

Original article

Comparison of the effectiveness of printed and digital booklets on home care for newborns*

Comparação da efetividade de cartilhas impressa e virtual sobre cuidados domiciliares com recém-nascidos

Comparación de la eficacia de los folletos impresos y digitales sobre los cuidados domiciliarios de los recién nacidos

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Abstract

Objective: to compare the effectiveness of the printed and digital versions of an educational booklet in expanding the knowledge of family caregivers about home care for newborns. **Method:** a quasi-experimental study, conducted in three stages (pre-test, intervention, and post-test), carried out in a municipal hospital in Rio das Ostras, Brazil, between January and July 2024. 104 family members of newborns participated, equally distributed into two groups (printed booklet and digital booklet). McNemar's and Chi-square tests were used, with a significance level of 5% ($p < 0.05$). **Results:** an increase in correct answers was observed in the post-test in both groups, being 22.2% in the printed version and 17.9% in the digital version. The comparison between the groups did not reveal a statistically significant difference between the versions. **Conclusion:** both versions of the booklet showed similar effectiveness in expanding the knowledge of family caregivers about home care for newborns. **Descriptors:** Infant, Newborn; Health Education; Effectiveness; Postnatal Care; Educational Technology

Resumo

Objetivo: comparar a efetividade das versões impressa e virtual de uma cartilha educativa na ampliação do conhecimento de familiares cuidadores sobre os cuidados domiciliares com recém-nascidos. **Método:** estudo quase experimental, conduzido em três etapas (pré-teste, intervenção e pós-teste), realizado em um hospital municipal de Rio das Ostras, Brasil, entre janeiro e julho de 2024. Participaram 104 familiares de recém-nascidos, distribuídos igualmente em dois grupos

(cartilha impressa e cartilha virtual). Foram utilizados os testes de McNemar e Qui-quadrado, com nível de significância de 5% ($p < 0,05$). **Resultados:** verificou-se aumento nas respostas corretas no pós-teste em ambos os grupos, sendo 22,2% na versão impressa e 17,9% na versão virtual. A comparação entre os grupos não revelou diferença estatisticamente significativa entre as versões. **Conclusão:** ambas as versões da cartilha apresentaram efetividade semelhante na ampliação do conhecimento de familiares cuidadores sobre os cuidados domiciliares com recém-nascidos.

Descritores: Recém-Nascido; Educação em Saúde; Efetividade; Cuidado Pós-Natal; Tecnologia Educacional

Resumen

Objetivo: comparar la eficacia de las versiones impresa y virtual de un folleto educativo para ampliar los conocimientos de los familiares cuidadores sobre los cuidados domiciliarios de los recién nacidos. **Método:** estudio cuasi-experimental, llevado a cabo en tres etapas (pre-prueba, intervención y post-prueba), realizado en un hospital municipal de Rio das Ostras, Brasil, entre enero y julio de 2024. Participaron 104 familiares de recién nacidos, distribuidos por igual en dos grupos (folleto impreso y folleto virtual). Se utilizaron las pruebas de McNemar y chi-cuadrado, con un nivel de significación del 5 % ($p < 0,05$). **Resultados:** se observó un aumento de las respuestas correctas en la post-prueba en ambos grupos, siendo del 22,2 % en la versión impresa y del 17,9 % en la versión virtual. La comparación entre los grupos no reveló diferencias estadísticamente significativas entre las versiones. **Conclusión:** ambas versiones del folleto mostraron una eficacia similar a la hora de ampliar los conocimientos de los familiares cuidadores sobre los cuidados domiciliarios de los recién nacidos.

Descriptores: Recién Nacido; Educación en Salud; Efectividad; Atención Posnatal; Tecnología Educacional

Introduction

It is estimated that more than 70% of neonatal deaths occur due to preventable causes, mainly as a result of inadequate care provided to pregnant women, during delivery, at birth, and to newborns.¹ The quality of care provided to newborns, from delivery to the home environment during the first days of life, is essential for survival and for healthy and harmonious development, constituting one of the global challenges to be addressed in order to reduce morbidity and mortality rates during this period.²

In Brazil, over the last decades, there has been a reduction of more than 80% in the infant mortality rate, successfully achieving the fourth Millennium Development Goal, whose target was to reduce mortality among children under five years of age.³ However, despite this reduction over the years, the rates in this age group are still considered high, especially when comparing different Brazilian regions, particularly with regard to neonatal deaths.⁴

There are several basic preventive care practices developed within the family and community that contribute to reducing neonatal morbidity and mortality, such as exclusive breastfeeding, proper hygiene, including umbilical cord care, and maintaining warmth, among others.² Therefore, during the neonatal period, family members need to adapt to the care required by the newborn, which is often surrounded by insecurities and doubts.⁵

Thus, it is essential that families are adequately prepared for this critical transition in order to prevent avoidable risks. Therefore, it is recommended that guidance from the healthcare team regarding safe postnatal care be provided continuously, from prenatal care through the safe transition from the maternity ward to the home environment, considering that inadequate performance of such care may cause real harm to the baby's health, compromising their survival.²

In this context, health education emerges as a fundamental strategy, especially with regard to home care during the neonatal period, a time when family members assume full responsibility for the baby's well-being. To this end, educational technologies, such as educational booklets, are important allies in this educational process, as they positively impact the teaching-learning process by allowing readers to consult the material whenever they wish, reinforcing guidance and clarifying doubts.⁶ Furthermore, they are useful tools for strengthening self-care and making learning a more collaborative experience.⁷

Given this importance, an educational booklet entitled "Home Care for Newborns" was recently developed in both printed and digital versions for family caregivers, based on scientific evidence and covering topics such as the maternity discharge process, visits to the baby, bathing, and umbilical cord stump hygiene, among others. The content of this technology was validated by specialists (nurses and professionals from the fields of social communication and information technology) and satisfactorily evaluated by the target audience (pregnant women, postpartum women, and family members of newborns) in a previous study.⁸

Following the validation of the booklet's content, the need emerged to assess its effectiveness, particularly regarding the expansion of family caregivers' knowledge about home care for newborns. Educational booklets are recognized as valuable communication tools because they contribute to health education due to their accessibility. They can be read, annotated, and consulted at home, functioning as an extension of professional follow-up beyond the healthcare service setting.⁹

On the one hand, printed educational materials allow individuals to manage their own teaching-learning process, progressing in reading at their own pace; on the other hand, digital materials can complement the written content, expanding patients' understanding of care through multimedia tools. However, studies comparing the effectiveness of printed and digital versions of educational booklets are rare, with only one study focused on eye self-examination being identified.¹⁰ Given the scarcity of studies in the scientific literature, this investigation sought to fill this gap by verifying whether the format of the educational material influences the learning process or whether there are no significant differences in effectiveness between printed and digital booklets.

The validated booklet can contribute to reducing neonatal morbidity and mortality, aligning with the second target of the third Sustainable Development Goal.² However, gaps in evidence persist regarding the comparative effectiveness between different booklet formats, which makes it difficult to support the most appropriate recommendation by health professionals, considering user preferences and challenges related to digital accessibility.

Given the above, the objective of this study was to compare the effectiveness of the printed and digital versions of an educational booklet in expanding the knowledge of family caregivers about home care for newborns.

Method

This is a quasi-experimental study, with two groups (printed booklet and digital booklet), using a quantitative approach,¹¹ developed between January and July 2024, in a municipal hospital located in Rio das Ostras, a municipality in the coastal region of the state of Rio de Janeiro, Brazil. The guidelines of the TREND (Transparent Reporting of Evaluations with Nonrandomized Designs) tool were adopted for the description of the research.

The population consisted of pregnant women, postpartum women, and other family members of newborns. According to the Ministry of Health's Live Birth Monitoring Panel, the monthly mean of live births in the municipality of Rio das Ostras in 2022 was 140.75, a value considered as the study population for the sample calculation. Thus, the sample size calculation for finite populations ($N = 141$) was used, with a Z-score of 1.96 (95% confidence interval), $p = 0.5$ (greater sample heterogeneity), and $e = 0.05$ (5% margin of error). This procedure resulted in a minimum sample of 104 participants, distributed equally between the two intervention groups (printed booklet and digital booklet).

The inclusion criteria were: pregnant women, postpartum women, and/or other family members over 18 years of age, whose newborns were in good health and hospitalized in the Rooming-In Unit of the research setting. The exclusion criteria were: pregnant women, postpartum women, and/or other family members who had compromised health status that made it difficult to evaluate the educational booklet; people with visual and/or hearing impairments; illiterate people; those who had previously had contact with the material, in any of its modalities; and participants who did not complete all three stages of the study.

The research was structured in three stages: pre-test, intervention, and post-test. Data collection was carried out by a nursing student, under the supervision of a PhD professor with experience in this type of study. The team's preparation included theoretical and practical training. Participants were approached in person in the wards, due to the ease of finding them in that environment. The sampling was non-probabilistic, consecutive, including all individuals who met the inclusion

criteria and agreed to participate in the study, beginning in January 2024 and continuing until the minimum sample size was reached in July 2024. Each group had access to a different version of the booklet: the first 52 participants used the printed version, while the subsequent 52 used the digital version.

The absence of randomization was due to the difficulty in recruiting participants, since adopting a lottery system could further limit the reach of the minimum sample within the stipulated period for data collection. It should be noted, however, that there was no prior relationship between the researchers and the participants, and that the same eligibility criteria were adopted for both groups, which helped to minimize possible biases and ensure greater comparability between the interventions.

The data collection form, printed and self-administered, was developed by the researchers specifically for this study and divided into two parts. Although it was not submitted to validation by external experts, its content was reviewed and agreed upon by three PhD professors with experience in the field, who were members of the research team. The first part of the instrument consisted of closed questions to characterize the participants, covering sex, age, education, profession, and degree of kinship with the newborn. The second part contained questions about home care for newborns, with the aim of assessing the participants' knowledge of the subject before and after the intervention. The instrument consisted of 21 statements, in which participants had to mark "True" (T), "False" (F), or "I Don't Know" (DK).

Initially, a pilot test was conducted with ten individuals, family caregivers, to verify the applicability of the instrument and the booklet. These participants met the same inclusion and exclusion criteria as the sample group and were randomly selected from the research setting. The results indicated that the form was feasible and understandable for the target population, and that the reading time of the booklet was adequate, regardless of the modality. These participants were not included in the final sample for data analysis, and no adjustments to the instrument were necessary.

In the first approach to potential participants, the study, its objectives, and the procedures planned for data collection were presented. After agreeing to participate, they were asked to sign the Informed Consent Form, with one copy given to each participant. Next, the first stage, the pre-test, began, in which each participant individually received a clipboard, a blue pen, and the printed form, with an estimated mean time of 15 minutes for its completion, the same for both groups. During this phase, participants were instructed to answer freely, based on their prior knowledge of the topic addressed.

In the second stage, corresponding to the intervention, the educational booklet, consisting of 24 illustrated, colorful, and informative pages, was presented to the participants. Its content was based on the recommendations of the main reference entities: the Ministry of Health, the Brazilian Society of Pediatrics, and the Brazilian Society of Immunizations. In the research, access to the digital version occurred through a smartphone provided by the researcher, with the material previously downloaded. For the printed version, a copy provided by the researcher was used. The booklets differed in format and level of interactivity: the printed version, on white paper, allowed browsing and reviewing specific sections without digital menus, while the digital version, accessed on electronic devices, offered images with better definition and easier navigation through search mechanisms. An mean reading and rereading time of 60 minutes was estimated, which was the same for both groups.

In the third stage (post-test), each participant was individually given a new printed self-completion form containing the same questions used in the pre-test, along with a clipboard and a blue pen. Participants in both groups had a mean of 15 minutes to freely mark their answers, and could choose alternatives different from those previously selected.

The three stages with the same individual took place on the same day, with an estimated mean time of 45 minutes for their completion, aiming to minimize the chances of bias in the research, such as seeking information from other people or on the internet, memory lapses, and to avoid the loss of participants, since they could be discharged from the hospital during the data collection process. During

the research stages, no space was provided for clarification of doubts, as the effectiveness of the educational technology was under evaluation. However, after the post-test was completed, any questions that arose regarding home care for the newborn were duly clarified by the researcher.

The collected data were tabulated in a Microsoft Excel spreadsheet and analyzed using the Statistical Package for the Social Sciences (SPSS) version 21.0. To ensure the accuracy and reliability of the information, the responses from the forms were double-entered. Descriptive statistics were used to calculate measures of central tendency, frequencies, and dispersion for the characterization variables. All pre-test and post-test responses were dichotomized into true and false, considering "I Don't Know" (DK) responses as false.

Considering that the data were categorical (correct and incorrect answers), McNemar's test was initially applied to compare the proportions of correct answers before and after the consultation in each group, corresponding to the printed and digital booklet modalities, analyzed separately. This approach allowed us to evaluate the effectiveness of each type of booklet based on the proportions of correct answers in the post-test in relation to the pre-test, identifying which modality resulted in a statistically higher proportion of correct answers. A general score was not generated from the form, but an item-by-item analysis was performed, with the aim of comparing the number of correct answers in the pre- and post-test for each type of booklet. The percentage variation was calculated from the difference between the percentages of correct answers in the post-test and in the pre-test, divided by the initial percentage and multiplied by 100.

Subsequently, the Chi-square test was used to compare the proportions of correct answers in the post-test between the two independent groups subjected to different interventions (printed or digital booklet). This comparison allowed us to identify whether there were statistically significant differences between the number of correct answers after using the different types of booklets. The significance level adopted was 5% ($p < 0.05$).

The study was approved by the Research Ethics Committee on December 19, 2023, through Opinion number 6,591,099 and Certificate of Presentation for Ethical Appraisal (CAAE) number 69357923.0.0000.5243.

Results

The study included 90 women (86.5%) and 14 men (13.5%). Regarding their relationship to the newborn, 76 (73.1%) were mothers, 13 (12.5%) fathers, seven (6.7%) aunts, six (5.8%) grandmothers, one (1.0%) uncle, and one (1.0%) sister. Participants' ages ranged from 18 to 65 years, with a mean of 28 years ($SD \pm 8.5$). Regarding education, participants had completed elementary education ($n = 15$; 14.6%), high school ($n = 63$; 61.2%), higher education ($n = 24$; 23.3%), and graduate studies ($n = 1$; 1.0%). One participant did not answer this question. Regarding occupation, 13 (12.5%) were homemakers, eight (7.7%) self-employed, five (4.8%) teachers, five (4.8%) unemployed, among other occupations.

Regarding the printed booklet, an increase in the total number of correct answers was noted after the use of educational technology. Of the total of 1,092 (100%) possible correct answers, 636 (58.2%) were correct in the pre-test and 777 (71.1%) were correct in the post-test, resulting in a percentage increase of 22.2% in correct answers. In the item-by-item analysis, it was observed that in 17 (80.9%) questions there was an increase in the number of correct answers, in two (9.5%) questions there was maintenance, and in two (9.5%) questions there was a reduction, as shown in Table 1.

Table 1 – Correct answers from family members regarding home care for newborns in the pre-test and post-test, according to the printed educational booklet. Rio das Ostras, RJ, Brazil, 2024 (n = 52)

Items	Number of correct answers			
	Pre-test	Post-test	p-value	Variation
	n(%)	n(%)	p*	%
1. The maternity ward discharge process refers only to the moment of leaving the hospital to go home.	14(26.9)	30(57.7)	0.002	114.3↑
2. Family support is fundamental during this adaptation period of the baby's arrival home, so it's important to always have someone nearby and not feel ashamed to ask family members for help when needed.	52(100)	52(100)	-	0.0=
3. When receiving visitors, before contact with the baby, it is important that they wash their hands with soap and water or use 70% alcohol to sanitize them.	51(98.1)	52(100)	1.000	2.0↑
4. Regarding the baby's sleep, it is important that during naps taken during the day the environment is as quiet and dark as possible so that he understands that it is time to sleep.	18(34.6)	30(57.7)	0.004	66.7↑
5. Pillows and stuffed animals should be avoided around the baby while he sleeps, as these objects are a suffocation risk.	44(84.6)	48(92.3)	0.219	9.1↑
6. A bath in a tub is the most recommended.	33(63.5)	43(82.7)	0.013	30.3↑
7. The newborn's bath should last between 8 and 15 minutes.	14(26.9)	29(55.8)	0.001	107.1↑
8. After bathing, it is important to care for the umbilical stump using 70% alcohol or 4% chlorhexidine to help with healing.	46(88.5)	50(96.2)	0.125	8.7↑
9. The use of coins is contraindicated, but umbilical bands can be used to prevent the navel from protruding.	19(36.5)	25(48.1)	0.180	31.6↑
10. Regarding diaper changes, it is important to use plenty of ointment to prevent diaper rash.	15(28.8)	31(59.6)	0.000	106.7↑
11. Ideally, avoid using baby wipes, reserving them for emergencies, such as when out and about. At home, it is preferable to wash the diaper area using warm water, cotton, and appropriate soap.	43(82.7)	46(88.5)	0.453	7.0↑
12. Sunbathing is great for treating jaundice (yellowing of the baby).	5(9.6)	25(48.1)	0.000	400.0↑
13. Regarding breastfeeding, you should wait at least one hour after birth to begin.	29(55.8)	28(53.8)	1.000	3.4↓
14. The use of pacifiers, the use of bottles, the duration of feedings, "poor latch," returning to work without expressing milk, among other things,	40(76.9)	43(82.7)	0.508	7.5↑

can cause early weaning.

15. After feeding, it is important to burp the baby, positioned upright with his head resting on his shoulders, in order to avoid reflux, which can cause choking.

49(94.2) 49(94.2) 1.000 0.0=

16. Signs of choking include a persistent cough and/or the presence of purple lips.

40(76.9) 46(88.5) **0.031** 15.0↑

17. It is important for the family to take the baby for walks whenever possible to help build antibodies.

12(23.1) 23(44.2) **0.019** 91.7↑

18. Regarding vaccination, parents should decide whether or not the baby should receive vaccines.

30(57.7) 32(61.5) 0.727 6.7↑

19. The vaccines that should be given immediately after birth are the BCG and the pentavalent vaccine.

6(11.5) 12(23.1) **0.031** 100.0↑

20. Some general danger signs for the baby include: not being able to breastfeed, vomiting everything they drink, and moving less than normal.

44(84.6) 43(82.7) 1.000 2.3↓

21. The first well-child visit should take place in the baby's first week of life, preferably between the 3rd and 5th day.

32(61.5) 40(76.9) 0.077 25.0↑

Notes: *McNemar test

↑ Positive percentage change between pre- and post-test (increase in the number of correct answers)

↓ Negative percentage change between pre- and post-test (decrease in the number of correct answers)

= No percentage change between pre- and post-test (maintenance of the number of correct answers)

Nine questions showed statistically significant differences between the pre-test and the post-test ($p < 0.05$), all with an increase in correct answers in the post-test. The five questions with the greatest increase were: baby skin care/sunbathing (from 9.6% to 48.1% — an increase of 400%), maternity discharge process (from 26.9% to 57.7% — an increase of 114.3%), baby bathing/bath duration (from 26.9% to 55.8% — an increase of 107.1%), diaper changing/use of ointment (from 28.8% to 59.6% — an increase of 106.7%), and baby sleep/daytime naps (from 34.6% to 57.7% — an increase of 66.7%).

Regarding the digital booklet, an increase in the total number of correct answers was also observed after the use of educational technology. In the pre-test, out of 1,092 (100%) possible correct answers, 641 (58.7%) were recorded, while in the post-test, 756 (69.2%) were recorded, resulting in a 17.9% increase in correct answers. Item-by-item analysis showed that 17 (80.9%) questions showed an increase in the number of correct answers, three (14.3%) questions maintained the same number of correct answers, and one (4.8%) question showed a decrease, as shown in Table 2.

Table 2 – Correct answers from family members regarding home care for full-term newborns in the pre-intervention and post-intervention tests of the digital educational booklet, Rio das Ostras, RJ, Brazil, 2024 (n=52)

Items	Number of correct answers			
	Pre-test	Post-test	p-value	Variation
	n(%)	n(%)	p*	n %
1. The maternity ward discharge process refers only to the moment of leaving the hospital to go home.	12(23.1)	25(48.1)	0.001	108.3↑
2. Family support is fundamental during this adaptation period of the baby's arrival home, so it's important to always have someone nearby and not feel ashamed to ask family members for help when needed.	52(100)	52(100)	-	0.0=
3. When receiving visitors, before contact with the baby, it is important that they wash their hands with soap and water or use 70% alcohol to sanitize them.	52(100)	52(100)	-	0.0=
4. Regarding the baby's sleep, it is important that during naps taken during the day the environment is as quiet and dark as possible so that he understands that it is time to sleep.	19(36.5)	29(55.8)	0.006	52.6↑
5. Pillows and stuffed animals should be avoided around the baby while he sleeps, as these objects are a suffocation risk.	49(94.2)	49(94.2)	1.000	0.0=
6. A bath in a tub is the most recommended.	34(65.4)	44(84.6)	0.021	29.4↑
7. The newborn's bath should last between 8 and 15 minutes.	12(23.1)	25(48.1)	0.004	108.3↑
8. After bathing, it is important to care for the umbilical stump using 70% alcohol or 4% chlorhexidine to help with healing.	46(88.5)	49(94.2)	0.453	6.5↑
9. The use of coins is contraindicated, but umbilical bands can be used to prevent the navel from protruding.	15(28.8)	18(34.6)	0.549	20.0↑
10. Regarding diaper changes, it is important to use plenty of ointment to prevent diaper rash.	22(42.3)	26(50.0)	0.344	18.2↑
11. Ideally, avoid using baby wipes, reserving them for emergencies, such as when out and about. At home, it is preferable to wash the diaper area using warm water, cotton, and appropriate soap.	45(86.5)	47(90.4)	0.625	4.4↑
12. Sunbathing is great for treating jaundice (yellowing of the baby).	3(5.8)	16(30.8)	0.000	433.3↑
13. Regarding breastfeeding, you should wait at least one hour after birth to begin.	25(48.1)	29(55.8)	0.344	16.0↑
14. The use of pacifiers, the use of bottles, the duration of feedings, "poor latch," returning to work without expressing milk, among other things, can cause early weaning.	36(69.2)	44(84.6)	0.039	22.2↑

15. After feeding, it is important to burp the baby, positioned upright with his head resting on his shoulders, in order to avoid reflux, which can cause choking.	50(96.2)	51(98.1)	1.000	2.0↑
16. Signs of choking include a persistent cough and/or the presence of purple lips.	39(75.0)	47(90.4)	0.021	20.5↑
17. It is important for the family to take the baby for walks whenever possible to help build antibodies.	18(34.6)	19(36.5)	1.000	5.6↑
18. Regarding vaccination, parents should decide whether or not the baby should receive vaccines.	36(69.2)	35(67.3)	1.000	2.8↓
19. The vaccines that should be given immediately after birth are the BCG and the pentavalent vaccine.	5(9.6)	10(19.2)	0.063	100.0↑
20. Some general danger signs for the baby include: not being able to breastfeed, vomiting everything they drink, and moving less than normal.	37(71.2)	46(88.5)	0.035	24.3↑
21. The first well-child visit should take place in the baby's first week of life, preferably between the 3 rd and 5 th day.	34(65.4)	43(82.7)	0.012	26.5↑

Notes: *McNemar test

↑ Positive percentage change between pre- and post-test (increase in the number of correct answers)

↓ Negative percentage change between pre- and post-test (decrease in the number of correct answers)

= No percentage change between pre- and post-test (maintenance of the number of correct answers)

Nine questions showed statistically significant differences between the pre-test and post-test ($p < 0.05$), all with an increase in correct answers. The five questions with the greatest increase were: baby skin care/sunbathing (from 5.8% to 30.8% — an increase of 433.3%), maternity discharge process (from 23.1% to 48.1% — an increase of 108.3%), baby bathing/bathing time (from 23.1% to 48.1% — an increase of 108.3%), vaccines to be administered after birth (from 9.6% to 19.2% — an increase of 100%), and baby sleep/daytime naps (from 36.5% to 55.8% — an increase of 52.6%). Table 3 compares the proportions of correct answers in the post-test between the two groups (printed booklet and digital booklet). The analysis revealed no statistically significant differences in responses between the two formats.

Table 3 – Comparison of post-test scores between the two groups (printed booklet and digital booklet). Rio das Ostras, RJ, Brazil, 2024 (n = 52)

Questions	Response options	Type of booklet		p-value
		Printed n(%)	Digital n(%)	
1. The maternity ward discharge process refers only to the moment of leaving the hospital to go home.	True	30(57.7)	25(48.1)	0.326
	False	22(42.3)	27(51.9)	
2. Family support is fundamental during this adaptation period of the baby's arrival home, so it's important to always have someone nearby and not feel ashamed to ask family members for help when needed.	True	52(100)	52(100)	-
	False	-	-	
3. When receiving visitors, before contact with the baby, it is important that they wash their hands with soap and water or use 70% alcohol to sanitize them.	True	52(100)	52(100)	-
	False	-	-	
4. Regarding the baby's sleep, it is important that during naps taken during the day the environment is as quiet and dark as possible so that he understands that it is time to sleep.	True	30(57.7)	29(55.8)	0.843
	False	22(42.3)	23(44.2)	
5. Pillows and stuffed animals should be avoided around the baby while he sleeps, as these objects are a suffocation risk.	True	48(92.3)	49(94.2)	0.696
	False	4(7.7)	3(5.8)	
6. A bath in a tub is the most recommended.	True	43(82.7)	44(84.6)	0.791
	False	9(17.3)	8(15.4)	
7. The newborn's bath should last between 8 and 15 minutes.	True	29(55.8)	25(48.1)	0.432
	False	23(44.2)	27(51.9)	
8. After bathing, it is important to care for the umbilical stump using 70% alcohol or 4% chlorhexidine to help with healing.	True	50(96.2)	49(94.2)	0.647
	False	2(3.8)	3(5.8)	
9. The use of coins is contraindicated, but umbilical bands can be used to prevent the navel from protruding.	True	25(48.1)	18(34.6)	0.163
	False	27(51.9)	34(65.4)	
10. Regarding diaper changes, it is important to use plenty of ointment to prevent diaper rash.	True	31(59.6)	26(50.0)	0.325
	False	21(40.4)	26(50.0)	
11. Ideally, avoid using baby wipes, reserving them for emergencies, such as when out and about. At home, it is preferable to wash the diaper area using warm water, cotton, and appropriate soap.	True	46(88.5)	47(90.4)	0.750
	False	6(11.5)	5(9.6)	
12. Sunbathing is great for treating jaundice (yellowing of the baby).	True	25(48.1)	16(30.8)	0.071
	False	27(51.9)	36(69.2)	
13. Regarding breastfeeding, you should wait at least one hour after birth to begin.	True	28(53.8)	29(55.8)	0.844
	False	24(46.2)	23(44.2)	
14. The use of pacifiers, the use of bottles, the duration	True	43(82.7)	44(84.6)	0.791

of feedings, "poor latch," returning to work without expressing milk, among other things, can cause early weaning.	False	9(17.3)	8(15.4)	0.308
15. After feeding, it is important to burp the baby, positioned upright with his head resting on his shoulders, in order to avoid reflux, which can cause choking.	True	49(94.2)	51(98.1)	
	False	3(5.8)	1(1.9)	0.750
16. Signs of choking include a persistent cough and/or the presence of purple lips.	True	46(88.5)	57(90.4)	
	False	6(11.5)	5(9.6)	0.424
17. It is important for the family to take the baby for walks whenever possible to help build antibodies.	True	23(44.2)	19(36.5)	
	False	29(55.8)	33(63.5)	0.539
18. Regarding vaccination, parents should decide whether or not the baby should receive vaccines.	True	32(61.5)	35(67.3)	
	False	20(38.5)	17(32.7)	0.631
19. The vaccines that should be given immediately after birth are the BCG and the pentavalent vaccine.	True	12(23.1)	10(19.2)	
	False	40(76.9)	42(80.8)	0.402
20. Some general danger signs for the baby include: not being able to breastfeed, vomiting everything they drink, and moving less than normal.	True	43(82.7)	46(88.5)	
	False	9(17.3)	6(11.5)	0.464
21. The first well-child visit should take place in the baby's first week of life, preferably between the 3 rd and 5 th day.	True	40(76.9)	43(82.7)	
	False	12(23.1)	9(17.3)	

Notes: *Chi-square test

Discussion

The booklet "Home Care for Newborns" proved to be effective, regardless of format, in improving family members' knowledge about home care for newborns. The findings of this study are consistent with those of a study conducted in Northern Ceará, which evaluated the effectiveness of a printed booklet in increasing knowledge about fall prevention among hospitalized patients. The data collection instrument included 12 questions on fall prevention, nine of which showed statistical significance by demonstrating an increase in correct answers after the intervention, confirming the effectiveness of the printed material.¹²

On the other hand, the internet, as a widely accessible source of information, enables quick and practical access to content without temporal or geographical barriers, making it a valuable resource in health promotion. Social media, in particular, has shown potential in the teaching-learning process and in promoting new forms of educational interaction,¹³ such as digital booklets. However, despite the potential benefits of technology in this format, this

study did not identify statistically significant differences between the digital and printed versions in increasing participants' knowledge. The results indicate that the choice of format may be guided by the profile and preferences of the target audience, including their level of familiarity with and access to digital technologies.

The results corroborate those of another study conducted in Fortaleza, which compared the effects of digital and printed versions of an educational booklet on ocular self-examination. Both modalities were effective in ocular self-examination for identifying visual changes and structural abnormalities, except for the pupillary reflex, in which the digital version showed greater effectiveness.¹⁰ On other hand, a meta-analysis on paper reading versus digital reading among students and healthcare professionals found an advantage for paper reading, although this difference was not statistically significant. These findings reinforce the need for further studies to evaluate the best strategies for improving knowledge among target audiences.¹⁴

The limitations imposed by digital inequalities, especially in regions with restricted internet access or low digital literacy, indicate that printed materials may be an efficient means of disseminating information. In this sense, integrating printed and digital methods may increase the impact of educational interventions, ensuring that guidance reaches a more diverse audience. Thus, considering that both versions of the booklet proved effective, users' preferences become an important factor to be considered when offering educational technology.

Other innovative formats for improving target audience knowledge should also be considered. For example, a study on the education of medical and nursing residents in cardiac anatomy and physiology used three-dimensional (3D) technologies, including digital and printed models, digital reality (DR), augmented reality (AR), and mixed reality (MR). Unlike the results of this study, digital reality stood out among professionals as the preferred modality, highlighting the relevance of comparative studies to evaluate the feasibility and pedagogical impact of these technologies.¹⁵

A study conducted in Slovakia addressed the creation of a website with educational content aimed at mothers and family members of infants. The results indicated that visitors showed interest in the platform and used it to clarify doubts, especially regarding breastfeeding and newborn and infant care,¹⁶ which reinforces the

relevance of educational materials also being made available in digital formats.

In Brazil, a study aimed to develop and validate a booklet on home care for preterm newborns, highlighting that the validation of educational technologies, such as booklets, manuals, videos, and games, has been widely used to improve health education and enhance teaching-learning strategies.¹⁷ Unlike these experiences, the present study advanced by including not only content validation but also the evaluation of the effectiveness of the educational material in two distinct modalities (printed and digital), thus contributing evidence regarding the impact of the booklet on participants' knowledge.

Nursing practice should therefore consider family dynamics as a fundamental element in health education focused on newborn care, including the choice of educational material modality. Evidence indicates that clear, accessible, and contextualized guidance favors healthy infant development, consolidating health education as an essential strategy for safe care. From this perspective, another investigation demonstrated that the use of an educational package also resulted in a significant improvement in mothers' knowledge about neonatal disorders, with a marked increase in post-test scores compared to pre-test scores,¹⁸ reinforcing the importance of studies of this nature.

Similarly, another study evaluated the effect of an educational video on newborn care applied to pregnant women, postpartum women, and family members, and found an increase in the frequency of correct answers, rising from 70.82% to 92.97% after the intervention. Thus, the video proved effective in participants' knowledge acquisition and may constitute a valuable resource in educational actions conducted by nurses.¹⁹

Furthermore, a quasi-experimental study found that education on exclusive breastfeeding through audiovisual media and booklets had a positive impact on both mothers' knowledge and attitudes regarding exclusive breastfeeding practices.²⁰ All this evidence reinforces the importance of using different modalities of educational materials in health education with families of newborns. Therefore, educational technologies, including booklets adaptable to the family context in printed or digital formats, are promising tools for promoting safer and more effective newborn care.⁸

One limitation of the study concerns the sample. The absence of randomization may have introduced some bias in the comparison between pre- and post-intervention moments. Furthermore, future studies with more robust methodological designs, such as randomized

controlled trials and evaluations at multiple time points, are recommended to deepen understanding of the effectiveness of the educational booklet in its different modalities.

It is therefore emphasized that this technology, in its different modalities, can contribute significantly to reducing preventable risks during the neonatal period and, consequently, infant morbidity and mortality. The choice of format may be guided by users' preferences and the resources available within the community.

Conclusion

The findings of this study indicated that both the printed and digital versions of the educational booklet "Home Care for the Newborn" are similarly effective in expanding the knowledge of family caregivers about home care for newborns.

Thus, this educational technology proves to be a valuable tool in the teaching-learning process, contributing to the promotion of safer care for the baby and the family, by ensuring the dissemination of essential information in an accessible and understandable way. The digital version of the booklet is available at <https://www.dopartoadomicilio.com.br/cartilhas-educativas>.

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