b	36	19	19
Breastfeeding practice at 1 month	**BFHI**		**Non-BFHI**		**Total**	
	N	**%**	**N**	**%**	**N**	**%**
Exclusive	7	19.4	0	0	7	9
Full	0	0	14	34	14	18
predominant	3	8.3	2	5	5	7
Mixed-feeding	22	61	23	56	45	58
Exclusive formula	4	11	2	5	6	8
Total	36	100	41	100	77	100

Each subscript letter denotes a subset of hospital categories whose proportions do not differ significantly from each other at the.05 level.

Table 3: Women's Attitudes Toward Breastfeeding

Women attitudes	Strongly Disagree %	Disagree %	Neutral %	Agree %	Strongly agree %
Women should not breastfeed in public places such as restaurant*	2.9	33.3	7.8	52.0	3.9
Formula feeding is the better choice if a mother plans to work outside the home*	2.0	38.2	2.9	51.0	5.9
Father feels left out if a mother breastfeed*	2.9	74.5	3.9	15.7	2.9
Breastfeeding is more convenient than formula feeding	1.0	4.9	5.9	56.9	31.4
Formula is as healthy for an infant as breast milk*	23.5	66.7	3.9	4.9	1.0
Breastfed babies are healthier than formula fed babies	1.0	5.9	5.9	41.2	46.1
The benefits of breast milk last only as long as the baby is breastfed*	5.9	80.4	4.9	6.9	2.0
A heavier baby is healthier*	2.0	79.4	4.9	11.8	2.0
Breastfeeding affects the maternal figures negatively*	5.9	79.4	2.0	12.7	0

*Reverse scoring was used for the negative questions.

Breastfeeding Self-Efficacy Scale and Attitudes Towards Infant Feeding

Tables **3** & **4** shows that most women were confident with breastfeeding at baseline (84%) and one month (70%) with no difference between hospitals at baseline (p= 0.357) or 1 month (p= 0.253). Feeding method at one month was associated with baseline BSES (p= 0.029). Seventy-four percent of mothers with lower BSES scores were mixed feeding, and 59% of mothers with medium scores. Most women were confident in one month, but 52% not at all confident/not very confident about breastfeeding their babies without supplementation. Other fears reported involved breastfeeding for every feed, knowing when the baby had finished breastfeeding, breastfeeding in the presence of relatives, time consumption and managing when the baby was crying. There was no difference in baseline BSES scores between hospitals (47.44± 5.1, 48.1± 5.44, p= 0.893). A relationship between BSES and ethnicity was found (p= 0.055).

Table **3** shows the Mean attitudes score was 32.9 ± 3.4 (mean ± SD), with no difference between hospital scores (32.8± 3.7, 32.9± 3.1, p= 0.413). Most women had moderate attitudes. Most mothers agreed/strongly agreed to breastfeed is more convenient than formula

Table 4: Breastfeeding Self-Efficacy Scale Results

Self -efficacy	Baseline			1 month postpartum		
	BFHI N=52	Non-BFHI N=50	Total N= 102	BFHI N=32	Non-BFHI N=39	Total N=71
	%	%	%	%	%	%
Very confident (between 70 and 56 scores)	4	6	5	9	15	13
Confident (between 55 and 42 scores)	85	84	84	84	64	73
Sometimes confident (between 41 and 28 scores)	11	10	11	6	21	14

and that breastfed babies are healthier. Many strongly disagreed/disagreed that: fathers feel excluded if the mother breastfeeds; the formula is as healthy for infants as breast milk; the benefits of breast milk last only while the baby is breastfed; a heavier baby is healthier; that breastfeeding harms a mother's figure. Two negative attitudes were prevalent: 55.9% believed women should not breastfeed in public, 56.9% felt formula was better if the mother worked or needed to go out. Baseline attitudes, measured with the IIFAS, were associated with breastfeeding methods at one month postpartum (p= 0.016). Half of the mothers with high scores were mixed feeding and 37.5% exclusively or fully breastfeeding at one month. Seventy-five per cent of mothers with medium scores were mixed feeding, 26.3% exclusively/fully breastfeeding.

Logistic Regression

Logistic regression tested the following variables as predictors for breastfeeding practice: ethnicity, BSES, attitudes, intentions, support, hospital, age, education, occupation, parity, delivery mode, family income. Egyptian ethnicity was excluded because all Egyptian women were fully breastfeeding at 1 month. Forward stepwise logistic regression analysis predicted the probability of factors that can make women more likely to exclusively or predominantly breastfeed. The model gave an overall success rate of 86%, model coefficient p< 0.0001. The methodology used logistic regression, coefficient, odds ratio and Wald test. Employing a 0.05 criterion of statistical significance revealed that baseline BSES (p= 0.001) is the only significant predictor of feeding outcomes. The odds ratio for BSES indicates that holding all other variables constant, every increase in one score of BSES means women will be 1.3 times more likely to be exclusively, fully or predominantly breastfeeding than mixed feeding.

Breastfeeding Support

Table **5** shows that Most women reported breastfeeding support during pregnancy and after. Mothers supported at baseline were less likely to exclusively/fully breastfeed at one month (p= 0.043). Egyptian mothers delivered in a non-BFHI setting without breastfeeding education or support and were all exclusively/fully breastfeeding at one month. Women who delivered in BFHI and had helped were mostly mixed feeding. This relationship vanishes when Egyptian mothers are excluded (p= 0.082). No association was found between support received after discharge up to 1 month and feeding method used at 1 month (p= 0.061). Seventy-four per cent of women received postpartum breastfeeding support in hospital; this was commonest for women in the BFHI (X^2= 12.15, p< 0.0001). Most had help with practical issues, more in the BFHI hospital (86.5%) than in the non-BFHI (32%). The BFHI offers postnatal breastfeeding support, the non-BFHI offers routine support to primiparous women. Most women received breastfeeding information while pregnant. Sources included the internet, books and their mothers. Prenatal advice from lactation consultants was free to women planning delivery in the BFHI was 21% attended.

DISCUSSION

All women initiated breastfeeding but at one month, mixed feeding was commonest (58%). This echoes most recent Saudi study carried on 1700 mother based on a national survey, showing that 43.6% which was identified as “fair” regarding the overall prevalence of breastfeeding initiation [27]. In agreement with our study, data has showed that 58% of women in both BFHI and Non-BFHI were depending on mixed feedings at 1 month (Table **2**), which was seen previously as well in a recent study carried on 420 mothers in Rabigh City [27] and previously discussed to be due to attitudes and other behaviours [4, 5, 9, 13, 28, 29]. Most women in this study were Saudi, housewives, multiparous, non-smokers, university graduates and delivered via caesarean (Table **1**). Saudi women are less than 15% of Saudi Arabia’s workforce [30]. The difference between this sample and others could arise because previous studies used

Table 5: Breastfeeding Support

a. During pregnancy	% of women who used sources *		
	BFHI N=52	Non-BFHI N=50	Total N=102
Internet	19	31	24.5
Books	19	25	21.5
TV	4	12	8
Radio	0	0	0
Doctor	2	2	2
BFHI lactation consultant	11	0	6
Mother	19	8	14
Mother in law	2	0	1
Friends	4	2	3
Others	20	20	20

b. During hospitalisation	BFHI N=52		Non-BFHI N=50		Total N=102	
	N	%	N	%	N	%
Help with breastfeeding	46_a	88.5	29_b	58	75	74
Professional help	45_a	86.5	16_b	32	61	59.8
Family and friend help	7_a	13.5	27_b	46	30	29.4

c. During the first month after hospital discharge	BFHI N=36		Non-BFHI N=41		Total frequency N=77	
	N	%	N	%	N	%
If received support						
Yes	24	67	33	80	57	74
no	12	33	8	20	20	26
Lactation consultant support						
Information+ emotional	3	12.5	0	0	3	5.2
Doctor support						
Information	0	0	2	6.1	2	3.5
Emotional	0	0	3	9.1	3	5.3
Information+ emotional	2	8.3	13	39.4	15	26.3
Total	2	8.3	18	54.6	20	35
Sister support						
Emotional	6	25	1	3	7	12.3
Information+ emotional	2	8.3	0	0	2	3.5
Total	8	33.3	1	3	9	15.8
Mother and mother in law support						
Practical	1	4	0	0	1	1.7
Emotional	22	91	27	81.8	49	85.9
Information+ emotional	1	4	3	9	4	7
Total	24	100	30	91	54	95
Husband support						
Emotional	8	33.3	21	63.6	29	50.9
Information+ emotional	0	0	1	3	1	1.8
Total	8	33.3	22	66.6	30	52.7
Friends support						
Emotional	2	8.3	1	3	3	5.3
Others support						
Information	0	0	1	3	1	1.8
Emotional	0	0	2	6.1	2	3.5
Information+ emotional	2	8.3	0	0	2	3.5
Total	2	8.3	3	9	5	8.8

Each subscript letter denotes a subset of hospital categories whose proportions do not differ significantly from each other at the.05 level.
*Some women received both types of help.

public hospitals, with lower socioeconomic groups, and pre-date changes in Saudi society. Several studies have found occupation negatively associated with duration and patterns of breastfeeding [9, 28]. This could be due to limited follow-up, while most were on maternity leave. The Saudi Ministry of Health (MOH) encourages breastfeeding, launching an initiative to ban the advertising of formula in 2008. However, our findings showed that 58% of mothers still depend on mixed feeding at one month postpartum. Similar to previous studies in Riyadh [28], 77.2% of mothers were reported to choose mixed feeding for their children. Among the most common reasons to use the formula given by Saudi mothers were insufficient production of milk, or mode of delivery and parity [3, 4, 9, 10, 13, 18, 28].

In this study, self-efficacy, measured by the BSES-SF (Table **4**), showed the strongest relationship of any variable to women's breastfeeding practice at one month, and was the only variable significant in a multivariate model [19] found women who exclusively breastfed at one month had higher BSES scores at birth than others. This study found no association between parity and baseline BSES (p= 0.272), unlike others [20, 22]. There was also no difference in baseline BSES scores between the hospitals (47.44± 5.1, 48.0± 5.44, p= 0.893). We also looked at attitudes towards infant feeding (Table **3**), measured by modified IIFAS. These were positively associated with breastfeeding at one month, but in multivariate analysis, this did not explain more of the variance in feeding practice once self-efficacy was accounted for. Positive correlation was found between BSES and attitudes scale r= 0.291 (p= <0.01). There was no difference in attitude scores between hospitals (p= 0.413). About half the women believed mothers should not breastfeed in public, and the formula was the better choice for a mother who works or must go out, which was also seen by Dr Maha Al-Madani group in the year 2010 suggesting these may be common opinions. Most women agreed/strongly agreed that breastfeeding is more convenient than formula and breastfed babies are healthier [9]. In addition to recent studies, some of the factors were associated with insufficient milk supply or nipple pain [27]. Our data shows that most women disagreed/strongly disagreed that formula is as healthy for infants as breast milk, which was similar to a study carried in central Saudi Arabia [10]. Double the percentage of women in this study disagreed that the benefits of breast milk last only as long as the baby is breastfed than in [9].

Although women knew the benefits of breastfeeding, this did not motivate them to breastfeed exclusively. Scholars have considered language in breastfeeding education [31]. Some suggest referring to "risks of the formula", to improve understanding that breastfeeding is normal and formula poses risks. However, an American study tested this and found no difference in outcomes [32]. Women in this study got breastfeeding support through the internet, books and health professionals, who were their main sources of breastfeeding information during pregnancy (Table **5**). In another Saudi study, women got most breastfeeding information from health professionals, then relatives especially mothers or media and others self-study [4, 27]. Older studies reported relatives as main sources of breastfeeding information [3].

In this study, 75% of women had breastfeeding support but none had changed their feeding practice. This result is surprising where even when mothers had support in hospitals, their attitudes did not follow the TPB (theory of planned behavior), intentions predict behaviours. Al-Madani *et al*. (2010) found an association between mothers' feeding intentions and real practice at four months postpartum [9]. The WHO launched BFHI in 1991, where most studies have shown it effective in increasing breastfeeding initiation, duration and exclusivity [33-37]. The WHO/BFHI recommends initiation of breastfeeding within one hour postpartum. In this study 23% achieved this (21% BFHI, 2% non-BFHI), exceeding the 11.4% and 11.2% reported in eastern Saudi Arabia [38, 39] and replicating a in a nationwide study (23.2%) [13]. Most infants in the BFHI hospital consumed breast milk first, and 96% in the non-BFHI had formula first.

After one month, the effect of BFHI on feeding practice was indiscernible; mixed feeding/exclusive breastfeeding was similar for both hospitals. Table **5** shows all support provided by the BFHI hospitals, which includes information, private prenatal breastfeeding education sessions prenatally and after discharge and practical support during hospitalisation. Few women attended all sessions. Hannula *et al*. (2008) found support at the hospital plus postnatal home visits were better at increasing the duration of any breastfeeding at six months than solely hospital-based education/support. Yet, sociocultural factors limit home visits for Saudi women [40]. Reasons associated with cessation of breastfeeding are reported to be due to low milk supply and self-weaning. These should be evaluated further in specific Saudi Arabian populations.

Samples in this study came from two private hospitals, it is impossible to infer at the general population level or generalise about BFHI. At one month, small sample size limited interpretation and increased the risk of bias. Furthermore, follow-up was during maternity leave, so relationships between employment and breastfeeding were obscured, and only first month and initiation of breastfeeding was evaluated. Further research must cover a two year follow up study for specific and more reliable results specifically on the Saudi population.

In conclusion, this study supports what was found in earlier studies; that mixed feeding is the most common feeding method Saudi women used. Although Saudi women reported a good attitude to breastfeed, a high percentage of women were mixed feeding at one month. Surprisingly, even though women from the BFHI hospital were more likely to know the WHO recommendation about exclusive breastfeeding duration, and more likely to intend to exclusively breastfeed at one month, mixed feeding was the most common feeding method they used at one month postpartum. Future research may investigate how to increase the mother's self-efficacy, which should result in longer exclusive breastfeeding duration. Furthermore, providing postnatal home support and a 24-hour phone line for breastfeeding support, similar to Plunket services in New Zealand, may increase breastfeeding self-efficacy especially regarding insufficient milk supply. Findings of this study stated the majority of women understood benefits of breastfeeding but were still mixed feeding at one month postpartum. Future research using the term ‘risk' of formula, in addition to the benefits of breastfeeding is another possible approach to investigate.

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