Introduction

In their Global Strategy on Infant and Young Child Feeding published in 2002, the WHO and UNICEF recommend starting breastfeeding during the first hour of life and continuing with exclusive breastfeeding during the first 6 months of life, followed by its complementation with other foods until the age of 2 years or more[1]. Early breastfeeding onset can assist in establishing exclusive breastfeeding and is related to its longer duration[2]. Despite the importance of this practice worldwide, less than half of newborns are put to the breast within an hour of birth[3]. Furthermore, according to the UNICEF, only two out of five children continue receiving exclusive breastfeeding to the age of 6 months[3].

Health care professionals can influence the establishment and maintenance of breastfeeding[4–6]. Various systematic reviews have shown that appropriate professional interventions increase the number of women who begin breastfeeding[7,8] and that professional support can be effective to prolong exclusive breastfeeding[9,10], especially when offered by trained staff[11].

The aim of clinical practice guidelines (CPGs) is to achieve evidence-based changes in professional practice.The Registered Nurses' Association of Ontario has developed a CPG on breastfeeding and runs a Best Practice Spotlight Organization program to supervise and monitor the implementation of all Registered Nurses' Association of Ontario CPGs[12]. However, the success of breastfeeding CPG implementation programs has been considered only modest or moderate, with the percentage adherence to recommendations ranging between 6 and 14%[13]. The

implementation process is highly complex and affected by multiple factors that have not been fully elucidated.

The Theory of Planned Behavior[14] is considered an appropriate conceptual framework for predicting and explaining the behavior ofprofessionals and their compliance or not with CPGs[15–17]. According to this theory, three factors influence behavior intention: a) attitudes, which refer to the general evaluation of behavior and are determined by beliefs and perceptions of behavior; b) subjective norms, which refers to the social approval of behavior perceived by reference groups, and c) perceived behavioral control, which refers to the perceived self-efficacy to carry out a specific behavior[14]. There has been scant research usingTheory of Planned Behavior to analyze the behavior of professionals in relation to breastfeeding. Studies in students of health sciences and registered nurses found that knowledge and previous experience of lactation were associated with positive attitudes towards breastfeeding, which were important predictors of the intentionality of professionals[18–20]. Another study in nurses observed that subjective norms, behavioral control, and moral norms were associated with the adoption of breastfeeding support behaviors[21].

The objective of this study was to identify factors associated with breastfeeding support behaviors of health care professionals in a health area in which a Registered Nurses' Association of Ontario CPG for breastfeeding was implemented, comparing the results with: professionals in the same health area before CPG implementation, those in a standard-care health area, and those in a Baby Friendly Hospital Initiative (BFHI)-accredited area.

Methods

An observational cross-sectional study was conducted in a health care area in Southern Spain in 2016, after implementation of a Registered Nurses' Association of Ontario breastfeeding CPG. These data were compared to the findings of a previous cross-sectional study conducted in 2011 by the Regional Care Quality Authority[22] in the same health area before CPG implementation and in two other health areas within the same Regional Health System, one considered to provide standard breastfeeding care and the other "gold-standard" breastfeeding care, being accredited by the Baby Friendly Hospital Initiative (BFHI)[6,23].

The study was conducted in three settings. The health area investigated before and after CPG implementation includes 11 primary care centers and one 289-bed hospital; the standard-care health area includes 14 primary care centers and one 863-bed hospital, and the BFHI accredited area includes 11 primary care centers and one 98-bed hospital.

The eligible study population comprised all health care professionals of all categories working in maternal and/or pediatric care in hospitals and primary care centers in the selected health areas, and all those who volunteered for the study were enrolled: 164 pre-implementation and 152 post-implementation in the "CPG" area, 634 in the standard-care area, and 94 in the BFHI-accredited area.

The breastfeeding CPG implementation followed the Registered Nurses' Association of Ontario Guideline Implementation Program and took three years (2012-2014)[12]. In Spain, this program is replicated and supported by the Nursing and Health Care Research Unit of the Carlos III Health Institute of the Ministry of Economy and Competitiveness, which accredits centers for this purpose and supervises the CPG implementation[12]. The program implementation procedure comprised of the following steps: a) Establishing an organizational structure and selecting a CPG leader; b) Training the leader in accordance with the Knowledge-to-Action Framework[24,25]; c) Recruiting and training CPG implementation collaborators in the unit(s); d) Identifying obstacles/facilitators and stakeholders; e) Selecting CPG recommendations and planning implementation activities, reviewing policies, and updating protocols, circuits, educational and training materials, etc.; f) Planning the monitoring and evaluation of results, harmonizing clinical records and the utilization of indicators; and g) Planning the diffusion of results within and outside the health care institutions. Upon completion of this process, the "CPG" area was selected as a Best Practice Spotlight Organization in 2015.

After obtaining the informed consent of the health care workers to their participation in the study, we gathered data on sociodemographic (age, sex) and work (professional category and place of work) characteristics. Outcome variables were the factors affecting breastfeeding support behavior according to the Theory of Planned Behavior, evaluated using the validated Spanish version of the Questionnaire of Professional Breastfeeding Support[26]. This questionnaire includes 49 items grouped into four scales, "Attitudes" (13 items), "Beliefs" (16 items),

“Subjective Norms” (12 items), and “Behavioral intention” (8 items). Response options range between 1 (low support) and 5 (high support).

Data were recorded by participants in a specifically designed notebook that included all study variables and the aforementioned questionnaire. In both studies (2011 and 2016), a single previously-trained researcher was responsible for handing the notebook (with a letter seeking informed consent) to each participant and for collecting it once completed.

The study was approved by the Clinical Research Ethics Committee of Health care Area III of the Murcia Autonomous Community. Participants were informed of the objective of the study and their consent was requested. Permission to use data from the 2011 study was obtained from the Murcia Department of Health.

Exploratory analysis was carried out to evaluate missing data and questionnaires with missing items (6% of the total) were eliminated. Means and standard deviations were calculated for quantitative variables and percentages and absolute frequencies for qualitative variables. A score of 4 or 5 for items in the Questionnaire of Professional Breastfeeding Support was considered to indicate adequate breastfeeding support, and the percentage of adequate responses for each item was calculated by dividing the number of participants who responded with a score of 4 or 5 by the total number of responders and multiplying the result by 100. The chi-square test was used to compare the percentage of adequate responses to each questionnaire item in 2016 with the percentage obtained in 2011 for the same area before implementation and for the standard-care and BFHI-accredited health areas.

P< 0.05 was considered statistically significant. IBM SPSS 21.0(IBM SPSS, Chicago IL) was used for data analyses.

Results

The response rate was 68.6% (n=103) in the post-implementation health area *versus* 40.8% (n=67) in the same area before breastfeeding CPG implementation, 56.6% (n=359) in the standard-care area, and 91.5 % (n=86) in the BFHI-accredited area.

The socio-demographic and work characteristics of the participants in the 2011 and 2016 studies were highly similar among the different settings (Table 1).

Comparison of health area professionals before and after implementation: the percentage of adequate responses for attitude scale items was slightly higher post-implementation, although the difference only reached statistical significance for item 9 ("it is upsetting for me to see publicity for bottle feeding for babies in my center") (52.4 *vs.* 42.4%; p=0.03) (table 2 and figure 1). The percentage for belief scale items was significantly higher post-implementation for items 4, 6, 7, and 8 (related to various breastfeeding practices) (table 3 and figure 2). The percentage for subjective norms scale items was higher post-implementation for 10 of the 12 items, with statistical significance being reached for items 2 and 4 (introduction of human milk substitute and use of bottle feeding) and for items 9 and 10 on compliance with the International Code of Marketing of Breast-milk Substitutes (table 4 and figure 3). Finally, the percentage for behavioral intention scale items was very high both before and after implementation, with no statistically significant difference between 2011 and 2016 (table 5 and figure 4).

*Comparison between post-CPG implementation health area and standard-care area***:** the percentage of adequate responses for attitude scale items was always significantly higher in the post-implementation *versus* standard-care area except for item 13 (table 2 and figure 1). The percentage for beliefs scale items was significantly higher in this area than in the standard-care area in 10 of the 16 items (related to breastfeeding practices/maintenance and gifts of formula milk samples, bottle teats, etc.) (table 3 and figure 2). The percentage for subjective norms scale items was significantly higher in the post-implementation area for 7 of the 12 items (related to breastfeeding practices/recommendations and compliance with International Code) (table 4 and figure 3). Finally, the percentage for behavioral intention scale items was significantly higher in the post-CPG implementation area for 6 items (related to intention to participate in breastfeeding training and promotion activities aimed at mothers and work centers) (table 5 and figure 4).

Comparison between post-CPG implementation health area and BFHI-accredited area: the percentage of adequate responses for attitude scale items was only lower in thepost-implementation area *versus* BFHI-accredited area for item 13 (“I consider it excessive to ban professionals from giving free formula milk samples to breastfeeding mothers”) (49.5 *vs.* 54.0 %; p:0.04) (table 2 and figure 1). The percentage for subjective norms items was significantly lower in the post-implementation area for items 4 and 12 (related to providing practical breastfeeding assistance) (table 4 and figure 3). The percentage for beliefs scale score items was significantly higher in the post-implementation area than in the BFHI-accredited area for items 4, 6, 7, and 8 (related to various breastfeeding practices) (table 3 and figure

4). However, no statistically significant difference was observed between these areas in any behavioral intention scale item (table 5 and figure 4).

Considering the results in all settings together, the lowest percentage of adequate scores were observed for items 3, 9, and 13 in the attitude scale, items 15 and 16 in the beliefs scale, item 9 in the subjective norms scale, and item 8 in the behavioral intention scale, all related to the International Code.

Discussion

To our knowledge, this is the first study that adopts a Theory of Planned Behavior-based approach to analyze changes in the support of professionals for breastfeeding resulting from the implementation of a breastfeeding CPG. The health areas under study are all within the same regional health care service and operate under similar management and administrative systems, favoring their comparability. Participants were all health care professionals involved in breastfeeding in both hospital and community settings, with a predominance of registered nurses, nursing assistants, midwives, and pediatricians. The percentages of these professional categories were representative of their distribution in the respective areas.

In the area in which the breastfeeding CPG was implemented, breastfeeding support by the professionals was improved post-implementation in three of the four Theory of Planned Behavior components, with the greatest improvement in the subjective norms scale, which is related to social pressures to enact a behavior[27]. These results are similar to findings in Canadian nurses[21]. Higher subjective norms scores have been associated with the cultural changes that accompany CPG implementation,

socializing the value of breastfeeding and increasing peer pressure among professionals[26,28]. These processes have been found to promote a spirit that favors the development of evidence-based practice[29]. CPG implementation also significantly improved beliefs on various breastfeeding-related practices in the present study, possibly attributable to the training offered during the implementation process. All health care professionals involved in the care of mothers and infants received personalized instruction on these practices during work time. This type of training has been associated with a clinically relevant increase in beliefs on breastfeeding[30,31]. Further studies are needed to investigate the poor knowledge of some items observed in these health care professionals, even among those in a BHFI-accredited area.

CPG implementation only achieved a small improvement in attitude scores, in part because the professionals in this area had already shown a positive attitude in 2011. The slight increase may also be attributable to the personal experience acquired by professionals actively involved in the implementation. It has been demonstrated that a greater improvement in attitude is achieved when knowledge is acquired through personal experience rather than theoretical learning[32,33]. Likewise, we observed only minimal post-implementation improvement in behavioral intention scores, with very high percentages (90-100%) being recorded both before and after implementation for almost all items. Intention is assumed to immediately precede behavior. However, Ajzen[34] pointed out that hypothetic and real situations can be interpreted distinctly, and these high scores may overestimate the likelihood of the professionals enacting a socially desirable behavior such as breastfeeding support.

Scores for numerous items in all four scales were significantly higher in the post-CPG implementation area than in the standard-care area, consistent with the positive effect of CPG implementation reported by other authors[13,35]. The percentage of adequate responses was higher in the BFHI-accredited area than in the post-implementation area for some items. BFHI accreditation has been associated with high scores in subjective norms and attitudes towards breastfeeding practices[21,36], and a higher proportion of professionals in the BFHI-accredited area reported providing practical breastfeeding assistance, suggesting that consolidation of this important behavior change may require more time. Thus, a similar study in primary care nurses found that beliefs were modified at 16 weeks after Registered Nurses' Association of Ontario breastfeeding CPG implementation but that breastfeeding support was not[31]. These findings suggest that activities favoring this practice should form a key part of the implementation process. It would be of interest to follow up CPG adherence after implementation to determine whether the area reaches the level of a BFHI-accredited area in all items over time, as previously suggested[35].

The worst results for all scales in all areas were related to compliance with the International Code. The marketing of infant formulas appears to have such a strong impact on social norms[37] that it may influence the clinical activity of health care professionals. Implementation of the breastfeeding CPG significantly improved compliance with the International Code, possibly because all publicity materials (posters, leaflets) promoting infant formulas were removed during the process; however, there continued to be a certain permissiveness towards these practices, as observed in other studies[38–40].

Strengths and limitations

We contribute novel data on changes in maternal breastfeeding support by health care professionals after implementation of a CPG, comparing results with those obtained by a single study using the same instrument in a standard-care area and a BFHI-accredited area.

One potential study limitation is the possibility of differences in characteristics between the health care professionals who volunteered for the study and those who did not, especially in the health areas with lower response rates. In addition, the unequal size of the study groups reduced the statistical power, with only large differences achieving statistical significance.

It should also be noted that the comparisons with standard-care and BFHI-accredited areas were based on data from 2011 and took no account of any subsequent changes. In addition, we cannot rule out that the observed changes might have taken place without CPG implementation. Finally, our discussion of the findings is limited by the lack of published research on this issue.

Conclusions

Factors related to breastfeeding support by health care professionals were improved by the implementation of a CPG. The greatest changes were in subjective norms and beliefs on breastfeeding practices, bottle-feeding, weaning, and the regulation of infant formula marketing. A small improvement in attitudes was recorded, but there was no appreciable difference in behavioral intention. Implementation achieved

improvements in all studied factors in comparison to a standard-care area. There appears to be a need for increased provision of practical activities to support breastfeeding and for more effective measures to ensure compliance with the International Code of Marketing of Breast-milk Substitutes.

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Table 1. *Characteristicsof health professionals before and after implementation of a CPG program, Spain, 2011 and 2016* (N= 615)

Study	2011	2016
	n = 512	n =103
	n (%)	n (%)
Sex		
Male		
Registered Nurse	174 (34.0)	29 (28.2)
Place of work		
Delivery room	78 (15.1)	19 (18.5)
Maternity unit	130 (25.5)	16 (15.5)
Pediatric unit	135 (26.5)	22 (21.4)
Primary care center	137 (26.8)	36 (35.0)
Other unit	32 (6.1)	10 (9.6)

CPG: Clinical Practice Guideline

Table 2. *Comparison of responses to Attitude scale items between the health area after CPG implementation (2016) and the three health areas studied in 2011 (N= 615), Spain*

Attitude scale items	Health area after CPG implementation n=103 n (%)	Health area before CPG implementation n=67 n (%)	Standard-care area n=359 n (%)	BFHI area n=86 n (%)
1 I think it is unnecessary to discuss the benefits of breastfeeding with pregnant women*	98(95.1)	60(89.4)	296(82.5)**	78(90.7)
2 I think it is over the top for a mother to initiate breastfeeding immediately after birth*	97(94.2)	62(95.5)	292(1.3)**	79(91.9)
3 I think it is excessive to prohibit infant formula advertising in health care centers[a]	61(59.2)	38(56.9)	168(46.8)*	53(61.3)
4 I think that mother and newborn skin-to-skin contact is unnecessary in first half hour after caesarean section[a]	91(88.3)	57(84.6)	285(79.3)*	76(88.1)
5 I think it is over the top to use a cup or glass to give formula supplements to breastfeeding infants[a]	61(59.2)	39(57.6)	169(47.1)*	57(63.3)
6 I think it is acceptable to give mothers gift packs containing pacifiers[a]	73(70.9)	46(68.2)	180(50.1)***	62(72.1)
7 I feel uncomfortable seeing a woman breastfeeding a child more than 1 year old[a]	94(91.3)	65(97.0)	260(72.5)***	81(94.2)
8 I think it is unrealistic to recommend that a mother breastfeed on demand[a]	92(89.3)	64(95.5)	275(76.5)***	73(84.9)
9 I do not like seeing infant formula advertising in my health center	54(52.4)	24(42.4)*	117(32.7)***	36(41.9)
10 I am not convinced by expressed milk[a]	94(91.3)	60(89.2)	283(79.0)***	78(88.2)
11 I like talking to mothers about breastfeeding problems	87(84.5)	52(77.3)	239(66.7)***	72(83.7)
12 I would not mind working with support groups	73(70.9)	48(71.2)	179(50.0)***	70(67.4)
13 I think it is excessive to prohibit professionals from giving free samples of infant formula to breastfeeding mothers[a]	51(49.5)	30(45.5)	151(42.2)	65(54.0)*

[a] Items written in a negative sense; CPG: Clinical Practice Guideline; *P<.05, **P<.01, ***P<.001

Table 3. *Comparison of responses to Beliefs scale items between the health area after CPG implementation (2016) and the three health areas studied in 2011 (N= 615), Spain*

Beliefs scale items	Health area after CPG implementation	291(81.0)	71(82.1)	
3 Mother and newborn skin-to-skin contact immediately after birth is important to establish breastfeeding	95(92.2)	62(92.2)	305(85.1)*	81(94.0)
4 Bottle-feeding is the best way to administer formula supplements to infants that need them[a]	82(79.6)	26(45.3)**		
13 Information on how to express milk is necessary when breastfeeding mothers are separated from their infants	101(98.1)	65(96.9)	339(94.5)	84(97.6)
14 Breastfeeding support groups play an important role in maintaining breastfeeding	93(90.3)	61(90.6)	275(76.7)**	80(92.9)
15 The presence of infant formula advertising in health care centers does not influence a mother's decision to breastfeed [a]	48(46.6)	39(57.8)	151(42.2)	38(44.0)
16 Health care professionals should avoid giving mothers gift packs containing pacifiers or infant formula	69(67.0)	44(65.6)	164(45.6)***	58(67.9)

[a] Items written in a negative sense; CPG: Clinical Practice Guideline; *P<.05, **P<.01, ***P<.001

Table 4. *Comparison of responses to Subjective Norms scale items between the health area after CPG implementation (2016) and the three health areas studied in 2011 (N= 615), Spain*

Subjective norms scale items	Health area after CPG implementation n=103 n (%)	Health area before CPG implementation n=67 n (%)	Standard-care area n=359 n (%)	BFHI area	278(77.5)**	77(89.3)
7 A mother's informed choice about child care is respected	85(82.5)	55(81.8)	283(78.5)	76(88.4)		
8 The work of mothers' support groups is appreciated	84(81.6)	49(72.7)	264(73.5)	76(88.4)		
9 Infant formula advertising (calendars, stationery, stadiometers, etc.) is permitted [a]	63(61.2)	27(40.9)**	132(36.7)***	56(64.7)		
10 Formula samples are given to breastfeeding mothers [a]	89(86.4)	49(73.8)*	227(63.1)***	76(88.1)		
11 Breastfeeding training is considered important	93(90.3)	59(87.9)	325(90.5)	82(95.3)		
12 Besides information, mothers are given practical help with breastfeeding	89(86.4)	59(87.9)	281(78.4)	82(95.3)*		

[a] Items written in a negative sense; CPG: Clinical Practice Guideline; *P<.05, **P<.01, ***P<.001

Table 5. *Comparison of responses to Behavioral Intention scale items between the health area after CPG implementation (2016) and the three health areas studied in 2011 (N= 615), Spain*

Behavioral intention scale items	Health area after CPG implementation n=103 n (%)	Health area before CPG implementation n=67 n %	Standard-care area n=359 n (%)	BFHI area