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# A Web-Based Module to Enhance BSN Students' Knowledge and Confidence in Teaching Parents About Newborn Behavior

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## ABSTRACT

As an adjunct to traditional instructional strategies, students enrolled in a Bachelor of Science in Nursing maternity course completed a Web-based module called “HUG Your Baby” (HYB) about newborn behavior, interpreting and responding to an infant’s cues and body language, and teaching new parents. Students who completed the HYB program were compared with students enrolled in another semester of the same maternity course in which only traditional teaching strategies were used. Both groups were compared on knowledge and confidence about newborn behaviors and teaching new parents. Knowledge and confidence scores increased significantly in both groups from beginning to end of the semester. Students who completed the HYB program demonstrated a significantly greater increase in knowledge and confidence compared with students who did not complete the HYB program. Students highly rated the HYB program and recommended it for incorporation into the maternity course.

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## INTRODUCTION

Understanding infant behavior and responding effectively to infant cues can promote positive interactions between parent and child and increase the parent’s confidence (Ateah, 2013; Brazelton & Nugent, 2011; Cook et al., 2012; Fulton, Mastergeorge, Steele, & Hansen, 2012; Karl & Keefer, 2011; Liu, Chen, Yeh, & Hsieh, 2012; Mathews, Leerkes, Lovelady, & Labban, 2014). This same ability can also contribute to increasing breastfeeding success (Labbok, Taylor, & Parry, 2013; Neifert & Bunik, 2013; Tedder, 2015; Tharner

et al., 2012) and reduce the risk of postpartum depression (Radesky et al., 2013). Research confirms that parents want and need more information about child development and parenting skills (Bryanton & Beck, 2010; Cook et al., 2010; Liu et al., 2012; Moniz et al., 2016; Radesky et al., 2013). Nurses who work in maternity settings are crucial to educating and mentoring new parents about infant care, development, and parenting skills. A key area is helping them recognize, interpret, and respond to infant behaviors (Karl & Keefer, 2011).

Most prelicensure nursing education programs include a course related to the care of childbearing families. Such courses provide students with didactic and clinical learning opportunities in prenatal, intrapartum, postpartum, and neonatal care. In the clinical area, nursing students are expected to provide care for mothers and newborns and interact with new parents, providing education and support related to newborn and infant care. Interactions are typically supported by knowledge the students have gained in classroom settings. Most students have had little experience with newborn infants unless they have children of their own. They often enter the clinical setting lacking confidence in their abilities to provide effective care and education for new parents. Although traditional instructional strategies for teaching about newborn care include lecture, discussion, case studies, and simulated clinical experiences, research in nursing education suggests that computer-based teaching methods, such as online learning modules and Web-based videos, can enhance learning (Gerdprasert, Pruksacheva, Panijpan, & Ruenwongsa, 2011).

### ***Self-Efficacy***

The term “self-efficacy” is often used interchangeably with “self-confidence.” According to Bandura’s Social Cognitive Theory, self-efficacy refers to a person’s perception of his or her ability to achieve designated levels of performance (Bandura, 1994). Individuals who have high levels of self-efficacy strongly believe that they can master a particular task or activity and are more likely to demonstrate greater willingness to apply effort while learning. Although the greatest influence on self-efficacy is mastery experience, vicarious experiences, such as observing others succeed in goal attainment (role modeling), can also influence an individual’s self-efficacy (Bandura, 1994).

The development of self-efficacy is fundamental to prelicensure nursing education. As nursing students’ perceived self-efficacy increases, the gap between theory and practice narrows. Student self-efficacy influences performance behaviors and affective processes. When students have high levels of self-efficacy, they believe they can master a certain task or activity and successfully demonstrate the required behavior; they have the ability to cope with interfering factors such as stress and environmental stimuli (Robb, 2012). Successful performance in clinical practice significantly influences nursing students’ self-efficacy (Chesser-Smyth & Long, 2013).

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### ***Web-Based Learning***

The use of information technologies in nursing education is growing. Web-based or e-learning takes education beyond the structured classroom or clinical environment and allows for asynchronous decentralized presentation and distribution of content. Advantages to the learner are flexibility in time and location; that is, the content can be accessed at a time and location that is convenient. In addition, with e-learning, there is the ability to proceed at one’s own pace and review the content as desired (Koch, 2014). E-learning is perceived as an effective and enriching experience (Cook et al., 2010). It appeals to the digital natives, the Millennial generation, born between 1981 and 2004, who have grown up with information technologies (Palfrey & Gasser, 2013). These learners prefer interactive and experiential learning strategies, especially those that incorporate information technology.

There is a lack of definitive evidence to show that Web-based or online learning is more effective than traditional instructional methodologies. However, meta-analyses have shown that it is at least equally effective in increasing knowledge and skills and, in some cases, is more effective than traditional methods (Lahti, Hätönen, & Vaälimäki, 2014; McCutcheon, Lohan, Traynor, & Martin, 2015). The supplementary use of Web-based learning for clinical skills may enhance learning and aid in closing the theory–practice gap (Cook et al., 2012). There is evidence to indicate that, in general, learner satisfaction is increased by Web-based learning (McCutcheon et al., 2015). However, some learners have indicated that they appreciate online learning in addition to, but not instead of, traditional instructional methodologies (Bloomfield & Jones, 2013).

There is a paucity of evidence about the effect of online learning on self-efficacy or self-confidence. McConville and Lane (2006) found a significant increase in nursing students’ self-efficacy with the use of online video clips about difficult situations. In a study by McMullan, Jones, and Lea (2011), there was no significant difference in self-efficacy pre- and post-online training on drug calculations.

HUG Your Baby is an innovative educational program for health care professionals that provides practical, evidence-based information about newborn behavior, demonstrates how to interpret and respond to an infant's cues and body language, and shows how information impacts the developing parent–child relationship and breastfeeding success.

The addition of a Web-based module or learning unit as an adjunct to traditional teaching strategies has been shown to affect knowledge, skills, and satisfaction positively. Gerdprasert et al. (2011) found that an interactive Web-based learning unit for nursing students on the topic of intrapartum care was effective in increasing knowledge and skill performance. Students who completed the learning unit reported lower levels of stress. The majority of students rated the Web-based module highly and found it beneficial, especially when performing procedures for the first time. They appreciated the realism portrayed in the video clips.

#### ***HUG Your Baby Online Training***

HUG Your Baby (HYB; <http://hugyourbaby.org/>) is an innovative educational program for health-care professionals that provides practical evidence-based information about newborn behavior, demonstrates how to interpret and respond to an infant's cues and body language, and shows how information impacts the developing parent–child relationship and breastfeeding success (Tedder, 2008, 2012, 2015). This knowledge is instrumental in preventing and solving issues related to infant feeding, sleeping, crying, and parent–infant interaction and attachment. The HYB program teaches traditional child development concepts using language that is familiar to contemporary learners and is family-friendly. For example, the “rebooting zone” refers to a newborn's fussy or crying state (Tedder, 2008, 2012, 2015).

The HYB training program for health-care professionals is available both as a live in-service education offering and as an online self-study course. The course has been completed by numerous health-care professionals throughout the world, including hospital/clinic/home visiting nurses, lactation consultants, doulas, and childbirth/infant massage/parent educators. Course evaluations have been overwhelmingly positive; health-care professionals who completed the HYG course agreed

that the program provides useful tools and strategies for teaching parents about newborn behavior. In addition, the information was deemed culturally appropriate by a group of nurses in Japan who completed the HYB program (Shimpuku & Tedder, 2013; Tedder, 2012).

Although the primary focus of the HYB program is to provide training and resources for health-care professionals who work with new parents, there are also resources for parents available through the HYB website ([hugyourbaby.org](http://hugyourbaby.org)). Parents can access streaming videos and DVDs and view parent newsletters and other resources about newborn behaviors. Previous research on HYB suggests that this material helps new parents understand infant behavior. A study of 46 fathers of preterm infants in a NICU in Iran examined the effect of the HYB parent educational video and handouts on knowledge of preterm infant behaviors. Fathers who participated in the HYB program in addition to routine NICU care demonstrated a significantly greater understanding of preterm infant behaviors than those who participated only in routine NICU care (Kadivar & Mozafarinia, 2013).

This study represents the first use of the online HYB training program for health-care professionals with prelicensure nursing students. Because nursing students are expected to teach new parents about how to recognize, interpret, and respond to newborn behaviors, this program has the potential to enhance current course content, improve students' knowledge and skills, and increase their confidence in educating new parents.

#### **PURPOSE**

The purpose of the study was to explore the effectiveness of the HYB module in increasing prelicensure nursing students' knowledge of newborn behaviors, their confidence in teaching new parents, and their skill in providing practical information to parents.

#### **METHODS**

The setting for the study was the School of Nursing at a large public university in the southeastern United States. The sample included prelicensure students enrolled in the baccalaureate nursing program. The study was approved by the university Institutional Review Board (IRB).

A nonrandomized experimental design was used to compare BSN students enrolled in the maternal–newborn course during the fall (control) semester



For more information about HUG Your Baby see <http://hugyourbaby.org/>

with BSN students enrolled in the maternal–newborn course during the following spring (intervention) semester. The students in the two groups were compared with respect to (a) their knowledge about newborn behaviors and techniques to calm a baby, help a baby sleep well, enhance feeding, and appreciate a newborn’s ability to respond to visual and auditory stimulation and (b) their confidence in interpreting and responding to newborn behaviors and educating new parents.

### ***Procedure***

The control and intervention groups received the same maternal–newborn course content and participated in 84 hours of clinical experiences in the labor and delivery, mother/baby, and newborn care units of one of five local health-care facilities. Course content on newborn behaviors is provided through textbook reading assignments, lecture, and clinical teaching on mother/baby units and in newborn nurseries.

The intervention group additionally completed the Web-based HYB module. The HYB module included a 1.5-hour video demonstrating infant behaviors (state changes, physiological stress responses, and active vs. deep sleep), infant capabilities (ability to orient to an object or a parent’s face), infant calming techniques, infant feeding cues and responses to overstimulation, and how to teach parents about infant behavior (Tedder, 2008, 2012, 2015). Other components of the training module were six blogs (5 minutes each) and two brief follow-up questions to answer after each blog.

Using a pre- post-test design, students’ knowledge and confidence in teaching new parents about infant behavior were measured and compared between students who completed the HYB module and students in the same course who did not complete the HYB module. In addition, an evaluation was done by students who completed the HYB program.

For the control and intervention groups, the pretest was completed during the first week of the 15-week semester, and the post-test was done during the last week. By giving this test to students at the beginning and the end of the course, the goal was to ascertain whether or not a significant difference would be observed in the number of correctly answered questions and also whether a net change in confidence level could be measured between the fall and spring courses, given that the only difference was the added HYB module. The strategy was to

assess the effectiveness of this added module on the change in knowledge and confidence scores.

The IRB Committee advised that student participation in the study must be voluntary; students could not be required to participate but could be offered an alternative assignment if they chose not to participate. Therefore, students were given the option of participating in the study or completing a brief evidence-based written assignment about newborn behaviors and parent education. One hundred percent (100%) of students in both semesters of the maternal/newborn course chose to participate in the study. To assure confidentiality and to remove the possibility of bias in student performance, the study instruments were administered by a teaching assistant in the maternal/newborn course. Each student used an algorithm to create a unique personal identification code. Only the teaching assistant had access to the list of student names that were associated with the personal identification codes. This process helped to determine who had completed the pre- and post-tests in the event that some students had chosen not to participate in the study and to complete the alternative written assignment instead. Information related to individual student performance on the pre- or post-tests was not available to the course coordinator or clinical faculty in the maternal/newborn course.

### ***Measures***

The pre- and post-tests were identical. A brief demographic questionnaire was included with the pretest. Students in the intervention group were asked to complete an evaluation of the HYB module along with the post-test. The pre- and post-tests consisted of two components. Part I was the knowledge measure that included 15 multiple-choice items related to key aspects of the HYB module. This knowledge measure was created and routinely used by the author of the HYB program as part of course evaluations when training health-care professionals. The knowledge measure was evaluated for content validity by nursing educators who completed the HYB program and have taught the training course in various settings.

Part II of the pre- and post-tests was the confidence measure consisting of 10 items for which students were asked to rate their confidence. The 5-point Likert-type rating scale ranged from 1 = no confidence to 5 = complete confidence. Examples of confidence items were as follows: I can “Identify an

infant's sleep/wake state," "Comfort a crying baby," and "Identify when an infant is 'shutting down' from over-stimulation during feeding." This tool was evaluated for content validity by the author of the HYB program and by a nursing educator with over 30 years of experience in a prelicensure BSN program.

Students who completed the HYB program were asked to evaluate the module. The evaluation consisted of two components. The first section included 10 statements about the module; students were asked to rate each one using a Likert-type scale in which 1 = strongly disagree and 5 = strongly agree. Examples of the items were as follows: "The HUG Your Baby material was presented in a clear manner that facilitated understanding" and "The HUG Your Baby course should be a regular part of the maternal/newborn nursing course." Part II of the evaluation included three open-ended questions: "What did you like most about the course?", "How could the course be improved?", and "Is there anything else you would like to share about your experience with the HUG Your Baby course?"

### Analysis

The statistical analyses were performed using the statistical software SAS 9.4 (SAS Institute, Inc., Cary, NC). Descriptive statistics were used to analyze the demographic characteristics of the sample. Because the study was not randomized, baseline differences between groups were carefully considered. Paired *t*-tests were used to assess individual improvement in knowledge and confidence. Data were analyzed using paired and independent-sample *t*-tests to assess whether growth in knowledge and confidence was enhanced during the semester using the HYB module.

## RESULTS

Data were collected on 105 students in the fall (control) semester and on 94 students in the spring (intervention) semester. Five students were excluded from the study because of the issues with their identification codes and the inability to match their pre- and post-tests.

### Characteristics of the Sample

The majority of students in both the groups were aged between 20 and 30 years, female, and had no children (see Table 1). Only a few had experience in early childhood education, social work, psychology, or working in a childbirth or newborn setting. No

TABLE 1  
Demographics of the Sample

Characteristics	Control Semester, N(%)	Intervention Semester, N(%)	<i>p</i> Value
Age (y)			
20–30	88 (83.81)	83 (88.30)	.363
>30	17 (16.19)	11 (11.70)	
Gender			
Female	91 (87.5)	85 (90.43)	
Male	13 (12.5)	9 (9.57)	.513
Any children?			
No	97 (92.38)	86 (91.49)	.817
Yes	8 (7.62)	8 (8.51)	
Experience in:			
Early childhood education			
No	91 (86.67)	79 (84.04)	.600
Yes	14 (13.33)	15 (15.96)	
Social work			
No	101 (96.19)	91 (96.81)	.813
Yes	4 (3.81)	3 (3.19)	
Psychology			
No	92 (87.62)	85 (90.43)	.528
Yes	13 (12.38)	9 (9.57)	
Doula/childbirth educator/lactation/midwife			
No	102 (97.14)	90 (95.74)	.593
Yes	3 (2.86)	4 (4.26)	

significant differences were observed between the two groups in terms of demographics ( $p > .05$ ; see Table 1).

### Knowledge Scores

The two-sample *t*-test with pooled variances and a significance level of  $p = .05$  was used to test for a difference between the net number of correctly answered questions between the control (fall) and intervention (spring) groups. At baseline (pretest), there was no statistically significant difference in total knowledge score between the two groups ( $p = .72$ ). However, a significant difference was observed in the post-test knowledge scores for both the control ( $M = 55.11$ , standard deviation [ $SD$ ] = 12.95) and intervention groups ( $M = 60.85$ ,  $SD = 11.98$ ). The *t*-value of 0.9785 is significant ( $p = .0045$ ). Since this *p*-value is less than .05, we concluded that the HYB module significantly affected the change in test score between pre- and post-tests (see Table 2).

Examination of individual test items showed that both groups had a significant increase in scores for questions related to (1) behavioral signs of overstimulation, (2) distance of an infant's visual focus, (3) skills to help a baby to the alert state while avoiding overstimulation, (4) infant responses to overstimulation, and (5) infant self-calming behaviors. However, the increase was significantly greater in the



**TABLE 2**  
**Effect of the HYB Module on Knowledge of Infant Behaviors**

Theme of Item	Control (Fall) Semester (N = 105)			Intervention (Spring) Semester (N = 94)			p-Value for Intervention vs. Control
	Pretest (% Correct)	Post-test (% Correct)	p-Value for Change	Pretest (% Correct)	Post-test (% Correct)	p-Value for Change	
1. Behavioral signs of overstimulation	64.76	83.81	<.0001	56.38	85.11	<.0001	.2307
2. When increase in crying occurs (at 2 wks)*	29.52	31.43	.6687	43.62	39.36	.4054	.4401
3. Characteristics of active or light sleep	30.48	39.05	.0564	27.66	32.98	.2489	.6992
4. Hunger cues*	80.95	83.81	.4559	91.49	92.55	.7117	.7522
5. Distance of infant's visual focus	28.57	41.90	.0025	35.11	65.96	<.0001	.0385
6. Signs of transition from alert to crying state	85.71	87.62	.5770	87.23	86.17	.7573	.6571
7. Impact of adjusted age on increased crying (calculating adjusted age for babies born early)	35.24	33.33	.6829	39.36	42.55	.5265	.5536
8. Characteristics of still or deep sleep	11.43	15.24	.2199	11.70	12.77	.7483	.638
9. Normal vs. concerning infant behavior often misunderstood by mother	48.57	57.14	.0789	39.36	41.49	.6729	.4677
10. Skills to help baby get to alert state (avoiding overstimulation)*	56.19	66.67	.0305	43.62	76.60	<.0001	.0119
11. Infant's responses to overstimulation	91.43	97.14	.0365	88.30	96.81	.0103	.5499
12. Self-calming infant behaviors	50.48	61.90	.0192	47.87	75.53	<.0001	.0442
13. Infant sleep cycles*	66.67	67.62	.8359	53.19	85.11	<.0001	.0003
14. Signs of overstimulation that impact breastfeeding	30.48	34.29	.3964	30.85	50.00	.0001	.0508
15. Infant's interactive capabilities (how babies respond to stimulation)	26.67	25.71	.8253	30.85	29.79	.8233	.9898
Overall knowledge, mean (SD) % correct	49.14 (14.12)	55.11 (12.95)	.0016	48.44 (13.12)	60.85 (11.98)	<.0001	.0048

Note. SD = standard deviation.

\*Fall (control) and spring (experimental) groups differed significantly at baseline ( $p < .05$ ).

intervention group for the questions related to (2), (3), and (5). In addition, the intervention group had a significant increase in scores for questions related to infant sleep cycles and signs of overstimulation that can affect breastfeeding, whereas the control group did not.

### Confidence Scores

There were no significant baseline differences between the two groups with respect to total confidence score or any of the confidence items ( $p = .2463$ ). Confidence score increased significantly for all items and overall for the control and intervention groups. For the confidence score analysis, the two-sample  $t$ -test with pooled variance and a significance level of  $p = .05$  was used to test for a difference in net change in confidence score between the beginning (pretest) and the end of the semester (post-test)

scores. The  $t$ -value of 0.2533 is significant ( $p = .008$ ). Because this  $p$ -value is less than .05, we concluded that the HYB module does significantly affect the change in confidence score between pre- and post-tests (see Table 3).

More specifically, the increase in confidence score was significantly higher in the intervention group for 5 of the 10 items: identify infant's sleep-wake cycle, identify body changes in response to overstimulation, explain crying pattern during the first month, identify signs of overstimulation during feeding, and describe infant's ability to see and hear.

### Student Evaluation of the HUG Your Baby Program

Students in the intervention group (spring semester) were asked to complete a written evaluation of the HYB program. Analysis of the responses ( $N = 91$ ) on

**TABLE 3**  
**Effect of the Intervention on Level of Confidence**

Level of Confidence	Control Semester			Intervention Semester			<i>p</i> Value for Intervention vs. Control
	Pretest Mean ( <i>SD</i> )	Post-test Mean ( <i>SD</i> )	<i>p</i> Value for Change	Pretest Mean ( <i>SD</i> )	Post-test Mean ( <i>SD</i> )	<i>p</i> Value for Change	
1. To identify an infant's sleep or wake state.	2.43 (0.99)	3.27 (0.84)	<.0001	2.44 (1.06)	3.56 (0.80)	<.0001	.0505
2. To identify an infant's body changes in response to overstimulation.	2.16 (0.89)	3.50 (0.89)	<.0001	2.10 (0.86)	3.80 (0.80)	<.0001	.0084
3. To intervene to help an infant who is exhibiting a significant stress response.	2.28 (0.97)	3.61 (0.81)	<.0001	2.10 (0.99)	3.59 (0.83)	<.0001	.288
4. To explain normal changes in a baby's crying pattern during the first month of life.	1.61 (0.80)	2.87 (0.88)	<.0001	1.57 (0.74)	3.19 (0.99)	<.0001	.0068
5. To comfort a crying baby.	3.09 (1.01)	4.09 (0.69)	<.0001	3.00 (1.02)	3.96 (0.77)	<.0001	.8244
6. To identify whether a sleeping infant is in active/light or still/deep sleep.	2.06 (0.89)	3.38 (0.80)	<.0001	2.01 (0.93)	3.56 (0.81)	<.0001	.1434
7. To identify when an infant is "shutting down" from overstimulation during feeding.	1.95 (0.89)	3.40 (0.84)	<.0001	1.74 (0.78)	3.59 (0.83)	<.0001	.0051
8. To describe an infant's ability to see and hear.	2.04 (0.91)	3.01 (0.96)	<.0001	1.99 (0.77)	3.32 (0.86)	<.0001	.0116
9. To teach new parents about normal infant behavior.	1.77 (0.81)	3.23 (0.82)	<.0001	1.56 (0.78)	3.28 (0.83)	<.0001	.0694
10. To teach new parents how to respond effectively to their newborn.	1.85 (0.86)	3.48 (0.78)	<.0001	1.63 (0.79)	3.38 (0.78)	<.0001	.3957
Overall confidence	2.12 (0.68)	3.39 (0.59)	<.0001	2.01 (0.65)	3.52 (0.61)	<.0001	.0094

*Note.* *SD* = standard deviation.

the 10 items indicated that the students were pleased with the HYB program. The mean scores for all 10 items were greater than 4 (agree); the highest score ( $M = 4.319$ ,  $SD = .842$ ) was on the item, "The HYB course should be a regular part of the maternal/newborn course." The lowest score ( $M = 4.088$ ,  $SD = .77$ ) was on the "The HYB outline of course content was helpful" (see Table 4).

Responses to the three open-ended questions about the HYB program were overwhelmingly positive. In response to the question, "What did you like most about the course?" over one-third of the students cited the videos, describing them as "short," "succinct," "informative," and "very helpful." Comments included, "The videos kept me engaged"

and "It is easier to recognize the behaviors if you've seen them versus just reading a description of them." One mentioned the ethnic diversity in the videos. Students liked the self-paced online format of the HYB program. They found that the information made them feel more confident; one said, "I really appreciated doing this before clinical because it really helped me to have more confidence about how to work with newborns." Another noted that the HYB program was helpful in learning how to handle and soothe babies.

In response to the question, "How could the course be improved?" students suggested that the content should be incorporated into class teaching and reinforced in the clinical setting by clinical

**TABLE 4**  
**Student Evaluation of the**

<b>Evaluation Items: Rated on Scale From 1 = Strongly Disagree to 5 = Strongly Agree</b>	<b>Mean (SD)</b>
1. HYB material was presented in a clear manner that facilitated understanding.	4.165 (0.734)
2. The HYB course was well organized.	4.198 (0.687)
3. The pace of the HYB course was good.	4.198 (0.763)
4. The HYB video clips of newborns and their parents positively impacted my understanding of the material.	4.363 (0.738)
5. The HYB blog readings positively impacted my understanding of the material.	4.099 (0.883)
6. The HYB outline of course content was helpful.	4.088 (0.770)
7. The HYB Web-based format was an effective way to teach this course.	4.187 (0.698)
8. The HYB course should be a regular part of the maternal/newborn course.	4.319 (0.842)
9. The HYB course opened my eyes to an infant's ability to communicate.	4.333 (0.750)
10. I recommend that all nurses working with new parents take this HYB course.	4.367 (0.694)

*Note.* HYB = Hug Your Baby; *SD* = standard deviation.

faculty. One student suggested a review section to highlight important points in the program, and another indicated that more examples and case studies would be helpful.

Some students expressed concern about the post-test being administered at the end of the semester when they had completed the HYB program early in the semester. They indicated that the time lapse negatively affected their recall of the HYB concepts on the post-test.

Students provided additional comments about the program in their responses to the third open-ended question, "Is there anything else you would like to share about the HYB program?" The majority of comments were positive. Students enjoyed the course and felt it was very helpful: "It is a great course"; "This information should be provided to all parents." Two students noted that they learned a great deal that helped them in clinical practice, and one said it was helpful even the first day when they used HYB information with their first patient.

## DISCUSSION

The students enrolled in the maternal/newborn course each semester were typical of the nursing student population, with the majority being female and ranging in age from 20 to 30 years. Previous experience with newborns was limited. Only eight students in each group had children of their own. Few had previous professional experiences that would have involved newborn infants, for example, childbirth education, midwifery, and lactation. The study did not ask about other experiences with infants such as previous experience as a childcare provider or having younger siblings.

Overall knowledge increased in both groups from beginning to end of the semester-long maternal/

newborn course, but there was a significantly greater increase in scores for the students who completed the HYB program. This suggests that, in a traditional maternal/newborn course, students are learning about newborn behaviors and teaching new parents to some degree through didactic and clinical learning experiences. However, the addition of a module that targets these topics significantly increases student knowledge in comparison to the traditional course.

The time lapse from pre- to post-test may have contributed to performance on the post-test for students in the intervention group. All the students in the intervention group completed the HYB program during the first 2 weeks of the 15-week semester. Some were in their maternal/newborn clinical practicum during the first half of the semester, whereas others were assigned to the clinical practicum during the second half. The post-test was given to all students at the end of the semester, which meant that there had been a time lapse of approximately 14 weeks since they had completed the online program; in addition, for some students, it had been as much as 7 weeks since they completed their clinical practicum.

Clinical experiences for the students in the two semesters of the maternal/newborn courses were varied, and responses to the post-test questions were likely affected by the learning opportunities the students encountered. Students in both semesters were assigned to a variety of clinical sites and

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schedules for their practicum experiences in the maternal/newborn course. Some were in 7-week rotations for a 12-hour shift once a week; others were in semester-long rotations for 6 h/d, 1 d/wk. Each student was assigned to one of five clinical agencies—four were large acute care hospitals, and one was a smaller community hospital.

The confidence scores for both groups increased significantly from the beginning to the end of the semester, which suggests that the didactic and clinical components of the maternal/newborn course contributed to their increased self-confidence in working with newborns and parents. The increase in confidence was even greater among the intervention group, which would indicate that the HYB program was effective in increasing self-confidence. One student wrote, “I really appreciated doing this before clinical because it really helped me to have more confidence about how to work with newborns.” The video component of the HYB program provided footage of an HYB educator interacting with newborns and demonstrating various concepts inherent to the program. The role modeling in the videos provided students with opportunities to vicariously experience the interactions, which has been shown to increase self-confidence (Chesser-Smyth & Long, 2013; Bandura, 1994).

Students were overwhelmingly positive about the HYB program. Although the vast majority of the students in both semesters had limited experience with newborns, even those who had personal experience found value in the course. One remarked, “I wish I had this material when my children were babies.” Students indicated that they appreciated the content and found it to be valuable; several suggested that it be added to the class content, incorporated regularly into lectures and learning simulations throughout the course to facilitate increased understanding through consistent reinforcement.

The Web-based self-paced format of the HYB program was well received by most students although this mode of learning did not appeal to everyone. One student indicated, “I personally don’t learn well in Web-based course so I would like it to be taught in the class.” This is indicative of the variety of learning styles and preferences across the population of nursing students and supports the need for faculty to use a variety of instructional methods.

### **LIMITATIONS**

This was a single-site pilot study, which limits the generalizability of findings. The pre- and post-test

instruments had marginal internal consistency although analysis was done for individual items to account for this. The time lapse of approximately 14 weeks between the pre- and post-tests (beginning to end of semester) may have had a negative effect on recall of information about the HYB module. Scores would likely have been higher had the post-test been administered as soon as the students completed their clinical rotations.

Faculty in the maternal/newborn course at this institution completed the HYB course at the end of the fall semester; so they were familiar with the content as they supervised the spring (intervention) group in the clinical arena. We do not know the extent to which the faculty may have discussed the HYB concepts with their students and how this might have influenced student responses.

### **IMPLICATIONS FOR PRACTICE**

This study demonstrates the value of an online module as an adjunct to traditional instructional strategies to teach prelicensure BSN nursing students about newborn behaviors, including newborn states and stress responses, techniques to calm a baby, to help a baby sleep well, to enhance infant feeding, and to appreciate a newborn’s ability to respond to visual and auditory stimuli. Going beyond the traditional content related to newborn care that is included in maternal/newborn nursing courses, the HYB module provides engaging video footage of ethnically diverse newborns and families; the students are able to see the HYB educator interact with newborns and parents to demonstrate various techniques. Having seen the role modeling by the HYB educator, students are more confident and knowledgeable in teaching new parents about newborn behaviors, including how to recognize and interpret infant cues, how to avoid overstimulation, how to calm a baby, and how infant behavior influences breastfeeding success. It is important to consider that some students enter maternal/newborn courses with minimal or no experience working with newborns or infants. By providing them with visual demonstrations of newborn behavior and interventions, they are better prepared to enter the clinical setting. The 2-hour time frame that is needed to complete the HYB module is worthwhile, especially in terms of increasing the self-confidence (self-efficacy) of the students in teaching new parents. Although the content of the HYB program could be incorporated into didactic and clinical

teaching, the videos are distinctly designed to create a more interactive and engaging instructional strategy for students to learn about newborn behaviors and how to teach new parents. The HYB module is a positive addition to the maternal/newborn course for prelicensure students.

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