

ORIGINAL ARTICLE

Effectiveness of the “Nasci Bem” mobile application on the knowledge of health professionals and family members of newborns

HIGHLIGHTS

1. The “Nasci Bem” application improved users’ knowledge.
2. The application is an innovative and accessible educational technology.
3. It is a tool without physical or temporal restrictions.
4. The technology can empower professionals and family members.

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ABSTRACT

Objective: To evaluate the effectiveness of the “Nasci Bem” mobile application in improving the knowledge of health professionals and family members about humanized practices in newborn care in the maternity ward. **Method:** Quasi-experimental, single-group study conducted in a municipal hospital in the state of Rio de Janeiro, Brazil, from December/2024 to July/2025. The participants were health professionals and family members of newborns. The research comprised three stages: pretest, intervention, and posttest. The McNemar test was applied ($p < 0.05$). **Results:** The study comprised 79 people, most of them women ($n = 71/89.9\%$). The total number of correct answers was 42.8% in the pretest and 64.3% in the posttest, an increase of 21.5 percentage points. In nine questions there was an increase in the number of correct answers, and in seven this increase was statistically significant. **Conclusion:** The application improved the knowledge of the end users of the educational technology about humanized practices in newborn care in the maternity ward.

DESCRIPTORS: Mobile Applications; Evaluation Study; Health Education; Infant, Newborn; Parturition.

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INTRODUCTION

The United Nations, through the Sustainable Development Goals (SDGs), established targets aimed at promoting maternal and child health and well-being, to be implemented by member states by 2030. Among these targets, SDG 3, focused on health and well-being, stands out, encompassing subitems 3.1 and 3.2, aimed at reducing maternal and neonatal mortality¹.

In Brazil, to strengthen care for the mother–child dyad, expand the coverage and quality of prenatal care, and improve childbirth and birth care, the Program for the Humanization of Prenatal Care and Birth was established. In this context, childbirth is understood not only as a clinical procedure, but as a profoundly human event that demands care, welcoming, and respect for the needs of the mother and the newborn². Thus, obstetric and neonatal care has been undergoing important transformations in the care model, including reflections and questions about professional practices traditionally established in the context of childbirth, which involves biological, social, cultural, and emotional dimensions³.

To reduce unnecessary professional interventions during labor, the World Health Organization (WHO) established guidelines that seek to standardize care for pregnant women. These recommendations advocate that, in usual-risk scenarios, there should be no interference by the medical or nursing team to accelerate labor, and that each woman's own timing should be respected and she should be included in decisions about the care she will receive, even when interventions are necessary⁴.

For the newborn, the humanized practices recommended by the WHO—including early skin-to-skin contact, breastfeeding within the first hour of life, timely umbilical cord clamping, and the presence of a companion in the delivery room—represent essential strategies for promoting health, family bonding, and neonatal well-being. However, such practices are still not consistently implemented in Brazilian maternity hospitals^{2,5}.

Undergoing fewer invasive interventions, being born by vaginal delivery, and presenting good vitality favor early skin-to-skin contact and early breastfeeding in the delivery room, and also increase the chances of immediate admission to rooming-in. The application of these humanized practices is essential to respecting the physiology of birth⁵. However, despite the recognized benefits and the health policies aimed at the newborn, often dispensable immediate interventions, such as airway suctioning and the use of inhaled oxygen, continue to predominate, overriding humanized practices^{6,2}.

With an overall cesarean rate of 57%, Brazil ranked second worldwide in 2019. This rate was higher when the private sector was considered alone⁷. Evidence indicates that cesarean section can hinder the performance of good practices, although humanized care should be guaranteed to all newborns, regardless of the type of delivery, prioritizing the prevention of neonatal and puerperal risks^{8,6}.

It is essential that managers and professionals directly involved in care create or strengthen institutional policies and practices that encourage the adoption of good conduct, keeping the multiprofessional team up to date on the scientific evidence that promotes positive birth experiences and reduces inappropriate interventions². Likewise, it is essential that the family knows and supports humanized practices, actively participating in the childbirth process to ensure a safe and satisfactory experience. In this sense, educational health technologies emerge as allies, as they favor professional improvement and the integration of the patient into the educational process⁹.

Among these technologies, mobile applications stand out for their versatility, allowing access to multimedia content, such as texts, images, videos, and podcasts, on devices such as computers, tablets, and smartphones, enhancing the rapid and effective dissemination of health information¹⁰. Considering these benefits, in 2023 the “Nasci Bem” mobile application was developed and validated for content, appearance,

and usability, focused on humanized practices in newborn care in the maternity ward and aimed at both health professionals and family members. The technological product achieved excellent scores in this process¹¹.

Despite its validation as an educational technology, a significant gap remained: to verify whether the application effectively increased the target audience's knowledge about the topic. Identifying this effectiveness is essential to improving its application, ensuring that the technology fulfills its educational role¹². The application has the potential to reduce the adoption of inappropriate practices, encourage correct conduct, and motivate family members, based on technical and scientific recommendations, promoting knowledge, autonomy, safety, and empowerment in care, which reinforces the relevance of this research.

Therefore, this study aimed to evaluate the effectiveness of the "Nasci Bem" mobile application in improving the knowledge of health professionals and family members about humanized practices in newborn care in the maternity ward.

METHOD

Quasi-experimental, single-group study with a quantitative approach to evaluate the effectiveness of a mobile-device application. The guidelines of the SQUIRE 2.0 tool (Revised Standards for Quality Improvement Reporting Excellence)¹³ were used to guide the research report. Data collection was carried out between December 2024 and July 2025, in the rooming-in unit of a municipal hospital in the coastal lowland region of the state of Rio de Janeiro, Brazil. As the only public reference maternity hospital, it serves low- and medium-risk parturient women who live in the municipality and neighboring cities.

The population consisted of health professionals, pregnant women, postpartum women, and other family members of newborns. For the sample calculation, the monthly average of live births in the municipality of Rio das Ostras in 2023 was considered, corresponding to 144.25 births, as it approximately represents the universe of births in the investigated setting, since the institution is the only public maternity hospital in the municipality and concentrates most of the deliveries performed in the city. Thus, the number of live births was used as a reference parameter to size the people potentially involved in the birth process and exposed to the guidance addressed in the application.

Therefore, a sample calculation for finite populations was performed using the formula: $(Z^2 \cdot p(1 - p) / e^2) / 1 + (Z^2 \cdot p(1 - p) / e^2 \cdot N)$. A Z score of $Z=1.645$ (90.0% confidence interval), $p=0.5$ (more homogeneous population distribution), $e=0.05$ (5.0% margin of error), and $N=144$ (monthly average of live births) were used, yielding a minimum sample of 79 participants.

The inclusion criteria were: health professionals who worked in the delivery room, and pregnant women and/or postpartum women and/or caregiving family members aged 18 years or older whose newborns admitted in the research setting presented favorable health conditions. The following were not included: health professionals who were nursing assistants, who worked only in administrative activities and did not provide care to the mother–baby dyad; and pregnant women, postpartum women, or family members who had any change in their health condition that hindered participation in the research and/or were illiterate.

The investigation comprised three stages (pretest, intervention, and posttest). Data collection began only after the study had been approved by the Research Ethics Committee. Potential participants were contacted in person, considering the ease of frequently finding them in the study environment. Thus, the invitation to participate

in the research was made by the nursing student, under the supervision of the faculty advisor, with no withdrawals during data collection.

In the first stage (pretest), the collection instrument was a printed self-administered form, developed by the researchers themselves for use in this study, since the statements prepared had to be directly related to the content addressed in the application and applicable to both the health professionals and the participating family members. The instrument was organized into two parts, the first consisting of closed-ended questions to characterize the participants: age, sex, education, and occupation; and whether they were participating in the research as a health professional or as a family member of a newborn. If they were health professionals, they were asked about their length of experience in delivery rooms; if they were family members, they were asked about their degree of kinship with the baby. The second part contained questions about the application's theme to assess the participants' knowledge before the intervention. The form had 10 statements for participants to mark as True (T), False (F), or Do Not Know (DK).

In the second stage (intervention), the latest version of the application was made available on a cell phone provided by the researchers. Figure 1 presents the interfaces (main menu; available tabs; professional booklet and family booklet; and quiz) of the "Nasci Bem" application.



Figure 1. Screenshots of the "Nasci Bem" application. Rio de Janeiro, RJ, Brazil, 2025
Source: The authors (2025).

When opening the "Nasci Bem" application, users are presented with an introduction to the technology, followed by a choice between two access options: "Health Professional" or "Family Member of a Newborn." Both options provide three tabs: "Booklet," "Quiz," and "About Us," but the content is adapted according to the user's profile. The "Booklet" tab offers relevant information about humanized practices in newborn care in the maternity ward, while the "Quiz" tab allows users to assess their knowledge through 10 questions with true or false answers, accompanied by detailed explanations. In this stage, participants used the application, with an estimated average duration of 20 minutes.

In the third stage (posttest), participants completed a printed self-administered form, composed of the same questions applied in the first stage, with the possibility of modifying the answers previously given in the pretest. The three stages with each individual took place on the same day, with an estimated average time of 45 minutes to complete them, avoiding the loss of participants, especially in cases where the family

was discharged from the hospital during data collection. The researcher accompanied all stages of the study in order to reduce possible biases, such as consulting other people or external sources. During data collection, participants could not ask questions, thus ensuring an impartial evaluation of the educational technology. However, after completing the posttest, all questions related to the topic were duly clarified by the researcher.

The data collection instrument was previously submitted to a pilot test with ten participants, including health professionals and family members of newborns. These participants were incorporated into the final sample for data analysis, since the instrument proved adequate and no adjustments to its structure were necessary.

The data obtained were organized in Microsoft Excel spreadsheets and analyzed using the Statistical Package for the Social Sciences (SPSS) statistical software, version 21.0. The form responses were entered twice independently by study collaborators, which allowed discrepancies found during data entry to be discussed with a third collaborator, ensuring that all responses were consistent and minimizing errors. Descriptive statistics were used to calculate measures of central tendency, frequencies, and dispersion of the characterization variables.

The test responses were classified as correct or incorrect, with the "Do Not Know" options considered incorrect. As these were categorical data, the McNemar test was applied to compare the proportions of correct answers before and after the intervention, verifying the change of category resulting from the participants' exposure to the technological product. A significance level of $p < 0.05$ was adopted. Thus, the effectiveness of the mobile application was evaluated by comparing the proportions of correct answers between the pretest and posttest, identifying in which stage the results were statistically superior. The analysis was conducted overall and also by question, allowing performance to be compared between the two test moments.

The research was approved by the Research Ethics Committee of the Universidade Federal Fluminense (Opinion No. 7,199,493), meeting the premises of Resolution No. 466/2012 of the National Health Council.

RESULTS

The study included the participation of 79 (100%) people, whose mean age was 28.75 years ($SD=7.119$), ranging from 18 to 47 years. Most participants were female, totaling 71 (89.9%) people. Regarding education, 49 (62.0%) participants had completed secondary education, 21 (26.6%) had higher education, and seven (8.9%) had primary education. Two people chose not to answer this question.

Regarding the participants' characteristics, 67 (84.8%) were family members of newborns, while 12 (15.2%) were health professionals. Among the family members, 52 (65.8%) were mothers, seven (8.9%) were fathers, and two (2.5%) were aunts, among other degrees of kinship. Among the occupations listed, 16 (20.3%) were homemakers, five (6.3%) were teachers, three (3.8%) were cashiers, three (3.8%) were sales clerks, in addition to other occupations. Sixteen people preferred not to answer this question. In the category of professionals, 10 (12.7%) were nurses, one (1.3%) was a physician, and one (1.3%) was a nursing technician. Regarding length of experience in delivery rooms, it ranged from one to 25 years, with a mean of 5.3 years ($SD=6.510$).

The total number of possible correct answers was 790, considering 10 questions for each of the 79 participants. Before the intervention, the total number of correct answers was 338. After the intervention, the total number of correct answers increased to 507. This change represents an increase of 21.5 percentage points in the rate

of correct answers, rising from 42.8% in the pretest to 64.3% in the posttest. This growth represents a relative improvement of approximately 50.3% in the participants' performance.

The individual analysis of the 10 questions (n=79) revealed that the number of correct answers increased in nine questions and decreased in only one. The four questions with the greatest increase were: question 5 (from 27.8% to 74.7% – a 168.7% increase), question 8 (from 16.5% to 40.5% – a 145.5% increase), question 9 (from 26.6% to 60.8% – a 128.6% increase), and question 10 (from 17.7% to 67.1% – a 279.1% increase). This last question, which addressed the prophylaxis of ophthalmia neonatorum, had the greatest relative increase between the pretest and the posttest. In addition, only question 6 showed a slight decrease (from 72.2% to 70.9% – a 1.8% reduction).

The statistical analysis, using the McNemar test, showed that most questions (seven questions) had a statistically significant increase in correct answers after the intervention. Only one question showed a reduction in the number of correct answers, without statistical significance. These results suggest that the application was effective in expanding the participants' knowledge. Table 1 presents the number of correct answers of the participants before and after the intervention mediated by the "Nasci Bem" application.

Items	Correct answers				
	Pretest		Posttest		p-value
	n	%	n	%	p*
1. The main good practices with the newborn in the delivery room are airway suctioning and the use of inhaled oxygen.	19	24.1%	28	35.4%	0.049
2. For the baby to be considered to have good vitality, it must have been born at 37 weeks of gestation or more, be breathing and/or crying, and be moving its arms and legs.	60	75.9%	69	87.3%	0.022
3. It makes no difference whether breastfeeding is started within the first hour of life or later. What matters is to breastfeed!	50	63.3%	56	70.9%	0.286
4. As soon as the baby is born, do the health professionals need to cut the umbilical cord?	29	36.7%	42	53.2%	0.002
5. The number of cesarean sections is still very high in our country, and this type of delivery hinders the performance of good practices with the newborn.	22	27.8%	59	74.7%	0.000
6. Does the baby born by cesarean delivery need the same care after birth as the baby born by vaginal delivery?	57	72.2%	56	70.9%	1.000
7. Some actions that can be postponed until after skin-to-skin contact and breastfeeding within the first hour of life are: care such as physical examination, blood collection, and vaccination.	53	67.1%	64	81.0%	0.027
8. Gastric suctioning of the baby in the delivery room is no longer recommended in any situation.	13	16.5%	32	40.5%	0.002
9. It is not necessary to give the baby a vitamin K injection at birth.	21	26.6%	48	60.8%	0.000
10. It is necessary to put a medication in the baby's eye in the delivery room to prevent a disease called ophthalmia neonatorum.	14	17.7%	53	67.1%	0.000

Source: The authors (2025).

Among the health professionals, the total number of correct answers rose from 85 in the pretest to 107 in the posttest, considering a possible total of 120 correct answers. This change represents an increase of 18.3 percentage points in the rate of correct answers, rising from 70.8% in the pretest to 89.2% in the posttest. This growth corresponds to a relative improvement of approximately 25.9% in the professionals' performance after the educational intervention.

Among the family members of newborns, the total number of correct answers increased from 253 to 400, considering a possible total of 670 correct answers. This change represents an increase of 21.9 percentage points in the rate of correct answers, rising from 37.8% in the pretest to 59.7% in the posttest. This growth corresponds to a relative improvement of approximately 58.0% in the family members' performance after the educational intervention.

DISCUSSION

The use of the "Nasci Bem" application significantly demonstrated the improvement of participants' knowledge about humanized practices in newborn care in the maternity ward. The technology was built with the aim of reaching different target audiences, thus democratizing scientific knowledge and making it more acceptable and effective.

Mobile applications today therefore constitute important collaborative tools in the innovative and informative teaching-learning process¹⁴. These technologies, widely used in prevention, treatment, and rehabilitation actions, can modify health-related behaviors and improve individuals' quality of life¹⁵.

Worldwide, the number of smartphone users grew from 2016 to 2023, rising from 3.57 billion to 6.71 billion¹⁶. In parallel, the rapid dissemination of applications has favored the democratization of information, making these technologies valuable resources for health consultation¹⁷. Therefore, evaluating the effectiveness of the application in promoting knowledge among its users was essential, which was successfully achieved in the current study.

As mobile health technologies (mHealth) emerge and become present in various contexts of daily life and in health settings, it becomes essential to further explore their potential to sustain and improve local and global health outcomes. Among these technologies are smartphone applications¹⁸, such as "Nasci Bem."

Thus, due to their ubiquity, mobile applications must undergo rigorous evaluations for quality control of the material created and its effectiveness for the target audience. In this way, studies evaluating the effectiveness of educational technologies, such as the current one, are of great importance to investigate whether the objective proposed by the technological product is being met.

Other studies have also evaluated the effectiveness of applications on users' knowledge, such as research conducted with 196 health students in the state of Piauí, Brazil. The university students underwent a pretest, an educational intervention using the "educ@aids" application for 15 days, and a posttest. It was concluded that the application had a positive effect on the students' knowledge about the HIV virus, showing statistically significant changes in topics related to HIV transmission, drug treatment, and prevention measures, raising the users' level of knowledge from medium to high¹⁹. Similarly, "Nasci Bem" promoted an improvement in knowledge both among health professionals and among family members of newborns, even with a short usage time.

A randomized controlled pilot study from the United Kingdom evaluated the effectiveness of the "Flo" mobile application for sexual and reproductive health education in 438 participants divided into two groups, one focused on the menstrual cycle and

the other on premenstrual tension symptoms. The research lasted three months, and the intervention group showed satisfactory results, obtaining a higher menstrual health education score compared to the control group, demonstrating the positive effect of educational health technologies on individuals²⁰. Thus, like the present study, the use of mobile applications as an educational strategy proves to be an excellent ally in disseminating reliable information with the potential to impact users' lives.

A Brazilian mixed-methods study conducted in Rio de Janeiro evaluated the "Descomplicando a Amamentação" application with 15 family members of premature babies, showing that the application favored learning about the practice of breastfeeding through objective guidance and visual resources²¹.

Furthermore, a quasi-experimental study in the Brazilian Northeast evaluated the "E-MunDiabetes®" application with 40 nursing students, showing a statistically significant increase in knowledge about diabetes during the COVID-19 pandemic. In addition, the self-assessment and technology satisfaction items showed high agreement among the students²².

The results corroborate the present investigation, reinforcing the potential of "Nasci Bem" as an effective educational tool for family members and health professionals. Therefore, the application has the potential to be incorporated into prenatal care and maternity hospitals, especially in the context of the Unified Health System (SUS), and can be used in health education and continuing education actions, contributing to the dissemination of good practices in neonatal care.

Among the questions evaluated, the one with the greatest relative increase concerned the prophylaxis of ophthalmia neonatorum. It is estimated that this condition annually causes blindness in more than 10,000 newborns globally²³. As it is an aggravating factor for newborn health, professionals need to be up to date on the new scientific evidence surrounding this topic to ensure the quality of care. In addition, family members need to be made aware of this practice to ensure that the newborn's rights are being fulfilled. Thus, "Nasci Bem," based on the best available scientific evidence, constitutes a safe and reliable tool that can be used both for professional updating and for guiding and preparing families.

The humanization of labor and birth is currently a highly relevant topic, reinforced by the establishment of humanized care as a principle within the Unified Health System, in accordance with Law No. 15,126/2025²⁴. Childbirth should be understood as a physiological event, generally free of complications for the mother-baby dyad, and should take place in a safe environment, centered on the pregnant woman and based on scientific evidence and human rights principles. However, in recent decades, an increase in unnecessary interventions has been observed, which has resulted in a reduction of women's protagonism during this process²⁵.

In this context, health professionals should promote the humanization of labor and birth, and may draw on the information provided by the "Nasci Bem" application. In parallel, families play an essential role: by equipping themselves with this information, they become able to claim their rights in a conscious and informed manner, contributing to a safer and more respectful experience.

The present study has limitations inherent to the single-group quasi-experimental design, without a control group, which restricts the ability to establish causality and to differentiate the effect of the application from external factors. The sample was obtained from a single institution and had unequal representation between health professionals and family members, which limits the generalization of the results. Furthermore, the instrument used was previously submitted to a pilot test for adequacy of comprehension and applicability, but it did not undergo a formal process of psychometric validation, representing another methodological limitation.

The intervention occurred at a single time point, with an average duration of 45 minutes, and the short interval between the pretest and the posttest makes it impossible to assess knowledge retention and the maintenance of learning over time. These limitations reinforce the need for future studies with control groups, validated instruments, more diverse samples, and longitudinal follow-up, in order to confirm the effectiveness of the application and to assess the sustainability of the acquired knowledge over time.

The “Nasci Bem” application presents itself as a practical and objective tool for acquiring information about humanized practices for the newborn in the maternity ward, for both professionals and family members. As an educational technology, it has the potential to make professional practice safer and more humanized, while strengthening the family’s role in newborn care. In addition, since it does not present physical or temporal barriers, it demonstrates high dissemination potential, favoring the sharing of reliable and evidence-based information.

CONCLUSION

The findings of this study demonstrate that the “Nasci Bem” application improved the knowledge of the mobile application’s users about humanized practices in newborn care in the maternity ward.

The application proved to be an innovative educational technology, with the potential to positively contribute to professional practices, ensuring quality and safety in care. In addition, it empowers families by providing them with knowledge and autonomy to act for the benefit of the newborn’s health.

Thus, the application proves relevant for its accessibility, robustness, and objectivity, presenting itself as a tool without physical or temporal restrictions, capable of expanding the dissemination of reliable and evidence-based information.

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