

Measuring Nurses' Knowledge and Understanding of Universal Newborn Hearing Screenings

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Abstract: The present study was conducted to investigate the knowledge and understanding of Universal Newborn Hearing Screening (UNHS) in nursing professionals. A group of 15 adult, licensed nurses with varied professional experience participated in the study. Participants completed both objective and subjective measurements to evaluate their current knowledge of training procedures. A free online UNHS training program offered through the National Center for Hearing Assessment and Management (NCHAM) served as both the objective measure and training module. Participants completed pre- and post-surveys as the subjective measure of their UNHS training. Results of these surveys were compared across the participants to determine significant outcomes. Results of this study suggest nursing professionals are not confident in their current level of training concerning UNHS. Additionally, the participants' scores on the online training module testing showed improvement from pre- to post-testing.

Key Words: Universal Newborn Hearing Screening (UNHS), National Center for Hearing Assessment and Management (NCHAM)

Acronyms: AAA = Academy of Audiology; ADPH = Alabama Department of Health; ASHA = American Speech-Language-Hearing Association; EHDI = Early Hearing Detection and Intervention; NICU = Neonatal Intensive Care Unit; NIDCD = National Institute on Deafness and other Communication Disorders; NIH = National Institutes of Health; UNHS = Universal Newborn Hearing Screening

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Introduction

The most critical period of speech and language development occurs during the first three years of life while the child's brain changes and develops. According to the National Institute on Deafness and other Communication Disorders (NIDCD), if a child is not immersed in language and communication during this time due to hearing loss, other difficulties arise involving the development of speech, language, and reading abilities (2014). Children with undetected hearing loss often fall behind their peers in school concerning the development of language, cognitive, and social skills. It is difficult to interact, learn, and follow social cues when a hearing loss is present. Academic performance, problem solving skills, and even long-term job opportunities can be affected by hearing loss in infancy or early childhood (National Institutes of Health, 2010).

Prior to discharge, a baby's hearing is screened to determine if further testing is needed to verify if the child is deaf or hard of hearing (DHH; Nierengarten, 2016). Normal

hearing is vital for the typical development of speech and language in children. Children who are DHH often have delayed speech and language development when the hearing loss is left unidentified. Further, hearing loss can be one of many symptoms associated with genetic, congenital disorders (Morten, 1991). According to the National Institutes of Health (NIH), "2 to 3 of every 1000 children in the United States are born deaf or hard-of-hearing." This does not include children with milder hearing impairments or those who develop hearing loss later in childhood (NIH, 2010).

Universal Newborn Hearing Screening (UNHS) programs are now established in all states and U.S. jurisdictions (American Speech-Language-Hearing Association [ASHA], n.d.). Across most of the country, health care workers complete, document, and report the baby's hearing results to the state. Typically, the state early hearing and intervention coordinator will then follow a baby's hearing results until a passing result is documented for each ear or a hearing loss is identified and an early intervention plan is determined.

In February 2001, the Alabama Department of Health (ADPH) initiated a state-wide universal newborn hearing screening (UNHS) program, known as Alabama's Listening!. The main goals of the initiative were to establish statewide UNHS programs to ensure early identification of children who are DHH, identify the appropriate treatment of each individual child identified with hearing loss, and propagate the necessary early intervention services to aid families of children identified as DHH (ADPH, 2014). Since that time, UNHS programs have developed under the guidelines of the Joint Committee of Infant Hearing (JCIH) Position Statement (2007) and the regulation and documentation of the ADPH. Across the state, hospitals conduct hearing screenings on all newborns to evaluate the status of their hearing sensitivity at birth. Although this process has shown progress in the number of babies screened, professionals who conduct the screens are often not up-to-date on current procedures, equipment, or documenting the results of such testing (Gallagher, Easterbrooks, & Malone, 2006).

UNHS programs aim to promote the identification of congenital hearing loss as early as possible in order to initiate appropriate early intervention services and supports. Although the UNHS program has been successful in lowering the age at which children who are DHH are identified, the immense variation of training procedures used across the state leaves confusion concerning the effectiveness of training offered at different locations (Pallarito, 2012; Parving & Salomon, 1996). The purpose of this project was to obtain information concerning the knowledge and understanding of nurses in administering UNHS procedures, correctly documenting results, and clearly explaining outcomes to parent/guardians.

This research aims to aid in identifying areas in which current training is lacking. The information obtained can be used by hospitals across the state to better equip their personnel to conduct UNHS and deliver appropriate results to families. A better understanding of UNHS serves to aid parents and professionals in initiating the appropriate treatment for children identified as DHH (DesGeorges, 2003).

Literature Review

In the past, only babies born into circumstances that put them at a higher-than-normal risk for hearing loss were screened. These risk factors included low birth weight, a stay in the Neonatal Intensive Care Unit (NICU), and other difficulty at time of birth (NIH, 2010). On average, children were identified as being DHH around 30 months (JCIH, 2000). This was simply not good enough to ensure the appropriate intervention and management of hearing loss in young children. The need for a better screening protocol was as clear as the detrimental effects of unidentified hearing loss were prevalent. Finally, in 1993, the National Institutes of Health (NIH)

held a conference that endorsed the screening of all newborns for hearing loss before the child left the hospital. This consensus bolstered a state-by-state effort to promote mandatory screenings of newborns. In addition, Congress passed the Newborn and Infant Hearing Screening and Intervention Act of 1999, which helped coordinate and fund statewide programs while promoting awareness (NIH, 2010). Increased recognition sparked new research. Study after study found that children who are DHH and received intervention at an earlier age demonstrated language skills comparable to their age-matched peers regardless of degree of hearing loss (Moeller, 2000; White & White, 1987; Yoshinaga-Itano, Sedey, Coulter, & Mehl, 1998).

Across the country, all states have implemented Early Hearing Detection and Intervention (EHDI) programs to aid in the identification of children who are DHH. The EHDI guidelines are based on a "1-3-6" goal: newborns should receive a hearing screen no later than 1 month of age, infants that did not pass their initial hearing screening should have appropriate audiological and medical evaluations to confirm the presence of hearing loss no later than 3 months of age, and all infants with confirmed permanent hearing loss should receive early intervention services as soon as possible after diagnosis but no later than 6 months of age. Further, use of amplification should begin within 1 month of diagnosis and ongoing audiological management should not exceed 3 month intervals (Ditty, 2007; JCIH, 2007). Early intervention is associated with attaining language abilities of age-matched peers, which is one of the main goals of programs that support children who are DHH (JCIH, 2007). UNHS has become a routine practice in hospitals across most states. This practice provides a significant benefit to children identified as being DHH at birth because early intervention can be initiated earlier (NIH, 2010; Pallarito, 2012). Although significant progress has been made, not all newborns are screened after birth. In some cases parents refuse testing, a qualified screener is not available, or a more pressing medical condition may take priority over hearing screenings (DesGeorges, 2003). Additionally, of the babies who are screened but did not pass the hearing screen, only 34.4% return for follow-up testing to confirm if a hearing loss is present (Centers for Disease Control and Prevention [CDC], 2014). Reasons for lack of follow-up may be due to some families being unable to afford the cost to travel to audiologists (especially in rural settings), some parents may be in denial about the presence of a hearing loss, and some families may not be aware of the need for a follow-up appointment (ASHA, n.d.; Ditty, 2007). These children continue to risk late identification and delay intervention, leading to similar outcomes seen before the implementation of UNHS.

Although UNHS programs are in place at hospitals around the country, training provided to those employees and volunteers who screen newborns is widely varied.

The American Academy of Audiology (AAA) and the American Speech-Language-Hearing Association (ASHA) recommend training programs that are under the direction of a supervising audiologist with content that exceeds the simple understanding of how to use the equipment and addresses the competency of screening personnel. Additionally, it is advised that personnel should be retrained every two years with continuing assessment (AAA, 2014; ASHA, n.d.). Often other factors, such as finances and available staffing, are the main factors in determining what personnel, training, equipment, and procedures are implemented. Although most states are required to submit documentation of hearing screen results to their state EHDI for follow-up, even this process is not uniform among hospitals within and across individual states (Pallarito, 2012).

Despite the progress that has been made with the implementation of UNHS, several challenges complicate the goal of early detection of children who are DHH, including the number of infants born annually and personnel available for screening in newborn nurseries (AAA, 2014). In 2010, President Obama signed legislation that reauthorized and expanded EHDI law and emphasized the importance of appropriate and efficient diagnosis of hearing loss by a trained professional so that children who are DHH may receive appropriate services and are provided access to intervention earlier (Pallarito, 2012). Even with increased funding and governmental support, establishing and maintaining programs with uniform practices has proven difficult due to a lack of awareness of health providers and the lack of training of personnel (Gallagher et al., 2006; Houston, Bradham, & Guignard, 2011). Appropriate training of the screeners and their competence with giving correct information to parents is essential to the early intervention process (Laugen, 2013).

Ultimately, hearing loss remains the most prevalent developmental disorder that is identifiable at birth. Even though it is clear this situation demands a solution to better serve children and their families, a lack of identification and appropriate management continues to have significant impact on children's educational, cognitive, and social development (AAA, 2011). Understanding the clinical effectiveness (and shortcomings) of the current knowledge of hearing screening providers will assist in improving current training programs. This information provides feedback concerning how training programs are currently functioning, and how the programs in place can be made better for both professionals and patients (Gallagher et al., 2006; Houston et al., 2011).

Methods

Participants

Participants in this study were required to be employed and licensed as a nurse and 19 years of age or older. Additional participant demographics are seen in Table

1. For this study, the participants included 15 nursing professionals with varied career experience ranging from 0–1 year to more than 5 years of experience, with a scope of practice that includes newborn hearing screening. All participants were licensed in the nursing field at the time of this study. The majority of the participants have worked in their current position for 5 or more years. All participants completed 0–5 newborn hearing screenings per day, and no more than 10 per week. Of those who participated, half had never interpreted the results of the hearing tests they completed, while the other nurses interpreted 0–5 of the newborn hearing screenings they conducted. The majority of the participants have never counseled parents or guardians on the results of the newborn hearing screenings.

Table 1
Participant Demographics

	0-1 Years	1-3 Years	3-5 Years	5 or More Years
Length of Time in Current Position	2	5	1	7
Years of Experience	8	0	1	6

	0-6 Months	6-12 Months	1-2 Years	2-5 Years	5 or More Years	Never
Time Elapsed Since Initial Training	10	0	1	1	3	0
Most Recent Continuing Education on UNHS	3	0	0	0	0	0

	0-5 Screenings	5-7 Screenings	7-10 Screenings	15 or more Screenings	Never
UNHS Conducted Per Day	15	0	0	0	0
UNHS Conducted Per Week	14	1	0	0	0
UNHS Interpreted Per Day	7	0	0	0	8
UNHS Interpreted Per Week	5	1	0	1	8
	Never	Rarely	Sometime	Often	Always
UNHS Counseling Per Day	12	2	1	0	0
UNHS Counseling Per Week	11	3	1	0	0

Recruitment

This study recruited participants from local hospitals, through posts on social media, and across university nursing school departments. Participants were sent individual packets of information containing the consent forms and project instructions. Additionally, packets contained directions for completing the online UNHS training, how to submit online test scores, and

the three hard-copy surveys they were required to complete (participant demographics, pre-training, and post-training surveys). Contact information for the investigators was included in each of the information packets. Participants were required to sign an Institutional Review Board (IRB) approved informed consent form outlining the study, their requirements, and their potential benefits and risks before completing the project.

Procedures

In order to obtain information concerning the effectiveness of UNHS training procedures, participants were asked to complete both subjective and objective measures. Three subjective surveys were used to collect information: a participant demographics survey with 11 questions, a pre-survey with 15 questions, and a post-survey with the same 15 questions. These were all presented in the same hard-copy format.

The pre-survey measured their knowledge and understanding of UNHS according to their previous level of training in UNHS. This information provided a baseline for how the participants believed their current understanding of UNHS was and showed which areas they had less confidence in their training. The National Center for Hearing Assessment and Management (NCHAM) online training modules (Interactive Newborn Hearing Screening Training Curriculum at <http://www.infanthearing.org/nhstc/index.html>) were used as both an objective measure of participants’ knowledge and the continuing education course to update professionals on the current best practices for UNHS. See Table 2 for the list of topics covered in the Interactive Newborn Hearing Screening Training Curriculum. The participants

Table 2
List of topics in the Interactive Newborn Hearing Screening Training Curriculum

Introduction to screening
Preparing to screen
Screening with otoacoustic emissions (OAEs)
Screening with automated auditory brainstem response (A-ABR)
Communicating with parents and providers
Completing the screening process
Screening babies with risk indicators
Outpatient screening and re-screening

were asked to complete the provided pre-test within the Interactive Newborn Hearing Screening online course and then complete the training modules. Next, the post-test within the Interactive Newborn Hearing Screening online course was completed to assess their knowledge after completing the training modules. The post-survey asked the same questions and provided the same answer choices as the pre-survey but was completed after finishing the Interactive Newborn Hearing Screening online course training modules. The participants printed their pre- and post-test scores and submitted them to the investigators. Data was collected by the investigators and de-identified before any

analysis was completed. Participant responses to the subjective pre- and post-surveys were coded in order to conduct statistical analyses. The results of the pre- and post-surveys of both the subjective and objective measures were compared across the participants to determine any significant outcomes.

Participants completed the surveys and online training in their free time. The participants were not compensated for the time they spent completing the project. Those who took part in the study could use this training to fulfill some of their continuing education hour requirements for their licensure based on their guidelines from work. The only risk to the participants who completed the study was breach of confidentiality. To minimize this risk for those in the current study, their information was de-identified and coded using a numbering system. There were no costs to the participants to complete the research. Participation was completely voluntary and any participant could choose to withdraw from the study at any time, at which point their information (if, identifiable) would be destroyed.

Results

Subjective Survey Responses

All participants completed surveys pre- and post-training. Not all participants completed every question; answers that were not recorded by the participant were deleted from the analysis. Responses to each question can be found in Figures 1–14. Within subject one-way repeated measures ANOVAs were conducted to assess if there were significant differences between the participants’ pre- and post-training responses. Responses were statistically significant for questions 1–2, 4–5, 7–8, 10, and 12–14.

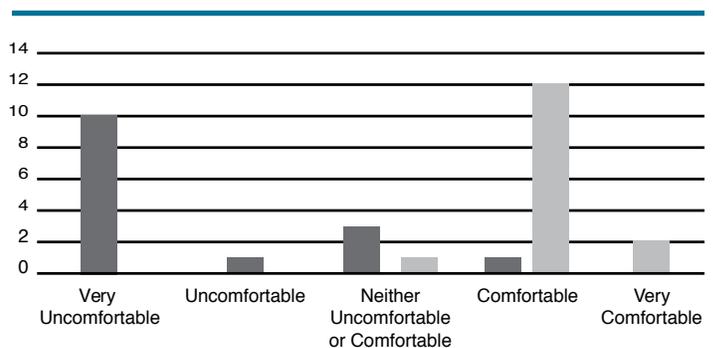


Figure 1. Response to Q1: How comfortable do you feel performing UNHS?

Figure 1 shows the majority of the subjects reported feeling uncomfortable prior to completing UNHS training. Conversely, after completing the training, most participants reported feeling comfortable with how to perform UNHS screenings. One way repeated ANOVA showed ($F [1, 12] = 39.76, p < 0.01$). This was statistically significant.

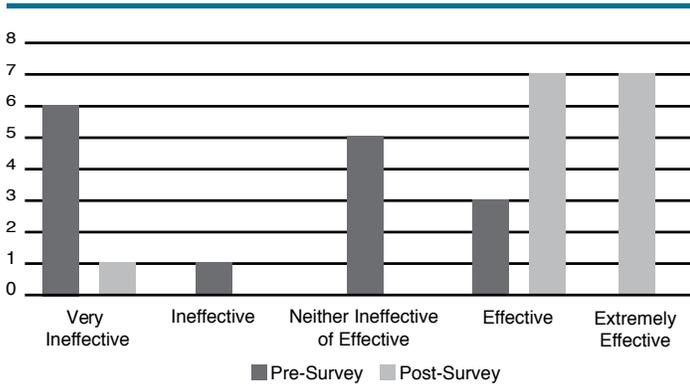


Figure 2. Response to Q2: How effective do you believe your training concerning UNHS has been?

Figure 2 indicates many participants did not believe their training concerning UNHS was *effective*. After completing the NCHAM module training 14 of 15 participants reported their training was *effective* or *extremely effective*. One way repeated ANOVA showed ($F [1, 12] = 14.52, p < 0.01$). This was statistically significant.

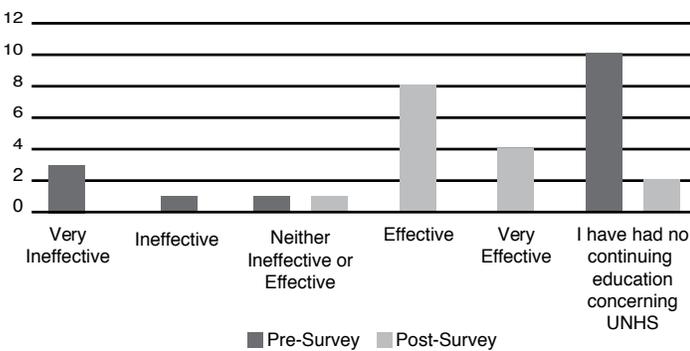


Figure 3. Response to Q3: How effective do you believe your continuing education concerning UNHS has been?

In Figure 3, pre-training, most participants reported they had no continuing education at all concerning UNHS. One way repeated ANOVA showed ($F [1, 12] = 2.69, p > 0.05$). This was not statistically significant even though most of the participants indicated that the continuing education was *effective* post-training.

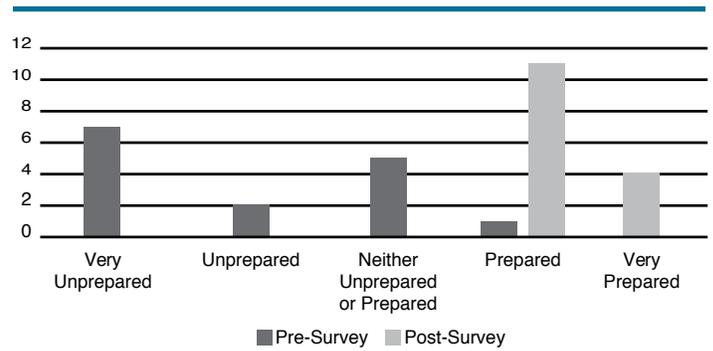


Figure 4. Response to Q4: Do you feel your training has prepared you to complete UNHS using the most up-to-date methods?

Figure 4 indicates that the majority of the participants did not feel their training had prepared them to complete UNHS using the most updated methods. Post-training survey responses showed significant differences. All participants felt they were either *prepared* or *very prepared*. One way repeated ANOVA showed ($F [1, 12] = 94.08, p < 0.00$). This was statistically significant.

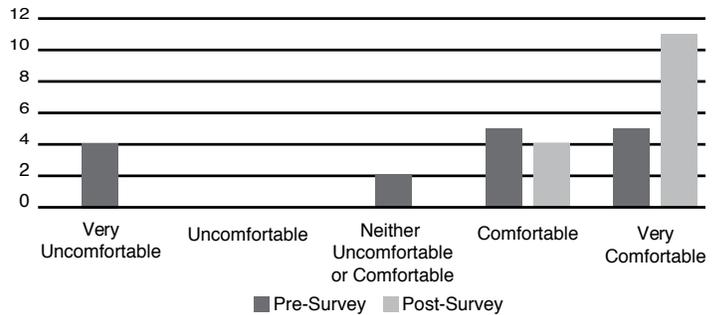


Figure 5. Response to Q5: If you have a question concerning UNHS testing methods, how comfortable do you feel asking another professional?

In Figure 5, the majority of participants were already comfortable asking another professional for help to complete UNHS testing if necessary. Post survey, all participants were either *comfortable* or *very comfortable*. One way repeated ANOVA showed ($F [1, 12] = 7.89, p < 0.05$). This was statistically significant.

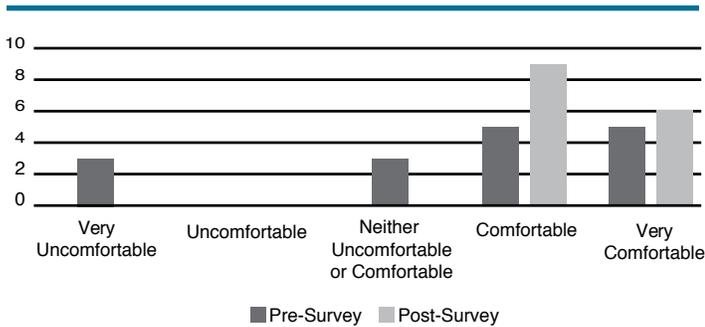


Figure 6. Response to Q6: If you have a question concerning UNHS testing methods, and there is no other professional available at the time of your screening, how comfortable do you feel rescheduling the UNHS for another time?

Pre-training responses, reported in Figure 6, showed that a majority of participants were already *comfortable* rescheduling UNHS for another time if they had a question concerning testing methods and another professional was not available at the time of the screening. Post-training survey responses showed that all participants were *comfortable* or *very comfortable*. One way repeated ANOVA showed ($F [1, 12] = 2.18, p > 0.05$). This was not statistically significant.

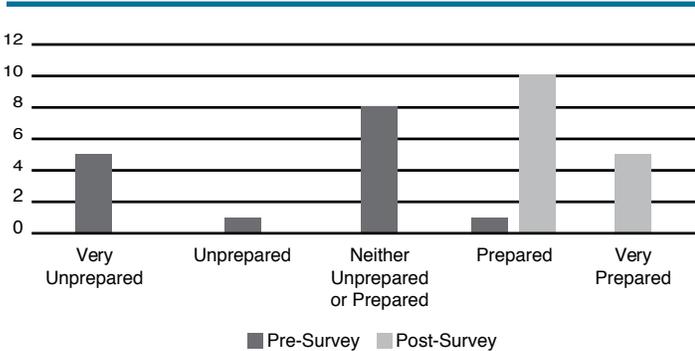


Figure 7. Response to Q7: Do you feel your training has prepared you to complete UNHS using the most up-to-date equipment?

Figure 7 indicates that a majority of the participants did not feel prepared to complete UNHS using the most updated equipment before they completed the training module. After completing the online training, all participants reported feeling *prepared* or *very prepared*. One way repeated ANOVA showed ($F [1, 12] = 45.47, p < 0.01$). This was statistically significant.

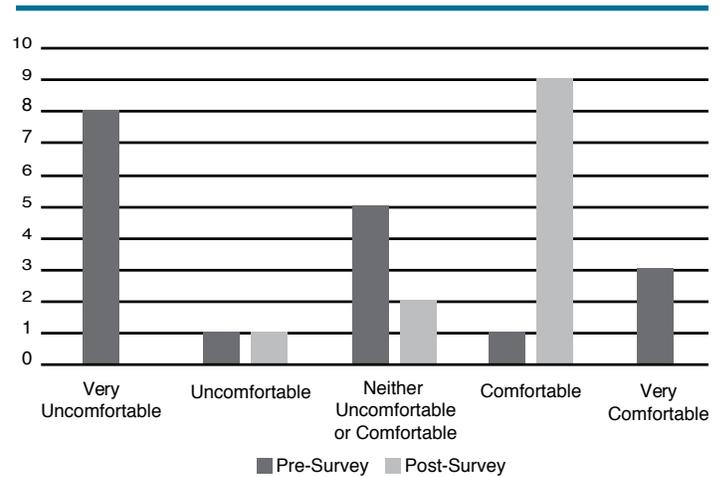


Figure 8. Response to Q8: If you have trouble with the testing equipment, how comfortable are you performing troubleshooting?

As shown in Figure 8, prior to completing the online training, the majority of test subjects reported feeling *very uncomfortable* with conducting troubleshooting if a problem occurs with the testing equipment. Post-training survey responses show the majority of subjects were *comfortable* completing troubleshooting. One way repeated ANOVA showed ($F [1, 12] = 27.57, p < 0.01$). This was statistically significant.

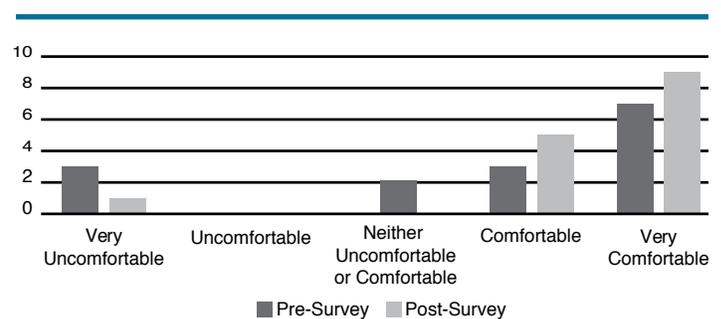


Figure 9. Response to Q9: If you perform troubleshooting and it does not correct the problem you are experiencing with the testing equipment, how comfortable are you asking another professional for help?

In Figure 9, the majority of participants indicated they were either *comfortable* or *very comfortable* asking another professional for help if performing troubleshooting did not correct an equipment problem that occurred during UNHS testing. The total number of participants who were either *comfortable* or *very comfortable* increased across post-survey responses. One way repeated ANOVA showed ($F [1, 12] = 1.21, p > 0.05$). This was not statistically significant.

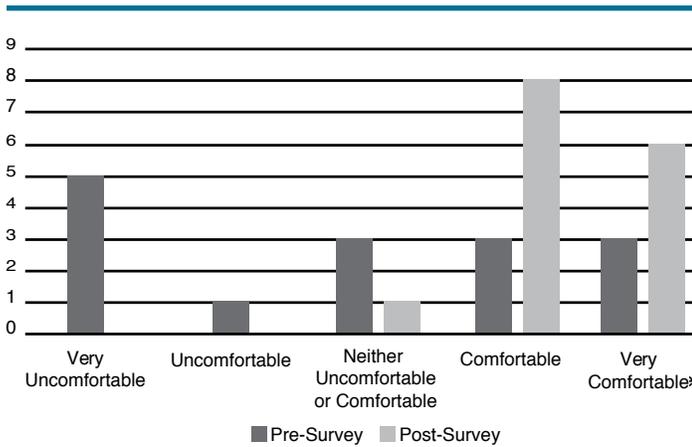


Figure 10. Response to Q10: If the patient you are testing has a failing result, how comfortable do you feel documenting the result?

Figure 10 shows that a majority of participants were not comfortable documenting the results of UNHS testing if the newborn has a failing result. After completing the online training module, most participants responded that they felt comfortable documenting this type of result. One way repeated ANOVA showed ($F [1, 27] = 5.85, p < 0.02$). This was statistically significant.

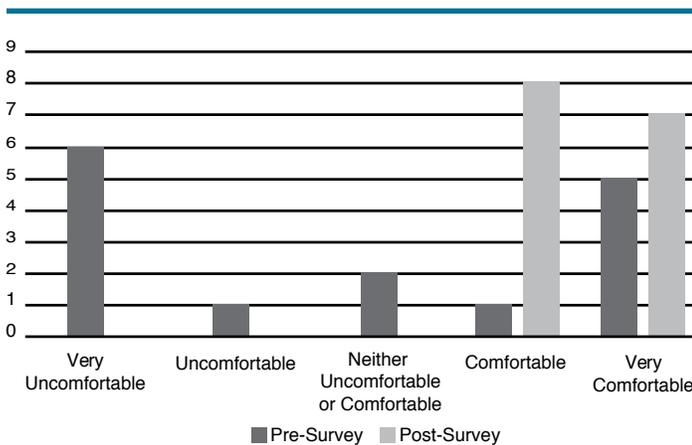


Figure 11. Response to Q11: If the patient you are testing has a passing result, how comfortable do you feel documenting the result?

In Figure 11, most subjects responded that they were very uncomfortable documenting a passing newborn hearing screening result. After training, post-survey responses show that all participants felt either comfortable or very comfortable with documenting a passing test result. One way repeated ANOVA showed ($F [1, 10] = 4.23, p > 0.05$). This was not statistically significant.

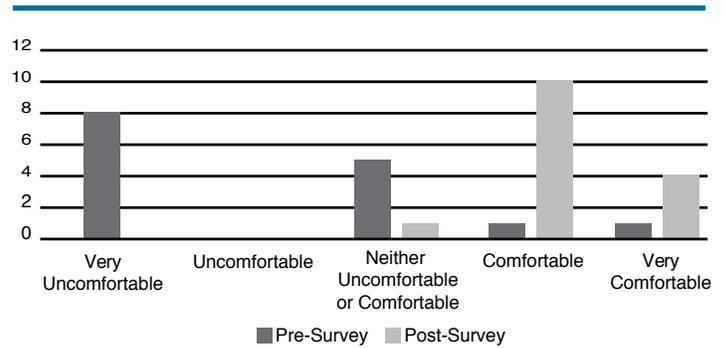


Figure 12. Response to Q12: How comfortable do you feel interpreting the results of UNHS?

Figure 12 indicates that most participants felt very uncomfortable interpreting the results of UNHS. Post-survey responses show that the majority of subjects felt comfortable interpreting the results of UNHS testing after completing the online training module. One way repeated ANOVA showed ($F [1, 11] = 25.63, p < 0.01$). This was statistically significant.

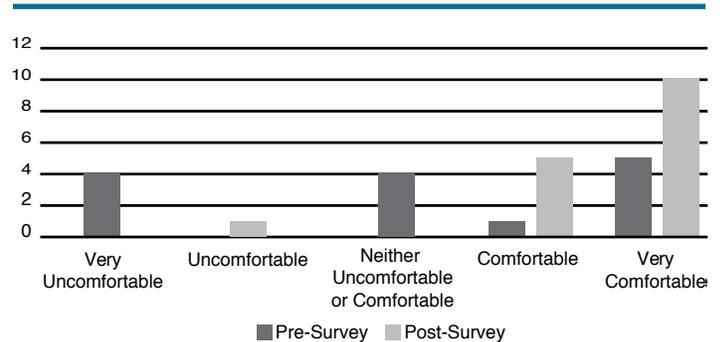


Figure 13. Response to Q13: How comfortable do you feel relaying the results of UNHS to another professional?

Concerning how comfortable participants felt relaying the results of UNHS to another professional, Figure 13 shows that there was a wide variety of responses prior to completing the online training. However, post-survey responses indicate that all subjects felt comfortable or very comfortable completing this task. One way repeated ANOVA showed ($F [1, 11] = 6.22, p < 0.05$). This was statistically significant.

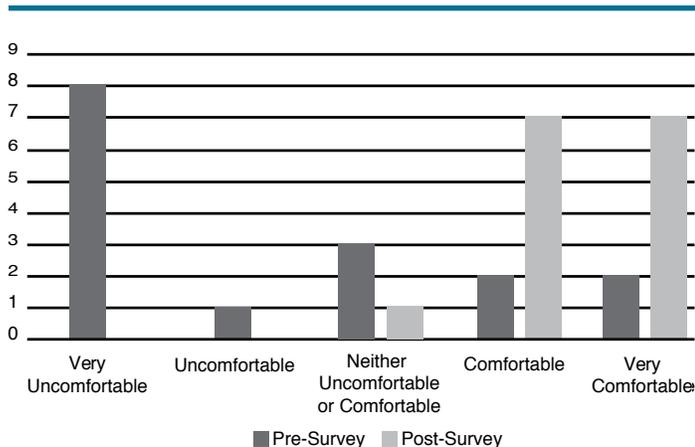


Figure 14. Response to Q14: How comfortable do you feel counseling parents on the results on UNHS?

As shown in Figure 14, when asked how comfortable they felt counseling parents on the results of UNHS, the majority of participants indicated that they felt *very uncomfortable*. Conversely, after completing the online training module, almost all participants indicated that they felt either comfortable or very comfortable completing this task. One way repeated ANOVA showed ($F [1, 11] = 18.75, p < 0.01$). This was statistically significant.

Participants completed both pre- and post-surveys as a subjective measure of their level of comfort and preparedness to complete different aspects of UNHS testing. The main goal of this study was to see if the nurse's knowledge and understanding improved following this online training program. In Figure 15, investigators compared the number of participants who responded that they were *comfortable* or *very comfortable* (or, a similar response such as *prepared* or *very prepared*) on each survey question asked both pre- and post-training.

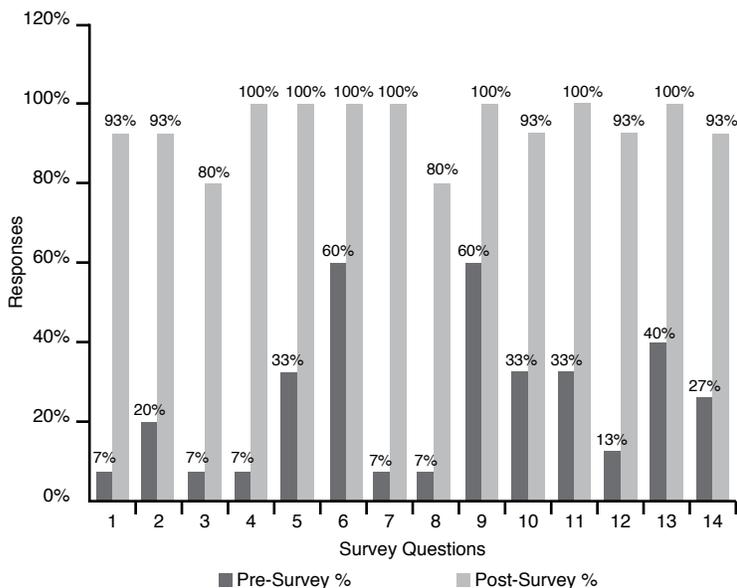


Figure 15. Comparison of Pre- and Post-Survey Responses.

Participants who responded *comfortable* or *very comfortable* (or, an equivalent answer) improved on all questions asked between pre- and post-survey questions.

Test Scores

Participants completed pre- and post-testing through the NCHAM online training module. Mean test scores for the pre-test was 81 with a standard deviation of 6 and the mean test scores for the post-test was 92 with a standard deviation of 6. Figure 16 shows the comparison of subjects' test scores prior to training and after completing the training module. A one-way repeated measures ANOVA was completed, and showed ($F [1, 14] = 33.27, p < 0.01$). This was statistically significant. Thirteen of fifteen participants made improvements to their test scores between pre- and post-training. Two subjects' test scores remained the same between measures.

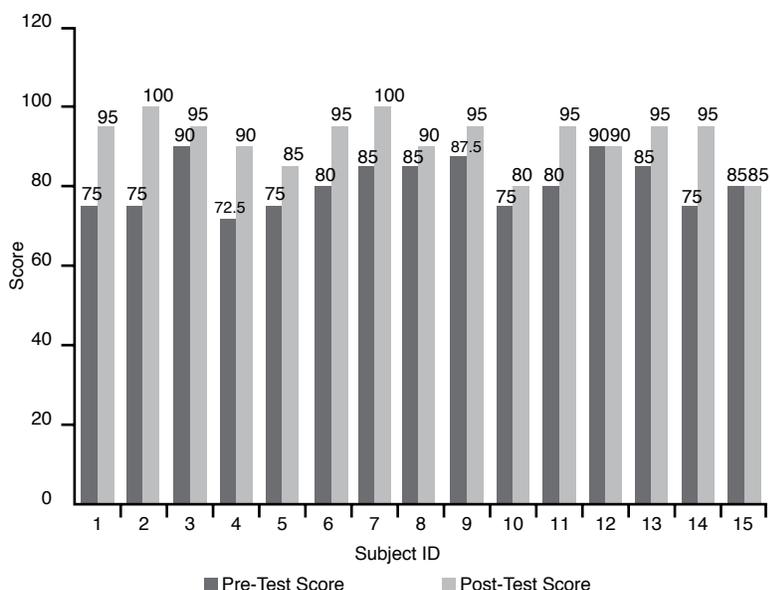


Figure 16. Comparison of Pre- and Post-Test Scores.

Discussion

In the present study, several aspects included in UNHS were evaluated to determine whether or not nursing professionals were currently comfortable with and prepared to perform UNHS. Participants initially reported that they were uncomfortable performing UNHS evaluations. As similarly reported (Parving & Saloman, 1996), they did not believe their previous training was effective, or that it prepared them to complete UNHS using the most up-to-date methods. After completing the online training, participants' perception of their comfort in completing UNHS was much improved. This subjective improvement, coupled with the improvement on the participants' pre- and post-training test scores, indicates that the online training program was effective in increasing the subject's perception of their ability to complete UNHS.

The results show that, as a whole, the participants do not feel comfortable asking other professionals for help concerning testing methods, troubleshooting the testing equipment, or documenting passing or failing results. Our findings agree with those of Ditty (2007) who found that communication between medical professionals and with patients' families is sometimes neglected. Further, participants did not feel they were prepared to interpret the results of UNHS, relay the information from the screening to another professional, or counsel parents concerning test results. After completing training, the majority of participants showed an improvement concerning their perception of their ability to ask other professionals for help and complete testing on their own. This was confirmed in 13 out of 15 participants who improved their test scores post-training. The remaining two participants who did not have improvement in post-training test scores had already achieved high scores on the pre-test measure.

When asked how effective their continuing education has been concerning UNHS, many participants reported that they have never had any additional training. That is concerning since everyone included in the project has a scope of practice that includes conducting UNHS and even training other professionals how to complete testing and record UNHS results. As similarly addressed in Pallarito's (2012) article, the importance of sufficient training and adequate documentation of screening information is of the utmost importance in positive outcomes. After completing this study, the majority of participants reported feeling their continuing education using NCHAM's Interactive Newborn Hearing Screening Curriculum was either *effective* or *extremely effective*. This shows that this method is sufficient to further train and equip professionals who are required to complete UNHS. Continuing education improves awareness of healthcare providers and improves their ability to perform the screenings (Gallagher et al. 2006; Houston et al., 2011).

Conclusions and Future Study

In general, the findings of this study suggest that nursing professionals do not feel they are adequately up-to-date with newborn hearing screenings and documenting screening results. Healthcare professionals are trusted with completing and documenting results that may affect how their patients develop and learn. It is imperative these professionals are adequately trained to manage the amount of responsibility entrusted to them. Objectively, study participants who completed this specific online training made improvements in their pre- and post-testing across both objective and subjective measures. This indicates that the training model used is an effective way to update professionals' current knowledge while expanding their overall understanding.

This model should be considered to adequately train professionals who complete UNHS in order to ensure timely diagnosis of infants and education of parents. Additional continuing education for professionals that complete UNHS should include the modules included in this training, such as how to complete hearing screens, what current equipment looks like, how to document and record results, and how to answer questions concerning screening, results, and further follow-up. Further, training for professionals working in the NICU nursery, should be expanded to cover more in-depth topics that may not be addressed by general training such as risk factors. Routine evaluation of healthcare professionals' understanding of such topics would underscore the importance of the measures and would serve to identify any areas for needed training.

Several of the participants stated that they received initial training several years prior to completing the training included in this project. Further, the majority of participants indicated that they had never received continuing education concerning UNHS even though this is included within their scope of practice. This is not an acceptable standard for health care professionals, especially concerning such an important measure of how a child will grow, develop, and learn. Professionals should be adequately prepared to complete the job they are certified and licensed to complete. In order to most effectively and efficiently serve patients and their families, UNHS training should continue to evolve and retraining should be completed on a scheduled basis.

The present study had limitations that could be improved to more adequately investigate current procedures to develop the best-suited training program. Most notably, the sample size of this research includes only 15 participants. Although results are promising concerning the effectiveness of this model, further research should focus on replicating this project on a larger scale to determine whether or not the outcomes apply to larger, more diverse populations as well. This project focused on nursing professionals. A future study including allied health professionals and non-nursing staff would be beneficial as well as including a hands-on module.

Finally, research should evaluate how including a hands-on training component, or lab, for participants would affect their perception and performance concerning overall preparedness to complete UNHS. Although the online training module provides both verbal and visual components to aid in participant's learning, it did not provide an actual person to ask questions of or demonstrate procedures directly. This experience would allow for more in-depth education for professionals and promote active training.

UNHS is one of many tests and screenings that newborns undergo when they are first born. Screening does not take a long time and is non-invasive. However,

for as quick and easy a test as hearing screening is, the outcome of the screening is vital. The need to effectively screen infants' hearing is crucial. Early identification of hearing loss allows for earlier referral to early interventions services and support systems for the child and their families. Conversely, missing a hearing loss or not identifying a loss until there are developmental delays eliminates the possible gains of early intervention. Healthcare professionals are tasked with serving patients and their families to the best of their abilities. Adequately training professionals and volunteers to complete hearing screening is necessary to provide important information to parents to assist them in appropriate and timely follow-up (DesGeorges, 2003).

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