



Stressful life events in pregnancy: A risk factor for exclusive breastfeeding among high-income mothers

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ABSTRACT

Objective: The aim of this study was to examine the association between prenatal stressful life events in pregnancy and breastfeeding initiation, exclusivity, and duration, defined according to the WHO.

Study design: Feeding practices were prospectively collected from 425 puerperae living in an industrialized area of Northeast Italy starting on the second day post-partum, when they filled out the Life Experience Survey (LES, 1978).

Results: In this sample, analysis revealed that at discharge 65/358 (18.16 %) puerperae presented with a negative LES score and 293/358 (81.84 %) with a positive LES score. Puerperae with negative LES scores were more likely to adopt formula at discharge, either to complement breast milk or to substitute breast milk altogether (16/65; 24.62 % vs 43/293; 14.68 %; RR = 1.64 and 95 % CI: 1.01–2.70), and they were also more likely to adopt exclusive formula feeding at the 3rd month of life (8/48; 16.66 % versus 18/242; 7.44 %; RR = 2.03 and 95%CI: 1.06–3.86). At the 6th month of life, there were significantly less puerperae with a negative LES score who were breastfeeding exclusively (1/48; 2.08 vs 44/249; 17.67 %; RR = 0.11 and 95 % CI: 0.01–0.84) and correspondingly there were significantly more puerperae with a negative LES score who were using formula feeding with weaning practices (20/48; 41.67 % vs 35/249; 14.06 %; RR = 3.14 and 95 % CI: 1.82–5.04).

Conclusions: Identification of specific barriers to breastfeeding related to negative life events in pregnancy may help direct providers' anticipatory guidance to improve breastfeeding rates in high-risk populations.

1. Introduction

Optimal breastfeeding duration and exclusivity practices contribute to significant short- and long-term health benefits for both baby and mother [1]. Current professional associations, including the World Health Organization (WHO), recommend exclusive breastfeeding for 6 months and continued breastfeeding for at least a year [2,3]. Great differences exist in breastfeeding prevalence and duration both within and between industrialized countries [4]. Data from the year 2000 indicated that in Italy breastfeeding rates were among the lowest in Europe, with 85.3 % mothers exclusively breastfeeding at hospital discharge, 41.8 % at 3 months, 19.4 % at 6 months, and 4 % at 12 months [5]. There were significant geographical differences for breastfeeding rates at discharge (rates ranging from 75.8 % in the islands to 90.8 % in Northeast Italy) and duration of breastfeeding (shorter in the islands than in other areas, particularly Northeast Italy [5]).

A wide range of sociocultural and physiological factors could potentially impact breastfeeding behaviors of a woman and her ability to breastfeed successfully. Several previous studies have suggested that perinatal factors, such as preterm birth, cesarean section, maternal socioeconomic status, and stress during pregnancy [6] as well as delivery [7,8] may be associated with increased risk of early breastfeeding termination. It is believed that the mechanism responsible for this involves the release of cortisol, prolactin, and oxytocin when stress is experienced [9–13]. However, the mechanism linking perinatal determinants to breastfeeding duration is yet to be elucidated.

In recent years, numerous studies have investigated the relationship between life stress and susceptibility to physical and psychological problems. Stressful life events in pregnancy are also known to be associated with negative or adverse perinatal outcomes. However, research describing associations between stressful life events and breastfeeding is limited in part because stressful life events are typically only

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incorporated as an adjusted factor and not as a primary exposure in pregnancy when assessing breastfeeding duration [14]. Additionally, most studies are not specific to high-income women [14] and do not follow WHO breastfeeding definitions [15].

Peripartum stress in women is a complex phenomenon, possibly exacerbated by the biopsychological changes of motherhood and by the new role of breastfeeding mothers in the puerperium and can constitute a risk factor for breastfeeding discontinuation [16]. Therefore, a unique approach that accounts for the complexity of this process should be used when studying it, such as [17], which is a 57-item measure that asks respondents to rate the occurrence of negative or positive life events (including pregnancy itself) in the past 6 months or 1 year. If a respondent experienced an event, then s/he would rate the impact the event had and whether the event was negative or positive. It is important to note that stress due to life changes is better contextualized with negative scores.

Therefore, we chose the Life Experiences Survey (LES) developed by Sarason, Johnson, & Siegel (1978) to focus on negative scores instead of total LES scores. The latter methodology, by weighing each event equally, assumes that each event is equivalent, which may not be the case in gestation and in the perinatal time period. Furthermore, we were interested in observing how different types of positively and negatively perceived stressful life events were associated with breastfeeding outcomes as defined by the WHO [15].

2. Methods

This study was an extension of a previous longitudinal, population-based study that analyzed the effects of stressful life events during pregnancy on mother-infant bonding in women with postpartum depressive symptoms [18]. We planned a six-month breastfeeding follow up of 425 women to focus on the relationship between maternal stressful life events and breastfeeding duration and exclusivity practices. The hospital where the study took place, the Polyclinic Abano Terme, Abano Terme (Italy), is located in an industrialized area of Northeast Italy, supporting a population with advanced educational levels, good socioeconomic status, occupational status, and low and late fertility.

Women over 18 years of age who could read and understand Italian, who had delivered a singleton, healthy neonate at term (>37 and <42 weeks) between January and July 2019 were consecutively asked to participate.

Institutional Review Board approval (Polyclinic Abano Terme) was obtained before the study began.

All participants were given an information sheet and were only included in the study if they had signed the consent form and provided written permission for us to access their obstetric and neonatal records, which included basic personal data, education, medical history of the mother-infant dyad, self-reported questionnaire results, and breastfeeding practices, defined according to the WHO as exclusive, complementary, and formula feeding [15].

A detailed description of study design and sampling methods is available elsewhere [18]. In accordance with the hospital's standard practice, following an uneventful delivery, infants were placed on the mother's chest for about 15 min during which time the midwife assisted with the first suckling episode. Infants were then dried, they received umbilical care, and they were weighed before their first warm water bath. During the subsequent 2 days in our ward, neonates roomed-in with their mothers, who were encouraged to feed them on demand. Infants received complementary or formula milk if breast milk intake was judged insufficient by the midwives. In the absence of obstetric or neonatal complications, length of hospital stay was scheduled for 48 h for both vaginal and cesarean delivery.

During the study period, the LES self-reported questionnaire [17] was distributed on the second day postpartum, prior to discharge, to eligible women. LES is a 57-item self-report measure that allows respondents to separately rate the desirability and impact of events that

they have experienced. Thus, they are asked to indicate those events experienced during the past year as well as (a) whether they viewed the event as being positive or negative and (b) the perceived impact of the particular event on their lives at the time of occurrence. Many of the items (34/57) are based on existing life stress measures, particularly the Schedule of Recent Experiences [19], which is by far the most widely used instrument in life stress research. In the construction of the present LES scale, certain items were made more specific. Ratings are on a 7-point scale ranging from extremely negative (−3) to extremely positive (+3). Summing the impact ratings of the events designated as positive by the subject provides a positive change score. A negative change score is derived by summing the impact ratings of the events experienced as negative by the subject. By adding these two values, a total change score can be obtained, representing the total amount of rated change (desirable and undesirable) experienced by the subject during the past year. This seems relevant, considering that Sarason et al. [17] stated that the positive and negative life change scores are essentially uncorrelated. Test-retest correlations for the positive change score were 0.19 and 0.53 ($p < .001$). The reliability coefficients for the negative change score were 0.56 ($p < .001$) and 0.88 ($p < .001$). The coefficients for the total change score were 0.63 ($p < .001$) and 0.64 ($p < .001$), respectively.

In the present study, negative and positive LES scores were considered separately to evaluate the relative role of negative and positive events on breastfeeding exclusivity and duration. Breastfeeding outcomes data were collected in three phases: at discharge, on the second day postpartum, and on the infant's third and sixth month of life by a telephone interview, during which mothers reported if they were currently breastfeeding and if not, when they stopped (based on their infant's age). This information was used to calculate if the mother was still breastfeeding at 3 and 6 months (yes/no). Mothers also reported if and when the baby was introduced to formula, other liquids, cereal, or solid foods. Using this information, breastfeeding exclusivity and duration were calculated at discharge and at 3 and 6 months (yes/no) with exclusivity being defined as the infant receiving only breast milk and no other liquid or solid food [15].

Patient characteristics and outcome measures were summarized using mean and standard deviation (continuous data) or frequencies and percentages (categorical data). Negative and positive LES scores [17] were considered separately to evaluate the relative risk (RR, 95 % CI) on breastfeeding practices (exclusive, complementary and formula feeding) up to the 6th month of an infant's life [15]. The continuous variables were analyzed by independent sample *t*-test. The χ^2 test was used to analyze qualitative variables. Statistical significance was defined as $p < .05$. Statistical analysis was performed using R 3.5 (R Foundation for Statistical Computing, Vienna, Austria).

3. Results

The sample of eligible women ($n = 425$) was characterized by low and late fertility with 225/425 or 52.94 % of them being primiparous and their average age \pm SD being 33.22 ± 5.21 years. The sample was also characterized by high socio-cultural level with 417/425 or 98.12 % being married or cohabiting, 160/425 or 37.65 % having graduated from university, and 325/425 or 76.47 % being employed. Labor induction was used for nearly one in four women. In vaginal delivery, labor analgesia was frequently used (201/425; 47.29 %) as well as oxytocin for labor augmentation (76/425; 17.88 %). Cesarean delivery rate was also quite high (96/425; 22.59 %), of which more than a half were elective cesarean deliveries.

Among the 425 eligible women, 358/425 (84.24 %) puerperae participated in the breastfeeding duration and exclusivity practices telephone survey from discharge to the 3rd and the 6th month of their infant's life, 65/358 (18.16 %) with negative LES scores and 293/358 (81.84 %) with positive LES scores (Table 1).

With a negative LES score, the overall risk of complementary and

Table 1

Breastfeeding duration and exclusivity follow-up from discharge to the 3rd and the 6th month of the infant's life in puerperae categorized as having a negative or positive score by the Life Experiences Survey.

Feeding practices	Negative LES	Positive LES	RR (95 % CI)
At discharge, 358	65 (18.16)	293 (81.84)	
*Exclusive ^a	49 (75.38)	250 (85.32)	a vs b + c: 1.65 (1.01–2.70)
Complementary ^b	13 (20.00)	38 (12.96)	
Formula ^c	3 (4.61)	5 (1.70)	
3rd month, n 290	48 (16.55)	242 (83.44)	
Exclusive	33 (68.75)	178 (73.55)	
Complementary	7 (14.58)	46 (19.01)	
Formula	8 (16.67)	18 (7.44)	2.03 (1.06–3.86)
6th month, 297	48 (16.16)	249 (83.84)	
Exclusive	1 (2.08)	44 (17.67)	0.11 (0.01–0.84)
Weaning at breast	15 (31.25)	98 (39.36)	
Complementary+Weaning	12 (25.00)	72 (28.92)	
Formula+Weaning	20 (41.67)	35 (14.06)	3.14 (1.91–5.14)

RR (95 % CI), Relative Risk (95 % Confidence Interval).
LES, The Life Experiences Survey.

formula feeding at the time of discharge was significantly higher (16/65; 24.62 % vs 43/293; 14.68 %; RR = 1.65 and 95 % CI: 1.01–2.70).

At the 3rd month of infant life, while a negative LES score did not affect exclusive and complementary breastfeeding prevalence, the risk of formula feeding was significantly increased (8/48; 16.67 % vs 18/242; 7.44 %; RR = 02.03 and 95 % CI: 1.06–3.86).

Finally, at the 6th month of infant life, a negative LES score significantly affected exclusive breastfeeding rates (1/48; 2.08 vs 44/249; 17.67 %; RR = 0.11 and 95 % CI: 0.01–0.84). Similarly, at the 6th month of infant life, a negative LES score was associated with a significantly higher formula feeding with weaning prevalence (20/48; 41.67 % vs 35/249; 14.06 %; RR = 3.14 and 95 % CI: 1.91–5.14).

4. Discussion

In this population-based study, a strong association was found between breastfeeding exclusivity and duration and exposure to stressful negative life experiences in puerperae with low and late fertility, living in an industrialized area of Northeast Italy. It was found that women who had a negative LES score [17] were at greater risk for formula adoption from maternity ward discharge to the 6th month of infant life compared to women who had a positive LES score. This risk along with the risk of the mother adopting complementary feeding practices became statistically significant at discharge. The risk of the mother having more advanced weaning became statistically significant at the 6th month of infant life.

Numerous factors influence breastfeeding outcomes, from institutional practices to individual characteristics and actions [20]. However, the extent to which new mothers experience stressful life events and how these may be related to breastfeeding outcomes is less well understood [21]. Consistent with previously published research [22], our findings add to the literature indicating that women's negative emotional response to life events can have a negative impact on both their mental health and their breastfeeding practices. Our research adds that this risk is particularly high for women with a history of negative life events in the time period antecedent to delivery, including pregnancy. Questions of both a theoretical and methodological nature can, however, be raised concerning the present method of assessing life changes in new mothers [23].

Despite methodological differences and a different high-income country (United States), our findings are consistent with a

breastfeeding and stress analysis by Buck et al. [24]. Of note, they examined Rhode Island Pregnancy Risk Assessment Monitoring System data from 2012 to 2014, focusing on stressful life events during pregnancy, and they reported that women who experienced 14 stressful life events were less likely to initiate breastfeeding when compared with women who did not report any stressful life events during pregnancy. The study also found that among women who breastfed, those exposed to stressful life events were less likely to continue up to 10 weeks. Other studies have found that women who reported stressful life events were more likely to stop exclusive breastfeeding as well as any breastfeeding whatsoever [25].

These data may have some implications for practice and/or policy. Efforts that minimize exposure to stressful life events for pregnant women may improve exclusive breastfeeding practices so that they are carried out for the recommended 6 months. Maternal screening for stressful life experiences during the prenatal period serves to identify women who need additional support to promote breastfeeding exclusivity and duration. The findings from this study also increase awareness about how stressful life events impact breastfeeding success among women in industrialized countries. Women who experience negative stressful life events during pregnancy should be identified by health care providers. These women should be thoroughly encouraged to exclusively breastfeed for the recommended 6 months during pregnancy, early postpartum, and through follow-up phone calls, at-home lactation visits, and support groups [2,3]. Future research should explore how the level of support provided by significant others such as partners, grandmothers, and husbands during pregnancy and postpartum correlates with breastfeeding success. Such research would help identify other barriers to exclusive breastfeeding.

Although this is the first longitudinal study to generate possible evidence linking mothers' negative life stress events in gestation to breastfeeding exclusively out to 6 months postpartum, we acknowledge that there are several limitations. First, its generalizability is limited due to the selection of the study participants as they were able to communicate in Italian and all from Northeast Italy, which is one of the most socially and economically advantaged areas of Italy. Second, participants reported negative stressful life events on the second day of the infant's life and not in the course of the postpartum period. The reason LES scores were not obtained in the postpartum period is because it would have been logistically difficult to administer the LES by phone at the 3 and 6 mo timepoints. This methodological aspect subjected the perception of stressful events to the effects of postpartum blues and depressive symptoms, which a considerable number of mothers may experience during the puerperium [26]. Third, the survey did not include questions about maternal intention to breastfeed for 3 to 6 months and paternal support, factors that have been shown to be predictors of breastfeeding initiation and duration [27].

In conclusion, this study adds to the body of literature by revealing that stressful life events during pregnancy can negatively influence breastfeeding initiation, exclusivity, and duration. Hence, based on the study findings and on the literature review, it is highly recommendable to assess women's mental well-being during pregnancy, if possible, from the beginning, especially aiming to identify situations that might jeopardize the mother's ability to carry out exclusive breastfeed for 6 months and continued breastfeeding for at least a year in accordance with WHO recommendations [2,3]. Identification of specific barriers to breastfeeding related to negative life events may help direct providers' anticipatory guidance to improve breastfeeding rates in high-risk populations.

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CRedit authorship contribution statement

Dr. Vincenzo Zanardo had primary responsibility for protocol development and writing the manuscript. Dr. Arturo Giustardi performed the statistical analysis. Dr. Andrea Sandri helped to draft the manuscript. Dr. Gianluca Straface participated in the development of the protocol.

Declaration of competing interest

The authors disclose any conflict of interest.

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