Original Paper

How much do healthcare workers in the mother & child health area know about breastfeeding? A study of the 14 public hospitals in Castile & Leon

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Abstract

Introduction: breastfeeding is a priority objective in public health. Health care professionals involved in the delivery of hospital-based maternal and child health services need to have adequate knowledge of breastfeeding.

Material and methods: we conducted a cross-sectional descriptive study in January and February 2015 using the validated questionnaire ECola, which we adapted for administration to gynaecologists, midwives and nurses. To survey nursing assistant technicians (NATs), we adapted the questionnaire developed by Temboury Molina MC, modified by the authors. The study universe consisted of all health care professionals involved in the delivery of maternal and child health services in the 14 public hospitals of Castilla y León.

Results: we received a total of 724 questionnaires (61.0%). Having defined a threshold of 70% of correct answers (16.8 points) to define adequate knowledge, nurses had an adequate knowledge of breastfeeding (18.19) that was significantly better ($p < 0.05$) compared to physicians (17.01). Midwives had the highest mean score (20.03). Gynaecologists, with a mean score of 15.24 points, had a level of knowledge considered inadequate. Nurse assistants, with a mean score of 16.93 points, exhibited adequate knowledge but close to the lower limit. We found statistically significant differences in knowledge between the providers working in different hospitals. Overall, the level of knowledge of professionals working in maternal and child health in public hospitals in Castilla y Leon was adequate (17.54).

Conclusions: overall, the level of knowledge of health professionals involved in delivery of maternal and child health services was adequate. Some categories of professionals lacked knowledge in aspects that are essential to the adequate management of breastfeeding. We need to consider the need to include training in breastfeeding in educational curricula, especially those of gynaecologists and NATs.

Key words:
- Auxiliary nursing technicians
- Doctors
- Knowledge
- Maternal breastfeeding
- Midwives
- Nursing

¿Cuánto saben de lactancia los sanitarios del área materno-infantil? Estudio de los 14 hospitales públicos de Castilla y León

Resumen

Introducción: la lactancia materna es un objetivo prioritario en salud pública. Los profesionales sanitarios que trabajan en el área materno-infantil de los centros hospitalarios deben poseer un adecuado nivel de conocimientos de lactancia materna.

Material y métodos: estudio descriptivo trasversal realizado durante enero-febrero de 2015 utilizando el cuestionario validado ECola, que se adapta a ginecólogos, matronas y enfermería. Para los técnicos auxiliares de enfermería (TCAE) se utiliza el cuestionario de Temboury Molina MC, modificado por los autores. La población de estudio fueron todos los profesionales sanitarios del área materno-infantil de los 14 hospitales públicos de Castilla y León.

Resultados: en total se recibieron 724 cuestionarios (61,0%). Considerando aceptable el 70% de aciertos (16,8 puntos), los profesionales de enfermería presentan un nivel de conocimientos en lactancia bueno (18,19) y significativamente superior (p <0,05) a los médicos (17,01). Las matronas han presentado la media de aciertos mayor (20,03). Los ginecólogos, con 15,24 puntos, poseen un nivel inferior al recomendable. Los TCAE, con 16,93 puntos, manifiestan conocimientos suficientes, pero en el límite inferior. Se observaron diferencias significativas entre los distintos centros hospitalarios. Globalmente, el nivel de conocimientos de los profesionales del área materno-infantil de los hospitales públicos de Castilla y León es suficiente (17,54).

Conclusiones: el nivel de conocimientos de los profesionales del área materno-infantil en global es aceptable. Algunas categorías profesionales presentan carencias en aspectos trascendentales para el adecuado manejo de la lactancia materna. Se debe considerar la necesidad de implementar formación en lactancia en los currículos formativos, especialmente ginecólogos y TCAE.

Palabras clave:
- Conocimiento
- Enfermería
- Lactancia materna
- Matronas
- Médicos
- Técnicos auxiliares en enfermería

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INTRODUCTION

The Global Strategy on Infant and Young Child Feeding (GSIYCF) was developed by the World Health Organization (WHO) and the United Nations Children's Fund (UNICEF), approved by the Board in 2002. It reinforced the importance of promoting and supporting exclusive breastfeeding in the first 6 months of life and maintenance of breastfeeding combined with a feasible diet of adequate, safe and appropriate complementary foods through age 2 years.[1]

Multiple studies conducted in Spain[2-5] and other countries[6-9] have described the factors associated with the prevalence of breastfeeding, and all of them have emphasised the important role of the health professionals that are in contact with the mother, both during pregnancy and after birth.

The first and possibly most important step to promote breastfeeding is to improve the knowledge and attitudes of health care providers. They must be able to help mothers initiate breastfeeding and address the questions and concerns that arise during breastfeeding.[10] The education of parents before and after birth seems to be another essential factor for successful breastfeeding.[11]

Every instance in which breastfeeding is dropped due to lack of training of health professionals constitutes a failure of the health care system. To date, there were no validated tools for the assessment of knowledge about breastfeeding in Spain. The rigorous work of Gómez Fernández-Vegue and Menéndez Orenga has produced a valuable instrument that allows us to evaluate knowledge and skills in breastfeeding.[12] A questionnaire was developed in the context of the Baby Friendly Hospital Initiative (BFHI) to assess the knowledge and training needs of health care professionals on the subject of breastfeeding[13] and disseminated in mid-2015, but we do not have any current data on its use in Spanish hospitals.

The current situation of breastfeeding in Castilla y Leon is that 82.7% of mothers initiate exclusive breastfeeding, but only 27.1% (95% confidence interval [95 CI]: 21.8 to 39.9) maintain it through 6 months post birth.[14] There are no published data for Castilla y Leon about the knowledge of health professionals regarding breastfeeding.

MATERIALS AND METHODS

Study design: we conducted a descriptive cross-sectional study in January and February 2015.

Study universe: health care professionals of any type (paediatricians, gynaecologists, midwives, nurses, nurse assistant technicians [NATs]) involved in the delivery of maternal and child health services in the 14 hospitals of the Regional Public Health Administration of the Autonomous Community of Castilla y Leon (SACYL): 1187 health care providers. We chose to survey the entire population to obtain data from every hospital.

Methods: we used two questionnaires as measurement tools:

Questionnaire 1. Questionnaire on the Knowledge of Breastfeeding (*Encuesta sobre Conocimientos en Lactancia Materna*, ECola),[12], validated for use in paediatricians and medical intern-residents (MIR) in the area of paediatrics. In collaboration with the authors of the original questionnaire, we adapted it to make it applicable to gynaecologists, midwives and nursing staff. We obtained the permission of the authors to do so, and the final version used in the study included 42 items.

Items 1 to 8 collect data about the health provider. The questionnaire has been validated, and it includes 24 items whose answers can be rated (items 9 to 33 excluding item 30, which we could not rate, as it was an open-ended question). We gave correct answers 1 point. A total score of 24 points thus corresponded to 100% correct answers. The questionnaire also included items whose answers could not be scored (items 34 to 42), which addressed the attitudes of health professionals toward breastfeeding, which we did not analyse in this study.

The questionnaire explored basic knowledge and skills in breastfeeding: physiology of breastfeed-

ing, public health, problems in the first few days, late problems, assessment of intake during feeds, maternal factors and attitudes.

Questionnaire 2: this questionnaire was developed by Temboury Molina in 2003[10] to assess the knowledge of paediatrics MIRs in Spain on the management of breastfeeding. Since it is simple and it explores the knowledge areas that we considered important, we used it to survey NATs after making minor adjustments. The final questionnaire comprised 29 items. Items 1 to 4 explored sociodemographic characteristics. Items 5 to 28 received a score of 1 point if answered correctly. We did not score item 29 because it was an open-ended question.

We assessed basic knowledge areas about breastfeeding: advantages of breastfeeding, risks of artificial feeding, mechanisms of lactation and sucking, skills to adequately manage breastfeeding initiation and maintenance, assessment of feeds, management of difficulties, and hospital regulations regarding breastfeeding.

Study protocol: we reached out to health professionals through a letter sent from the Directorate General of Public Health to the administrators, medical directors, directors of nursing and supervisors of maternal and child health services in all hospitals of Castilla y Leon. We also contacted the Asociación Castellanoleonesa de Matronas (Midwife Association of Castilla y Leon, ASCALEMA) to appoint a study coordinator in each hospital. Questionnaires were administered in paper form and completed during team meetings or patient care conferences, at which point respondents also signed their informed consent to participation.

We performed the analysis using the software package IBM SPSS Statistics version 22.0.0.0.

RESULTS

Sociodemographic data

The distribution of respondents to questionnaire 1 by professional category was: 13.3% neonatologists, 18.6% gynaecologists, 24.8% midwives, 19.7% nurses employed in the maternity ward, 19.5% nurses in the neonatal ward. Most respondents were female (87.1%), and the median age was 43.6 years (±10.6), 62.5% had children and 59.2% had experience breastfeeding.

In questionnaire 2, the distribution of respondents that were NATs was predominantly female (95.8%), with a mean age of 53.1 years (±7.5), 78.8% had children, most of them 2 children (61.1%).

Some respondents did not complete some of the questions in the sociodemographic section (Table 1).

Response rate

We received a total of 724 responses (corresponding to 61.0% of all eligible health providers in Castilla y Leon). Questionnaire 1 was completed by 512 professionals (response rate of 60.5%) and questionnaire 2 by 212 (response rate of 62.2%) (Table 2).

We found statistically significant differences based on sex and age; physicians that responded were younger, and there was a predominance of the female sex.

We did not find statistically significant differences in participation based on type of employment, personal experience with breastfeeding, or years of professional experience.

Variation in participation in the different public hospitals of Castilla y Leon

We found significant differences ($p < 0.05$) between hospitals in the response rate. In most hospitals (9/14), between 50% and 70% of the health care staff in women's and children's services participated in the survey (Figure 1).

Analysis of questionnaire items

The results can be found in Tables 3 and 4.

Level of knowledge by professional category

To analyse the level of knowledge, we set a minimum of 70% of correct answers (16.8 points) to

Table 1. Sociodemographic data

Absolute frequency (n)		Sex		Type of employment			Professional experience		Experience breastfeeding (self or partner)		Age				
		Female	Male	Permanent	Temporary	Per diem	<10 years	≥10 years	No	Yes	Mena	Standard deviation	Minimum	Median	Maximum
		n	n	n	n	n	n	n	n	n					
Professional category	Neonatologist	50	18	41	14	13	25	43	31	36	40.98	9.65	27	39	64
	Gynaecologist	63	32	58	17	20	32	63	38	56	43.33	11.18	26	42	65
	Midwife	122	5	85	10	32	46	80	51	74	42.74	10.53	24	41	64
	Maternity nurse	99	2	69	13	18	17	83	35	60	44.59	10.93	27	45	62
	Neonatal nurse	96	2	70	15	13	15	84	24	70	46.69	10.25	21	48	64
	NATs	203	4	0	0	0	84	87	0	0	53.15	7.54	25	55	63
	Total	633	63	323	69	96	219	440	179	296	46.46	10.75	21	48	65

NAT: nurse assistant technician.

define adequate knowledge. We based this threshold on the recommendations of the authors of the questionnaires,[12] who categorised scores as: <50% very poor, 50%-70% inadequate, 70%-85% adequate, > 85% excellent. A study in Canada also set a threshold of 70% to define adequate knowlege.[18] Neonatologists, midwives, nursing professionals in the maternity ward and NATs exhibited adequate knowledge. Gynaecologists did not achieve the recommended minimum number of correct answers (**Tables 6** and **7**, **Figure 2**).

As can be seen in **Table 8**, we found a statistically significant difference in the number of correct answers between medical and nursing professionals ($p = 0.01$).

We found differences between professionals working in different hospitals ($p = 0{,}033$), with significant differences in the number of correct answers between hospital 7 and hospital 2, hospital 9 and hospital 2, and others) (**Figure 3**).

DISCUSSION

Given that we conducted a survey of breastfeeding knowledge addressed to all professionals employed in maternal and child health services in public hospitals of the SACYL based on the information of the database of this public health system, obtained a high response rate (60.9%), and the administered the survey in paper form and within the framework of clinical team meetings, we expect that our findings provide an accurate perspective regarding the knowledge of health providers on this subject.

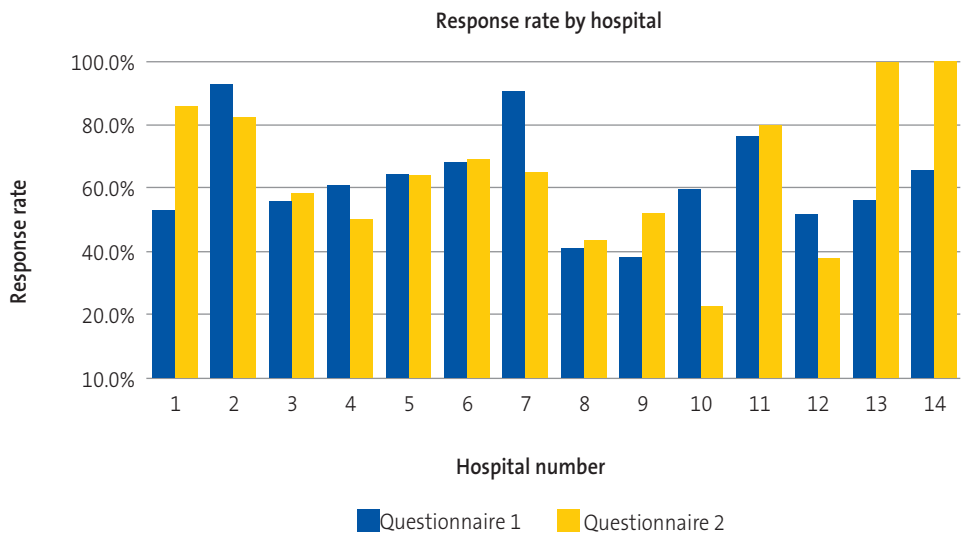
In our review of the literature, we did not find a similar study conducted in Spain in the previous literature surveying different types of professionals or the entire collective of professionals involved in maternal and child care in all the public hospitals of an autonomous region. We did find studies involving specific types of professionals (resident

Table 2. Differences in participation by professional (medical/nursing) category

Absolute frequency		Sex			Type of employment				Professional experience			Experience breastfeeding (self or partner)			Age	
		Female	Male	*p*-value, physicians vs nurses	Permanent	Temporary	Contract	*p*-value, physicians vs nurses	< 10 years	≥ 10 years	*p*-value, physicians vs nurses	No	Yes	*p*-value, physicians vs nurses	Mean	*p*-value, physicians vs nurses
		n	n		n	n	n		n	n		n	n			
Profession	Physicians	113	50	$p = 0.0000$	99	31	33	$p = 0.0866$	57	106	$p = 0.227$	69	92	$p = 0.110$	42.36	$p = 0.045$
	Nurses	317	9		224	38	63		78	247		110	204		44.46	
	NATs	203	4		0	0	0		84	87		0	0		53.15	
	Total	633	63		323	69	96		219	440		179	296		46.46	

NAT: nurse assistant technician.

Figure 1. Participation by hospital



physicians in paediatrics,[10] paediatricians and residents in paediatrics,[12] family physicians in Tenerife[15] and various health providers in a single health district in the Valencian Community[16]), but found no studies comparing the different categories of health professionals.

In the state of Sonora (Mexico),[17] which has a very different health care system compared to ours, a similar study was conducted using an adaptation of the questionnaire developed by Temboury that also included residents in paediatrics and gynaecology.[10] The questionnaire was administered by students of nutrition with random selection of a sample of physicians and nurses (327 responses). This study also concluded that the knowledge of breastfeeding of health professionals was inadequate, although the authors found that residents in paediatrics achieved better scores, which could be explained by previous training in educational workshops and conferences.

The study conducted in Canada to assess the knowledge, beliefs and attitudes of paediatricians, family physicians and final-year residents in paediatrics and family medicine[18] found a score below 70% (the threshold for correct knowledge) in physicians, while the score of residents in paediatrics exceeded 70%.

To improve breastfeeding outcomes and offer solutions to the problems reported by mothers, it is important to evaluate the baseline level of knowledge. In pursuit of the same objectives and after we had started our study, the BFHI in Spain in 2015 published a document "Monitorización de la formación en atención a la lactancia materna mediante encuestas a profesionales" (Monitoring of training in the management of breastfeeding by surveying health professionals)[13] proposing a tool for monitoring levels of training and educational needs and recommending a yearly survey of health professionals and the sample sizes to be obtained in different hospitals based on the number of beds. This proposal of the BFHI has not yet led to published results.

Our findings have highlighted different aspects for consideration. More than 80% of midwives and neonatologists had an "adequate" level of knowledge, but only 39% of gynaecologists reached this threshold, and no more than 40% of professionals in the remaining categories reached it either. Therefore, in two-thirds of the professional categories that are in contact with mothers that initiate breastfeeding, a substantial proportion of providers do not have knowledge at a level considered "adequate" in our study.

Table 3. Percentage of professionals that answered correctly by professional category

	Correct answer	Overall	Neonatologists	Gynaecologists	Midwives	Maternity nurses	Neonatology nurses
Questionnaire 1. First section							
9. A blood glucose test should be performed in all breastfed full term newborns in the first 24-48 h of life, even in the absence of symptoms	False	92.1%	98.5%	78.9%	98.4%	96.0%	89.0%
10. In case of mastitis, breastfeeding should be suspended temporarily	False	88.8%	92.6%	89.5%	93.7%	88.1%	84.0%
11. Mothers should be advised to feed infants each breast for 15 minutes every 2-3 hours	False	77.3%	88.2%	64.2%	96.9%	76.2%	64.0%
12. Exclusive formula feeding carries an increased risk of morbidity and mortality	True	55.9%	67.6%	44.2%	64.6%	51.5%	52.0%
13. Most infants delivered by caesarean section will require supplementation with formula in the first hours of life	False	79.9%	88.2%	74.7%	96.1%	75.2%	66.0%
14. In case a breastfed infant has problems breastfeeding and requires supplementation (with human milk or formula), administration with a bottle is generally against, especially in the first weeks of life	True	67.2%	80.9%	47.4%	80.3%	64.4%	65.0%
15. In breastfed infants, frequent feeds decrease the risk of requiring phototherapy	True	74.1%	79.4%	67.4%	74.0%	81.2%	69.0%
16. In healthy newborns, before the first feed in the delivery room, the newborn should be weighted and placed in a radiant crib to obtain the Apgar score and deliver adequate eye prophylaxis	False	67.0%	85.3%	53.7%	91.3%	54.5%	51.0%
17. In very preterm newborns (<32 weeks) the preferred food is maternal milk (fortified as needed), and the second best option is banked human milk, with administration of preterm formula used only as a last resort	True	89.0%	100%	83.2%	92.1%	85.1%	90.0%
18. In the maternity ward, after 15 hours post birth, a full term newborn with normal weight that needs to be awakened to be breastfed in every feed is considered an infant at risk	False	76.4%	79.4%	82.1%	79.5%	69.3%	72.0%
Questionnaire 1. Second section							
19. Starting at 12 months, the nutrient content of human milk decreases compared to the first year of lactation	False	69.8%	66.2%	66.3%	74.0%	71.3%	72.0%
20. If a lactating mother becomes pregnant, weaning is recommended due to an increased risk of miscarriage	False	91.2%	94.1%	86.3%	96.9%	89.1%	92.0%
21. If a breastfed baby in good general health shows poor weight gain as the sole health problem, the first step is to supplement feeds with formula followed by re-evaluation	False	72.4%	82.4%	53.7%	86.6%	69.3%	70.0%
22. From the first week of life, the 2 most reliable signs to assess milk intake are weight gain and urine output.	True	95.3%	95.6%	95.8%	94.5%	98.0%	95.0%
23. Starting at 6 months, the number of feeds should be reduced to 2-3 a day, supplemented with complementary foods	False	66.4%	73.5%	43.2%	79.5%	70.3%	67.0%
24. Kangaroo care should be available to all haemodynamically-stable preterm newborns regardless of gestational age, as it helps regulate body temperature, promotes breastfeeding and attachment and reduces the risk of infection	True	94.7%	95.6%	90.5%	95.3%	96.0%	98.0%
25. The foremilk at the beginning of each feed is thinner	True	67.4%	69.1%	53.7%	79.5%	67.3%	65.0%

Table 3. Percentage of professionals that answered correctly by professional category (*cont*.)

	Correct answer	Overall	Neonatologists	Gynaecologists	Midwives	Maternity nurses	Neonatology nurses
26. The drawing below represents correct latching 	False	75.1%	69.1%	70.5%	79.5%	71.3%	84.0%
Questionnaire 1. Third section							
27. What are the current breastfeeding recommendation of the WHO?	Exclusive BF through 6 months and BF complemented with other foods through age 2 years or more, as the mother and child wish	84.8%	85.3%	75.8%	92.9%	81.2%	87.0%
28. Which of the following actions is most important for a breastfeeding mother to do if she has cracked nipples?	Assess milk intake	60.5%	75.0%	46.3%	81.9%	48.5%	48.0%
29. Two parents bring their 17-day-old baby to the emergency department due to crying. The baby is exclusively breastfed and everything was fine until present, but parents report that for the past 24 h the baby cries and wants to nurse very often, sometimes every 30-60 minutes. The baby is soothed at the breast and suckles vigorously. The infant is not ill-appearing, the weight gain is adequate and the physical examination is normal, but the mother feels that the infant is still hungry after feeds. How would you diagnose and treat this case?	Growth spurt. Observation of a feed, recommendation of feeding on demand and regular check-ups by paediatrician	52.7%	54.4%	45.3%	69.3%	43.6%	45.0%
Questionnaire 1. Fourth section							
30. Not evaluated							
31. What would you tell a pregnant woman that tells you during an appointment that she is considering formula feeding?	I would ask her to elaborate on the subject to understand her rationale and source of information and, with a respectful attitude, would encourage her to reconsider	83.2%	94.1%	60.0%	88.2%	87.1%	88.0%
32. What do you think about newborn formula samples being given out for free to mothers in health care facilities?	This practice is in violation of the code for the marketing of breast milk substitutes	40.4%	48.5%	12.6%	59.8%	40.6%	33.0%
33. A lactating mother has sought a consultation because she needs to start treatment with adalimumab for Crohn's disease. Her gastroenterologist advised her to wean her 8-month-old baby because this treatment is important. Where can you check whether this drug is compatible or contraindicated for breastfeeding?	In a website I know	48.4%	83.8%	38.9%	58.3%	31.7%	34.0%
Questionnaire 1. Fifth section							
34. Estás en la maternidad, una enfermera está preocupada por la lactancia de un recién nacido, cree que algo no va bien y quiere que vayas a observar una toma	I've done feed observations many times and feel capable of diagnosing the most common breastfeeding problems and offering solutions	68.4%	70.6%	36.8%	78.7%	78.2%	81.0%

Table 3. Percentage of professionals that answered correctly by professional category (*cont*.)

	Correct answer	Overall	Neonatologists	Gynaecologists	Midwives	Maternity nurses	Neonatology nurses
35. Do you think it is appropriate for mothers to breastfeed in public?	Yes	88.1%	91.2%	74.7%	92.9%	93.1%	90.0%
36. Not evaluated							
37. Have you received any specific training on breastfeeding within your education programme or in the time you have been working in the maternity ward?	Yes	57.2%	57.4%	12.6%	88.2%	59.4%	61.0%
How many trainings? Mean (SD)	Average	2-3	1,7 (1,0)	1,7 (0,7)	2,6 (1,8)	2,6 (1,9)	2,5 (2,2)
What was the duration of these trainings? Mean (SD)	Average	workshops	1.7 (1.0)	1.7 (0.7)	2.6 (1.8)	2.6 (1.9)	2.5 (2.2)
38. What is the most important source of knowledge for breastfeeding? (multiple possible answers)	Highest proportion	54.5% books/ articles	69.1% books/ articles	34.7% Co-workers	70.1% Trainings	56.4% Trainings	55.0% Trainings
39. Do you think training is required to diagnose and manage specific problems in breastfeeding?	Highest proportion: yes	88.7%	94.1%	73.7%	96.1%	91.1%	88.0%
39.A. Why? (multiple possible answers)	Highest proportion Because it is part of my job	84.6%	89.1%	72.9%	87.7%	83.7%	87.5%
41. On a scale of 1 (not at all) to 5 (totally), rate how prepared you feel to diagnose and manage specific problems in breastfeeding	Mean	3.33 (±0.93)	3.6 SD (0.7)	2.8 SD (1.1)	3.5 SD (0.8)	3.4 SD (0.9)	3.4 SD (0.9)

Our study revealed a lack of training in breastfeeding protocols and skills in the inpatient setting in NATs, who are professionals that carry out important tasks in this area. They were not aware of the significant impact of the introduction of bottles (items 8 and 19), challenges breastfeeding and the use of pacifiers (item 21), the importance of early skin-to-skin contact and the first feed (item 23) and did not recognised as erroneous something as basic as the need to wash the breasts before and after breastfeeding (item 25, 44.8%). Nearly half of these providers failed to reach the threshold for a level of knowledge defined as adequate.

Overall, our findings call for a reflection on the need to invest in training in breastfeeding across all involved categories of health professionals, especially gynaecologists, whose close involvement in the management of mothers at the time of breastfeeding initiation is of utmost importance. The level of knowledge in this collective of professionals was lowest of all.

Based on the answers to items 19, 21, 23, and 25 in questionnaire 1, we could state that despite the campaigns that have been implemented, the importance of exclusive breastfeeding through age 6 months and maintenance of breastfeeding combined with complementary foods through age 2 continues to be underestimated. There also seems to be a lack of awareness of the need to support mothers in addressing any challenges that may arise during this period.

Our findings confirm the frequent ignorance of the code on the marketing of breast milk substitutes and the tools that could help integrate breastfeeding in everyday clinical practice, such as the website e-lactancia.org and other digital applications, both of which have a direct impact on the prevalence of breastfeeding.

All professionals involved in maternal and child health services in hospitals in Castilla y Leon recognised their lack of specific training in breastfeeding, and nearly 90% considered this training important to be able to diagnose and successfully manage specific problems in breastfeeding, which they considered areas within the scope of their profession (item 39).

When we reviewed the official educational curricula for the degree in Medicine of the Universidad

Table 4. Percent distribution of answers for each item given by nurse assistant technicians			
	True	False	Did not answer
5. Breast milk is the best food for newborns as long as the mother is not malnourished	**83.5%**	15.6%	0.9%
6. In the second year of life, the quality of breast milk is very low	16.0%	**80.2%**	3.9%
7. Breastfeeding should be discontinued if the mother is taking any medication	5.7%	**90.1%**	4.2%
8. When breastfed infants cry due to hunger, breastfeeding should be supplemented with bottle feeding	52.8%	**43.4%**	3.8%
16. The first feed should take place right after birth	**90.6%**	7.5%	1.9%
17. Administration of normal saline with dextrose is needed to prevent hypoglycaemia in newborns	16.5%	**81.6%**	1.9%
18. Breastfeeding frequently reduces the risk of jaundice	**59.0%**	38.7%	2.4%
19. Many newborns need to be bottle-fed the first few days until the mother's breast milk "comes in"	54.2%	**43.9%**	1.9%
20. Babies should be breastfed on demand	**96.2%**	2.8%	0.9%
21. Pacifiers interfere with and hinder breastfeeding	**60.4%**	37.3%	2.4%
22. Newborns should stay with their mothers day and night	**81.6%**	17.0%	1.4%
23. The first feed should take place in the first 3 hours post birth	26.9%	**71.2%**	1.9%
24. Breastfeeding should be discontinued if the mother develops mastitis	24.1%	**73.6%**	2.4%
25. The breasts should be washed before and after each feed	53.8%	**44.8%**	1.4%
26. Breastfeeding is contraindicated if the mother is hepatitis B-positive	38.2%	**54.2%**	7.5%
27. If the baby has diarrhoea, breastfeeding should be discontinued for a few days	6.1%	**92.5%**	1.4%
28. Breastfeeding should not be recommended for twins	3.8%	**95.8%**	0.5%

Correct answers presented in boldface.

de Valladolid[19,20] and for different medical specialties, we found that medicine students are only educated on the physiology of lactation and that the educational curriculum for the MIR residency in gynaecology did not include specific training on the physiology of lactation, although it did specify the need to train residents on breastfeeding-related problems in the postpartum period.[21] The published official educational curriculum for NATs does not include any contents related to breastfeeding.[22]

The learning objectives of the official educational curricula published for paediatricians,[23] nursing professionals,[24-27] midwives[28] and paediatric nurses[29] include training in breastfeeding, although with a varying depth. Our findings show that there is a clear correlation between knowledge and the previous training of professionals, and highlight the need to improve the knowledge, skills and competencies in different types of health providers. There ought to be an emphasis on offering specific training in breastfeeding to those professionals that do not receive any during their formal education, such as gynaecologists and NATs.

Based on our findings, the knowledge of breastfeeding of the health care staff providing women's and children's services in Castilla y Leon in 2015 was lacking in aspects that are essential for the adequate management of breastfeeding: health providers lacked basic knowledge and skills with an impact on breastfeeding, made recommendations that did not promote breastfeeding (delaying

Table 5. Percent of professionals (NATs) that answered each question		
		% answers
9. Have you ever heard of "baby-friendly hospitals"?	No	36.3%
	Yes	**61.8%**
	Did not answer	1.9%
10. Until what age is exclusive breastfeeding recommended at present?	1 month	0.0%
	2 months	0.0%
	3 months	4.7%
	4 months	2.8%
	5 months	4.7%
	6 months	**86.3%**
	Did not answer	1.4%
11. What should a normal newborn receive in addition to breast milk?	Nothing	**87.7%**
	Water	4.2%
	5% dextrose solution	2.4%
	Formula	4.7%
	Did not answer	0.9%
12. What is the scientific meaning of the milk commonly known as "foremilk"?	Colostrum	16.5%
	Milk released at the beginning of each feed	**26.4%**
	Milk of low nutritional value	31.6%
	None of the above	23.1%
	Does not answer	2.4%
13. The amount of milk a woman can produce depends on: (you can check more than one)	Fluid intake	42.0%
	Breast size	0.9%
	Frequency and vigour of feeds	**85.4%**
	Emotional state	49.1%
14. Mark which of these institutional practices is most effective in promoting breastfeeding in the maternity ward	Analgesia during delivery	0.5%
	Allow the mother to rest at night (remove the baby)	2.8%
	Placing the baby at the breast in the first hour of life	**88.7%**
	Placing baby at the breast every 3 hours during the night	5.7%
	Stimulation of sucking with a pacifier	0.9%
	Does not answer	1.4%
15. Mark the most widely available and effective resource for nipple care	Moisturising creams	1.4%
	Alcohol and glycerine	1.9%
	Correct latch-on	**77.4%**
	Vigorous brushing	0.0%
	Soap and water	16.5%
		2.8%

Correct answers presented in boldface.

the first feed, fixed feeding schedules, use of bottles and pacifiers), and when difficulties arose simply recommended discontinuation of breastfeeding, disregarding the wishes of the mother and the wellbeing of the infant. Having defined a score of 16.8 points (70% correct answers) as the threshold for adequate "knowledge", we found that neonatologists, midwives and nurses and NATs employed in maternity or neonatal wards reached this threshold, while gynaecologists exhibited "inadequate" knowledge.

Breastfeeding is not a subject relevant solely to nursing professionals or those who have "an interest in the subject", on the contrary, due to its importance for the promotion of public health, it is the duty of politicians and health care administra-

Table 6. Overall score in each health professional category

		Number of correct answers					
		Mean	Standard deviation	Median	25th percentile	75th percentile	Interquartile range
Professional category	Neonatologist	19.47	3.92	20.00	18	22	4
	Gynaecologist	15.24	4.62	15.00	12	19	7
	Midwife	20.03	3.58	21.00	19	23	4
	Maternity nurse	17.07	4.21	18.00	15	20	5
	Neonatal nurse	16.97	4.21	17.00	14	20	6
	NAT	16.93	3.70	17.00	15	20	5

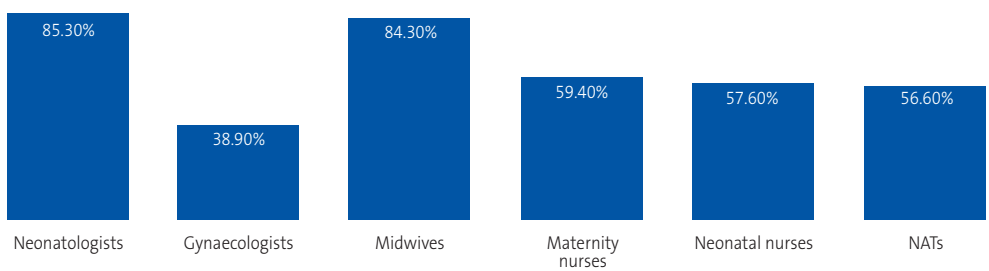
NAT: nursing assistant technician.

Table 7. Total score for each health provider category

		Number of correct answers					
		Mean	Standard deviation	Minimum	Median	Maximum	*p*-value
Profession	Physicians	17.01	4.81	2.00	18.00	24.00	0.01
	Nurses	18.19	4.23	7.00	19.00	24.00	
	NATs	16.93	3.70	4.00	17.00	24.00	
	Total	17.54	4.26	2.00	18.00	24.00	

NAT: nursing assistant technician.

Figure 2. Proportion of professionals that exceeded 70% of correct answers



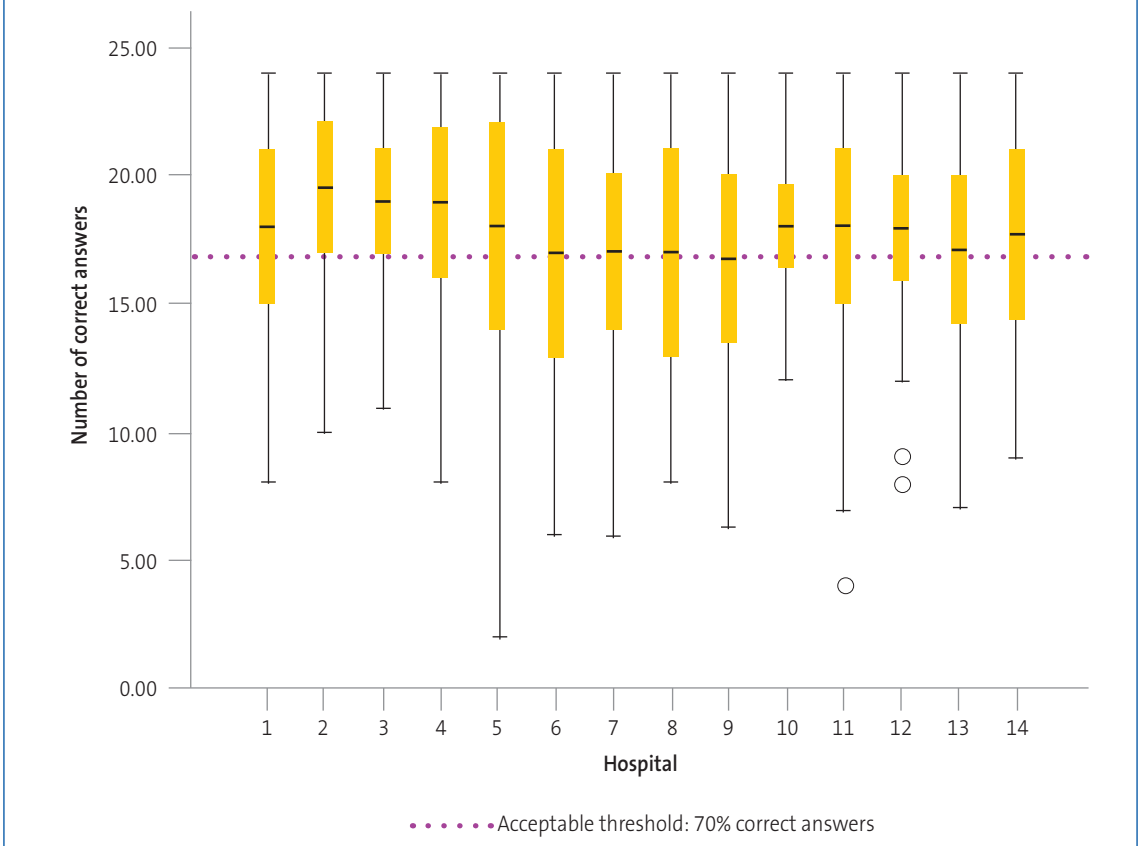
NAT: nursing assistant technician.

tors to develop adequate educational strategies for inclusion in the curricula of the different health professions and joint training programmes for delivery in the maternal and child health units of all hospitals addressed to all the professionals involved in the care of women and infants (neonatologists, gynaecologists, midwives, nurses and NATs). In short, improving the prevalence of breastfeeding in the autonomous region of Castilla y Leon will require an investment on specific training in breastfeeding.

CONFLICTS OF INTEREST

The authors have no conflicts of interest to declare in relation to the preparation and publication of this article.

Figure 3. Number of correct answers per hospital



ABBREVIATIONS

ASCALEMA: Asociación Castellanoleonesa de Matronas • **BFHI:** Baby-Friendly Hospital Initiative • **ECola:** Encuesta sobre Conocimientos en Lactancia Materna • **GSIYCF:** Global Strategy for Infant and Young Child Feeding • **NAT:** nurse assistant technician • **SACYL:** Regional Public Health Administration of the Autonomous Community of Castilla y Leon • **UNICEF:** United Nations Children's Fund • **WHO:** World Health Organization • **95 CI:** 95% confidence interval.

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