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Implementing a D/deaf Educational Module for Graduate Nursing Students

Brenda J. Pauley
University of Missouri-St. Louis, bjpzp9@mail.umsl.edu

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Brenda J. Pauley

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Advisory Committee

Cathy Koetting, PhD, DNP, APRN, CPNP-PC, PMHS, FNP-C

Chairperson

Sarah Jackson, DNP, APRN, FNP-C

Cathee Wolford, MSW

Abstract

Problem: Nurse practitioners lack knowledge and skills to effectively communicate with D/deaf individuals which potentiates risk for health disparities and gaps in care. Graduate nursing programs rarely incorporate D/deaf-focused education in their curriculums.

Methods: This descriptive quality improvement project implemented the first D/deaf-focused educational online module at a Midwestern university's College of Nursing. A purposive sample of 38 BSN-DNP students enrolled in the Spring Intensive completed a pre- and post-education survey. Both surveys assessed students' D/deaf perceptions through Lewis and Keele's (2020) D/deaf and Hard of Hearing Interaction Beliefs Scale for Registered Nurses (DdHH-IBS/RN) and evaluated students' knowledge through a modified version of Greene and Scott's (2021) and Ruesch's (2018) published instruments. Additionally, the post-education survey included two Likert questions to rate the education and its inclusion in the graduate curriculum.

Results: Students' mean pre-education knowledge score (71%) was below Ruesch's (2018) 75% benchmark score, indicating a need for educational intervention. A statistically significant increase in students' D/deaf perception and knowledge scores were seen after completing the D/deaf focused educational online module (p <.001 for both measures). The majority of the students (n=35) agreed the online module was helpful, and all recommended including the module into the graduate curriculum.

Implications for Practice: The D/deaf-focused online module provided foundational education on how to effectively approach D/deaf individuals, and the results suggest the online module could be valuable for future graduate cohorts. Further research is needed to evaluate how successful students are in translating knowledge into clinical practice.

Implementing a D/deaf Educational Module for Graduate Nursing Students

Deafness is a hidden disability, and a significant risk factor for health disparities and gaps in care. In the United States, an estimated 37 million adults aged 18 and older suffer some degree of hearing loss, of whom 1 in 100 are recognized as Deaf, making it the third most common physical disorder (Agaronnik et al., 2019; Ruesch, 2018). Hearing loss affects about three million children (Ruesch, 2018). Profound hearing impairment is characterized as a 90 decibel (dB) hearing threshold (Academy Hearing Centres, n.d.). However, mild hearing loss is just as functionally significant because it overlaps with conversational speech's range of 26-55dB (Academy Hearing Centres, n.d.). Those with hearing loss after understanding a spoken language, who primarily use spoken language, are regarded deaf with a lowercase "d" (Grady et al., 2018; Grote et al., 2021). Those with prelingual hearing impairment (before age three), who chiefly use sign language, and define their impairment as a cultural identity are regarded Deaf with an uppercase "D" (Grady et al., 2018; Grote et al., 2021). D/deaf will be adopted throughout this paper to include anyone with hearing loss, regardless if they identify with the Deaf culture.

Approximately one million Americans identify as Deaf, and a majority utilize American Sign Language (ASL) as their primary means of communication (Bailey et al., 2021; Schniedewind et al., 2020). ASL is speculated to be the third most used language in the United States (Bailey et al., 2021). Sign language is a complex, visually interactive language, using a blend of hand motions and facial expressions, with significant grammatical differences from English (Myers et al., 2021). Due to these differences, English is like a second language for many D/deaf ASL users, who often have significantly lower reading proficiency and limited health literacy since ASL is not a

spoken or written language (Pendergrass et al., 2017). Lip reading is more challenging for people who never have heard spoken language. Only 30% of spoken English is readable on lips in optimal situations (Pendergrass et al., 2017). However, clinicians falsely presume most D/deaf patients competently lip-read and comprehend written education.

Hearing loss greatly affects communication. Miscommunication in healthcare settings may result in misdiagnosis, inappropriate treatment, and unintentional harm to the patient (Ruesch, 2018). Many clinicians are trained in the traditional model, where they view deafness as a disability needing correction (Greene & Scott, 2021). On the contrary, D/deaf patients endorse the sociocultural model, where deafness is not viewed as a disability needing correction, but as a unique cultural community. Clinicians are often unaware of this outlook and lack appropriate D/deaf education, leading to substantial communication obstacles, cultural incompetence, and insensitivity (Greene & Scott, 2021).

Although legislation to legally safeguard D/deaf individuals' rights and access to equitable healthcare was passed more than 30 years ago, D/deaf patients still experience considerable hurdles in healthcare communication (Pendergrass et al., 2017). The Americans with Disabilities Act (ADA) mandates all healthcare facilities provide adequate, accessible accommodations to guarantee effective communication equivalent to hearing patients (Agaronnik et al., 2019; Myers et al., 2021). The law does not specify which accommodations to use, though the ADA requires clinicians to prioritize D/deaf patients' communication preferences (Agaronnik et al., 2019; Myers et al., 2021).

Despite the legal statutes meant to protect D/deaf patients' rights to fair healthcare access, numerous barriers to care remain. The purpose of this project is to implement an

education module for Doctor of Nursing Practice (DNP) students regarding the D/deaf community and appropriate communication strategies to use with D/deaf patients in the clinical setting. The project will utilize the John Hopkins Evidence-Based Practice Model (JHNENP) to guide the project. This project aims to increase DNP students' awareness, confidence, and understanding of how to effectively interact with future D/deaf patients. The primary outcome measures of interest include D/deaf perception and knowledge scores. The question for this study was: In DNP students, what is the effect of a focused D/deaf educational module?

Literature Review

A comprehensive literature search was conducted in the Cochrane Database of Systematic Reviews, CINAHL, Medline, Project MUSE, PubMed, and Scopus for publications concerning healthcare communication barriers with D/deaf patients and educational interventions to improve healthcare professional students' competence. Key search terms contained *deaf**, *communication, hearing impair**, *hearing loss*, *hard of hearing*, *D/HH*, and *healthcare** used with the Boolean operators AND and OR. Inclusion criteria included peer-reviewed publications written in English from January 2015 to 2021 and excluded articles about audiology, deaf-blind, dementia, and cochlear implants to refine the search to 239 publications. From these publications, 35 were selected for further review. Ultimately, 12 publications were chosen.

Cumulatively, research findings revealed varied communication preferences among clinicians, with many not aligning with patients' requests and the ADA mandates. Accordingly, Lewis and Keele (2020) created the validated D/deaf and Hard of Hearing Interaction Beliefs Scale for Registered Nurses (DdHH-IBS/RN) instrument to assess

nurses' beliefs about interacting with D/deaf patients. They recommended implementing the DdHH-IBS/RN screening tool in nursing simulations (Lewis & Keele, 2020). Professional sign language interpreters were consistently utilized last to facilitate communication. Medical settings lacked consistency in providing sign language. Many clinicians and D/deaf individuals shared negative experiences with using video remote interpreting (VRI), including no training, technology issues, limited placement, and lack of patient-provider relationships (Yabe, 2020). Multiple publications had themes about distress over limited health communication, unqualified interpreters, and communication breakdown. This review will first discuss clinicians' views about the D/deaf community, then D/deaf patients' healthcare experiences, and educational interventions to improve future clinicians' competency with D/deaf patients.

Two publications performed descriptive research to study clinicians' beliefs and experiences regarding D/deaf patients. Agaronnik et al. (2019) utilized a randomly selected sample from five specialty disciplines. Pendergrass et al. (2017) used the socio-ecological model to understand nurse practitioners' (NPs) perceptions of barriers and promoters of working with Deaf ASL users. Both studies had a large sample size and achieved data saturation. Pendergrass and colleagues' (2017) total convenience and snowball sample of 10 NPs were either unaware or partly aware of the ADA mandates, and NPs did not believe their responsibilities included arranging professional interpreters.

Many in Agaronnik and colleagues' (2019) sample preferred VRI although patients preferred in-person interpreters, and about half incorporated communication accommodations in their offices. While not in congruence with the ADA requirements, clinicians assumed, or recommended D/deaf patients arrange their own preferred

accommodations. Furthermore, most considered using less effective communication approaches first, including lip-reading, writing notes, and family/friend interpreters.

Numerous D/deaf individuals recounted negative healthcare experiences. Three publications explored D/deaf individuals' experiences and challenges with the healthcare system. Kuenburg et al. (2016) completed a non-systematic review of 1,754 articles, Schniedewind et al. (2020) executed the first reported retrospective review investigating the incidence and severity of procuring a professional medical D/deaf interpreter, and Stevens et al. (2019) conducted a focused primary care exploratory study. More than 90% of Stevens and colleagues' convenience sample of 1,581 D/deaf individuals reported at least moderate difficulty communicating with clinicians. In fact, 93% of participants indicated they notified office staff about their hearing loss; however, only 24% reported the office *often* made accommodations, and 29.3% reported the office *never* made arrangements (Stevens et al., 2019). Thus, D/deaf patients reported fear, mistrust, and frustration during medical encounters (Kuenburg et al., 2016).

D/deaf patients prefer communicating through sign language, which healthcare settings often fail to provide. For example, about half of the 108 filed complaints in Schniedewind and colleagues' (2020) convenience sample were about unfulfilled promised medical sign language interpreters, of which 83% occurred in medical clinics. Most of these complaints occurred in urban areas where healthcare staff should be more knowledgeable about meeting D/deaf patients' requests. The odds of being guaranteed but not receiving an interpreter, increased each year of the five-year retrospective review (Schniedewind et al., 2020). Using medically experienced professional interpreters was found to improve D/deaf patients' medical experiences (Kuenburg et al., 2016).

Yabe (2020) and Myers et al. (2021) both employed a mixed-methods cross-sectional study to examine D/deaf healthcare communication methods and its impact on communication; the first study utilized a sequential exploratory design to survey VRI experiences and preferences in critical and non-critical care, and the second focused on D/deaf patients' satisfaction levels. Both studies had a large sample size, achieved data saturation, and retained an ASL interpreter for the qualitative portion. In Myers and colleagues' convenience sample of 189 Deaf adults, 65% preferred using a professional sign language interpreter, but only 45% used one. Participants further expressed favoring in-person interpreters over VRI due to technical difficulties, 98% expressed VRI frustrations (Myers et al., 2021). More than 50% of Yabe's (2020) snowball sample of 62 clinicians did not receive any VRI training. Using VRI for non-critical care had a statistically significant difference between clinicians and D/deaf patients' preferences; D/deaf patients preferred in-person interpreters, and clinicians had no preference (p = 0.03). D/deaf patients were not able to see VRI interpreters if they were lying down or moving around; as a result, VRI was more challenging to use (Yabe, 2020). Both studies revealed D/deaf patients strongly preferred receiving in-person interpreters; VRI should not be utilized for all encounters.

Diaz and Goyal (2020) completed a cross-sectional study to understand nursing students' D/deaf cultural awareness and knowledge. From the total convenience sample of 131 nursing students, 67% had D/deaf cultural awareness and 17% correctly responded to more than half of the questionnaire. Also, 25.2% of the sample were aware that medical facilities are obligated to provide interpreters and 54% knew facilities are responsible for arranging these services (Diaz & Goyal, 2020). Similarly, Ruesch (2018)

utilized a descriptive study to form a validated knowledge assessment instrument to measure nurses' knowledge of hearing loss and effective communication strategies. A mean test score of less than 75% was established as the benchmark for needing an educational intervention; the convenience sample of 399 students had a 60.5% average. Knowledge about current laws regulating care had the lowest mean score of all four knowledge categories at 39.5% (Ruesch, 2018). The use of an assessment tool can evaluate nurses' knowledge before and after an educational intervention.

Two publications utilized an uncontrolled interventional study to improve healthcare professional students' competence. Each study employed a convenience sample at a single university. Greene and Scott (2021) assessed the impact of implementing a Deaf Culture panel in first-year medical students, and Bailey et al. (2021) examined the impact of an ASL co-curricular course in developing pharmacy students' confidence and comfort communicating with D/deaf patients. The intervention consisted of four 90-min classes over basic ASL components, D/deaf culture, non-ASL communication strategies, interactions with D/deaf individuals, and practice sessions. An ASL co-curricular course showed statistical significance in increasing students' confidence in communicating and collaborating with the D/deaf community along with cultural competency ($p \leq 0.01$ for all measures) (Bailey et al., 2021).

Greene and Scott's (2021) sample of 199 medical students were significantly less knowledgeable about D/deaf individuals' preferred terms, the complexity of ASL, and that a cochlear implant does not enable a D/deaf individual to understand like a hearing person ($p < 0.05$ for all measures). The Deaf Culture panel involved three D/deaf individuals sharing personal experiences during a 90-min session, and the second year

included a 90-min lecture prior to the panel covering D/deaf culture, language, and language acquisition. The sample had a statistically significant increase in assessment scores after implementation across both years, and a higher proportion of students with no prior experience correctly answered more post-assessment questions ($p \leq 0.00$) (Greene & Scott, 2021).

No systematic reviews or meta-analyses were located, although two non-systematic reviews were found, one selected for this review. The selection of publications and lack of statistical analysis restricts their generalizability. Limitations of the research included lack of randomization, small sample sizes, and limited sample demographic diversity. Many studies possibly had selection bias due to the participants' willingness to join. Several publications employed qualitative methods; accurate results depend on participants providing truthful testimonies. The 2022 revised John Hopkins Evidence-Based Practice Model (JHNEBP) will provide the theoretical framework to structure this quality improvement (QI) initiative by integrating established evidence-based educational interventions. The project will employ an iterative, rapid three-step process, consisting of: posing a practice question, thoroughly reviewing for evidence, and then translating that evidence into practice (Dang et al., 2022). The JHNEBP model will provide a simplified EBP process for assimilating the latest evidence and best practice into routine training.

Despite reported efforts to communicate with D/deaf patients, many gaps for effective communication remain. Overall, research findings revealed communication barriers and clinicians' misconceptions of the D/deaf community places D/deaf patients at increased risk for inappropriate informed consent or unacceptable care. Research findings indicated cultural competency training and education about the D/deaf

community is instrumental in increasing the number of D/deaf experts in healthcare.

Methods

Design

This QI project utilized a descriptive design. A pre- and post-education survey collected demographic data along with data regarding perceptions, awareness, and knowledge of the D/deaf community. Data collection occurred between February to March 2022.

Setting/Sample

The project took place in a public College of Nursing, providing education to more than 1,100 students at a Midwestern university. A purposive sample of DNP graduate students aged 18 years and older enrolled in both the BSN-DNP program and the Spring intensive were used. Nursing graduate students pursuing a PhD degree, or those not enrolled in the Spring intensive were excluded. The sample includes 38 DNP students enrolled in the Spring 2022 Intensive course. Students enrolled in the intensive are in various NP tracks of Family NP, Adult-Gero NP, Pediatric Primary and Acute NP, Psychiatric Mental Health NP, and Women's Health NP.

Data Collection/Analysis

A Qualtrics survey collected deidentified data before and after completion of the D/deaf educational module. In order to maintain anonymity of responses yet track pre- and post-education data individually, participants were asked to create a unique identifier consisting of the first letter and first three numbers of their driver's license. Additionally, demographic data such as NP track, years of RN experience, age, gender, ethnicity, prior experience with a D/deaf individual, and previous education about the D/deaf community

was collected. Lewis and Keele's (2020) 25-item DdHH-IBS/RN, which uses a six-point Likert-type scale to record responses, was used to assess DNP students' perceptions of the D/deaf community. A modified knowledge assessment tool based on Greene and Scott's (2021) and Ruesch's (2018) published tests was used to assess the DNP students' knowledge, including multiple choice and true and false questions. The post-education survey included two additional Likert-type scale questions to rate the education and its inclusion for future curriculum, along with encouraging students' written feedback. The initial analysis used descriptive statistics performed through SPSS. Additionally, a paired samples *t*-test was utilized to examine pre- and post-test scores and ANOVA to analyze for significant score variations among the different clinical tracks.

Approval Process

The third committee member is the Executive Director of the Missouri Commission for the Deaf and Hard of Hearing (MCDHH) and gave endorsement for this project. The D/deaf education for DNP students' curriculum is a QI project selected by the university and led by the DNP candidate, who obtained IRB approval from the university before implementation. This study may directly benefit DNP graduate students by increasing their awareness and knowledge of the D/deaf community and appropriate communication strategies to use in future practice.

Procedure

Planning for this education implementation, included a meeting with the Executive Director of the MCDHH to establish healthcare communication areas for improvement and any content requests for the proposed curriculum. Additionally, another meeting with the College of Nursing's Executive Director of Graduate Practice Programs

explored the preferred format, time, and content for the proposed curriculum. The key stakeholders agreed on the implementation of an online educational module about the D/deaf community focused on improving healthcare communication.

The project consisted of implementing a D/deaf educational online module. The module consisted of VoiceThread presentations, videos, and online resources discussing the background of the D/deaf community, the expected legal requirements as a future NP, appropriate and effective D/deaf communication strategies, and basic ASL. Before initiation of the online module, DNP graduate students completed a Qualtrics pre-education survey. After completion of the online module, DNP graduate students were given a Qualtrics post-education survey to gauge effectiveness of the intervention.

Results

A total of 38 out of the 44 Intensive enrolled DNP graduate students completed the D/deaf educational online module. Most of the sample were between the ages of 25-34 years (*n*=25, 65.8%), followed by nine in the 35-44 age group (*n*=9, 23.7%). The sample predominantly reported female (*n*=34, 89.5%) and White or Caucasian as their ethnicity (*n*=33, 86.8%). Students with 5-6 years of nursing experience comprised the largest group (*n*=14, 36.8%), followed by those with 3-4 years of nursing experience (*n*=10, 26.3%). The Family, Pediatric, and Psychiatric Mental Health NP clinical tracks each contained the same number of participants (*n*=11, 28.9%). Twenty students had prior experience with a D/deaf individual (*n*=20, 52.6%). Only six participants previously received education about the D/deaf community (*n*=6, 15.8%). Four participants failed to use the same anonymous self-created identifiers from the pre-education survey in their post-education surveys, leaving four unpairable score groups (see Table 1).

Lewis and Keele's (2020) DdHH-IBS/RN uses a minimum score of 25 (proposing more negative D/deaf perceptions) and a maximum score of 150 (proposing more positive D/deaf perceptions). As shown in Table 2 and Figure 1, the sample's pre-education scores ranged from 95 to 142, with a mean score of 123.66 (*SD*= 11.49). Post-education scores ranged from 103-147, with a mean score of 132.37 (*SD*= 11.62). Students scored between a 42.1%-94.7% on the pre-education knowledge assessment portion, with a mean knowledge score of 71% (*SD*= 11.9). A mean test score of less than 75% was established as the benchmark for needing an educational intervention in Ruesch's descriptive study (2018), and the same was done in this QI project. Students achieved between a 47.4%-100% on the post-education knowledge assessment portion, with a mean knowledge score of 80.9% (*SD*= 14.7). Table 3 along with Figures 2 and 3 provide further comparisons of the knowledge assessment portion among students who previously received D/deaf education and those who did not.

The four unpairable score groups were removed before performing the following analyses with an alpha level of .05. A two tailed paired samples *t*-test was conducted to compare the D/deaf perception and knowledge scores before and after completion of the education. Overall, the students scored significantly higher on both the post-education DdHH-IBS/RN (*M*= 133.47, *SD*= 11.46) and knowledge assessment (*M*= 82.3, *SD*= 14.1) after completing the module. A statistically significant difference was seen for both the D/deaf perception ($t(33) = -5.48$, $p<.001$) and knowledge scores ($t(33) = -4.01$, $p<.001$). Furthermore, Table 4 shows additional statistically significant differences for the modified knowledge assessment's general knowledge ($t(33) = -4.40$, $p<.001$) and communication strategies categories ($t(33) = -3.14$, $p = .004$). An ANOVA was

performed to assess for any significant score variations among the different clinical tracks on both the post DdHH-IBS/RN and knowledge assessment scores. The results indicated no significant difference among the clinical tracks on post-survey score performance (see Table 5).

The two additional Likert questions in the post-education survey measured participants' viewpoints about the online module. As shown in Figure 4, 25 students strongly agreed that the online module was helpful in learning about the D/deaf community (*n*= 25, 65.8%), followed by 10 students who moderately agreed (*n*= 10, 26.3%). The second Likert question asked participants to rate how much they would recommend continuing this online module for future students. On a four-point Likert scale (1= strongly disagree; 4= strongly disagree), the participants rated their recommendation as either moderately agree (*n*=13, 34.2%) or strongly agree (*n*= 25, 65.8%) (see Figure 5). The open-ended question, which concluded the post-education survey, was studied for similarities. Table 6 provides participants' feedback with a majority being positive responses, and a few reported some dissatisfaction.

Discussion

Implementation of the D/deaf educational module increased participants' awareness, confidence, and understanding. Before implementation, the sample mean knowledge score was 71%, which is consistent with Ruesch's (2018) benchmark score for requiring a D/deaf focused educational intervention. Based on the descriptive data and the statistically significant paired *t*-test results for both instruments, the findings suggest the positive effect of a D/deaf educational module in improving DNP students' attitudes and knowledge of the D/deaf community.

Four knowledge categories compose the modified knowledge assessment instrument: general knowledge (GK), communication strategies (CS), laws and policies (LP), and hearing assistive devices (HA). Both initially and after participating in the education, students scored the highest in the HA category. HA, such as hearing aids, are commonly taught in nursing curriculum; thus, the category's scores were not surprising.

Moreover, the students scored the lowest in the LP category before and after participating in the online module, likewise Ruesch (2018) found similar findings in her study. Nursing curriculum does not typically cover LP regarding disability as seen in the literature (Pendergrass et al., 2017). Thus, NPs are unknowingly noncompliant with the expected legal obligations when providing care to the D/deaf. As a result, to teach future NPs the LP a longer and denser portion with complicated terms was needed, which may explain the findings. Therefore, future research and educators should consider adapting the information into a video format or breaking the presentation into shorter segments to make grasping the information easier. Predictably, those who previously received D/deaf education scored higher in the GK and LP categories; however, remarkably they initially scored lower in the CS and HA categories. The lower scores may be due to, prior to this QI initiative, receiving education biased toward a traditional model where deafness is a disability needing correction. Both the GK and CS categories showed a statistically significant increase in post-education scores. These findings suggest the online module's positive effect in improving student's understanding and knowledge of the D/deaf community and how to effectively interact with D/deaf individuals.

The QI initiative imparted valuable information about the effect of adding focused D/deaf education to the DNP curriculum. Strengths of this QI project included a high

response rate, every participant completed both the pre- and post-survey in its entirety, and participants' responses remained unidentified through a participant-created anonymous identifier. Limitations of this study consisted of a small sample size, limited sample demographic diversity, and four DNP students failing to use the same anonymous self-created identifier from their pre-education surveys. Students accessed the education at no additional cost and had the opportunity to complete the education asynchronously; however, the participants were given about a month to complete participation.

The next step would be to assess how effective the students are in translating the knowledge into clinical practice since this QI is the first step in implementing D/deaf-focused education. An Objective Structured Clinical Examination with possibly a D/deaf standardized patient could be an ideal form of assessment, where students feel free to practice in a safe, controlled environment. Analysis of these future assessments may offer additional insight for continual curriculum improvement. Additionally, future curricula should include more VRI education due to its increasing usage in clinical practice and its associated usage problems. Due to time constraints, this QI was unable to provide VRI operability education. Despite the education's length and dense amount of information, most DNP students found the D/deaf educational module highly informative. All the participants recommended including this online module for future intensives.

Conclusion

As seen in the literature, healthcare professionals seldom receive D/deaf-focused education in their training, which results in a higher percentage of healthcare providers who are unknowledgeable and incompetent to effectively provide care to D/deaf individuals. Therefore, healthcare providers including future NPs must graduate from

programs that provide D/deaf education in their curriculum. The D/deaf educational module is the first time this College of Nursing implemented D/deaf education into its DNP curriculum. The data supports using a D/deaf educational module to improve DNP students' attitudes and knowledge of the D/deaf community, which is consistent with previous research results on D/deaf education in healthcare professional students. DNPs have the unique capability to carryout similar QI projects due to their holistic approach, which allows them to easily support the D/deaf sociocultural model instead of the medical traditional model of deafness. Additionally, they receive specialized training to narrow the gap between research and clinical practice, which can be implemented in either academia or in the clinical setting. Increasing nursing curriculums containing D/deaf education has the potential to not only produce more culturally competent NPs, but also D/deaf healthcare advocates.

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Table 1

DNP Graduate Student Demographic Characteristics

Variable	*n*	*%*
Age		
18 – 24 years	2	5.3
25 – 34 years	25	65.8
35 – 44 years	9	23.7
45 – 54 years	2	5.3
Gender		
Female	34	89.5
Male	4	10.5
Ethnicity		
Caucasian/White	33	86.8
African American/Black	3	7.9
Asian or Pacific Islander	2	5.3
RN experience		
1 – 2 years	4	10.5
3 – 4 years	10	26.3
5 – 6 years	14	36.8
9 – 10 years	2	5.3
Over 11 years	8	21.1
Clinical track		
Family	11	28.9
Pediatric	11	28.9
Psychiatric Mental Health	11	28.9
Women's Health	2	5.3
Adult-Geriatric	3	7.9
Prior experience with a D/deaf individual		
Yes	20	52.6
No	18	47.4
Previously received D/deaf education		
Yes	6	15.8
No	32	84.2

Note. $N = 38$.

Table 2

Descriptive Statistics of Students Pre- and Post-Education Surveys

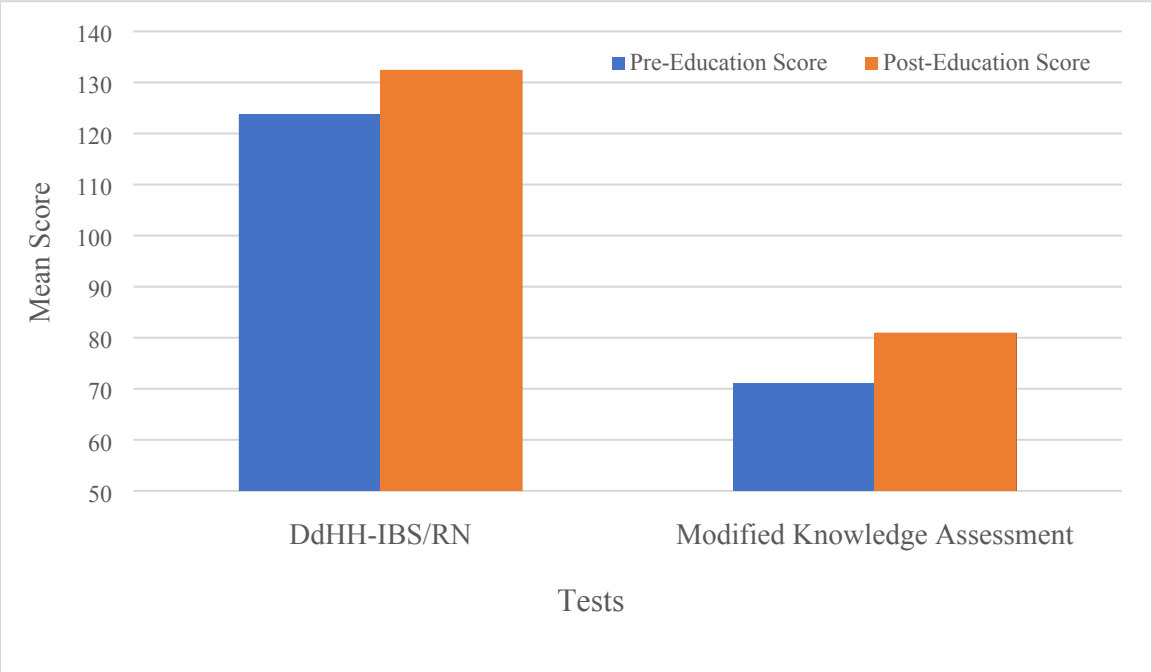
Scale	Pre-Education			Post-Education		
	Mean	Range	*SD*	Mean	Range	*SD*
DdHH-IBS/RN [a]	123.66	95-142	11.49	132.37	103-147	11.62
Prior D/deaf experience [b]	126.67	101-142	11.97	135	115-147	9.90
No prior experience [b]	122.5	95-137	10.66	131.75	103-145	13.12
Previous D/deaf education [b]	135.83	130-142	4.17	141.5	135-147	4.81
No D/deaf education [b]	122.32	95-141	11.06	131.75	103-146	11.79
Modified knowledge assessment [a]	71.0%	42.1%-94.7%	11.9	80.9%	47.4%-100%	14.7
Prior D/deaf experience [b]	70.8%	52.6%-94.7%	10.9	83.9%	57.9%-100%	10.7
No prior experience [b]	72.4%	47.4%-84.2%	12.1	80.6%	47.4%-100%	17.4
Previous D/deaf education [b]	73.7%	57.9%-94.7%	14.9	87.7%	78.9%-94.7%	6.4
No D/deaf education [b]	71%	47.4%-84.2%	10.7	81.2%	47.4%-100%	15.1

Note. For the DdHH-IBS/RN, higher mean scores are associated with more positive belief and lower mean scores are associated with less positive beliefs about the D/deaf community. For the modified knowledge assessment, a mean test score of less than 75% is the benchmark for needing an educational intervention.

[a] For the main scale rows $n = 38$. [b] For the subcategories $n = 34$ due to four participants failing to use the same self-created anonymous identifier.

Figure 1

Comparison of Pre- and Post-Education Scores



Note. For the DdHH-IBS/RN, higher mean scores are associated with more positive belief and lower mean scores are associated with less positive beliefs about the D/deaf community. For the modified knowledge assessment, a mean test score of less than 75% is the benchmark for needing an educational intervention.

Table 3

Descriptive Statistics of Modified Knowledge Assessment's Pre- and Post-Scores

Knowledge Assessment Categories	Pre-Education			Post-Education		
	Mean (%)	Range (%)	*SD*	Mean (%)	Range (%)	*SD*
Overall score [a]	71.0	42.1-94.7	11.9	80.9	47.4-100	14.7
General knowledge [a]	67.1	33-100	18.8	84.2	50-100	17.3
Previous D/deaf education [b]	77.8		17.2	94.4		8.6
No D/deaf education [b]	66.7		18.7	83.3		18.1
Communication strategies [a]	74.8	43-100	13	81.6	57-100	11.5
Previous D/deaf education [b]	73.8		16.7	83.3		10.7
No D/deaf education [b]	74		12.3	83.2		10.3
Laws and policies [a]	62.5	0-100	23.8	69.7	0-100	29.1
Previous D/deaf education [b]	66.7		20.4	79.2		29.2
No D/deaf education [b]	62.5		25	69.6		29.9
Hearing assistive devices [a]	86.8	0-100	25.2	90.8	0-100	22.8
Previous D/deaf education [b]	75		27.4	100		0
No D/deaf education [b]	91.1		19.5	91.1		23.8

Note. For the modified knowledge assessment, a mean test score of less than 75% is the benchmark for needing an educational intervention.

[a] For the main knowledge category rows $n = 38$. [b] For the knowledge subcategories $n = 34$ due to four participants failing to use the same self-created anonymous identifier

Figure 2

Comparison of Modified Knowledge Assessment's Subcategory Pre-Education Scores

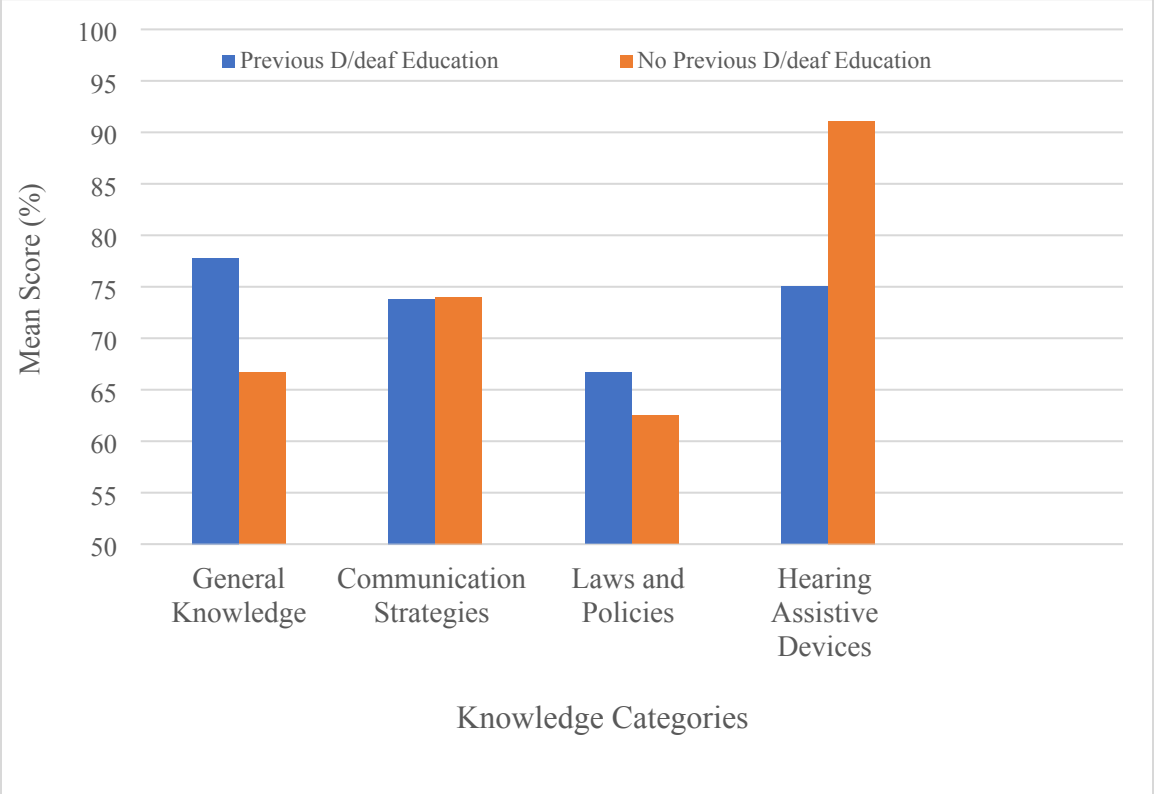


Figure 3

Comparison of Modified Knowledge Assessment's Subcategory Post-Education Scores

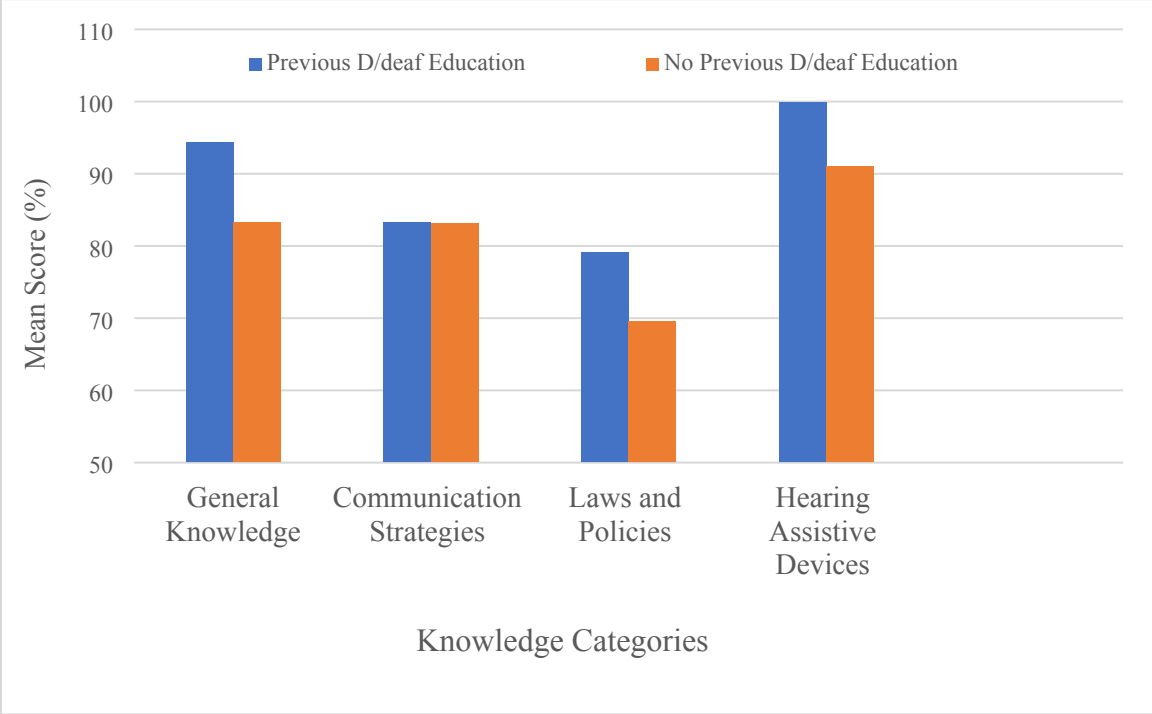


Table 4

Two-Tailed Paired Samples t-Test for the Pre- and Post-Education Survey Scores

Scale	Mean	*SD*	Paired *t* test		
			t	*p*	*d*
DdHH-IBS/RN	-8.76	9.32	-5.48	<.001	-.94
Modified knowledge assessment	-10.8	15.8	-4.01	<.001	-.69
General knowledge subcategory	-16.7	22.1	-4.40	<.001	-.75
Communication strategies subcategory	-9.24	17.2	-3.14	.004	-.54
Laws and policies subcategory	-8.09	30.0	-1.57	.12	-.27
Hearing assistive devices subcategory	-4.41	25.7	-1.00	.32	-.17

Note. *N*= 34. Degrees of freedom = 33.

Table 5

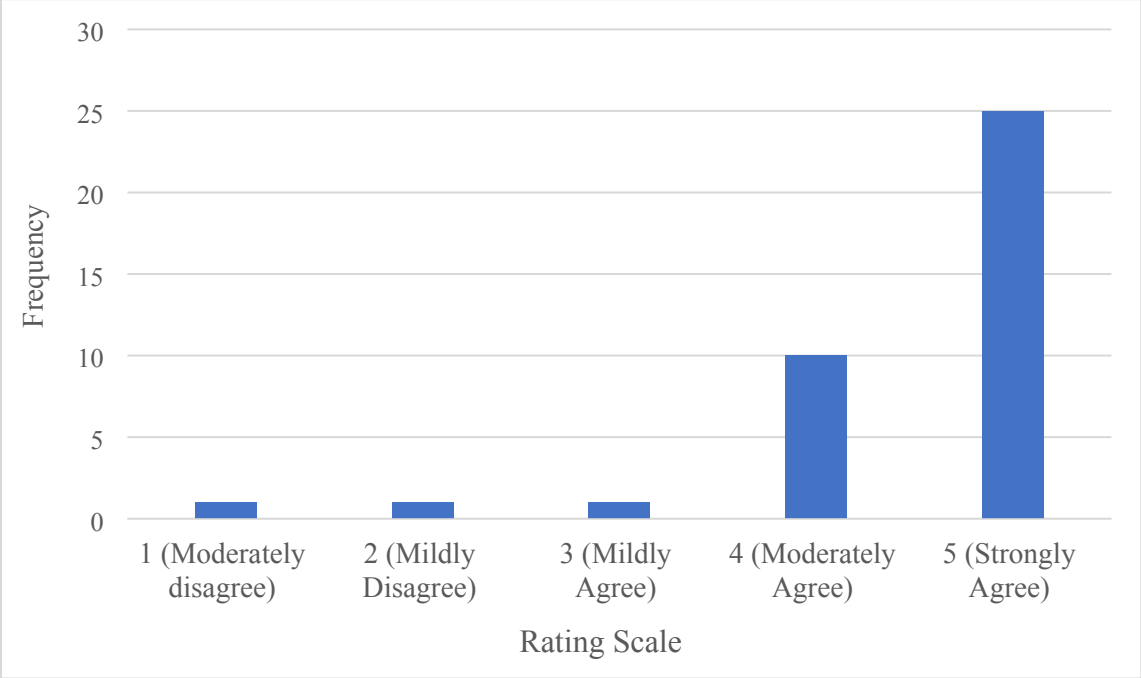
One-Way ANOVA for Graduate Nursing Clinical Tracks and Survey Scores

Variable	*df*	*F* ratio
DdHH-IBS/RN		
Pre-education score (Between groups)	4	0.91
Post-education score (Between groups)	4	1.31
Modified knowledge assessment		
Pre-education score (Between groups)	4	.63
Post-education score (Between groups)	4	1.66

Note. *N*= 34.

Figure 4

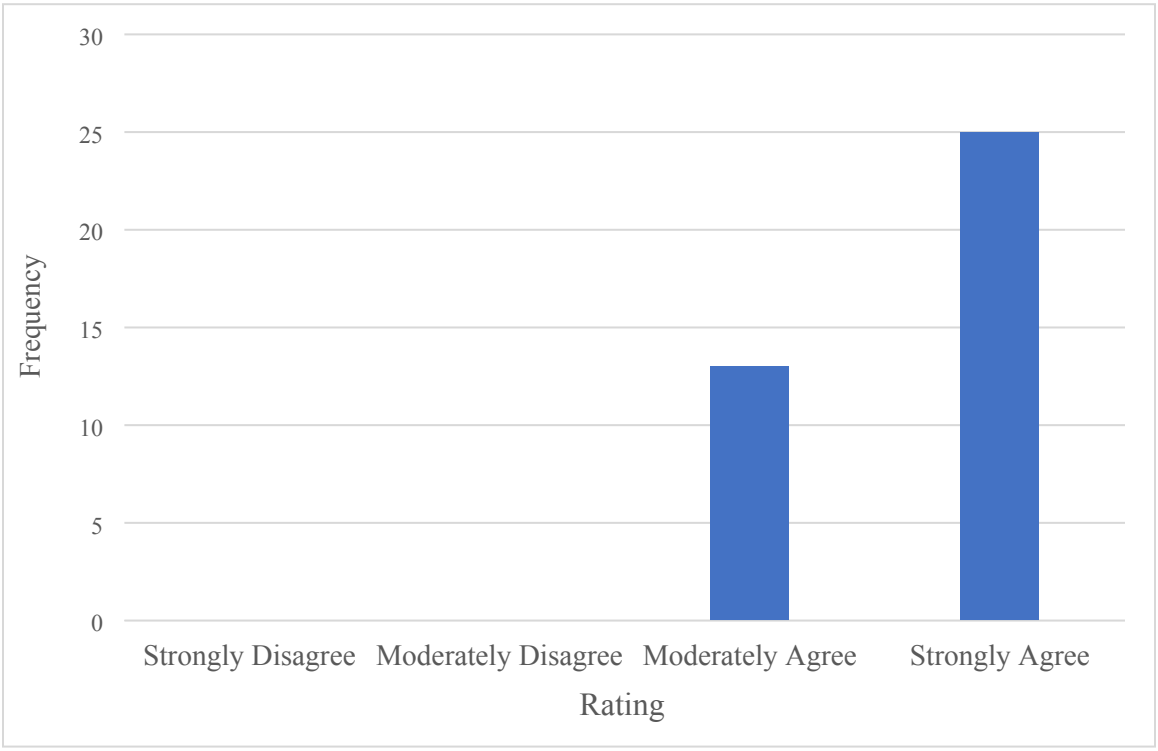
Online Educational Module's Helpfulness in Learning About the D/deaf Community



Note. $N = 38$.

Figure 5

Recommendation Strength for Repeating Educational Module for Future Intensives



Note. $N = 38$.

Table 6

DNP Graduate Student Participants' Feedback

Prompt	Feedback
Please feel free to share any feedback or thoughts about this focused D/deaf online module.	"I have taken a D/deaf culture class, learned some sign language, and interacted with a few D/deaf patients, even with that knowledge this module was informative and enlightening. It makes me so happy that D/deaf individuals are getting some love and attention." "Loved the short film!" "I really enjoyed this online module. I am interested in actually taking some America Sign Language courses so that I can better communicate with my pediatric patients." "I read the slides all before so I felt like it was a little redundant with the voice threads, maybe making them available after the fact?" "There was a lot of great information, but there was a lot of slides and some of the clips weren't informative. Also, The Silent Child was very well done, but it was so horrific and an unnecessary emotional blow. That's child abuse, please don't make more people watch that." "It was very informative and professionally done." "Module was a little long! It was hard to stay focused at times." "This was an incredibly insightful presentation! I learned multiple things. Thank you!" "This module was very good and I enjoyed the clips in the voicethreads. I also enjoyed the 20 minute video." "Amazing online lecture. The short film was just perfect but emotional." "I liked all of the videos embedded throughout the presentation." "This change my entire perspective. Thank you"