



Health literacy and its relation to continuing with breastfeeding at six months post-partum in a sample of Spanish women

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Abstract

Aim: To explore the relation between health literacy (HL) and continuing breastfeeding (BF) at 6 months post-partum.

Design: Observational, longitudinal and prospective study between December 2018–May 2019. The STROBE checklist was used.

Methods: 114 mother/baby pairings from a Spanish Hospital were included. Mothers' health literacy was studied with the Newest Vital Sign and Short Assessment of Health Literacy for Spanish Adults 50 (SAHLSA-50). Before hospital discharge, BF efficiency was studied using the LATCH BF score and BF continuity was followed for 6 months. Survival analysis and Cox regression were done.

Results: Health literacy levels and BF effectiveness were adequate before hospital discharge. At 6 months post-partum, less than half the sample still exclusively breastfed. The main reason for early exclusive BF cessation was lower than the recommended newborn weight gain. The HL level acted as a protective factor against abandonment of BF.

KEYWORDS

childbirth, health literacy, midwifery, nursing, post-partum

1 | INTRODUCTION

The World Health Organization, the European Commission and scientific societies like the Spanish Pediatrics Association recommend, exclusive breastfeeding (EBF) during the first 6 months of infants' lives (Asociación Española de Pediatría [AEP], 2012; European Commission, 2007; World Health Organization [WHO], 2018).

The Institute of Medicine (IOM) describes health literacy (HL) as the degree to which individuals have the capacity to obtain, process and understand the basic health information and services needed to make appropriate health decisions (Sorensen et al., 2013). Low or limited HL is related to less knowledge about socio-health services

and increased morbi-mortality upon hospital discharge (Berkman et al., 2011; Office of Disease Prevention & Health Promotion, 2010).

2 | BACKGROUND

The benefits of breastfeeding (BF) for mother include reducing the risk of post-partum depression and suffering breast and ovarian cancer throughout life, among others, and reducing the risk of sudden death, allergies, asthma or leukaemia, among others, for newborns (Oribe et al., 2015; Van Dellen et al., 2019). In central and southern Europe, EBF prevalence in countries like Spain varies between

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15%–51% (Oribe et al., 2015; Rius et al., 2014), and lowers to 16% at 6 months (Cabedo et al., 2019).

Women's HL may also have effects on their offspring's health during pregnancy and later (Corrarino, 2013). Different studies suggest that mothers with high HL levels are more likely to initiate and continue BF (Corrarino, 2013; Kohan et al., 2007).

Therefore, HL levels can be used by midwives and nurses to identify women at risk of abandonment of BF thanks to their professional competences and close contacts when attending to pregnant and puerperal women in Spain and elsewhere (WHO, 2016). However, no studies were found in Spain that have related the HL level and continuing BF at 6 months post-partum. The objective of this study was to explore the relation between the HL of a sample of Spanish mothers and continuing BF at 6 months post-partum.

3 | METHODS

3.1 | Study design and participants

This observational, longitudinal and prospective study was conducted to determine the relation between HL levels and continuing BF at 6 months post-partum in a sample of Spanish mothers. The Guidelines for reporting observational studies (STROBE) was used (see Supplementary File 1).

The study population comprised women who gave birth at the General University Hospital of Castellón (Spain).

A sample of 114 women was estimated by infinite population sampling, with a 0.05 alpha risk and a 0.2 beta risk with bilateral contrast, a common 1-point standard deviation for the Short Assessment of Health Literacy for Spanish Adults (SALSHA_50) instrument and 10% losses. Sample selection was done by consecutive non-probability sampling of those puerperal women who continued EBF after 36 hr post-partum. All the women were 18 years or older, and they voluntarily participated. Twin pregnancies, pre-term newborns and infants admitted to neonatal intensive care units were excluded.

3.2 | Measurement

Socio-demographic variables were selected, such as maternal age, country of origin, level of education (illiterate, primary/secondary education, vocational training, university studies), pregnant women's occupational status (work, do not work, student). Obstetric variables were also collected, such as parity (nulliparous, multiparous), risk pregnancy (low risk, gestational diabetes, hypothyroidism, pregnancy-related hypertension, assisted reproductive treatment, more than one risk pregnancy), gestational week at birth (at-term, post-term), mode of birth (vaginal, induced, caesarean), early skin-to-skin contact (with the mother, with the father, not performed) and skin-to-skin duration.

Mothers' HL levels were evaluated before being discharged from hospital with two validated instruments. Each one evaluates

different HL-related aspects; on the one hand, the Newest Vital Sign (NVS) evaluates reading comprehension and numerical skills with answers to six questions about the label of the nutritional composition of ice cream (Warsh et al., 2014). This instrument classifies HL as "inadequate" (0–1 points), "limited" (2–3 points) or "adequate" (4–6 points). Its internal consistency in Spanish was acceptable ($\alpha = 0.69$) (Weiss et al., 2005). On the other hand, the SAHLSA_50 survey, with 50 items, evaluates recognizing words and reading comprehension ($\alpha = 0.92$; test–retest reliability $r = .86$) (Lee et al., 2010). The instrument's overall score classifies HL as inadequate (<37 points) or adequate (≥ 37 points).

BF efficiency was analysed upon hospital discharge by the LATCH BF score, which is a systematic evaluation system validated in Spanish by Báez León and et al. (2008). This tool assigns a numerical value of 0, 1 or 2 to five of the evaluated components with a maximum of 10 points ("Latch," "Audible swallowing," "Type of nipple," "Comfort" for mothers in relation to breast/nipple, and "Hold –positioning" related to need for assistance). This scale offers good convergent validity with other widely used BF assessment instruments (Altuntas et al., 2014).

Feeding type (EBF, mixed or formula) was evaluated upon hospital discharge. Only one researcher performed the follow-up by telephone with the mothers at first, second, fourth and sixth month post-partum. Follow-up included asking about feeding type when making the telephone call, in the event of changes in it since the last time data were collected, and about the post-partum week when EBF was changed to mixed or formula feeding. If mothers indicated mixed or formula feeding, they were asked the reason for early EBF cessation or abandonment of BF respectively (no/little milk, increase light baby weight than that recommended, breast problems, return to work, other, unknown).

Due to a lack of consensus in the literature to define the terms of BF cessation, in the present study we have differentiated between early EBF cessation (the baby is fed by formula feeding and BF), and abandonment of BF (the baby is fed by only formula feeding).

3.3 | Data collection

The fieldwork was carried out, between December 2018–May 2019, by the nursing professionals of the Maternity Unit at the General University Hospital of Castellón, at approximately 36 hr post-partum after obtaining women's oral consent.

Forms were locked and stored, and only processed by a single team member, who destroyed them after completing fieldwork.

3.4 | Statistical analysis

A descriptive analysis was done of the study variables according to their type. In the survival analysis conditioned to continue BF, the Kaplan–Meier non-parametric method was used to study the possible relations between BF duration and HL. The comparison between

two survival curves was done by log-rank testing. Cox regression was performed to predict BF survival according to the risk that other variables conferred. This analysis was done with EBF cases and was repeated to include EBF and mixed BF cases. Finally, the Cox proportional hazard model was used to identify the overall differences adjusted to the hazard ratio with time. No analysis of missing data was necessary. Data were processed and codified with the R software, v3.5.1. Statistical significance was set at $p < .05$.

3.5 | Ethical considerations

This study was approved by the Clinical Research Committee of the General University Hospital of Castellón (Spain) on 6 November 2018 (PIC-2018-18). The participants received enough useful information about the study's objectives and methodology and gave their oral consent. This study met the legislation currently in force in Spain about personal data protection (Organic Law 15/1999, of 13 December on Personal Data Protection; Organic Law 3/2018, 5 December, on Personal Data Protection and Guaranteeing Digital Rights). The Declaration of Helsinki principles were respected.

4 | RESULTS

The sample was formed by 120 mother/baby pairings. Two mothers refused to participate in the study and four were lost during follow-up. The mean age of the final sample ($N = 114$) was 32 years ($SD = 5.363$; $Min = 20$; $Max = 43$; $IQR = 7$), of whom 66.66% ($N = 76$) were Spanish, had completed Secondary or Higher Education (61.40%; $N = 70$) and worked (75.43%; $N = 86$).

Regarding the obstetric variables, 51.75% ($N = 59$) were primiparous and 80.70% ($N = 92$) had a low-risk pregnancy. Gestational diabetes was the most reported risk (7.02%; $N = 8$). Birth modes were 50.88% ($N = 58$) spontaneous and vaginal, 27.19% ($N = 31$) were induced and 21.93% ($N = 25$) were caesarean. Of all the newborns, 86.84% ($N = 99$) underwent early skin-to-skin contact with their mother for 2 hr or more (58.77%; $N = 67$). Table 1 shows the evolution of feeding types during the 6-month post-partum follow-up.

Figure 1 shows the BF evolution during the 6-month follow-up. Vertically, the different sections in which BF monitoring was carried out are shown. Horizontally, the different feeding types are indicated (formula feeding in grey and round-pointed; EBF in pink

and a solid line; mixed feeding in orange and a double line; censored patients in brown and a dashed line). It should be noted that censored patients refer to those losses that occurred during follow-up, but for whom BF status was available at an earlier cut-off point. At each cut-off point, the number of infants receiving each feeding type is displayed (square with a line and colour corresponding to feeding type). Between two cut-off points, the changes that took place among the different feeding types (shaded square with white text) were classified according to reasons for early EBF cessation or abandonment of BF (specified in brackets and detailed in the figure legend). Similarly, at each cut-off point, the probability of an infant being fed EBF ($pr1$), mixed feeding ($pr2$) or formula feeding ($pr3$) is shown. The figure legend indicates how these probabilities were calculated.

It was noteworthy that the probability of continuing BF at 6 months was $pr1 = 0.412$. The probability of early EBF cessation ($pr2$) or abandonment of BF ($pr3$) rose with each passing month since birth. Indeed, from follow-up fourth month, the higher probability of abandonment of BF ($pr3 = 0.255$) versus that of continuing mixed BF ($pr2 = 0.19$) is stressed.

The main reason for early EBF cessation during the 6-month follow-up increased with lower baby weight than that recommended in 31.34% ($N = 21$) of cases. Of these, 80.95% ($N = 17$) changed to mixed BF and the rest to formula feeding. The main reason for abandonment of BF was perceiving hypogalactia in 41.46% ($N = 17$) of cases. Of these, 88.24% ($N = 15$) of cases had attempted to continue with mixed BF.

According to the NVS scale, 53.51% ($N = 61$) of our participants had an adequate HL level, 28.95% ($N = 33$) had a limited level and 17.54% ($N = 20$) had an inadequate HL level. Nonetheless, according to SAHLSA-50, 83.33% ($N = 95$) had an adequate HL level, while the level of the remaining mothers was inadequate (16.67%; $N = 19$). With the LATCH BF score, the mean BF efficiency score for the immediate puerperal period was 8.313 points ($SD = 1.408$; $p50 = 8$; $IQR = 1$).

4.1 | EBF survival analysis

Table 2 and Figure 2 offer the comparison of continuing EBF according to the HL level measured by the NVS instrument and the corresponding survival analysis, and a non-statistically significant relation between the number of early EBF cessation cases and the HL level

TABLE 1 Evolution of the types of feeding throughout the 6 months post-partum

Month	Exclusive Breastfeeding		Mixed feeding		Formula feeding		Censored patients	
	N	%	N	%	N	%	N	%
First	101	88.60	9	7.89	4	3.51	-	-
Second	84	73.68	18	15.79	11	9.65	1	0.88
Fourth	67	58.77	16	14.04	26	22.81	5	4.39
Sixth	47	41.23	21	18.42	38	33.33	8	7.02

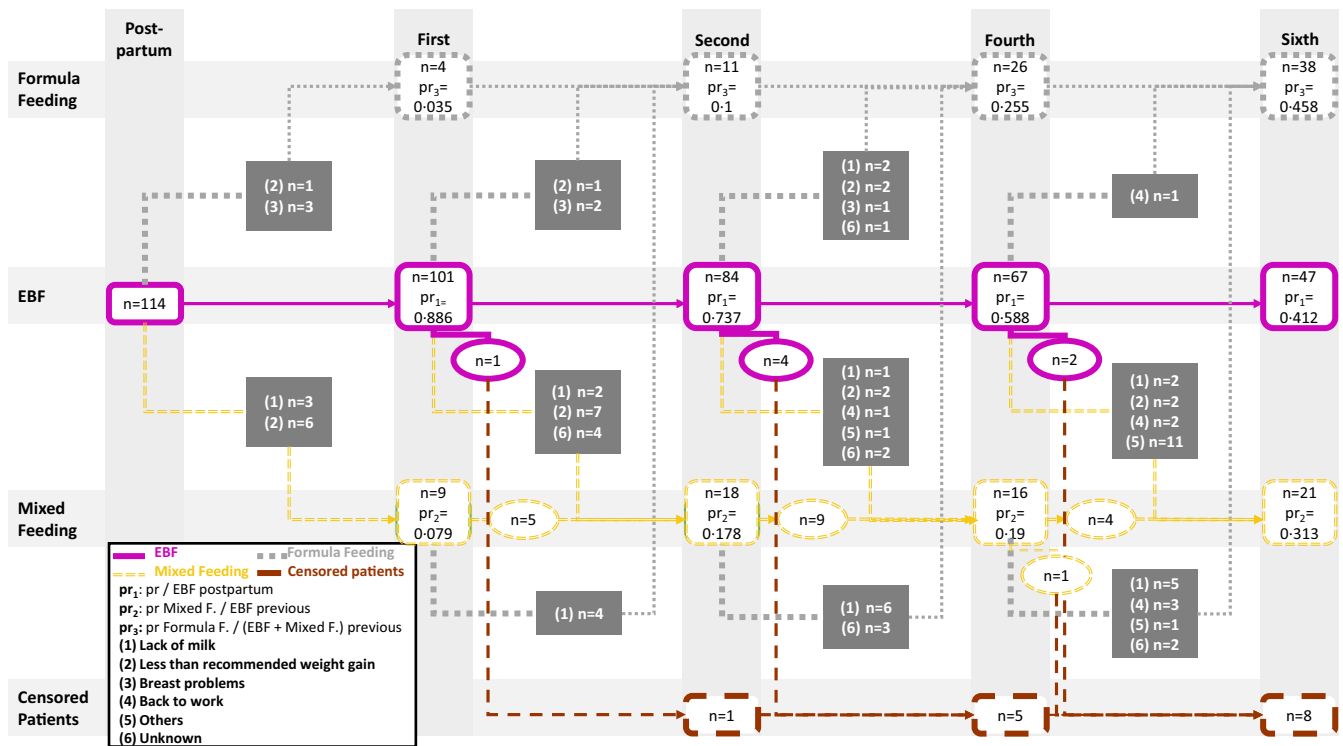


FIGURE 1 Evolution of feeding during the 6 months post-partum, reasons and probability of early EBF cessation or abandonment of BF. BF, breastfeeding; EBF, exclusive breastfeeding

was shown ($p = .2$). Similar results were obtained for SAHLSA-50 ($p = .6$) (Table 2; Figure 3).

4.2 | BF survival analysis

A survival analysis was run of overall BF (including EBF and mixed BF) compared to the HL level. Table 3 and Figure 4 show how the mothers with an adequate HL level, as measured by the NVS instrument, obtained a lower percentage for abandonment of BF cases, as well as a statistically significant relation between HL and continuing BF ($p = .05$). However, no significant differences were found for the percentage for abandonment of BF cases at 6 months when HL was evaluated by SAHLSA-50 ($p = .9$) (Table 3; Figure 5).

4.3 | Cox regression

The predictive model of EBF duration according to the socio-demographic and obstetric variables, and those related to HL ($r^2 = 0.432$; $p < .001$), showed that maternal age between 30–35 years ($HR = 0.2$; $p = .007$), and being born in a North African country ($HR = 0.062$; $p < .01$), were protective variables against early EBF cessation, while induced birth ($HR = 4.385$; $p < .01$), not performing early skin-to-skin contact during the first hours after birth ($HR = 13.51$; $p = .031$) or assisted reproductive treatments ($HR = 16.03$; $p < .01$) increased the risk of early EBF cessation before 6 months post-partum. The Cox proportional hazards model

confirmed lack of overall differences adjusted to the hazard ratio during follow-up ($p = .074$).

The Cox regression predictive model was used with BF duration (both EBF and mixed feeding) according to the socio-demographic and obstetric variables, and those related to HL ($r^2 = 0.393$; $p < .001$). It revealed that maternal age between 30–35 years ($HR = 0.176$; $p = .024$), an adequate HL level (NVS instrument) ($HR = 0.076$; $p = .014$), being born in a North African country ($HR = 0.057$; $p = .006$) and not being primiparous ($HR = 0.251$; $p < .01$) were protective variables, while assisted reproductive treatments increased the risk of abandonment of BF ($HR = 21.36$; $p = .002$). The Cox proportional hazards model confirmed lack of overall differences adjusted to the hazard ratio during follow-up ($p = .328$).

5 | DISCUSSION

In our study, baby weight gains lower than recommended was the main reason for early EBF cessation, followed by breast problems and perceiving lack of milk, which agree with the results reported by Oribe, et al. (2015), and Vila-Candel, Soriano-Vidal, et al. (2018). According to the results reported by Oribe and et al. (2015), with minimum baby weight gains, early EBF cessation was the main reason after obtaining professional advice (70.8%), whereas with hypogalactia and BF problems, early cessation was the main decision that mothers or family relatives gave in 65.1% and 84.2% of cases, respectively, with no previous diagnosis made by a healthcare professional (Oribe et al., 2015).

TABLE 2 Kaplan–Meier estimated survival function. Event: early EBF cessation, comparison according to the HL level measured by NVS and SAHLSA-50 (N = 114)

	0	4 (1) ^a	9 (2)	17 (4)	26 (6)	p value ^b
Newest vital sign						
Adequate health literacy						
ni	61	55	45	41	30	
di	-	3	-	1	-	
S(t)	1	0.852	0.738	0.686	0.515	
CP	-	-	2	-	-	
Limited Health Literacy						
ni	33	29	20	13	10	
di	-	1	2	1	-	.200
S(t)	1	0.848	0.573	0.404	0.368	
CP	-	-	2	1	-	
Inadequate health literacy						
ni	20	17	15	12	7	
di	-	1	1	-	-	
S(t)	1	0.800	0.747	0.640	0.407	
CP	-	-	1	2	-	
Short assessment of health literacy for Spanish adults						
Adequate health literacy						
ni	95	83	65	54	41	
di	-	4	3	2	-	
S(t)	1	0.832	0.672	0.592	0.476	
CP	-	-	5	1	-	
Inadequate health literacy						
ni	19	18	15	12	6	.600
di	-	1	-	-	-	
S(t)	1	0.895	0.789	0.632	0.344	
CP	-	-	-	2	-	

Abbreviations: CP, censored patients; di, Number of early cessation of EBF produced; ni, patients at risk; S(t), Survival function $S(t) = s(t)$ (previous) \times (ni-di)/ni.

^aWeeks (months).; ^bp-value: chi-squared.

It was striking that the main reason for early EBF cessation during the 6-month follow-up was increasing lower baby weight than that recommended, whereas the main reason for abandonment of BF was perceiving hypogalactia. In other words, mothers often supplement BF with formula feeding because of their baby's minimum weight gains, which makes BF during early and late puerperal periods difficult (Cabedo et al., 2019). It is worth mentioning that true hypogalactia is present in only 16.3% of cases because the remaining cases are due to a false perception of lacking milk, which leads to early EBF cessation (Govoni et al., 2019; Vila-Candel, Duke, et al., 2018). Nonetheless, other causes can make mothers perceive hypogalactia, such as short BF times due to the newborn's better sucking efficiency (Oribe et al., 2015).

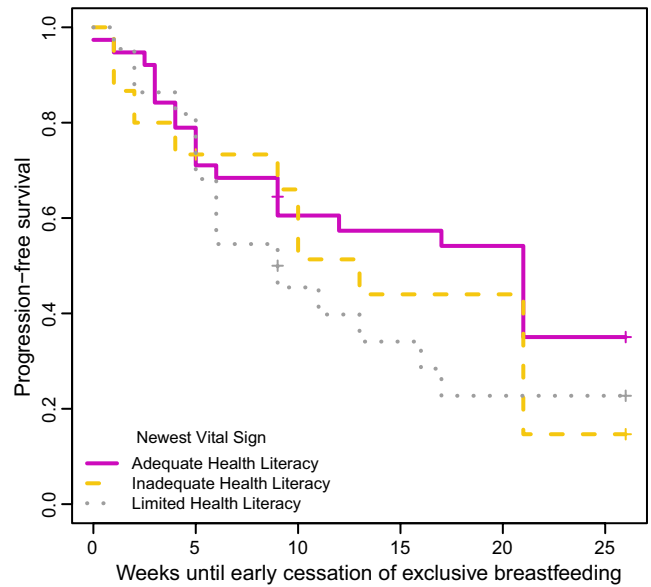


FIGURE 2 Kaplan–Meier estimated survival function. Event: early EBF cessation, comparison according to the HL level measured by NVS. EBF, exclusive breastfeeding; HL, health literacy; NVS, Newest Vital Sign

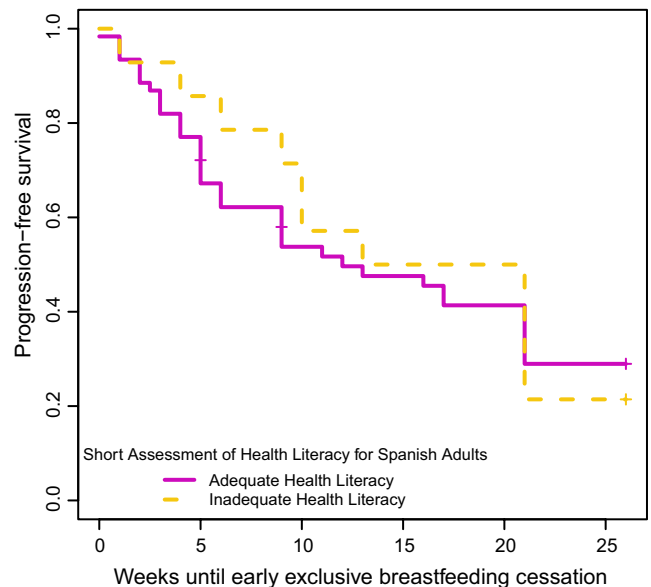


FIGURE 3 Kaplan–Meier estimated survival function. Event: early EBF cessation, comparison according to the HL level measured by SAHLSA-50. EBF, exclusive breastfeeding; HL, health literacy; SAHLSA-50, Short Assessment of Health Literacy for Spanish Adults 50

Several authors have pointed out that those mothers who receive education about BF are more likely to initiate and continue EBF (Cohen et al., 2018). Other works have indicated that a change in BF culture is necessary. Therefore, this training must start from early preschool ages by means of suitable activities for each age to bring about a social adaption in the future adult population as early as possible (Čatipović et al., 2018).

	0	4 (1) ^a	9 (2)	17 (4)	26 (6)	<i>p</i> ^b
Newest vital sign						
Adequate health literacy						
ni	68	58	56	48	43	.05
Di	-	-	4	4	-	
S(t)	1	0.951	0.868	0.764	0.746	
CP	-	-	2	-	-	
Limited health literacy						
Ni	32	31	26	21	14	
di	-	-	-	3	1	
S(t)	1	0.969	0.813	0.609	0.466	
CP	-	-	2	1	-	
Inadequate health literacy						
ni	21	20	17	14	13	
di	-	-	-	1	-	
S(t)	1	0.905	0.854	0.653	0.653	
CP	-	-	1	2	-	
Short assessment of health literacy for spanish adults						
Adequate health literacy						
ni	95	90	81	70	57	.9
di	-	-	4	8	1	
S(t)	1	0.947	0.840	0.704	0.646	
CP	-	-	5	1	-	
Inadequate health literacy						
ni	19	19	17	13	13	
di	-	-	-	-	-	
S(t)	1	1	0.895	0.684	0.684	
CP	-	-	-	2	-	

Abbreviations: CP, censored patients; di, number of abandonments of BF produced; ni, patients at risk; S(t), survival function $S(t) = s(t)(\text{previous}) \times (ni - di)/ni$.

^aWeeks (months); ^b*p*-value: chi-squared.

The results obtained with the survival analysis and Cox regression demonstrated that, despite the obtained models offering a modest predictive capacity (EBF model $r^2 = 0.432$; total BF model $r^2 = 0.393$), the HL measured by NVS was statistically significant for continuing total BF (Adequate Health Literacy HR = 7.621e-02, $p = .015$), and came close to the statistical significance for EBF (Limited Health Literacy HR = 2.979e-01, $p = .083$; Adequate Health Literacy HR = 2.545e-01, $p = .063$). It was a protective factor in both models against both early EBF cessation and against abandonment of BF.

In any case, it is worth reflecting on the suitability of the instruments employed to evaluate HL. These instruments were chosen because they have been validated in Spanish and we were unable to find either a validated instrument in the Spanish population or a specific instrument of BF literacy, and studying BF literacy as a predictive variable of EBF duration was potentially more relevant.

The LATCH BF score has been proven to be statistically significant as a predictor of EBF at 6 weeks post-partum (Sowjanya &

TABLE 3 Kaplan–Meier estimated survival function. Event: abandonment of BF, comparison according to the HL level measured by NVS and SAHLSA-50 (N = 114)

Venugopalan, 2018). However, it was not possible to observe this relation in the present study.

5.1 | Limitations

Although our study sample sufficed, it was limited, and the study was conducted in only one centre. Its longitudinal design reduced the risk of puerperal mothers' memory bias as in other studies (Ramiro González et al., 2018). However, it is important to evaluate the suitability of including other potentially relevant variables for BF duration, such as smoking habit, socio-economic level, previous negative BF experiences, prenatal attitude towards feeding a newborn and perceived received support by healthcare professionals during the perinatal period (Cohen et al., 2018; Ramiro González et al., 2018). It would be important to also consider other variables such as the labour world, BF-related working conditions or post-partum emotional symptoms such as anhedonia, insomnia, fatigue, irritability or

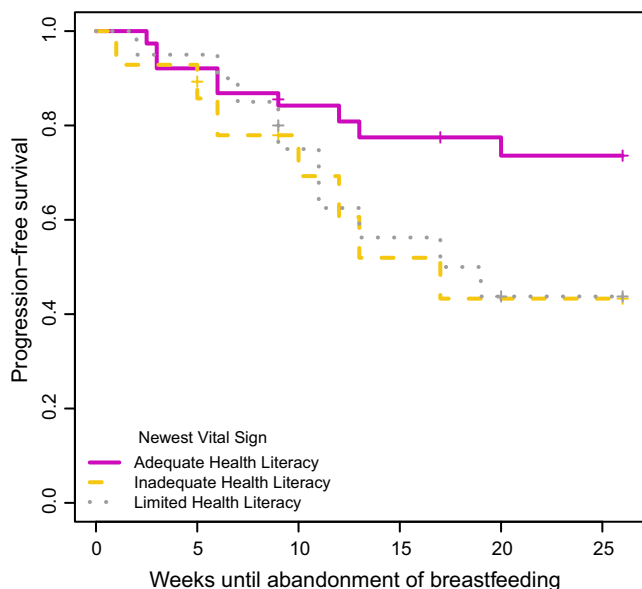


FIGURE 4 Kaplan–Meier estimated survival function. Event: abandonment of BF, comparison according to the HL level measured by NVS. BF, exclusive breastfeeding; HL, health literacy; NVS, Newest Vital Sign

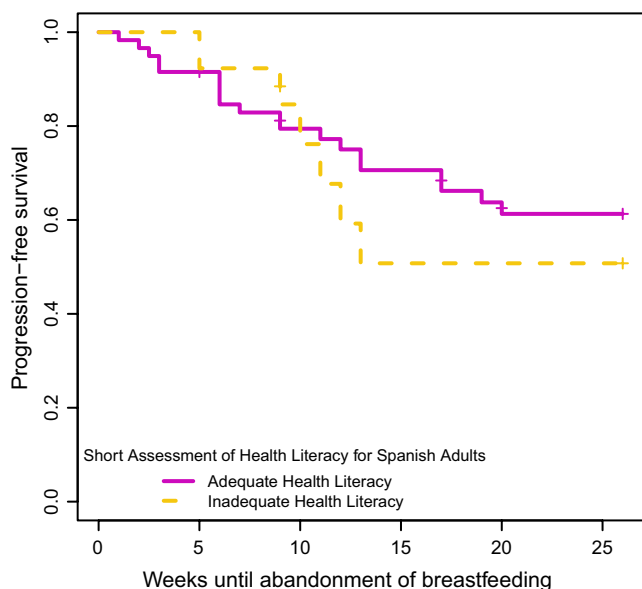


FIGURE 5 Kaplan–Meier estimated survival function. Event: abandonment of BF, comparison according to the HL level measured by SAHLSA-50. BF, breastfeeding; HL, health literacy; SAHLSA-50, Short Assessment of Health Literacy for Spanish Adults 50

not being able to concentrate (Oribe et al., 2015). Previous studies have reported that one of the reasons for early EBF cessation (before 4 months post-partum) might be due to lack of either BF support or BF follow-up with participants with a low level of education (Oribe et al., 2015; Ramiro González et al., 2018). It would be interesting to differentiate between the reason for early cessation and the main person who led this decision to be made. That is, one same

reason, such as hypogalactia, may be promoted by the mother who perceives she does not produce enough milk, or by the healthcare professional who truly diagnoses hypogalactia.

6 | CONCLUSION

HL level acts as a protective factor against early EBF cessation. However, its predictive capacity is limited because a range of factors influences continuing BF and specific instruments that measure BF literacy are lacking. The relation between HL, or BF literacy, and continuing BF should be investigated by longitudinal studies with bigger samples, which should contemplate other variables that influence continuing BF.

7 | RELEVANCE TO CLINICAL PRACTICE

This study is the first in Spain to consider the relation between BF for 6 months post-partum and HL. In this way, HL proved to be a protective factor against early EBF cessation.

In the context of the present study, pregnant women are habitually in contact with health professionals such as midwives while pregnant and during the first days of their newborn's life and also with nurses and paediatricians for the first six post-partum months. These professionals' support throughout the BF process is fundamental, especially if any difficulties arise. Therefore, a specific and validated instrument of literacy in BF would allow to identify risk factors to avoid early EBF cessation.

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CONFLICT OF INTERESTS

None.

AUTHORS CONTRIBUTIONS

Valero-Chillerón, MJ. Methodology, Formal analysis, Investigation, Writing—Original Draft. **González-Chordà, VM.** Formal analysis, Investigation, Writing—Original Draft, Supervision, Project administration. **Cervera-Gasch, A.** Formal analysis, Investigation, Writing—Original Draft. **Vila-Candel, R.** Conceptualization, Methodology, Writing—Review and Editing. **Soriano-Vidal, FJ.** Conceptualization, Writing—Review and Editing. **Mena-Tudela, D.** Conceptualization, Formal analysis, Writing—Original Draft, Supervision, Project administration.


DATA AVAILABILITY STATEMENT

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

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SUPPORTING INFORMATION

Additional supporting information may be found online in the Supporting Information section.

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