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## HUG Your Baby: Preparing Nurse Practitioner Students to Support Breastfeeding

Malinda S. Teague, Kathryn J. Trotter

## A B S T R A C T

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Breastfeeding is known to have numerous benefits for both mothers and infants. Although the United States reports high breastfeeding initiation rates after birth, the rates of continuation are quite low at both 6 and 12 months. Breastfeeding support in the health care setting is shown to improve the duration and exclusivity of breastfeeding, yet clinicians do not receive adequate training to provide this support to patients and families. By adding the HUG (Help, Understanding, Guidance) Your Baby virtual breastfeeding education program into our women's health and pediatric nurse practitioner courses, students showed significant gains in knowledge and confidence of breastfeeding support regardless of past personal or professional experience.

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Breastfeeding is often perceived as easy for mothers and infants because it is the “natural” way of feeding during infancy. However, many mother-infant dyads struggle with issues of supply and demand, proper and effective latch, and mutual communication in the form of infant feeding cues. Lactation consultants provide valuable assistance but are not always readily available or accessible to breastfeeding families. Health care providers offering breastfeeding support in the primary care setting can help improve access to this needed care and foster parents and infants to grow and thrive together.

The numerous benefits of breastfeeding for mothers and children are well-documented. Mothers who breastfeed have a reduced bleeding and infection risk, a quicker return to prepregnancy weight, and an improved glucose metabolism and lipid profile. Evidence for long-term benefits of prolonged breastfeeding includes a lower risk of endometrial, breast, and ovarian cancer and a lower risk of osteoporosis.<sup>1</sup> Breastfeeding is linked to a reduced risk of illness and severity of illness in children including gastrointestinal, respiratory, and ear infections; necrotizing enterocolitis; and early allergic disease.<sup>2,3</sup> The American Academy of Pediatrics (AAP) and the National Association of Pediatric Nurse Practitioners (NAPNAP) recommend exclusive breastfeeding for the first 6 months of life and support continuation through at least 1 year, citing essential neurodevelopmental benefits and the promotion of health across the life span.<sup>3,4</sup> Although the United States reports a high initiation rate after birth, for infants born in 2018, the rate of exclusive breastfeeding at 6 months was only 25.8%, and the rate of any breastfeeding at 1 year was just 35%.<sup>5</sup> Healthy People 2030 lists a priority to “Improve the health and safety of infants” and lists a

target rate of 42.4% exclusively breastfeeding at 6 months and 54.1% breastfeeding at 1 year.<sup>6</sup>

The Baby-Friendly Hospital Initiative was established in response to declining breastfeeding initiation rates, partly attributed to a lack of support by health care providers.<sup>7</sup> The Academy of Breastfeeding Medicine also added recent guidelines to support in-hospital breastfeeding, chest feeding, and human milk feeding practices.<sup>8</sup> Lactation counselors are now active in healthy baby-aligned hospitals but are more difficult to access after discharge home. Nurse practitioners (NPs) and other health care providers play a key role in supporting the establishment of successful breastfeeding in the prenatal and newborn periods. Outpatient health care support throughout the first year of life can also improve breastfeeding duration.

With the need for NPs and other health care providers to better support breastfeeding mothers and infants comes the need for increased education on the skills to provide this care. The evidence is clear on the benefits of breastfeeding for both mothers and infants, and breastfeeding support in the health care setting is shown to improve the duration and exclusivity of breastfeeding.<sup>9-11</sup> The AAP, NAPNAP, and the surgeon general recommend incorporating breastfeeding support into the routine primary care of infants, with the surgeon general additionally calling for intentional prenatal, antenatal, and postpartum education on breastfeeding by health care providers caring for women.<sup>2,4,12</sup> The NAPNAP recommends that “comprehensive, evidence-based, and culturally sensitive educational and clinical experiences in lactation and breastfeeding be included in all educational programs that prepare pediatric health care providers.”<sup>4(pA12)</sup> The American College of Nurse-

**Table 1**  
Total Scores Pre- and Post Completion by Type and Combined

Variable	PNP <sup>a</sup> (n = 64)		WHNP <sup>a</sup> (n = 45)		Combined <sup>a</sup> (N = 109)	
	Pre	Post	Pre	Post	Pre	Post
Total score (mean ± standard deviation)	39.53 ± 6.02	56.25 ± 4.95	40.71 ± 7.02	57.67 ± 4.59	40.02 ± 6.45	56.83 ± 4.84

<sup>a</sup> A statistically significant difference pre- versus post completion ( $P < .001$ ). The possible score range is 0 to 62, with higher scores indicating more knowledge and confidence.

Midwives recommends the provision of evidence-based and continual support for breastfeeding with comprehensive breastfeeding education for health care providers as well.<sup>13</sup> The AAP and the surgeon general also acknowledge that health care providers do not receive adequate training to provide this support and are advocating for educational efforts to address this need.<sup>2,12</sup> The Academy of Breastfeeding Medicine<sup>14</sup> was formed to encourage teaching and supporting physician knowledge and comfort with lactation support and upholds the following position statement:

Breastfeeding and human lactation warrant serious, increased, and significant attention in medical training, practice, and research, given the substantial and longitudinal impact of breastfeeding on maternal, child, and societal health, as well as the influence healthcare policies and practices have on women's breastfeeding decisions and success in achieving their goals.<sup>15(p407)</sup>

The lack of sufficient education for physicians to provide breastfeeding support and guidance is well-documented in the medical literature.<sup>14</sup> There is minimal literature on lactation and breastfeeding education in midwifery programs, with recent graduates reporting inadequate training on breastfeeding support.<sup>16</sup> A survey of 36 pediatric nurse practitioner (PNP) programs across the US illustrated inconsistent breastfeeding content in PNP curricula.<sup>17</sup> A study of family NP programs revealed faculty concerns about how to include appropriate content in their curricula.<sup>18</sup>

Our own women's health NP program included breastfeeding case studies and hands-on lactation support cases, whereas our pediatric primary care NP program included online learning modules on infant feeding, nutrition, and basic breastfeeding, with hands-on case scenarios as well. Considering the importance of breastfeeding support in primary care, the program felt strongly that this was not enough and proceeded with a goal to better prepare our NP students by facilitating learning and increased confidence in caring for the mother-infant dyad.

## Teaching Plan

The HUG (Help, Understanding, Guidance) Your Baby program is a breastfeeding support program for young families. Pioneered in 2010 by an NP, it is built on the principles and science of infant development, breastfeeding basics, and the role of parents in reading newborn cues. The program has five 30-minute video modules for learners to build knowledge and confidence about nursing support. It has demonstrated significant enhancements in the knowledge, skills, and confidence of health care professionals worldwide but has been underutilized by nursing programs.<sup>19</sup> This gap is significant because the vast majority of lactation consultation and maternal support is provided by the nursing and advanced

practice nursing workforce. Peer-reviewed studies demonstrate it benefits childbirth and doula education; community maternal outreach; and lactation specialists' services at the Special Supplemental Nutrition Program for Women, Infants, and Children,<sup>20</sup> along with increasing maternal confidence and decreasing maternal stress.<sup>21</sup> A similar study with undergraduate nursing students concluded that taking the 2-hour HUG Your Baby digital course increased students' knowledge of infant behavior and strengthened their confidence to teach parents about breastfeeding.<sup>22</sup> Applying this virtual program to NP education for those who will care for mothers and infants seemed a feasible and effective way to address a system-wide educational gap and improve patient and family care.

We chose this intervention for our women's health nurse practitioner (WHNP) and PNP students in their second year of coursework, when they are active in clinical rotations and have the most opportunity to use and share this knowledge and gain confidence in this skill set. Exposing students to more targeted breastfeeding support, which they can then share with breastfeeding families in their clinical settings, seemed logical and important for impacting breastfeeding outcomes.

## Methods

During the second and final year of NP coursework, students engage in their population-specific didactic courses and the accompanying precepted clinical hours. The courses are delivered in a hybrid format with online learning modules and on-campus intensives. At the beginning of the second semester, women's health students navigate their postpartum content, whereas pediatric students work through the care of premature and preterm infants, having covered general infant and pediatric development, feeding, and nutrition in the previous semester.

The virtual HUG Your Baby educational program includes pre-completion and postcompletion assessments to be used along with the 5 video-based learning modules discussed previously. The pre- and postcompletion assessments are online assessments composed of 12 knowledge questions (multiple choice and true/false) and 10 confidence rating questions (scale of 1-5) for a total of 22 questions. The knowledge questions are each worth 1 point for a correct answer, and the confidence questions have a point value equivalent to the number on the rating scale (a rating of 4 = 4 points) for a total of 12 points in knowledge questions, 50 points in confidence questions, and 62 points possible overall.

The pre- and postcompletion assessments were loaded into the tests and quizzes section of the learning management system sites for both second semester women's health and pediatric primary

**Table 2**  
Knowledge Scores Pre- and Post Completion by Type and Combined

Variable	PNP <sup>a</sup> (n = 64)		WHNP <sup>a</sup> (n = 45)		Combined <sup>a</sup> (N = 109)	
	Pre	Post	Pre	Post	Pre	Post
Knowledge score (mean ± standard deviation)	7.48 ± 1.82	10.72 ± 1.35	7.58 ± 1.74	11.09 ± 1.20	7.52 ± 1.78	10.87 ± 1.29

<sup>a</sup> A statistically significant difference pre- versus post completion ( $P < .001$ ). The possible score range is 0 to 12, with higher scores indicating more knowledge.

**Table 3**  
Confidence Scores Pre- and Post Completion by Type and Combined

Variable	PNP <sup>a</sup> (n = 64)		WHNP <sup>a</sup> (n = 45)		Combined <sup>a</sup> (N = 109)	
	Pre	Post	Pre	Post	Pre	Post
Confidence score (mean ± standard deviation)	32.05 ± 5.75	45.53 ± 4.49	33.13 ± 6.88	46.58 ± 4.29	32.50 ± 6.24	45.96 ± 4.42

<sup>a</sup> A statistically significant difference pre- versus post completion ( $P < .001$ ). The possible score range is 0 to 50, with higher scores indicating more confidence.

care courses. Students submitted the precompletion assessment, worked through the learning modules, and then submitted the postcompletion assessment to evaluate knowledge and confidence. Students' answers were collected and scored through the learning management system functionality. Deidentified and aggregated answer data were exported to Microsoft Excel. Statistical analysis was performed to obtain the mean, minimum, and maximum scores along with standard deviations for both assessments. The data from each cohort were then combined to elicit the overall scores and comparisons of scores from precompletion to postcompletion.

This study included 2 sequential cohorts of WHNP and pediatric primary care NP students enrolled in their respective second semester courses in 2020 and 2021, completing the virtual HUG Your Baby educational program, including pre- and postcompletion assessments. Data were evaluated for each women's health cohort and each pediatric cohort. Comparison data between groups were evaluated between women's health cohorts, pediatric cohorts, combined women's health and pediatric groups for each year, and all students who completed the assessments across both years.

In the second year of offering the HUG Your Baby program (2021), 6 demographic questions were added to the precompletion assessment for both women's health and pediatric students, including whether or not participants had parented a newborn, breastfed an infant, or worked with newborns as a health care professional or were a certified doula or lactation consultant. Answers to these questions were collected, and scores for the women's health and pediatric student cohorts were compared for both pre- and post-assessments in relation to these prior experiences.

## Results

Paired  $t$  tests were conducted for pediatric students, women's health students, and the combined samples using IBM SPSS version 28. The level of significance was set to .05.

**Table 4**  
Demographic Questions of Personal and Professional Experience

Variable	n	Knowledge Mean ± SD	Confidence Mean ± SD	$t$	$P$ Value
Parented a newborn	23	10.8 ± 1.6	40.1 ± 7.4	1.04	0.304
No					
Yes	20	10.4 ± 1.3	40.7 ± 7.4	-0.25	0.805
Breastfed a newborn					
No	24	10.8 ± 1.6	39.7 ± 7.6	1.08	0.143
Yes	17	10.2 ± 1.3	41.9 ± 7.1	-0.97	0.169
Worked with newborns as a health care professional					
No	3	11.7 ± .58	39.7 ± 4.5	1.28	0.207
Yes	40	10.5 ± 1.5	40.8 ± 7.6	-0.25	0.801
Certified doula					
No	40	10.6 ± 1.5	40.4 ± 7.3	NA	NA
Yes	0	NA	NA	NA	NA
Lactation consultant					
No	40	10.6 ± 1.5	40.4 ± 7.3	NA	NA
Yes	0	NA	NA	NA	NA

NA = not applicable.

Not all demographics were answered by all participants; thus, n is reported for each item.

## Total Scores

PNP students showed a statistically significant improvement in total scores from pre- to postcompletion ( $t_{63} = -21.01$ ,  $P < .001$ ), with a mean improvement of 16.72 points (95% confidence interval [CI], 15.13-18.31). WHNP students showed a significant improvement ( $t_{44} = -15.54$ ,  $P < .001$ ), with a mean improvement of 16.96 points (95% CI, 14.76-19.12). The combined scores improved 16.82 points (95% CI, 15.54-18.09), indicating a statistically significant improvement ( $t_{108} = -26.03$ ,  $P < .001$ ; [Table 1](#)).

## Knowledge

PNP students showed a statistically significant improvement in mean knowledge scores from pre- to postcompletion ( $t_{63} = -11.14$ ,  $P < .001$ ), with a mean improvement of 3.23 points (95% CI, 2.66-3.81). WHNP students showed a significant improvement ( $t_{44} = -11.87$ ,  $P < .001$ ), with a mean knowledge improvement of 3.51 points (95% CI, 2.92-4.11). The combined knowledge scores improved 3.35 points (95% CI, 2.93-3.76), indicating a statistically significant improvement ( $t_{108} = -16.01$ ,  $P < .001$ ; [Table 2](#)).

## Confidence

PNP students showed a statistically significant improvement in mean confidence scores from pre- to postcompletion ( $t_{63} = -19.01$ ,  $P < .001$ ), with a mean improvement of 13.48 points (95% CI, 12.07-14.90). WHNP students showed a significant improvement ( $t_{44} = -13.31$ ,  $P < .001$ ), with a mean confidence improvement of 13.44 points (95% CI, 11.41-15.48). The combined confidence scores improved 13.47 points (95% CI, 12.31-14.63), indicating a statistically significant improvement ( $t_{108} = -22.97$ ,  $P < .001$ ; [Table 3](#)).

## Demographic Variables

No significant differences were found in the final knowledge and confidence scores across groups regardless of prior personal and professional experience (Table 4).

## Discussion

The American College of Obstetrics and Gynecology<sup>23</sup> released a committee opinion that all women should meet with a health care provider within 3 weeks of delivery, with services and support tailored to the individual woman's needs. Stuebe et al<sup>24</sup> released a consensus statement written by key stakeholders in women's health further recommending fourth trimester support, including a 3-week postpartum visit for all mothers that would include infant feeding support and documentation of the length of breastfeeding. The American Academy of Pediatrics<sup>25</sup> recommends primary care visits for infants within 3 to 5 days after discharge, at 2 to 4 weeks of age, every 2 months between 2 and 6 months of age, and then every 3 months between 6 and 12 months of age. Infants are seen even more often in instances of inadequate weight gain. With these frequent touch points of interaction, NPs who care for women and infants have significant opportunities to influence lactation success and duration if given adequate skills.

The challenge of having enough class time during education programs for health care providers requires alternative forms of learning to provide important experiences that can be valuable vectors of content. The virtual HUG Your Baby program elicited a statistically significant increase in knowledge and confidence of NP students relating to breastfeeding support of mother-infant dyads as evidenced by the pretest to posttest comparison. This improvement occurred regardless of past personal or professional experience with parenting, breastfeeding, infant care, lactation education, and doula training. Although increased knowledge and confidence have been previously shown in undergraduate nursing students,<sup>22</sup> this study of the HUG Your Baby program illustrates its effective use in NP education.

The limitations of this project include the use of the HUG Your Baby program in only 2 NP specialties. We have since expanded the offering of this program into the family NP course to extend the reach and number of students involved. The project also included a relatively small number of students over 2 years/cohorts. We intend to continue the HUG Your Baby program as an embedded educational component and have already engaged the third cohort of women's health and pediatric NP students. This will allow the opportunity to increase the student numbers for a more robust evaluation. Lastly, this intervention and evaluation were performed at 1 school of nursing.

## Conclusion

Breastfeeding support is a foundation of maternal-child care. Education on the benefits of breastfeeding, anticipatory guidance in managing common challenges, and education on infant feeding cues are important in establishing successful breastfeeding after birth and in the early postpartum weeks in women's health care. In the pediatric setting, support for infant feeding and growth is an essential component of early infant visits through the first year of life. Providers caring for women and children need to have the knowledge and confidence to address breastfeeding and its challenges, especially considering that lactation consultation is often not accessible and can be cost prohibitive for families.

The HUG Your Baby program provides a valuable learning opportunity to NP students who care for mothers and infants. The program provides a means to improve the knowledge base of

maternal-child care and to increase confidence in NP learners who will provide ongoing primary care. This study supports the use of the HUG Your Baby program as an effective and valuable offering in NP education for those caring for mothers and infants. By using HUG Your Baby in addition to the other breastfeeding experience and infant development and nutrition knowledge, these graduates will have the knowledge and confidence to support the postpartum breastfeeding care of mothers and the care of newborns and infants. Further evaluation of how this increased NP knowledge and confidence relates to breastfeeding success and parental support is the next step in this project. Translating this education into clinical practice by evaluating breastfeeding outcomes with patients and families is the end goal.

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Malinda S. Teague, DNP, CPNP-AC/PC, is an assistant professor at Duke University School of Nursing in Durham, NC, and can be contacted at [Malinda.teague@duke.edu](mailto:Malinda.teague@duke.edu). Kathryn J. Trotter, DNP, CNM, FNP, CHSE, is an associate professor at Duke University School of Nursing.

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