

DEVELOPMENT AND VALIDATION OF AN INSTRUMENT TO MEASURE
NURSES' BELIEFS TOWARD DEAF AND HARD OF HEARING INTERACTION

A DISSERTATION

SUBMITTED IN PARTIAL FULFILLMENT OF THE REQUIREMENTS FOR THE
DEGREE OF DOCTOR OF PHILOSOPHY
IN THE GRADUATE SCHOOL OF
TEXAS WOMAN'S UNIVERSITY

COLLEGE OF NURSING
TEXAS WOMAN'S UNIVERSITY

BY

AUDRA LEWIS, B.A., MSN

DENTON, TEXAS

DECEMBER 2018

To the Dean of the Graduate School:

I am submitting herewith a dissertation written by Audra Lewis entitled “Development and Validation of an Instrument to Measure Nurses’ Beliefs toward Deaf and Hard of Hearing Interaction.” I have examined this dissertation for form and content and recommend that it be accepted in partial fulfillment of the requirements for the degree of Doctor of Philosophy with a major in Nursing Science.

Rebecca Keele, Ph.D., Major Professor

We have read this dissertation and recommend its acceptance:

Elizabeth Restrepo, Ph.D.

Becky Spencer, Ph.D.

Chad Smith, Ph.D.

Accepted:

Dean of the Graduate School

Copyright © Audra Lewis, 2018
All rights reserved

DEDICATION

“If you are going through hell, keep going...”

— Winston Churchill

This work is dedicated to my parents, James and Pat Lewis, who showed me that success is really measured in the laughter and love that you share with others during this life.

This is also dedicated to my beautiful and highly intelligent children – Adrian, Kendall, Emerson, and Bryn, who have made me more successful than I ever imagined possible.

In memory of Molly, a truly *golden* retriever that taught me the meaning of dedication and although we never exchanged a single word, she knew my heart.

ACKNOWLEDGMENTS

First and foremost, I thank my committee chairperson, Dr. Rebecca Keele who was not only generous with her time and expertise, but was also brave enough to embark upon this journey of instrument development with me. Dr. Keele, thank you for inspiring me to become a better researcher and for offering your unwavering encouragement and support throughout the process, especially during difficult times.

I express appreciation to my committee members. Dr. Elizabeth Restrepo, thank you for making quantitative research less terrifying and for introducing me to Deaf Culture. Dr. Becky Spencer, thank you for challenging me to become a better (and published) writer and for showing a genuine interest in the many human faces and factors associated with interaction between nurses and D/deaf and hard of hearing patients. Dr. Chad Smith, thank you for accepting the task of bridging the gap between disciplines and for insisting that I broaden the scope of my instrument beyond Deaf American Sign Language (ASL) users.

Special thanks for the contributions of others to this research project – Dr. Paul Yeatts, statistician extraordinaire, for answering the last of my never-ending series of questions with the same enthusiasm and encouragement as the first, and for making both exploratory and confirmatory factor analysis less painful than I had anticipated. Sammie Sheppard, for introducing me to members of the Deaf community and for sharing your insight and expertise regarding Deaf Culture, ASL, and certified

interpreter preparation. Content experts Amber, Beth, Eric, Kathleen, Lea, and Will for giving your time and invaluable feedback for item development.

Finally, I would like to thank the National League for Nursing (NLN) and the Southern Nursing Research Society (SNRS) for the funding of this project. I am deeply honored to have been chosen as the recipient of the 2018 SNRS/NLN Dissertation Research Grant Award and the funds were instrumental in the execution and completion of my dissertation research project.

ABSTRACT

AUDRA LEWIS

DEVELOPMENT AND VALIDATION OF AN INSTRUMENT TO MEASURE NURSES' BELIEFS TOWARD DEAF AND HARD OF HEARING INTERACTION

DECEMBER 2018

Communication barriers experienced by Deaf signers, non-signing deaf, and hard of hearing (DdHH) individuals in healthcare environments are multidimensional and complex. Investigating what nurses believe about DdHH patient interaction is an important step in minimizing barriers and improving nursing care. This research addressed the lack of reliable instruments to assess nurses' beliefs toward DdHH interaction through instrument development guided by King's (1981) Theory of Goal Attainment and Transactional Communication Model. A quantitative methodological design was used to develop and test the validity and reliability of an instrument to measure registered nurses' beliefs toward interaction with DdHH patients and certified interpreters (CIs). An initial pool of items to assess registered nurses' beliefs toward DdHH interaction was developed based on an extensive review of literature. Item pool content was validated by six content experts including one Deaf signer, one Deaf nurse, two hard of hearing nurses, and two hearing CIs. The initial D/deaf and Hard of Hearing Interaction Beliefs Scale for Registered Nurses (DdHH-IBS/RN) included 58 items. The first wave of data collection and analyses resulted in a 25-item DdHH-IBS/RN consisting

of two factors: Personal-Social Beliefs Domain and Interpersonal Beliefs Domain. The 25-item DdHH-IBS/RN was subjected to a second wave of data collection and analysis to further refine and validate the instrument. Psychometric analysis of two separate groups of data concluded that the newly developed DdHH-IBS/RN is a reliable and valid scale to measure nurses' beliefs towards DdHH interaction. Results of confirmatory factor analysis (CFA) supported the hypothesized structure of the scale and provided some evidence for its factorial validity. Results of correlation analyses revealed a weak positive correlation between years of experience interacting with non-signing deaf and hard of hearing individuals and Personal-Social mean scores. Regression results indicated that the overall model moderately predicted Personal-Social subscale mean scores and had no significance in predicting Interpersonal subscale mean scores. Independent samples *t*-tests showed significant differences between participants with and participants without prior education and experience specific to DdHH interaction on both Personal-Social and Interpersonal subscale mean scores. Further improvement of scale items, and retesting for validity and reliability is recommended.

TABLE OF CONTENTS

	Page
COPYRIGHT	iii
DEDICATION	iv
ACKNOWLEDGMENTS	v
ABSTRACT.....	vii
LIST OF TABLES	xvi
LIST OF FIGURES	xviii
 Chapter	
I. INTRODUCTION	1
Background of Problem	3
Statement of Problem.....	8
Purpose of Study	9
Research Questions and Hypotheses	10
Significance of Study.....	11
Theoretical Framework.....	14
Interacting Systems Framework	16
Transactional Communication Model.....	19
Belief	20
Domains of Belief	24
General Beliefs about Being DdHH	24
Beliefs about Signing Interaction.....	25
Beliefs about Interaction with the DdHH	25
Beliefs about Available Resources for Interacting with the DdHH...	25
Integration of Theoretical Concepts.....	26
Definition of Terms.....	28
Assumptions.....	30
Limitations	31
Strengths	31
Summary	31

II. LITERATURE REVIEW	34
Literature Search	35
Deaf Cultural Identity	35
Social Organization.....	38
DdHH Communication	40
American Sign Language.....	41
Language Proficiency and Literacy	42
Health Literacy.....	43
Written Communication.....	46
Lip Reading.....	47
DdHH Interaction.....	48
Space	48
Time	51
Environmental Control.....	52
DdHH Experiences in Health Care Settings	53
Interpreter Service Use in Healthcare	59
DdHH Interaction Competence in Nursing.....	62
DdHH Interaction Competence in Other Health Professions	64
Ethical and Legal Implications	66
Instruments to Measure Nurses' DdHH Interaction Competence	68
Summary	70
III. METHODS	73
Research Design.....	73
Research Questions	76
Hypotheses	76
Participants and Sample Size	77
Sample Size.....	77
Content Validity.....	78
Construct Validity	78
Inclusion Criteria	80
Exclusion Criteria	81
Setting	81
Instrument Development.....	82
Initial Item Pool	83
Content Validity.....	84
Construct Validity	87

Data Collection	87
Content Validity.....	88
Construct Validity with Exploratory Factor Analysis	89
Data Analysis	90
Variable Correlation.....	90
Content Validity.....	91
Factor Analysis	91
Factor Extraction.....	92
Scree Test.....	92
Factor Rotation.....	93
Cronbach's Alpha	94
Split-Half Reliability.....	96
Confirmatory Factor Analysis.....	97
Follow-up Analyses	97
Measures to Protect Human Subjects	98
Informed Consent.....	98
Confidentiality	99
Data Management	100
Summary	101
IV. RESULTS	103
Initial Development and Validation of the DdHH-IBS/RN.....	103
Content Validity.....	103
Data Collection	105
Pre-Analysis Data Screening	107
Invalid Cases.....	107
Normality, Linearity, and Homoscedasticity	109
Summary of Pre-Analysis Data Screening	115
Main Study Findings Initial Sample	115
Demographics	115
DdHH Communication and Interaction Demographics.....	118
Construct Validity	120
Reliability Analysis.....	127
Summary of Data Analysis	128
Further Refinement and Validation of the DdHH-IBS/RN	129
Pre-Analysis Data Screening	129
Invalid Cases.....	129
Normality, Linearity, and Homoscedasticity	130

Summary of Pre-Analysis Data Screening	136
Main Study Findings Second Sample	136
Demographics	136
DdHH Communication and Interaction Demographics.....	139
Construct Validity	141
Reliability Analysis.....	147
What is the Reliability of the DdHH-IBS/RN?.....	147
Confirmatory Factor Analysis.....	148
Follow-up Analyses	152
Correlation Analysis	152
Multiple Regression	153
Independent Samples <i>t</i> -tests.....	156
Summary of Results.....	162
IV. CONCLUSIONS, IMPLICATIONS, AND RECOMMENDATIONS.....	164
Overview and Purpose of Study	164
Discussion of Findings.....	165
Limitations	171
Conclusions.....	172
Theoretical Implications	173
Implications for Nursing Education, Practice, and Policy.....	174
Recommendations for Future Research	176
Summary	178
V. REFERENCES	180
APPENDICES	
A. Nurse – DdHH – Interpreter Model of Transaction.....	219
A1 Revised Nurse – DdHH – Interpreter Model of Transaction	221
B. Additional Definitions Relevant to DdHH Communication and Interaction.....	222
C. Measuring DdHH Communication-Interaction Competence in Nursing	229
D. Measuring DdHH Communication-Interaction Competence in Other Professions	248
E. Attitudes to Deafness Scale	253
F. Dimensions of D/deaf and Hard of Hearing Interaction.....	255
G. Pool Item Categorization according to Personal, Interpersonal, and Social Dimensions of DdHH Interaction	273

H. Item Pool for DdHH Interaction Belief Scale for Registered Nurses	286
I. Results of Content Validity and Reliability Analyses for Initial Item Pool of D/deaf and Hard of Hearing – Interaction Beliefs Scale for Registered Nurses	296
J. D/deaf and Hard of Hearing Interaction Beliefs Scale for Registered Nurses ..	301
K. Institutional Review Board Approval	310
K1 IRB Approval for First Modification	312
K2 IRB Approval for Second Modification.....	313
K3 IRB Approval for Third Modification	314
L. Participant Recruitment Flyer	316
M. 2018 Southern Nursing Research Society/National League for Nursing Dissertation Research Grant Award.....	317
N. Revised D/deaf and Hard of Hearing Interaction Scale for Registered Nurses.	321
O. Curriculum Vitae	328

LIST OF TABLES

Table	Page
1. Collinearity Statistics: Group 1.....	114
2. Frequencies and Percentages for Demographic Variables: Group 1	116
3. Frequencies and Percentages for Nursing Demographic Variables: Group 1	117
4. Pattern Matrix with Principal Axis Factoring and Oblimin Rotation with Kaiser Normalization for 58 Item DdHH-IBS/RN	123
5. Factor 1 Items for First Wave: Personal-Social Beliefs Domain.....	125
6. Factor 2 Items for First Wave: Interpersonal Beliefs Domain.....	126
7. Split-half Reliability for 25 Item DdHH-IBS/RN: Group 1	128
8. Collinearity Statistics: Group 2.....	135
9. Frequencies and Percentages for Demographic Variables: Group 2	137
10. Frequencies and Percentages for Nursing Demographic Variables: Group 2	138
11. Pattern Matrix with Principal Axis Factoring and Oblimin Rotation with Kaiser Normalization for 25 Item DdHH-IBS/RN	143
12. Factor 1 Items for Second Wave: Personal-Social Beliefs Domain	145
13. Factor 2 Items for Second Wave: Interpersonal Beliefs Domain	146
14. Split-half Reliability for 25 Item DdHH-IBS/RN: Group 2	148
15. Results of Confirmatory Factor Analysis for the DdHH-IBS/RN	150

16. Pearson Correlations of Personal-Social and Interpersonal Subscales with Measures of Experience Specific to DdHH Interaction.....	153
17. Multiple Linear Regression Predicting Personal-Social and Interpersonal Positive Beliefs toward DdHH Interaction from Nursing Education and Experience Specific to DdHH Interaction	155
18. Means and Standard Deviations for Personal-Social Scores by Nursing Education and Experience.....	159
19. Means and Standard Deviations for Interpersonal Scores by Nursing Education and Experience.....	161

LIST OF FIGURES

Figure	Page
1. Nurse – Deaf ASL user – ASL Interpreter Model of Transaction.....	218
2. Histogram of 58 Item DdHH-IBS/RN Mean Scores	111
3. Predicted-Probability Plot for First Wave.....	112
4. Scatterplot of Standardized Predicted Values by Standardized Residuals for First Wave	113
5. Scree Plot for First Wave.....	121
6. Histogram for Personal-Social Mean Scores for Second Wave	131
7. Histogram for Interpersonal Mean Scores for Second Wave	132
8. Predicted-Probability Plot for Second Wave	133
9. Scatterplot of Standardized Predicted Values by Standardized Residuals for Second Wave	134
10. Scree Plot for Second Wave	142
11. Revised Nurse – Deaf ASL user – ASL Interpreter Model of Transaction.....	219

CHAPTER I

INTRODUCTION

Communication, signed or spoken, is an interactive process by which human beings exchange information and establish relationships. Nurse-patient communication has a significant effect on health outcomes as well as patient satisfaction and quality of care. In the United States, the provision of quality and safe patient-centered care can be compromised by poor communication between nurses and patients with limited English proficiency. Deaf American Sign Language (ASL) users are one such group that may lack proficiency in written English and often struggle to understand spoken English (McKee, Barnett, Block, & Pearson, 2011). Quality of care and safety may also be jeopardized when nurses do not understand diverse communication and interaction modalities among signing Deaf, non-signing deaf, and hard of hearing (HH) individuals. Deaf ASL users are distinguished with an uppercase *D*, whereas the audiological condition of deafness is indicated by a lowercase *d*. Notable differences in methods of communication exist among signing Deaf, non-signing deaf, and HH individuals. However, personal, interpersonal, and environmental considerations that hearing nurses should be aware of when interacting with members from each group are similar. Hence, this DdHH connotation will be used to include Deaf ASL users, deaf that use other signing methods, non-signing deaf, and HH individuals.

ASL is the primary language of Deaf culture and the fifth most common non-English language used in the United States (Gallaudet University, 2015). Approximately one million Deaf ASL users are isolated by communication and language barriers in a hearing-dominant world (Barnett, McKee, Smith, & Pearson, 2011). Deaf that use signing methods other than ASL, non-signing deaf, and hard-of-hearing may also experience isolation due to ineffective communication. Such barriers reduce opportunities for the DdHH to benefit from access to healthcare information and services. Lack of access to health information and services results in lower general health knowledge, lower health literacy, and less favorable health outcomes; all of which perpetuate health disparities (Barnett et al., 2011; Berman et al., 2013; Sacks et al., 2013; Ferguson-Coleman, Keady, & Young, 2014; McKee et al., 2015; Sirch, Salvador, & Palese, 2016).

Effective communication is a standard of competent professional nursing performance (American Nurses Association [ANA], 2015). Competency refers to an expected level of performance that integrates knowledge, skill, ability, and judgment (ANA, 2015). Competent communication requires that nurses not only understand needs of the patient, but that nurses have the knowledge and ability to convey a message in an appropriate and effective manner. Knowledge and behavior are formed by beliefs because what a person believes is the basis for how one interprets the world, understands his or her place within it, and reacts accordingly to changing environments (Connors &

Halligan, 2015). Thus, individual belief may be viewed as the gateway for competent knowledge and behavior formation and implementation.

The ANA (2015) recommended that competency be evaluated using tools that capture objective and subjective data about the nurses' knowledge base and actual performance. Nursing knowledge and performance evaluation tools should also be appropriate for the specific situation and establish the desired outcome of competence evaluation (ANA, 2015). Gaps exist in the literature regarding DdHH communication and interaction competency in nursing. Furthermore, instruments to measure American nurses' beliefs toward DdHH communication and interaction are nonexistent. Therefore, an instrument to assess beliefs is needed to identify the actualities and misconceptions that nurses' have regarding communication and interaction with DdHH patients.

The study is relevant to nursing because effective communication is a hallmark of professional competence and patient-centered care. This study is important because designing a valid and reliable instrument to assess nurses' beliefs towards DdHH interaction is critical in identifying knowledge gaps and creating tailored education modules to support competent nursing practice. From this point forward, the term *interaction* will be used to include verbal and nonverbal communication.

Background of Problem

Approximately 37 million American adults aged 18 and over report some degree of hearing loss (Blackwell, Lucas, & Clarke, 2014). However, hearing loss is a broad

term that is often used to collectively label individuals with various levels of hearing and equally diverse methods of communication. Some individuals who are born deaf may argue that they do not have hearing loss because it is impossible for a person to lose what they do not have in the first place. Many people who are born deaf identify as culturally Deaf and use ASL or other methods of sign, rather than spoken language, to communicate. Others who experience deafness due to trauma or illness, or progressive hearing loss later in life often identify with the hearing community and may use a combination of spoken language and sign to communicate, or not sign at all. While some people who are deaf may neither sign nor speak.

Sign language-using Deaf people are members of an underserved minority group whose health needs are understudied. Census data does not differentiate deafness from other alterations in hearing, and thus, there is no solid or reliable basis for any estimation of ASL or other sign use in the United States (U.S. Census Bureau, 2015; Harrington, 2016). Estimates of Deaf ASL users in the United States vary from 500,000 to 2 million, depending on the data source. Moreover, health care quality indicators do not specifically measure deafness or sign language, so the full effect of health care barriers on the well-being of D/deaf signers and their families is unknown (Barnett et al., 2011).

Healthcare and health-related information is routinely inaccessible for Deaf adults. Deaf signers have unique cultural and linguistic characteristics that affect health behavior, health literacy, access to healthcare services, and communication with

healthcare professionals (HCPs) (National Association of the Deaf [NAD], 2017a; Neuhauser et al., 2013). One source of disconnect for the Deaf is lack of ASL accessible health information materials including printed medication instructions, disease specific prevention, screening, and treatment brochures, educational videos, and mass media announcements. (Barnett et al., 2017; Berman et al., 2013; McKee et al, 2011; 2015; Neuhauser et al., 2013; Sacks et al., 2013; Sirch et al., 2016). Lack of HCP's knowledge of cultural and linguistic differences of Deaf signers is another barrier to effective communication that results in misunderstandings and negative outcomes for Deaf patients. For example, one fundamental misconception among HCPs is that sign language users understand general medical terms; however, many terms common in healthcare such as *allergy*, *cholesterol*, *bowel*, and *body mass index* (BMI), have little meaning for Deaf patients (Iezzoni, O'Day, Kelleen, & Harker, 2004; McKee et al., 2011).

Like Deaf signers, many deaf and HH individuals have alternative communication modalities that affect health literacy, access to healthcare services, and health behavior (Naseribooriabadi, Sadoughi, & Sheikhtaheri, 2017; Neuhauser et al., 2013). Although HH individuals have also reported difficulties with accessing basic health care, being HH is not the same as being deaf (Pandhi, Schumacher, Barnett, & Smith, 2011). The term *hard of hearing* is often used to describe someone older in age with progressive hearing loss ranging from mild to severe deafness. More importantly, many people with hearing

loss do not consider themselves HH, despite their difficulty in understanding conversations (Widner-Kolberg, 2014). When hearing loss occurs later in life, individuals are usually proficient in spoken language, reading, and written communication and may rely on lip reading or hearing aids to facilitate spoken communication (McKee, 2013; Middleton, Niruban, Girling, & Myint, 2010). However, speaking ability may undermine effective communication between HH and hearing people because a hearing person may falsely assume that the message is being understood by the HH person. When one can speak, others may overlook hearing loss or believe that the ability to speak, or to smile and nod, indicates a functional level of hearing or understanding. Effective communication and quality of care for people who are HH may be further compromised because there are few written standards and little training for healthcare professionals regarding reliable communication methods with this population (Widner-Kolberg, 2014).

DdHH people are often more disabled by their transactions with the hearing world than by their hearing ability (Munoz-Baell & Ruiz, 2000). Research has shown that poor communication between care providers and DdHH patients compromises access to health care (Kuenburg & Fellingiers, 2016), inhibits the establishment of rapport and trust (Barnett et al., 2011; Preminger, Oxenbøll, Barnett, Jensen, & Laplante-Levesque, 2015), increases the risk of preventable adverse events in hospitals (Bartlett, Blais, Tamblyn, Clermont, & MacGibbon, 2008), and leads to unsatisfactory patient outcomes (Agency

for Health Care Research and Quality, 2014). Moreover, HCPs may be unaware of federal laws such as the Rehabilitation Act of 1973, the Americans with Disabilities Act of 1990 (ADA), and the Patient Protection and Affordable Care Act of (ACA, 2010), which mandate the provision of equal access and opportunity to participate in and benefit from healthcare services, and effective communication for DdHH individuals. Effective communication with DdHH patients may be further undermined because nurses are unaware of rules of interaction and environmental factors associated with sign and other alternative communication modalities.

Negative attitudes and beliefs of HCPs toward individuals with diverse healthcare needs have been related to miscommunication between patient and provider, mistrust of the healthcare system, and has been cited as the primary reason for why individuals with diverse needs do not access healthcare services (Barnett et al., 2011; Smeltzer, Avery, & Haynor, 2012). Current research specific to HCPs and DdHH patients found that negative attitudes and beliefs toward the DdHH individuals among medical doctors, medical students, genetic counselors, nursing students, and nurses were significantly related to a limited knowledge of Deaf culture and sign language, lack of exposure to DdHH patients, and little confidence in their ability to interact competently with DdHH patients (Adib Hajbaghery & Rezaei Shahsavarloo, 2014; 2015; Alselai & Alrashed, 2015; Hoang, LaHouse, Nakaji, & Sadler, 2011; Lapinski, Colonna, Sexton, & Richard, 2015; Nagakura, Schneider, Morris, Lafferty, & Palmer, 2015).

Statement of Problem

Gaps exist in the literature regarding nurse-DdHH patient interaction. Furthermore, studies designed to explore American nurses' beliefs toward interacting with DdHH patients and certified interpreters (CIs) are lacking, as are tools to measure these beliefs. Few nursing studies involving Deaf culture exist and all refer to a general concept of cultural competency that does not adequately address beliefs specific to interaction with Deaf ASL users or DdHH patients. Recent studies focusing on teaching cultural competency in nursing included communication, but did not consider Deaf culture or ASL (Hawala-Drury & Hill, 2012; Loftin, Hartin, Branson, & Reyes, 2013; San, 2015). Likewise, the Health Communication Assessment Tool (HCAT), designed to measure healthcare students' and professionals' communication skills, does not consider patients with diverse communication needs and does not require HCPs to assess patients' communication preferences, or to access alternative or augmentative communication methods (Pagano et al., 2015).

No studies were found that specifically addressed nurses' beliefs toward DdHH patients. The majority of studies found investigating nurses' knowledge, attitudes, and behaviors regarding DdHH interaction originated in countries other than the United States and in fact, only one study examining nurse practitioners' perceptions of barriers and facilitators in providing health care for Deaf ASL users was found (Pendergrass, Nemeth, Newman, Jenkins, & Jones, 2017a). All research found was developed based on

the perceptions of hearing registered nurses and none of the studies included hearing or DdHH CIs or DdHH nurses. Collectively, the literature revealed that knowledge and skill required to appropriately interact with DdHH patients and CIs is lacking in nursing education and practice.

Purpose of Study

The purpose of this methodological study was to develop a valid and reliable instrument to measure registered nurses' beliefs toward interaction with DdHH patients and CIs. An initial pool of items to assess registered nurses' beliefs toward DdHH interaction was developed based on an extensive review of literature. DdHH interaction experts validated item pool content. Content experts included Deaf signers, DdHH nurses, and DdHH and/or hearing CIs who work in healthcare settings. These individuals are considered experts in DdHH interaction because they are DdHH and hearing professionals who have personal knowledge, extensive education, and experience in communicating and implementing specific rules of social interaction with DdHH patients in healthcare environments. Knowledge of beliefs of how best to communicate and interact with DdHH patients and CIs in healthcare settings based on the recommendations of Deaf signers, DdHH nurses, DdHH and/or hearing CIs is fundamental in creating sustainable and effective programs and policies directed toward this highly vulnerable subgroup of the population (Stokols, 2000).

Communication barriers experienced by DdHH individuals in healthcare environments are multidimensional and complex. Identifying these barriers by investigating what nurses believe about DdHH patient interaction is an important step in providing quality healthcare services to DdHH patients. Therefore, personal, interpersonal, and social components of King's (1981) conceptual system were used to recognize multidimensional representations of nurse – DdHH patient – interpreter interaction that was essential to item development for the beliefs survey.

Research Questions and Hypotheses

A DdHH Interaction Beliefs Scale for Registered Nurses (DdHH-IBS/RN) was developed based on a review of the literature and tested to answer the following research questions:

1. What is the validity of the DdHH-IBS/RN?

Content validity was tested by administering the item pool questions to a minimum of six experts for relevancy ratings (Waltz, Strickland, & Lenz, 2017). To test for construct validity, the resulting DdHH-IBS/RN instrument was administered to a larger sample of professional staff registered nurses to assess nurses' beliefs toward DdHH interaction. Exploratory and confirmatory factor analyses were used to explore underlying latent factors and assist with item reduction (Costello & Osborne, 2005; McDonald, 1985; Reise, Walker, & Comrey, 2000).

2. What is the reliability of the DdHH-IBS/RN?

Internal consistency reliability and split-half reliability was used to test the reliability of the instrument beyond factor analysis (DeVellis, 2017; Furr & Bacharach, 2014).

3. What are the differences in registered nurses' DdHH-IBS/RN scores based on prior education and experience specific to interacting with DdHH?

H3_a: Registered nurses that have both more prior education and experience specific to interacting with DdHH will have higher scores on the DdHH-IBS/RN than with either prior education or experience alone.

H3₀: Registered nurses that have both more prior education and experience specific to interacting with DdHH will not have higher scores on the DdHH-IBS/RN than with either prior education or experience alone.

Survey scores were analyzed to determine differences in registered nurses' DdHH-IBS/RN scores based on prior education and experience specific to interacting with DdHH.

Significance of Study

Registered nurses' lack of knowledge and training about Deaf culture, signed communication, and rules of social interaction are significant barriers in the provision of quality, safe, and DdHH patient-centered nursing care. Likewise, communication barriers between DdHH individuals and HCPs are directly associated with lack of patient engagement in decisions about health, poor patient outcomes, and adverse events resulting in legal consequences for HCPs and healthcare organizations (Barnett, 1999;

Bartlett et al., 2008; Brown, Hughes-Bell, & McDuffie, 2015; Meador & Zazove, 2005).

Many HCPs risk patient safety and well-being, as well as their own licenses, due to a lack of knowledge regarding standards of practice for appropriate and effective interaction with DdHH patients and CIs including legal mandates for DdHH individuals in healthcare settings, existing organizational policies regarding communication access, how to access language interpreters, and how to implement and operate alternative or augmentative communication devices. Knowledge is influenced by what a person believes to be true about oneself and the world and these beliefs originate from experiences with others and the environment (Sathyanarayana Rao, Asha, Jagannatha Rao, & Vasudevaraju, 2009). Therefore, exploration of hearing individuals' beliefs about DdHH interaction is crucial to understanding individual attitudes and knowledge related to DdHH interaction.

Nurse communication plays a critical role in health care systems. Since 2012, hospitals' Centers for Medicare & Medicaid Services (CMS) payment programs have been associated with the Hospital Consumer Assessment of Healthcare Providers and Systems (HCAHPS) survey scores. Press Ganey (2012) demonstrated that the *Communication with Nurses* dimension is the most influential factor associated with patient experience of care within the value-based purchasing (VBP) framework. Based on VBP methodology, 30% of hospital payments are determined by how patients evaluate their stay on eight HCAHPS criteria. Patient perception of communication with

nurses accounted for about 15% of hospital payments associated with HCAHPS scores and has been strongly associated with performance on other CMS payment programs (Press Ganey, 2012). Therefore, communication with nurses was identified as a ‘rising tide measure’ and focused efforts to improve communication between nurses and patients were recommended as a potentially effective way to maximize VBP incentive payments and improve other payment initiatives based on CMS quality measures (Press Ganey, 2012, p. 1). Establishing standard protocols and providing ongoing training for nurse interaction with DdHH patients and CIs based on a valid and reliable measurement tool will help to reinforce improved communication in healthcare organizations and contribute to a focus on patient-centered care that will ultimately result in higher HCAHPS scores.

Nurses have an opportunity to lead the way for other HCPs and support staff to better communicate with and care for patients with diverse communication needs. Most of the literature reviewed reverts to disability language when referring to deafness, despite acknowledging the cultural and linguistic differences of Deaf ASL users. Thus, this research is necessary to help change the frame of reference for DdHH from hearing disability to communication diversity. Finally, perhaps the results from the DdHH Interaction Beliefs Scale for Registered Nurses (DdHH-IBS/RN) can turn the tide of nursing education and reveal that hearing nurses may need a qualified interpreter or communication assistance equally as much as, if not more than, DdHH patients.

Psychometric development of tools to assess nursing interaction beliefs in an objective and systematic manner are lacking in nursing. Developing a valid and reliable tool to assess nurses' beliefs about DdHH patient interaction can provide a baseline from which tailored education modules could be developed. An evidence-based education module could be used in staff nurse education as a pretest posttest measure of program evaluation or could be integrated into required annual competencies or continuing education for license renewal. This survey may be instrumental in establishing standards of nursing practice focusing on promoting self-determination rights and communication access for DdHH patients in healthcare settings. More importantly, this survey could be used in future research emphasizing the importance of measures to identify this specific group and then, to test the relationship between nurses' belief scores with the Centers for Medicare & Medicaid Services (CMS, 2017) quality measures such as patient length of stay, patient satisfaction, readmission rates, and healthcare acquired conditions for DdHH individuals.

Theoretical Framework

The purpose of providing a theoretical framework for research is to establish a basis and conceptualize the nature of a proposed problem in a well-supported and organized manner. The explanation of a theoretical framework reveals the perspective and context of a research project. Additionally, the framework determines how the data will be analyzed and interpreted to gain a better understanding of a topic. Imogene

King's (1981) Theory of Goal Attainment (TGA) and Transactional Communication Model (TCM) guided item development for the study. The concept of *belief* was defined as a mental state in which a person accepts a particular idea as actuality or truth (Schwitzgebel, 2015). Beliefs shape how an individual perceives and reacts to the environment and are thus, central to understanding how individual beliefs influence interpersonal and social interaction.

King (2007) demonstrated how specific assumptions about nurse-client interactions based on the TGA have endured and are relevant into the 21st century.

Examples of the specific assumptions are:

Perceptions of nurse and client influence the interaction process.

Individuals and families have a right to knowledge about their health.

They have a right to accept or reject health care. They have a right to participate in decisions that influence their life, their health and community services. Health professionals have a responsibility to share information that helps individuals make informed decisions about their health. Health professionals have a responsibility to gather relevant information about the perceptions of the client so that their goals and the goals of the client are congruent (King, 1981, p. 143; as cited by King, 2007, p. 110).

Four basic propositions of the TGA have been outlined: (a) goals are attained through nurse-client interactions; (b) the nurse-client must perceive one another and their motives accurately for transactions to occur; (c) role expectation and performance must be congruent; (d) nurses must use their knowledge and skills to mutually set goals, communicate information, and aid clients in achieving their goals (Alligood, 2010).

Interacting systems framework. King's (1981) interacting systems framework for nursing illustrates the constant interaction between three integrated systems: individuals (personal systems); dyadic, triadic, and small groups (interpersonal systems); and large groups (social systems). Personal system concepts include (a) perception, (b) self, (c) growth and development, (d) time, (e) personal space, and (f) learning. The concepts of personal systems are fundamental in understanding human interaction because they refer to how the nurse views and integrates his or her self into interpersonal and social systems based on beliefs and goals. Concepts of interpersonal systems include (a) interaction, (b) communication, (c) transaction, (d) role, (e) stress, and (f) coping. The component of stress in interpersonal systems may be viewed as communication noise. In any communication model, noise refers to interference of effective communication that influences the interpretation of conversations (Pierce, 1980; Shannon & Weaver, 1949). While often overlooked, communication noise can have a profound impact on an individual's perception of interactions with others and on self-analysis of communication proficiency (DeVito, 2016). Examples of noise interference pertaining to

nurse-patient interpersonal communication include (a) physiological, (b) semantic, (c) organizational, (d) cultural, (e) psychological, and (f) environmental.

Social system concepts include (a) organization, (b) authority, (c) power, (d) control, (e) status, and (f) decision-making. The interacting systems framework demonstrates how humans interact with others and within their social world. Despite the assignment of each concept to one of three systems, King (1995) emphasized that concepts are not limited to a single system and move fluidly across personal, interpersonal, and social systems. King's (1981) Theory of Goal Attainment (TGA) focuses on the interpersonal system and interactions between individuals in the nurse-patient relationship (Alligood, 2014). The components of interpersonal systems illustrate dyadic (nurse – DdHH patient) and triadic (nurse – DdHH patient – interpreter) relationships. According to King (1995), "the concepts in the framework are the organizing dimensions and represent knowledge essential for understanding the interaction between three systems" (p. 18). The concepts are clearly defined, based on evidence, and have been tested and validated in subsequent research (Clarke, Killeen, Messmer, & Sieloff, 2009; Doornbos, 1995, 2007; Frey, 2010; Frey, Ellis, & Naar-King, 2007; Wicks, Rice, & Talley, 2007). The components of a comprehensive interactive system were particularly appropriate for this research because the goal is not for nurses to understand what it means to be DdHH; but rather, to know what is essential for effective interaction with DdHH and CIs.

Interactive systems framework views *nursing* as a process of action, reaction, and human interactions between the nurse and client whereby each perceives the other and the situation or environment, while exchanging information through communication (King, 1981). *Communication* is seen as a verbal or nonverbal vehicle through which human beings connect and establish relationships (Caceres, 2015; King, 1981). *Interaction* is the process of developing perceptions of encounters based on verbal and nonverbal communication between people. King (1981) proposed that individual perceptions developed during interactions facilitate formation of judgments that influence actions and future encounters. These concepts form the *transaction* process, which refers to purposeful interactions by which human beings communicate within the environment to achieve goals that are mutually valued (Caceres, 2015; King, 1981, p. 82). King's (1981) transaction process model depicts perception, judgment, and action of independent people as precursors to reaction, interaction, and transaction. The concept of transaction in King's (1981) TGA is based on three levels of organization outlined by Dewey and Bentley (1949) and named as self-action, interaction, and transaction. Self-action was described as entities acting under their own power. Interaction was described as entities balanced against other entities in a causal relationship. Transactions were described as beings in action, as a fundamental component of the environment, with "extension in time to be as indispensable as extension in space" (Dewey & Bentley, 1949, p. 123). King (1999) contended that these transactions can be directly observed in nurse-patient

encounters wherein knowledge based behavior can be identified in nursing and healthcare situations (King, 1999).

Transactional communication model. TCMs transcend an interactional sender-receiver-feedback loop and represent communication as a dynamic, simultaneous, and reciprocal process of sending and receiving messages through which a shared meaning is constructed by interdependent individuals within the environment (Barnlund, 1970; West & Turner, 2014). Components of transactional model include communicator, message, medium, and environment. The model recognizes that each person is a communicator, both sender and receiver, and that the existence of a message depends upon reciprocal communication between all participants. Communication is described as a process to shape self-concept, engage in dialogue, create relationships, and generate social realities (Anonymous, 2016). The communication environment refers to how the message is interpreted and factors that impact transmission and reception. Many factors such as communication barriers, environmental noise, and field of experience may directly or indirectly affect the communication process in transaction model. Field of experience refers to personal beliefs, knowledge, prior experience, attitudes, and self-esteem (West & Turner, 2014). Consideration is also given to the medium or channel used in relation to the efficiency and reliability of the communicated message. The point of transaction represents the point at which communicators share the same meaning of the message.

TCM has been criticized because nonverbal communication is encouraged and communication noise is increased due to simultaneous communication and continuous environmental influences. However, these limitations are viewed as strengths for this research because nonverbal communication is a defining feature in the context of interaction involving nurses, DdHH patients, and CIs. Also, because sign language is a visual spatial language, consideration of factors that continuously impact communication allows for a more realistic representation of the nature of communication and interaction between Deaf signers and hearing nurses.

Kuhn (1975) expanded on ideas related to communication and transaction stating that “the question is not whether a particular interaction is a communication or a transaction (it is always both) but whether we are interested in the information or in the values transferred or in both” (p. 189). Effective communication and meaningful interactions between nurse and patient are crucial to King’s (1981) transaction process model because the TGA views goal attainment as the purpose of the nurse-patient relationship. In other words, if the nurse does not know how to effectively communicate with the patient, then the patient will not have the ability to participate in information sharing, goal setting, and decision making in his or her care and thus, nursing care of the individual is far from patient-centered.

Belief. *Belief* is a highly ambiguous term that refers to a person’s enduring, unquestioned representations of reality and encompasses basic convictions about events,

causes, agency, and objects that people use and accept as true (Campbell, 1967; Connors & Halligan, 2015; Schwitzgebel, 2015). Beliefs may be conscious or unconscious. In fact, the majority of beliefs exist beyond an individual's immediate awareness and are relatively commonplace: for example, that a person's senses reveal a physical environment that is real, that a person participates in interpersonal relationships, and that a person's present actions can produce future outcomes (Connors & Halligan, 2015). However, belief systems are significant because they provide the 'mental scaffolding' for how individuals construct an understanding of the world and act within it (Connors & Halligan, 2015, p. 2; Halligan, 2006; 2007). Thus, beliefs can produce significant emotional effects and prompt action by providing a representation of physical reality and a referential framework for goals and actions (Tullett et al., 2013).

Nurses' beliefs toward DdHH interaction and belief was measured and evaluated as a construct based on Connors and Halligan's (2015) cognitive account of belief. Connors and Halligan (2015) explained that beliefs can be distinguished from other types of cognitive representations that shape individual's perception of reality and truth such as memory, knowledge, and attitudes. Contrary to memory, beliefs can pertain to present and future events, as well as the past. In contrast to knowledge, beliefs are personal view points that are regarded as truth and typically involve a self-referential element that may not be present in knowledge (Connors & Halligan, 2015; Fishbein & Ajzen, 1975; Wyer & Albarracín, 2005). Unlike attitudes, beliefs may not include evaluation of a subject or

object; however, beliefs may provide a basis for understanding attitudes (Connors & Halligan, 2015; Eagly & Chaiken, 1993; Kruglanski & Stroebe, 2005; Wyer & Albarracín, 2005). As explained by Ajzen and Fishbein (1972), a person first learns to form beliefs about a subject or object and then, these beliefs influence his or her attitude toward the object. Connors and Halligan (2015) acknowledged that memory, knowledge, and attitude may share fundamental qualities and noted the high probability of extensive overlapping with the characteristics of belief.

Most beliefs are acquired through experience and sustained by overlapping or integrating existing beliefs to avoid discord between new experiences and a person's worldview. Connors and Halligan (2015) offered a perspective on how beliefs function, and overlap, to incorporate new experiences into an individual's understanding of how the world works. Four key functions of beliefs were identified: (a) to provide a stable representation of a person's world and a person's place within it; (b) to provide an explanatory framework for interpreting the world and processing new information; (c) to provide the interpretive 'lens' that shapes individual experience of the world by configuring and calibrating other cognitive systems such as perception, language, memory, and attention; (d) to serve important social functions at an interpersonal level (Connors & Halligan, 2015, p. 3).

At the interpersonal level, belief systems allow individuals to navigate social relationships and facilitate a mutual understanding that promotes interaction and social

empowerment. This intuitive belief framework provides a basis for action because it allows an individual to avoid perceived threats, make decisions, regulate behavior, decisions, and pursue goals. As explained by Tullet et al. (2013):

Every action that we take is grounded in an elaborate web of beliefs and goals.

Take the simple act of opening a door. Such an act depends on our beliefs about what lies beyond the door, as well as what is available to us in our current location. At an even more basic level, our attempt to open the door is rooted in a belief that we understand how a door works, and are capable of using it.

Furthermore, without the goal of pursuing something beyond the door, the act of opening the door would probably not take place (p. 401).

This elaborate web of beliefs is a dynamic adaptive system that is used to resolve and/or integrate inconsistencies between new experiences and previous experiences held in memory. Collective representations can evolve over time in response to new experiences and still represent pooled understanding based on the past. This adaptive function provides humans with a greater capacity to understand and adjust to environmental changes by quickly interpreting ambiguous or incomplete information and responding accordingly. Beliefs allow individuals to go beyond available sensory information and to act effectively within their environment. In this instance, the *door* may represent a DdHH individual or communication diversity. If the attempt to interact with DdHH patients is rooted in a nurse's general beliefs about DdHH and beliefs about DdHH

interaction, then it is imperative that the nurse's beliefs promote effective communication. Likewise, if the attempt to interact with DdHH patients is rooted in the nurse's belief that he or she understands DdHH interaction then, it is also important that this understanding reflect valid information regarding DdHH populations and DdHH interaction. Furthermore, if the nurse believes that he or she has the knowledge and resources to effectively interact with DdHH patients, then he or she can focus on the goal of providing appropriate care for DdHH patients that circumvents possible barriers in communication. Therefore, the key to pursuing mutual goals beyond communication barriers is to explore nurses' general beliefs about DdHH and beliefs about how DdHH interaction works.

Domains of Belief

Four domains of belief regarding nurse – DdHH patient – interpreter interaction were used to define the construct, to integrate the concept of belief into the interacting systems framework of King's (1981) TGA, and to identify important characteristics of DdHH interaction. The four belief construct domains and definitions are presented here.

General beliefs about being DdHH. General beliefs about being DdHH refers to what an individual nurse accepts as actuality or truth regarding Deaf culture, deaf signers, deafness, and hearing loss. These beliefs correspond to the concept of personal systems in King's (1981) interacting systems framework and relate to how individuals make sense of others and the environment. It is important to note that these beliefs may

be influenced by education and experience; and can be based on fact, personal preference, or ideology (Heiphetz, Spelke, Harris, & Banaji, 2013).

Beliefs about signing interaction. Beliefs about signing interaction refers to what an individual nurse accepts as actuality or truth regarding signed communication and interaction with Deaf ASL users, deaf that use other signing methods, non-signing deaf, HH and CIs. These beliefs correspond to the concept of interpersonal systems in King's (1981) interacting systems framework and relate to beliefs about communication, interaction, transaction and the role of the nurse in communicating with Deaf ASL users, deaf signers, and CIs.

Beliefs about interaction with the DdHH. Beliefs about interaction with the DdHH refers to what an individual nurse accepts as actuality or truth regarding strategies for communicating and interacting with DdHH patients. These beliefs correspond to the concept of interpersonal systems in King's (1981) interacting systems framework and relate to beliefs about communication, interaction, transaction, and the role of the nurse in communicating and interacting with DdHH patients and CIs.

Beliefs about available resources for interacting with the DdHH. Beliefs about available resources for interacting with the DdHH refers to what an individual nurse accepts as actuality or truth regarding available resources for communicating and interacting with Deaf ASL users, deaf that use other signing methods, non-signing deaf, HH and CIs. These beliefs correspond to the concepts of social systems in King's (1981)

interacting systems framework and relate to beliefs about education and training, laws, organizational policies, and community resources relevant to DdHH communication and interaction in healthcare environments.

Integration of Theoretical Concepts

A model of how concepts of belief, the TCM, and King's (1981) TGA can be integrated to represent the process of nurse – DdHH patient – interpreter transaction is presented (see Figure 1; Appendix A). The model does not indicate a hierarchical order of components; but rather, each component is given consideration as a relevant part of effective communication and interaction. Dashes, rather than solid lines, are used to indicate that personal, interpersonal, social systems are open and that each is influenced by the components of the other. Social systems are presented as wide, light gray dashes that encompass both interpersonal and personal systems. Light gray dashes illustrate that the influence of authority, decision making, organization, power, and status of social systems may not be obvious; however, each component impacts interpersonal and personal systems in some way. Interpersonal systems are represented by thin, dark gray dashes. Belief construct domains are presented in black boxes and are aligned with the corresponding system. The solid, dashed, and dotted lines represent the ambiguous and adaptive nature of beliefs.

Simultaneous communication and interaction between personal systems are illustrated to show that each person's perception, judgment, and action lead to a reaction,

interaction, and transaction. The components of interpersonal systems are depicted in a continuous process through feedback loops as a result of simultaneous exchange and input from senders and receivers. Each person in an encounter is represented as a personal system and both sender and receiver. In this particular model, the interpreter represents a sender, receiver and channel by which a message is relayed between nurse and DdHH patient. Although an interpreter may not be present in every circumstance, the interpreter role may represent a channel by which optimal communication between the nurse and DdHH patient is achieved. Overall, the model represents the simultaneous and continuous process of transactional communication between nurse and DdHH patient with the aim of mutual understanding, agreement, and goal attainment.

Concepts of the TCM and King's (1981) TGA provided structure for item pool generation because both view the processes of communication and interaction as continuous, interlinked, and reciprocal encounters between human beings within ever changing environments. The connections between the four domains of belief and the personal, interpersonal, and social components of King's (1981) interacting systems framework provided a basis from which characteristics of DdHH interaction were identified and extracted from the literature. An extensive review of the literature is presented in Chapter 2.

Definition of Terms

The following definitions are relevant for clarification and understanding of the study. Additional definitions relevant to DdHH communication are also presented (see Appendix B).

Adult Deaf ASL users are individuals who self-identify as culturally Deaf, were born with limited hearing or developed hearing loss before developing a spoken language, and who use ASL as their primary language (Padden & Humphries 2005; Pendergrass, Newman, Jones & Jenkins, 2017b). Adulthood is identified as the age of majority at which a person is recognized by law to be and an adult, capable of managing his or her own legal obligations and personal affairs (Burton, 2013). Eighteen is generally the legal age of majority for individuals in most of the United States, but this may vary depending upon geographic location and the nature of the activity in which a person is engaged.

American Sign Language (ASL) is a unique visual, spatial, and gestural language that is used by Deaf people in the United States and Canada. ASL is a language with its own grammatical rules and syntax with which users incorporate a fingerspelling alphabet, hand signs, body movements, and facial expressions to communicate (NAD, 2017b).

Certified Deaf Interpreter (CDI) is hard of hearing or deaf and has demonstrated knowledge and understanding of interpreting, deafness, the Deaf community, and Deaf culture. CDIs have specialized experience and training in the use of gesture, mime,

props, drawings and other tools to enhance communication. CDIs possess native or near-native fluency in ASL (Registry of Interpreters for the Deaf [RID], 2017a).

Deaf community consists of a diverse group of people who share a common language and cultural beliefs about themselves and their connection to the greater society (Padden & Humphries, 2005). There is a simple identification method used by the community – Deaf ASL users are distinguished with an uppercase *D*, whereas the audiological condition of deafness is indicated by a lowercase *d*. The Deaf community may include those who are culturally Deaf and are native ASL users; those who are deaf and utilize oral means of communication such as cued speech, speech reading, and total communication, and auditory devices such as hearing aids or cochlear implants; those who are deaf and blind, those who are hard of hearing, and hearing people such as spouses or children of deaf adults (CODA), sign language interpreters, educators, and parents of deaf children (Moore & Levitan, 2003).

Hearing loss is measured in terms of decibels. Decibels measure pressure level of a sound which determines the volume or loudness of a sound and the higher the decibels, the louder the sound. Sound must be above a certain auditory or hearing threshold in order to hear and humans have a hearing threshold of around 0 decibels. A hearing loss of up to 20 decibels below the hearing threshold is still considered to be normal hearing (Vaupel, Schaible, & Mutschler, 2015). The Institute for Quality and Efficiency in Health Care [IQWiG], 2017) described hearing loss according to severity, as follows:

- A. mild hearing loss: hearing loss of 20 to 40 decibels;
- B. moderate hearing loss: hearing loss of 41 to 60 decibels;
- C. severe hearing loss: hearing loss of 61 to 80 decibels;
- D. profound hearing loss or deafness: hearing loss of more than 81 decibels.

Hearing thresholds of 25 dB or greater in both ears is defined as hearing loss and the medical community has established that a hearing impairment is a hearing loss greater than 40 decibels (IQWiG, 2017). One or both ears may be affected by hearing loss and this generally leads to difficulty in hearing conversational speech or loud sounds. People who are hard of hearing usually communicate through spoken language and can benefit from hearing aids, cochlear implants, and other assistive devices as well as captioning (IQWiG, 2017). Deaf people usually have profound hearing loss and may use sign to communicate.

Nationally-certified interpreters have earned the National Interpreter Certification (NIC) by demonstrating professional knowledge and skills that meet or exceed the minimum professional standards necessary to perform in a broad range of interpretation and transliteration assignments. Candidates must be at least 18 years old to be eligible for the NIC Knowledge Exam (RID, 2017b).

Assumptions

Primary to this research is an assumption that while it is not possible for nurses who are not part of the Deaf community to fully understand what it means to be deaf or hard of

hearing, nurses must possess a standard of practice for this population. It is critical that nurses have a basic knowledge and skill set needed to interact with DdHH individuals and CIs appropriately and effectively to promote safe, quality patient-centered care.

Limitations

Limitations existed in this study. One limitation was the use of a convenient purposive sample of Deaf signer, hearing certified interpreter, and DdHH nurse content experts known to the primary investigator and willing to participate in the study for content validation of the DDHH interaction scale items. Another limitation was self-report and potential problems with validity of the reported data.

Strengths

This research contributed to nursing knowledge of beliefs about communication and interaction with DdHH patients and CIs. This was the first nursing study to use DdHH nurses, DdHH and hearing CIs, and DdHH communication professionals for tool development and validation. Furthermore, research that promotes interaction knowledge and standards of practice will improve nursing care of the most vulnerable and underrepresented patients.

Summary

DdHH individuals continue to face inequitable healthcare services and inaccessible healthcare information related to communication barriers. Studies designed to explore professional nurses' beliefs toward communicating and interacting with DdHH and CIs

are lacking, as are tools to measure these beliefs. In healthcare environments, the welfare of DdHH patients and the professional licenses of nurses are at risk because DdHH interaction knowledge is lacking in nursing education and practice. Nurses are ethically and professionally bound to act as patient advocates and therefore, nursing research is obligated to pay attention to and address issues involving inadequate knowledge of appropriate and effective communication with any population.

Cultural competency alone is inadequate to address the cultural and linguistic challenges when caring for Deaf ASL users. Furthermore, instruments designed to assess communication competencies of nurses omits qualities pertaining to DdHH interaction. The purpose of the study was to develop a valid and reliable instrument to measure registered nurses' beliefs toward DdHH interaction. The overarching goal of the research was to improve nurses' knowledge and behavior when interacting with DdHH adults and CIs. Improving nursing practice translates into better outcomes for individuals, healthcare organizations, and society in general.

Chapter 2 will consist of a review of literature pertaining to communication and interaction in relation to Deaf cultural identity, ASL, non-signing deaf, hard of hearing, and CIs. These concepts were examined within the context of DdHH experiences in healthcare, DdHH communication and interaction competence in nursing education and practice, as well as in other health professions. The purpose of this review was to explore the state of the science regarding beliefs about DdHH communication and interaction in

healthcare to determine what is known and what nurses should be aware of when communicating and interacting with DdHH patients and CIs.

CHAPTER II

LITERATURE REVIEW

Appropriate and effective nurse-patient communication is essential in the provision of safe, quality patient-centered care. Knowledge of how to communicate and interact with Deaf ASL users, Deaf that use other signing methods, non-signing deaf, hard of hearing (DdHH) and certified interpreters (CIs) is lacking in nursing. Interaction is seen as the process of connecting with others through verbal and nonverbal communication and therefore, the term *interaction* will be used to include both communication and interaction. Concepts of interaction associated with Deaf identity, sign, and alternative communication modalities among DdHH individuals are multidimensional and often too complex for hearing people to understand. However, it is important that nurses are aware of various differences and similarities among DdHH individuals and that nurses pay attention to these characteristics when interacting with DdHH patients and CIs. Translating these concepts into nursing knowledge is an important step in helping nurses to interact with DdHH and CIs appropriately and effectively. The purpose of this review was to explore the defining characteristics of DdHH interaction. The state of the science regarding DdHH interaction knowledge in healthcare was examined to determine what is known and what nurses should know about interacting with DdHH patients and CIs. Based on the results of this review, an initial

pool of items was generated to assist with the development of the DdHH interaction belief scale for registered nurses (DdHH-IBS/RN).

Literature Search

The purpose of this literature review was to provide an overview of Deaf cultural identity, DdHH communication, DdHH experiences in healthcare settings, and DdHH communication-interaction competence in nursing and other health professions. The focus of the literature search was from 2009 to 2018, but due to the limited research, the review includes seminal research from as early as 1977. A literature search was initiated on databases including EBSCOhost, Cumulative Index of Nursing and Allied Health Literature (CINAHL), MedLine, ProQuest, PsycArticle, SocINDEX, and Google Scholar. Search terms included *Deaf culture, d/Deaf patients, hearing-impaired, hearing disability, hard of hearing, nurse, registered nurse, nurse beliefs, beliefs toward deafness, d/Deaf communication, nurse-patient communication, nurse communication competence, d/Deaf interaction, nurse-patient interaction, American Sign Language, ASL in healthcare, sign language in healthcare, ASL certified interpreters in healthcare, and nurse-interpreter interaction*. A bibliography search of articles within the inclusion criteria revealed additional evidence.

Deaf Cultural Identity

Deaf culture is distinguished with an uppercase *D*, whereas the audiological condition of deafness is indicated by a lowercase *d*. In a socio-cultural context, Deaf

refers to individuals who were born with limited hearing or developed hearing loss before developing a spoken language and who use ASL as their primary language (Pendergrass et al., 2017b). In the United States, Deaf culture affirms the essence of deafness which is not the lack of hearing, but rather the community and culture based on ASL (Dolnick, 1993). The audiological condition of deafness may be a fact of life, but *being* Deaf is a way of life.

Deaf cultural identity is formed through a sense of connectedness based on communication. Noteworthy core cultural values include: a sacred respect for and use of the hands and ASL, disassociation from speech, full access to communication and information sharing, self-determination, healthy identity formation, and complete acceptance of being Deaf as a normal existence (Holcomb, 2013; Padden, 1980). Central to the meaning of Deaf cultural values are identity with, participation in, and loyalty to the Deaf community (Smith, 1996; Mindess, 2014). The Deaf community includes both nonhearing and hearing individuals such as signing Deaf, family members, friends, teachers, and interpreters. Acceptance into the Deaf community is based on two conditions: adoption of a cultural view of deafness and proficiency in ASL (Singleton & Tittle, 2000). Not all who experience the auditory condition of deafness identify with Deaf culture; however, only people who are deaf can claim Deaf cultural identity (Holcomb, 2013).

In the early 1970s, an attempt was made by the “disabled” community to put an end to negative terminology associated with disability in general (Holcomb, 2013, p. 44). During this time, an effort was made to use the term ‘hearing-impaired’ in place of the word *deaf* (Holcomb, 2013, p. 44). The Deaf community however, has rejected the use of the term hearing-impaired as demeaning and the use of this term is discouraged (Holcomb, 2013; Moore & Levitan, 2003). Deaf individuals may benefit from protections for disabled persons; however Padden and Humphries (1988) emphasized that the term *disabled* is one that requires a disclaimer and should not be mistaken as a primary term of self-identification. The authors also pointed out that many labels are not used to establish commonality; but rather, to label particular individuals as having a lower status (Padden & Humphries, 1988). Holcomb (2013) contends that as a linguistic minority, Deaf people are ‘handicapped’ by communication barriers and an inadequate level of understanding about their language and culture by the majority (p. 56). Although those who do not hear well, those who do not hear at all, and those who are culturally Deaf are often collectively labeled as ‘hearing impaired’ by the hearing majority, “Deaf people still refer to themselves as DEAF” (Padden & Humphries, 1988, p. 43). If the work of hearing health professionals and researchers has any hope of being acknowledged and accepted by the Deaf community then, appropriate terminology must be used to identify Deaf people who use ASL as their primary means of communication.

Other appropriate terms used to identify Deaf people include Deaf signers, Deaf ASL users, or culturally Deaf adults.

Social organization. Ninety percent of deaf children have two hearing parents and this is a significant aspect of the structure of social organization in Deaf culture (Mitchell & Karchmer, 2004; Smith, 2013). Dr. Jerome Schein (1989) proposed the *90% formula* that poignantly describes a unique phenomenon among people who are deaf. More recently, Mitchell and Karchmer (2004) reported that number of deaf people born to hearing parent was closer to 95%. Schein (1989) further posed that 90% of parents with deaf children have no prior experience with deaf people or sign language and therefore, communication between parent and child is compromised. Although ASL may seem like a natural or logical choice to communicate with a deaf person, most hearing parents with a deaf child do not know sign language (Smith, 2013). Other research supported the 90% formula and revealed significant communication challenges faced by deaf children. For example, 90% of deaf children do not achieve intelligible speech despite years of intensive speech therapy (Neisser, 1983). Therefore, it has been suggested that 90% of Deaf signers were raised in speaking environments and converted to sign language later in life (Bechter, 2008; Neisser, 1983). Consequently, 90% of Deaf signing adults have experienced communication challenges that date back to early family and educational experiences (Marschark, 2007; Marschark & Spencer, 2010). Over thirty years ago, DiPietro, Knight, and Sams (1981) explained this situation:

The scenario is simple: all the information interchange when the deaf child is ill occurs between the parent and the physician. Later, no one takes the time to explain to the child what the illness was. It is not unusual for a hearing adult to know the medical history of his/her deaf sibling better than does that sibling. Neither is it unusual for deaf adult to have to write to a parent or a school official for information about past medical history. Sometimes there is no source of information (p. 107).

Unfortunately, many healthcare professionals (HCPs) in similar situations associate lack of knowledge with a Deaf person's level of intelligence or interest in their own well-being. Many HCPs fail to make the connection between a Deaf individual's knowledge of personal medical history and the hazards of growing up Deaf in a hearing world. Therefore, nurses should be aware that language barriers within the family may result in the loss of a Deaf adult's knowledge of family history or his or her childhood health history (Hauser, O'Hearn, McKee, Steider, & Thew, 2010).

For Deaf people born to hearing parents, the Deaf community often becomes a surrogate family because membership offers easy communication, role models to emulate, and a positive identity (Lane, 2010). Thus, it is also important for nurses to know that Deaf adults may rely on a trusted member of the Deaf community, rather than family members, for support when seeking information and making decisions (Holcomb,

2013). On the other hand, nurses should not mistake a professional interpreter for a close personal friend, known to the Deaf individual.

According to the World Federation of the Deaf (WFD, 2016), membership in the Deaf community depends on member self-identification and acceptance of other members, which is often strongly linked to competence in a signed language.

Identification with Deaf culture and ASL is a personal choice and is usually made independent of an individual's hearing status. Nurses must understand that Deaf culture identity is not based on level of deafness or speaking ability. When communicating with Deaf signers, nurses need to know that one's ability to speak is irrelevant and asking about the details of one's audiological status is considered rude unless the individual offers this information (Mindess, 2014). If the nurse does not know ASL or other forms of sign and an interpreter is not readily available, multiple methods may be necessary to communicate with a Deaf individual and these methods of communication should be based on patient preference (Sheppard, 2014).

DdHH Communication

Communication is an interactive process by which individuals exchange information through a common system of symbols, signs, or behavior (Communication, n.d.). When communicating with the hearing world, Deaf signers often depend on friends, family members, interpreters, and technological devices to relay information from sign to spoken language and vice versa. Non-signing deaf and hard of hearing

individuals often depend on hearing aids and other augmentative or alternative communication modalities to facilitate understanding in spoken conversation (see Appendix B). For purposes of clarity, use of the term *DdHH interaction* will refer to the effective exchange of information and meaningful encounters between nurses and DdHH patients, or between nurses, DdHH patients, and CIs.

American Sign Language. ASL is the primary language of Deaf culture and the fifth most common non-English language used in the United States (Gallaudet University, 2010). ASL is not English, but a combination of French and Native American Indian signs (Gallaudet University, 2010). Unlike English, ASL has no written form and it is a spatial and visual language that uses hand gestures, facial expressions, and a grammatical syntax of time, noun, adjective, and verb (TNAV). Like English, ASL has the capacity to describe physical reality and hypothetical abstractions (Holcomb, 2013). In ASL, each sign is defined by four parameters: palm orientation, hand shape, signing space or location, and movement. The benefit of these distinct parameters is that a signer has the ability to communicate a lot of information simultaneously and visually (Holcomb, 2013; Liddell, 1980; 2003). Because of its visual properties, ASL is considered to be the most accessible language for d/Deaf people whereas English only offers fragmented language access because of its limited visibility when spoken and ungrammatical structure when translated verbatim to signed English (Kannapell, 1989).

As with any group, distinct cultural and communication differences exist among d/Deaf people. For instance, not all deaf people sign or identify with Deaf culture. Not all Deaf sign using ASL. In the United States, other forms of English-based signed communication methods exist (see Appendix B). ASL is also dynamic and signage may differ slightly depending on geographic region, education, or personal preference (Moore & Levitan, 2003). ASL is not universal and sign languages vary across the globe. Some Deaf ASL users may use a combination of methods or gestures to simplify communication for hearing people, but the combination of other methods and/or gestures should not be mistaken for ASL. Variations in sign language would be important for a nurse to know when requesting interpreter services for a patient whose primary method of communication is sign language.

Language proficiency and literacy. English is a second language for many Deaf adults and language proficiency often varies depending on whether a person is *prelingually* deaf, at birth or before language acquisition, or *postlingually* deaf, after language acquisition or later in life; and on a person's family dynamics and educational opportunities (Padden & Humphries, 1988). Few people who are d/Deaf report fluency in English (Barnett, 1999; Iezzoni et al., 2004; Lieu, Sadler, Fullerton, & Stohlmann, 2007). Although little research is available, it has been estimated that the average Deaf ASL user reads English at or below a sixth grade level (Allen, 1986; McKee et al., 2015; Traxler, 2000; Zazove, et al., 2013). LaVigne and Vernon (2003) estimated that only

about 10% of the Deaf population who earn college degrees are both fluent ASL users and proficient English readers. The researchers also estimated that 60% of Deaf adults use ASL effectively, but read English between third and sixth grade levels, while 30% have both weak ASL skills and also read below a third grade level. (LaVigne & Vernon, 2003). Based on these findings, communication experts have recommended that communication for Deaf populations be written at or below a fourth grade reading level (Neuhauser et al., 2013). Likewise, the U. S. Department of Health and Human Services (2012) and the National Institute on Deafness and Other Communication Disorders (2017) have recommended that health communication materials for older and hard of hearing populations be written at a sixth grade level or lower. Regardless of whether the primary language is ASL or English, literacy levels vary widely among DdHH individuals and it is the responsibility of the HCP to ensure and verify understanding (Barnett, 1999; Iezzoni et al., 2004).

Health literacy. Health literacy refers to “the degree to which individuals have the capacity to obtain, process, and understand basic health information and services needed to make appropriate health decisions” (Nielsen-Bohlman, Panzer, & Kindig, 2004, p. 2). Once viewed as an individual patient's lack of knowledge and skills regarding health issues; inadequate health literacy is now being recognized as a “systems issue”, reflecting the complexity of barriers to effective communication in both the presentation of health information and navigation of the health care system (Parker &

Ratzan, 2010; Rudd, 2010, p. 2284). The Joint Commission, the agency responsible for accrediting and certifying health care organizations and programs in the United States, accreditation standards and website resources (www.jointcommission.org) emphasize the fundamental right and need for patients to receive information about their care in a way in which they can understand this information. In *Advancing Effective Communication, Cultural Competence, and Patient- and Family-Centered Care: A Roadmap for Hospitals*, the Joint Commission (2010) stated that ineffective communication and health literacy issues place patients at greater risk of preventable adverse events and stressed the importance of health literacy and health communication as an elements of quality health care.

Results from the 2003 National Assessment of Adult Literacy (NAAL) showed a higher prevalence of low health literacy among certain groups such as the elderly and adults who have limited English proficiency (Kutner, Greenberg, & Jin, 2006; National Center for Education Statistics [NCES], 2006). For example, in the results demonstrated that when compared with all adults who scored in the bottom two of the four categories on the NAAL survey, more than half of adults age 65 and older scored in the *basic* and *below basic* range. An updated systematic review of the 2003 NAAL report showed that the majority of literacy instruments are based on reading ability and word recognition (Berkman et al., 2011). In addition, these subsequent reports have questioned whether low literacy among the elderly was related to aging or declining cognitive function, but

did not consider a relationship between declining hearing ability and low health literacy (Kutner et al., 2006; Berkman et al., 2011). These reports also associated low health literacy with race or ethnicity and educational level, but hearing level or deafness was not included as a factor associated with low health literacy (Kutner et al., 2006; Berkman et al., 2011). In addition, Berkman et al., (2011) recommended that future research priorities focus on “developing tools that measure additional related skills, particularly oral (spoken) health literacy” (p. v-vi). Measurement of oral health literacy skills may be appropriate for hard of hearing populations, but this approach would do little to improve health information accessibility for Deaf people.

Similar to other vulnerable populations, inadequate health literacy among DdHH adults has been associated with lower health care communication and information knowledge; lower ability to participate in decision making about health care and treatment options; and lower adherence to medical instructions and recommendations (McKee et al., 2015; Neuhauser et al., 2013; Nielsen-Bohlman, et. al., 2004;). In an effort to improve health literacy among ASL users, McKee and colleagues (2015) developed the Newest Vital Sign (NVS), to assess the prevalence of inadequate health literacy among Deaf ASL users and hearing English speakers. A cross-correlational designed was used to test the differences in health literacy among a group of 405 Deaf and hearing participants. Results of the self-administered NVS scores of 166 Deaf ASL users and 239 hearing English speakers revealed that 48% of Deaf ASL users had

inadequate health literacy, compared to 25% of hearing English speaking participants, and Deaf participants were 6.9 times more likely to have inadequate health literacy than hearing English speaking participants (McKee et al., 2015).

Written communication. Note writing is often used in communication between hearing and DdHH people. Conversely, the National Association of the Deaf (NAD, 2017a) position on health care access for deaf people states that written communication is not always the best way to exchange information, especially medical or health related information, with someone who is deaf. The aforementioned research findings by McKee et al. (2015) with regard to health literacy support the NAD's position on written communication. This may also be true for exchange of written information materials with DdHH populations. The suitability of emergency preparedness materials (EPMs) for Deaf, hard of hearing, and older adult populations magnifies the vulnerability of these populations. Neuhauser and colleagues (2013) reviewed EPMs from community based organizations, public health departments, and local and national websites serving Deaf, hard of hearing, and older adult populations. The findings showed that all EPM intended to serve DdHH people tested above the recommended fourth grade reading level and 91% of EPM intended to serve older adults scored above the recommended sixth grade reading level (Neuhauser et al., 2013). Therefore, nurses should consider a person's reading level and the difficulty of writing in a second language; and then, the additional the effects of age, illness, medications, stress, and unfamiliar environment to these challenges.

Note writing in English is most appropriate for brief and uncomplicated messages, but should never be regarded as an effective method to convey detailed instructions or health information for Deaf ASL users. On the other hand, DdHH patients may benefit from nonverbal communication strategies such as writing and drawing. According to Britto and Sampen (2010), blue or green should not be used for written or printed text because these colors are more difficult to discriminate as the patient ages. Most importantly, nurses should consider each individual patients' language preference, reading level, and font size of written material to ensure understanding (Blevins, 2015).

Lip reading. Lip reading is another inadequate method of communicating with DdHH individuals. Speech or lip reading is ineffective because the majority of English sounds are not clearly visible on the lips and even the most proficient lip readers understand less than 30% of verbal communication (Commission on Education of the Deaf, 1988; Nicholls & Ling, 1982, Barnett & Franks, 2002). According to U. S. Department of Justice (2003), lip reading should only be considered when an appropriate interpreter is not available and the DdHH patient acknowledges that this option is preferred to any other alternative method of communication. One problem with this rationale is that when lip reading is used, communication travels one-way and this disregards nurse-patient communication; unless of course, the nurse is a proficient lip reader. Regardless of whether the patient prefers lip reading, when speaking in the presence of a DdHH patient, the nurse must speak normally and clearly, and avoid over-

enunciating or shouting. This is especially important for a DdHH person who is trying to recognize regular lip movements to understand the message (Barnett & Franks 2002; Lieu et al., 2007). Ultimately, nurses need to know that expecting a DdHH patient to read lips, especially in an unfamiliar healthcare environment, may cause emotional stress and miscommunication resulting in unnecessary harm (Iezzoni et al., 2004; Steinberg, Wiggins, Barmada, & Sullivan, 2002).

DdHH Interaction

In nurse-patient encounters, every action and interaction is an opportunity for communication, miscommunication, or missed communication. Because ASL is a visual and gestural language, interactions or behaviors play a significant role in communication. Rules of social interaction for ASL and other forms of signed communication focus heavily on physical expression in relation to body position, space, time, and environmental conditions. Likewise, nonverbal communication and behaviors are more significant than spoken language when communicating with nonsigning DdHH individuals.

Space. Space is the context in which all communication takes place. Space refers to an individual's position within the environment and the distance between individuals as they interact. Both culture and biological senses govern an individual's perception of personal space and comfort during communication and interaction in relation to proximity to others during conversation, body position, eye contact, and touch

(Critchfield, 2015; Giger & Davidhizar, 2002). Awareness of differences in concepts of space for DdHH individuals is key to nurses' ability to communicate and interact appropriately and effectively with DdHH patients and CIs.

DdHH individuals rely on close, face-to-face communication. Native ASL signers show a preference for eye contact and expect visual attention during conversation (Emmorey, Thompson, & Colvin, 2009; Gallaudet University, 2015). Baker (1977) noted that within the social context of Deaf culture, eye contact signals attention by the addressee and to look away from the signer signals the desire for a conversational turn. "With respect to language comprehension, gaze toward the signer's eyes provides a stable fixation point for sign perception and enables the addressee to easily detect changes in eye gaze that convey grammatical and referential information" (Emmorey et al., 2009, p. 242). Changes in eye gaze signal shifting roles within conversation, marking verb agreement and referencing to word expression in ASL (Thompson, Emmorey, & Kluender, 2006). Even subtle changes in eyebrow configuration marks syntactic meanings such as conditional clauses and yes-no questions (Liddell, 1980). Visual cues and reliance on speech reading may be equally important for people with severe hearing loss (Hallam & Corney, 2014). For people with hearing loss, Hallam and Corney (2014) recommended 'full facial contact' through non-verbal signals and by facing the person when speaking (p. 179). The Hearing Loss Association of America (2017) recommended

that healthcare providers maintain eye contact, minimize visual distractions, and augment communication with visual aids when speaking with DdHH patients.

Deaf cultural and personal touch practices differ from cultures that communicate through spoken language. For example, Deaf people are thought to hug more often than hearing people and there are noticeable differences between a Deaf hug and a ‘hearing hug’ (Mindess, 2014, p. 101). Deaf people hug when meeting and parting, they hug a wider range of people, and the Deaf hug has more body contact than the hearing hug (Mindess, 2014). Another example is attention getting. A wave of the hand or a tap on the shoulder or arm is perfectly acceptable and maybe even expected when the signer wants to have the attention of someone else. However, flapping one’s arms in front of a Deaf person’s face or grabbing a Deaf person forcefully is the equivalent of shouting “HELLLOOOOOOO!!!!!!” directly into a hearing person’s ear and this is unnecessary and considered rude (Mindess, 2014, p. 111). In Deaf culture, it is also considered extremely rude for a speaker to cover his or her mouth or to turn his or her back to the group when speaking. Furthermore, it is also considered rude to face an interpreter when speaking to a Deaf ASL users. Nurses should know to stand face forward and maintain eye contact with the Deaf ASL user. Nurses should expect that the Deaf ASL user will be looking at the interpreter during conversation. Also, questions should be directed to the person being asked. In other words, nurses should know better than to ask the interpreter to ask the Deaf ASL user a question.

Time. Time refers to individualistic views about points in time, passage of time, duration of time and time orientation. Deaf Standard Time (DST) may simply be an excuse for being habitually late, but DST is phenomenon acknowledged by the Deaf community (Mindess, 2014). DST can be traced to earlier times when Deaf people did not have access to texting or videophones and moment of face-to-face communication were so rare and precious that minimal value was place on the length of the meeting. Punctuality is an individual pattern and not all Deaf people follow DST, but knowing about just one source of humor or frustration in the Deaf community may be helpful when interacting with Deaf ASL users.

The difference between ASL grammatical syntax of TNAV and English sentence syntax of noun, then verb; may cause misunderstanding. For example, the hearing nurse states, “You may need surgery”, but the Deaf person interprets this message as “In May, you will need surgery” (Fileccia, 2011). According to some, ASL does not readily relay abstract and relational concepts. In *Deaf Like Me*, Thomas Spradley (1985) shared the difficulty that he, as a hearing parent, had in trying to explain the concept of *weekday* and *weekend* to his deaf daughter Lynn, who would walk to the end of the driveway to wait for the school bus every day for weeks before she finally understood that the school was not open on Saturday and Sunday.

Time as perceived by nurses is an important aspect of communication. Hemsley, Balandin, and Worrall (2011) explored the concept of time as a barrier and facilitator

with nurses caring for individuals with complex communication needs. Nurses viewed time as a barrier because learning a person's communication methods took too long (Hemsley et al., 2011). Time perceived as a barrier was related to nurses avoiding direct communication with the patient and preferring that others communicated on behalf of patient. Nurses viewed time a facilitator because applying multiple strategies was successful in assisting with the basic needs of the patient. Time as a facilitator was related to nurses valuing communication and allowing extra time for interaction to become familiar with a person's ways of communicating (Hemsley et al., 2011). Nurses may not have time to become familiar with a DdHH individual's ways of communicating in every situation; however nurses should possess a basic knowledge and skill set for DdHH interaction.

Environmental control. Environmental control is individual belief in the ability to plan activities and exert personal control over factors within the environment. Culture forms individual understanding of how environments facilitate or hinder behavior. Understanding of how environments facilitate and hinder behavior must be consistently recognized and understood within nursing culture. Factors that play a role in environmental control are locus of control, folk medicine, rituals, and health beliefs (Critchfield, 2015). Unlike hearing people, DdHH people are at an increased risk of a "low fund of information" which refers to incidental knowledge accumulated through media access and casual conversation (Mindess, 2014; Young & Hunt, 2011, p. 7).

Without a strong support network, deprivation of incidental information may have lasting effects on a DdHH person's quality of interpersonal relationships, ability to express thoughts and feelings, and ability to handle environmental stressors (Hauser et al., 2010). The roots of disability do not lie in an inability to hear, but rather, in the lack of environmental control in a predominantly hearing and the failure of societal structure that enables the participation of DdHH citizens (World Health Organization [WHO] 2001; Young & Hunt, 2011). For DdHH individuals, inclusion, visual accessibility, avoidance of visual distractions, and adequate lighting are important aspects of environmental control.

DdHH Experiences in Health Care Settings

DdHH individuals experience negative outcomes in health care settings primarily due to poor communication. Poor communication has been associated with delayed preventative healthcare services and inability to participate in shared decision making and informed consent (Barnett et al., 2011). Additionally, feelings of mistrust and lack of rapport with the medical establishment result in Deaf patients opting for familiar or less effective treatments because they may not understand something new (Barnett et al., 2011; Pereira & Fortes, 2010). Holcomb (2013) suggested that Deaf people may compensate for lack of information access by assuming an attitude of disinterest or by filling in the information gaps with their own ideas. Deaf individuals also expressed fear

of misunderstanding healthcare providers, or receiving bad or incorrect information, as barriers to seeking healthcare services unless sick (Richardson, 2014).

Fear of healthcare environments related to poor communication is a rational one, especially for individuals with limited English proficiency (LEP). Research has shown a strong connection between language proficiency and adverse events in hospitals (Bartlett et al., 2008; Divi, Koss, Schmaltz, & Loeb, 2007). Bartlett and colleagues (2008) found that patients with communication problems were three times more likely to experience a preventable adverse events than patients without such problems. Divi and colleagues (2007) examined differences in characteristics of adverse events between English speaking patients and patients with limited English proficiency (LEP) in six U. S. hospitals found that 52.4% of adverse events involving LEP patients were related to communication error. These adverse events referred to situations resulting in physical harm ranging from moderate to death (Divi et al., 2007).

Health disparities experienced by DdHH individuals related to communication barriers is widespread and well documented. Steinberg and colleagues (2002) identified multiple factors that inhibit health-seeking behaviors of Deaf women and lead to misperception, suboptimal care, and negative outcomes. Factors identified include the following: negative feelings, lack of knowledge, lack of information or informed consent, inadequate accommodation consideration for appointments, and poor communication (Steinberg et al., 2002). Fifteen years later, Deaf women in a hospital for maternity

services reported inadequate interpreter services requiring note writing to communicate while in labor and delivery, and some reported experiencing mistreatment from hospital staff (Gichane, Heap, Fontes, & London, 2017). More recently, interviews with Deaf women regarding their perinatal-care experiences in U. S. hospitals revealed common themes associated with missed opportunities for safe and patient-centered care using available technology and collaboration with ASL interpreters (Hubbard, D'Andrea, & Carman, 2018).

Kritzinger, Schneider, Swartz, and Braathen (2014) discovered that interpersonal factors, in addition to poor communication, hindered access to health care services for DdHH males and females. Interpersonal factors included lack of adequate communication within the family, not being addressed directly by HCPs, and pervasive feelings of disempowerment and exclusion (Kritzinger et al., 2014). Likewise, Deaf male hospital patients have described communication experiences with feelings of vulnerability, disempowerment, and discrimination (Sirch et al., 2016).

Study findings continue to show little improvement in DdHH individuals' access to equitable healthcare services and health information materials. Difficulties experienced when accessing medical and psychosocial services after a disaster or traumatic event by DdHH individuals in Denmark included HCP's lack of awareness, lack of access to interpreter services, HCPs' reliance on family members to relay information, and unwillingness of HCPs to try different forms of communication (Skøt,

Jeppsen, Mellentin, & Elklit, 2017). DdHH individuals in the United States reported additional difficulties in accessing mental health, recovery, and peer support services such as unequal access to health education materials, underutilization of interpreters, lack of services for DdHH mental health consumers, and a limited number of all-deaf peer support groups (Cabral, Muhr, & Savageau, 2013). While DdHH people often feel frustration due to communication barriers, their lives improve dramatically in situations in which their language is spoken, signed, or accommodated (Holcomb, 2013).

Language concordance between Deaf ASL using patients and HCPs has been identified as an important determinant of whether patients will seek to understand and adhere to provider recommendations (McKee et al., 2011). ASL concordant health information materials have also been associated with appropriate and timely healthcare utilization among the Deaf population (McKee et al., 2011). Moreover, research findings have demonstrated an improvement of Deaf patients' health knowledge related to use of ASL appropriate materials and researchers have acknowledged that ASL accessible instruments are critical in meeting the needs of Deaf ASL users (Berman et al., 2013; Hickey et al., 2013; McKee et al., 2015; Sacks et al., 2013; Sirch et al., 2016). For example, Berman et al. (2013) assessed breast cancer knowledge and practices among Deaf women and found misconceptions about breast cancer risk factors, screening, and treatment, with only 64.2% of participants correctly identifying the purpose of mammography. In a separate study on breast cancer knowledge among Deaf women,

Hickey et al. (2013) reported a significant improvement and retention in breast cancer awareness and screening practice knowledge after viewing a breast cancer educational video in ASL. Sacks and colleagues (2013) evaluated the educational value of an intervention video on general, testicular, and total cancer knowledge among Deaf and hearing men and found that hearing men had higher pre-test knowledge scores than Deaf men in all three areas. After viewing the intervention video, both hearing and Deaf men demonstrated significant increases in general, testicular, and total cancer knowledge scores (Sacks et al., 2013). More importantly, Sacks and colleagues (2013) developed the video through a partnership with the Deaf community and both English captioning and ASL signing was included with the spoken script.

The importance of partnerships between the Deaf community and healthcare community was revealed by Ferguson-Coleman et al. (2013) in an exploration of dementia knowledge and service access for the Deaf as a cultural-linguistic minority. Although Deaf individuals recognized primary care services as being available for dementia-related concerns, respondents did not view diagnosis as a gateway to healthcare access. A general mistrust of the effectiveness of healthcare services and support for dementia was identified and related to widespread communication failure and the inability of both Deaf and hearing organizations to meet the needs of Deaf people (Ferguson-Coleman et al., 2013).

Communication and language needs, as well as perception of hearing loss, vary widely among DdHH individuals. Adults that experience hearing loss later in life are at a high risk of communication breakdowns in health care environments (McKee, 2013). Hearing loss has been reported as a significant factor in adverse outcomes including social isolation, decreased functional status, depression, poorer quality of life, and dementia (Lin et al., 2011). McKee (2013) recommended that HCPs avoid assuming what these patients may require, and ask each DdHH person about their individual needs and preferences. Furthermore, HCPs must ensure that healthcare information and cognitive assessments are appropriate for the DdHH individual's literacy level and communication preference to prevent an inaccurate interpretation of cognitive decline (McKee, 2013; Cohen-Mansfield, Parpura, & Golander, 2006).

In an effort to identify and better attend to the unmet needs of Deaf people, Barnett and colleagues (2017) published a brief report on the Deaf Health Survey, a community-engaged research with deaf populations. According to Barnett et al. (2017) the results of the collaborative Rochester Prevention Research Center/National Center for Deaf Health Research (RPRC/NCDHR) study has identified strengths and priorities for Deaf health research by providing essential information that has been missing from existing public health surveillance instruments. This ongoing project is relevant to the proposed research because Barnett et al. (2017) are addressing the lack of Deaf ASL user health surveillance, the need for ASL accessible materials, and the need for

interprofessional collaboration to facilitate dissemination of information and inclusion of d/Deaf communities in research focused on improving healthcare access and services for this underrepresented population.

Research focused on interprofessional collaboration together with DdHH communities is essential in finding sustainable solutions to improve nurse communication and interaction with DdHH individuals and CIs. DdHH education modules for nurses and accessible health information for DdHH patients are realistic and positive steps in improving healthcare for DdHH individuals. In addition to ASL accessible materials, utilization of CIs and video relay interpreting services that meet the specific communication needs of each DdHH individual are among multiple ways to connect with patients and to support nurse-DdHH patient-interpreter communication.

Interpreter Service Use in Healthcare

Interpreter services are essential for effective communication between Deaf signers and HCPs who are not fluent in sign language (Barnett et al., 2011). Ludders (1987) exploration of communication between HCPs and Deaf patients found that use of an interpreter was the preferred method of communication of the majority of Deaf people (80.5%). Unfortunately, HCPs understanding and use of interpreter services has seen little improvement in 40 years. Despite federal laws that mandate equal communication access for DdHH people in healthcare settings, interpreter underutilization continues to be a problem. Even in situations where interpreters were available and HCPs were aware

of negative implications, Diamond, Schenker, Curry, Bradley, and Fernandez (2008) found that internal medicine residents expressed and demonstrated the belief that it was easier to ‘get by’ without an interpreter (p. 258).

Few studies specific to the use of certified interpreter in healthcare settings were found, but other studies indicated that Deaf signers preferred using sign to communicate during healthcare consultations. Middleton and colleagues (2010) found that within a healthcare setting, 50% of Deaf signers indicated that they preferred to communicate via a sign language interpreter and 43% would prefer communicating with a signing HCP. Furthermore, only 5% of the Deaf participants who used speech and sign to communicate said that they could manage spoken communication regarding in depth health information with HCPs who have no knowledge of Deaf cultural and linguistic differences (Middleton et al., 2010).

Despite patient preference, professional interpreters are rarely used and HCPs often depend on ad hoc interpreters, such as family or friends, during healthcare consultations (Schenker, Pérez-Stable, Nickleach, & Karliner, 2011). Schenker and colleagues (2011) found that ad hoc interpreters were used most often in physician-patient communication and in instances with nurses, patients reported that ‘getting by’ without an interpreter or barely communicating was common (p. 712). While use of ad hoc or nonprofessional interpreters may be appropriate in some instances, there are many problems related to the use of nonprofessional interpreters. For example nonprofessional

interpreters may not be aware of the Health Insurance Portability and Accountability Act (HIPPA) protections and the need for confidentiality. Other potential problems are nonequivalent interpretations and misunderstandings related to unfamiliarity with medical terminology, unsolicited advice or opinions, and embarrassment when communicating about personal or sexual issues (Juckett & Unger, 2014). Many HCPs may depend on a hearing child of a Deaf adult for interpreting needs but this practice raises other issues because it is illegal in some states, it can be demeaning to a Deaf adult, and it may cause undue emotional trauma for the child (Juckett & Unger, 2014; Ludders, 1987, p. 308). Overestimating a Deaf ASL user's English proficiency can lead to misunderstandings and substandard care in healthcare environments; however, overconfidence in one's own signing abilities can also be problematic (Maul, Regenstein, Andres, Wright, & Wynia, 2012). Juckett and Unger (2014) make the point that the decision to depend on one's own limited language skills versus hiring an interpreter is a common pitfall among HCP because "it is much easier to ask questions in another language than to understand the response" (p. 478).

Video Relay Services (VRS) and Video Remote Interpreter (VRI) services offer HCPs an alternative strategy for communicating with Deaf patients. VRS enables a deaf or hard of hearing person to make and receive telephone calls through a certified interpreter. VRS is closer to 'functionally equivalent' telephone services for the deaf and hard of hearing than any other form of relay service; however this strategy is only

appropriate when the DdHH person and hearing person are at different locations (NAD, 2017c). VRI should be used during face-to-face meetings between a DdHH person and hearing person, and only when an on-site interpreter is not available. VRS and VRI requires that both sender and receiver have video conferencing equipment or videophones, and a high speed Internet connection (NAD, 2017c; 2017d). Challenges to VRS and VRI utilization are equipment availability, HCPs' operational knowledge, and appropriate use of a virtual interpreter. In healthcare environments, it is especially important for nurses to consider the effects of illness, stress, medications, and environmental conditions – as well as patient preference, before choosing strategies to facilitate effective nurse – patient communication.

DdHH Interaction Competence in Nursing

The ANA (2015) standards of professional practice require that a registered nurse “assesses communication ability, health literacy, resources, and preferences of healthcare consumers to inform the interprofessional team and others” (p. 71). Competencies for effective communication also require that register nurses incorporate appropriate alternative strategies for healthcare consumers with language and communication differences (ANA, 2015). However, the ability to assess ASL communication needs, to access interpreter services, and to use ASL or VRS is not prevalent among HCPs (Barnett & Franks, 2002; Lieu et al., 2007). Nurses are at a disadvantage when expected to

communicate effectively with Deaf patients in practice because DdHH interaction is generally not included in nursing program curricula.

Few nursing studies involving DdHH interaction competence exist (see Appendix C). Six articles addressing nurses, knowledge, attitudes and behavior towards patients with disabilities (Filho, Silva, Freitas, Alves, & Costa, 2013; Hornáková, & Hudáková, 2013; Uysal, Bağdat, Koçulu, Kan, Aydin, 2014; Willis & Thurston, 2015) and hearing impairments (Adib-Hajbaghery & Razaee-Shahsavarlo, 2014, 2015) were found, and seven studies were found focusing specifically on Deaf patients (Alselai & Alrashed, 2015; Ljubicic, Zubcic, & Sare, 2017; Lunza & Emma, 2017; Machado et al., 2013; Pendergrass et al., 2017a; Velonaki et al., 2015; Yuksel & Unver, 2016). Most of the studies investigating nurses' sign language interaction and communication attitudes, knowledge, and behavior originated in countries other than the United States. Only two studies specific to American nurses' knowledge and perceptions of DdHH interaction were found. The first examined nurse practitioners' perceptions of barriers and facilitators in providing health care for Deaf ASL users (Pendergrass et al., 2017a). The second involved the development and validation of a knowledge assessment tool to measure nurses' knowledge of interaction and care for hospitalized DdHH individuals (Ruesch, 2018). Only one study explored nurses' use of sign language interpreters (Alselai & Alrashed, 2015).

DdHH Interaction Competence in Other Health Professions

Research has shown that health disparities and adverse outcomes among Deaf people are related to communication barriers and the lack of knowledge and skill of providers to competently address the needs of culturally Deaf clients (AHRQ, 2014; Barnett, 1999; Barnett et al., 2011; Bartlett et al., 2008; Smith & Chin, 2012; Thew, Smith, Chang, & Starr, 2012). Recent studies have found that medical doctors (Hoang et al., 2011), medical students (Hoang et al., 2011; Lapinski et al., 2015), pharmacy students (Matthews, Parkhill, Schlehofer, Starr, & Barnett; 2011), and genetic counselors (Nagakura, et al., 2015) have misconceptions, limited knowledge, and little training about Deaf culture, deaf patients' rights, and ASL. The majority of participants in these studies also reported a lack confidence in their ability to interact competently with the deaf community related to a lack of training about Deaf culture and lack of exposure to members of the deaf community (Hoang et al., 2011; Lapinski et al., 2015; Nagakura, et al., 2015). Matthews et al. (2011) did not assess pharmacy students' confidence or knowledge levels when interacting with Deaf ASL users before or after a role-reversal exercise with members of the Deaf community and ASL interpreters. However, results of post-exercise panel discussions, group debriefing, reflective writing, and opinion surveys found that a role-reversal experience with members of the Deaf community and ASL interpreters was an effective method of teaching students that the delivery of health

care is dependent on adequate communication between health care providers and the patient (Matthews et al., 2011).

In two studies, Deaf culture awareness training was found to increase the knowledge and confidence level of participants regarding Deaf Culture competence and communication using ASL. Hoang et al. (2011) compared the results of a Deaf Community Training (DCT) survey among DCT students, medical-school faculty, and non-DCT students and found that exposure proved to be the differentiating factor in results. Medical students that participated in DCT training scored significantly higher than faculty and non-DCT students, while the scores of faculty without any exposure to the Deaf community were the same as non-DCT students. Lapinski et al. (2015) found that a single 4-hour education module and standardized patient encounter had a significantly positive effect on students' knowledge, skill, and self-reported level of confidence when interacting with the Deaf community.

Nagakura et al. (2015) assessed knowledge of Deaf culture and attitudes toward d/Deaf people of recent genetic counseling graduates to determine if Deaf Awareness Training (DAT) is adequate in genetic counseling programs. The questionnaire used by Nagakura et al. (2015) consisted of demographic questions, items referring to DAT that were developed specifically for the study, knowledge competency questions used by Hoang et al. (2011), and attitude items from Cooper, Rose, and Mason's (2004) Attitudes toward Deafness Scale (ATDS; see Appendix E). Nagakura et al. (2015) found that

scores on Deaf culture items and attitudes toward deaf people did not differ significantly between genetic counselor graduates who reported some DAT and those who did not.

The findings from these studies have significant implications for any healthcare professional that may encounter a Deaf ASL user. Based on the study findings, Nagakura and colleagues (2015) recommended that DAT be increased or improved for students who may work with d/Deaf individuals. Hoang et al., (2011), Matthews et al., (2011), and Lapinski et al., (2015) suggested that exposure to members of the Deaf community in healthcare settings may be most beneficial in increasing healthcare providers' awareness of Deaf culture and ASL communication competency. A summary of the methods and findings from the literature regarding other health professions is presented because it is important to acknowledge and learn from what is already known about ASL interaction in healthcare settings (see Appendix D).

Ethical and Legal Implications

Audism is a term created by Tom Humphries (1977) and defined as "the notion that one is superior based on one's ability to hear or to behave in the manner of one who hears" (p. 12). Lane (1992) expanded the definition of audism to reflect the attitude of hearing superiority among corporate institutions and society in general. Lane's (1992) description of audism gives the reader, especially the hearing reader, a broader view of what this notion has done and can do, to a group of people based on a single trait:

The corporate institution for dealing with deaf people, dealing with them by making statements about them, authorizing views of them, describing them, teaching about them, governing where they go to school and, in some cases, where they live; in short, audism is the hearing way of dominating, restructuring, and exercising authority over the deaf community. It includes such professional people as administrators of schools for deaf children and of training programs for deaf adults, interpreters, and some audiologists, speech therapists, otologists, psychologists, psychiatrists, librarians, researchers, social workers, and hearing aid specialists (p. 43).

Audism can come in many forms and it is important to note that audists may be hearing or deaf (Harrington, 2002). By virtue of the profession, nurses have chosen to take on an obligation and responsibility to promote the health and well-being of others through knowledge, skill, advocacy, and education. Audism has no place in nursing practice.

In the United States, federal laws such as the Rehabilitation Act of 1973, the Americans with Disabilities Act of 1990 (ADA), and the Patient Protection and Affordable Care Act of (ACA, 2010), are meant to protect the rights of individuals to equal access and opportunity to participate in and benefit from healthcare services, and effective communication for individuals who are deaf or hard of hearing. The ADA applies to all public and private healthcare services including clinics, emergency room

care, inpatient and outpatient services, surgery, and educational classes. Despite legal mandates and acknowledgement of the need for effective nurse-patient communication, underutilization of interpreters and alternative communication methods continue to be barriers for Deaf ASL users in healthcare environments (Barnett et al., 2011; Diamond et al., 2008; Finke, Light, & Kitko, 2008; Schenker et al., 2011). Lack of nurses' knowledge regarding Deaf cultural and linguistic differences, ASL communication access, DdHH interaction, professional responsibilities and legal obligations continue to be among the communication barriers for DdHH individuals in healthcare environments (Pendergrass et al., 2017a; Sheppard, 2014; Ruesch, 2018).

Instruments to Measure Nurses' DdHH Interaction Competence

A summary of the literature measuring DdHH communication-interaction competence in nursing is presented to illustrate that nursing research and education regarding nurse – DdHH patient interaction is lacking and valid and reliable instruments to measure nursing beliefs DdHH interaction are needed (see Appendix C). The majority of these studies used qualitative methods to describe nurses' knowledge and experiences of communicating with people who are deaf or hard of hearing. In addition, thematic analysis was used to identify barriers to effective nurse – DdHH patient communication and the sources of these barriers. Among the studies involving quantitative methods, all included self-reported knowledge questionnaires based on literature reviews for data collection.

Velonaki and colleagues (2015) were the only research team that adapted an existing scale specific to deafness for their study. A modified version of the ATDS originally developed by Cooper et al. (2004) was used to measure participants' attitudes toward deafness and knowledge questions were based on a review of the literature (Velonaki et al., 2015). Velonaki et al. (2015) constructed a questionnaire for Greek nurses by incorporating 22 demographic questions, 4 questions specific to caring for D/deaf patients, 13 multiple choice knowledge questions, and the modified 27-item *attitude* scale. Velonaki et al. (2015) pilot-tested a modified 5-point scale, 27-item version of the ATDS scale and determined that it was a valid and reliable measure.

Ruesch (2018) explored the development and validation of a knowledge assessment tool to measure registered nurses' knowledge of 'hearing impairment' and effective communication strategies when interacting with a hospitalized patient who may be 'hearing impaired' (p. 148). Content experts for initial validation of the knowledge assessment items included three speech-language pathologists, two audiologists, and one hard of hearing nurse. Reusch (2018) referred to hearing loss and deafness in terms of *disability* and *hearing impairment* which may be common among HCPs and some who are DdHH, but use of this terminology may also be counterproductive when attempting to improve nursing care for individuals with diverse communication needs. Regardless, Ruesch (2018) reported that, nurses' knowledge of 'hearing impairment', effective communication with 'hearing impaired' patients', and laws and policies regarding

interacting and caring for patients with a ‘hearing disability’ patients was lacking (p. 145-146). Furthermore, only twenty-eight out of 339 participants reported having attended a course on ‘hearing impairment’ (Ruesch, 2018, p. 148).

Collective findings of the literature revealed that the knowledge, education, and skill required to competently care for DdHH patients and their families is lacking in nursing practice and education. Furthermore, valid and reliable instruments are needed to measure nurses’ ASL communication and interaction competence. Instrument development requires the identification of essential skills necessary to achieve for competency. Therefore, establishing a set of essential skills for competent nurse – DdHH interaction has the potential to shape education modules to improve nursing practice and healthcare access for DdHH patients.

Summary

Effective and appropriate interaction is essential to ensuring equitable healthcare services and information for DdHH people. However, a review of the literature associated with Deaf cultural identity, signed communication, and nurses’ knowledge of effective interaction with DdHH individuals and CIs revealed that cultural competence alone is inadequate to address the interpersonal, social, and environmental barriers that people who are DdHH encounter in the hearing world. This inadequacy was further revealed by the use of inappropriate or inaccurate disability terminology in much of the literature regarding healthcare and communication access for DdHH patients. Not

surprisingly, the literature also revealed that Deaf culture and DdHH communication education is lacking in health professions programs and in healthcare organizations. Furthermore, many healthcare providers are unaware of the ethical and legal implications of miscommunication and missed communication associated with failure to provide equitable communication access to patients with diverse communication needs.

Gaps exist in the literature regarding knowledge communication and interaction with DdHH and CIs in nursing. Studies designed to investigate nurses' communication and interaction with DdHH people did not include members of the Deaf community in instrument development and did not include DdHH people in educational experiences regarding DdHH interaction. Available instruments to assess nurses' Deaf culture and DdHH interaction attitudes, knowledge, and behavior were developed for nurses practicing outside of the United States or had questionable validity and reliability. The current state of nursing knowledge, or lack thereof, may be due to the complex and multidimensional nature of the cultural and linguistic differences of ASL and the rules of DdHH interaction. The concepts associated with Deaf cultural identity and DdHH interaction may be too complex for many hearing people to understand. Therefore, the concepts in King's (1981) TGA and TCM was useful in translating rules of DdHH interaction into manageable and meaningful knowledge for nursing practice.

This literature review supported the need for DdHH interaction education in nursing. As professionals responsible for patient advocacy, education, and health

promotion, nurses should be allowed the opportunity, or be required, to learn about best practices when interacting with DdHH patients and CIs in healthcare environments. Before education modules can be developed, valid and reliable information about nurses' beliefs toward DdHH interaction must be understood. More importantly, Deaf community participation is crucial in the development and implementation of appropriate and relevant educational modules, simulation experiences, and instruments to measure learner knowledge and performance involving DdHH individuals and CIs. Lastly, a valid and reliable instrument to measure nurses' beliefs toward DdHH interaction knowledge is needed in nursing. Chapter 3 includes the research design, methodology, participants, setting, instruments, data collection, and data analysis used for the study.

CHAPTER III

METHODS

Research Design

A quantitative methodological design was used to develop and test the validity and reliability of a D/deaf and hard of hearing interaction beliefs scale for registered nurses (DdHH-IBS/RN). A methodological design was an appropriate choice because the aims of the research were to develop and test the psychometric properties of an instrument to measure nurses' beliefs toward DdHH interaction. Methodological design (n. d.) is a process used by a researcher to develop the validity and reliability of instruments to measure construct variables of a specific phenomenon. Measurement is the assigning of numbers to aspects of objects or events in order to quantify phenomena (Stevens, 1968). According to Pedhazur and Schmelkin (1991), that which is relevant to measure can be determined only within a theory about the operations of or the relations among a set of variables relevant to the phenomenon of interest (p. 16). Thus, measurement encompassed the operationalization of theory-based concepts essential to competent DdHH interaction, and quantification of these variables so that the scale may be applied to assess registered nurses' DdHH interaction competency.

The purpose of such an instrument was intended to identify nurses' beliefs toward interaction with Deaf American Sign Language (ASL) users, deaf that use other signing methods, non-signing deaf, and hard of hearing individuals (DdHH). Methods used for

the study were based on a general approach for designing, validating, and testing the reliability of instruments to measure knowledge (DeVellis, 2017; Elliott, Regal, Elliott, & Renier, 2001). The eight general steps are as follows: (a) Determine an overall plan, (b) Conduct a literature review, (c) Generate a draft instrument, (d) Perform content validation and subsequent revision, (e) Pilot-test the second draft and revise as needed, (f) Conduct construct validation and revise as needed, (g) Perform reliability testing and revise as needed, (h) Determine whether further revision and pilot testing are needed (Elliott et al., 2001).

Based on the findings of the study, a skillset for competent DdHH interaction could be established and used to develop education modules and to assess nurse – DdHH patient – interpreter interaction competency in nursing practice. An initial pool of items to assess nurses' beliefs toward DdHH interaction was developed based on an extensive review of literature. Scale content was validated by DdHH or hearing certified interpreters (CIs) who work in healthcare settings, DdHH nurses and healthcare professionals. The newly developed DdHH-IBS/RN was distributed to a sample of registered nurses working in the United States. Data collected was used for exploratory and confirmatory factor analyses to test for construct validity. Reliability analyses tested for internal consistency and stability. In addition, differences in DdHH-IBS/RN scores based on prior education and experience specific to DdHH interaction were explored.

As stated, the overall plan of the research was to develop and validate an instrument to assess registered nurses' beliefs toward DdHH interaction. An extensive literature review was presented in Chapter 2. The next step of scale development involved the creation of items to assess a construct or concept of interest. First, an initial pool of items was created based on an extensive literature review and relevant concepts of belief, King's (1981) TGA, and TCM. In most situations where some theory exists, the deductive approach is considered to be the most suitable choice to ensure content adequacy of the initial scale (Hinkin, Tracey, & Enz, 1997; Schwab, 1980). Next, content validity of the initial pool of items was tested using content expert review and rating of items for items for relevance, sufficiency, and clarity. Then, construct validity was tested by administering the resulting DdHH-IBS/RN instrument to a sample of registered nurses.

Prior to administering the demographic questionnaire and DdHH-IBS/RN to the RNs, approval was obtained from Texas Woman's University (TWU) Institutional Review Board (IRB). IRB approval was not required for development, construction, or assessment of content validity. Once content validity was established, the newly developed DdHH-IBS/RN was included in an IRB application for permission to administer to a large and diverse group of RNs working in the United States. Lastly, factor analysis followed by regression analysis was used to test construct validity and

reliability of the DdHH-IBS/RN. An in depth discussion of content validity, construct validity, and reliability testing will be presented in sections to follow.

Research Questions

The D/deaf and Hard of Hearing Interaction Belief Scale for Registered Nurses (DdHH-IBS/RN) was developed based on a review of the literature and tested to answer the following research questions:

1. What is the validity of the DdHH-IBS/RN?
2. What is the reliability of the DdHH-IBS/RN?
3. What are the differences in registered nurses' DdHH-IBS/RN scores based on prior education and experience specific to DdHH interaction?

Hypotheses

The following hypotheses were used in an attempt to answer the third research question:

H3_a: Registered nurses that have both more prior education and experience specific to DdHH interaction will have higher scores on the DdHH-IBS/RN than with either prior education or experience alone.

H3₀: Registered nurses that have both more prior education and experience specific to DdHH interaction will not have higher scores on the DdHH-IBS/RN than with either prior education or experience alone.

Participants and Sample

A purposive sample of one Deaf signer, one Deaf nurse, two hard of hearing nurses, and two hearing CIs who work in healthcare settings were recruited for the content validity phase of this study. Recruitment was accomplished by sending an e-mail invitation to participate as a content expert for review of the DdHH-IBS/RN items. Other participants may have been included by referral, or snowball sampling. Snowball or network sampling involves the selection of participants through referrals from current participants in a study (Polit & Beck, 2012).

Participants for the construct validity phase of the research consisted of registered nurses (RNs) working in the United States. Recruitment of RN participants was accomplished by posting a recruitment flyer in the Texas Nurses Association (TNA) electronic newsletter, the *TNA Check-Up*, and on specific American Nurses Association (ANA) online communities. Recruitment was also be accomplished via distribution of a recruitment announcement by other professional nursing organizations including the Academy of Medical-Surgical Nurses (AMSN), American Association for Critical Care Nurses (AACN), American Association of Men in Nursing (AAMN), and through nurse referral, or snowball sampling. Two groups of participants were recruited for this study.

Sample size. A minimum of 150 participants for each group was deemed to be an adequate sample size for both the factor analysis and regression analysis (Guadagnoli, & Velicer, 1988; Hinkin, 1995; 1998; Kellar & Kelvin, 2012). An a priori power analysis

was conducted using G*Power 3.1.9 to determine the minimum sample size required to find significance with a desired level of power set at .80, an alpha (α) level at .05, and a medium effect size of .15 (f). Based on the analysis, it was determined that a minimum of 85 participants would be required to ensure adequate power for the regression analysis (Cohen, 1988). DeWinter, Dodou, and Wieringa (2009) support that a minimum sample size of 150 is adequate for factor analysis of a new instrument.

Content validity. Lynn (1986) recommended that a minimum of 6 experts review content in an instrument, but indicated that more than 10 was likely unnecessary for scale development. Rutherford-Hemming (2015) explained that when 6 or more experts evaluate the content of an instrument, one expert may disagree on the content of an item and the minimum validity requirement can still be satisfied. When fewer than six content experts review items of an instrument, an item is deemed valid only all experts agree that the content item is relevant. Content validity testing for the study consisted of members of the Deaf community including a minimum of three DdHH or hearing CIs who work in healthcare settings, and three DdHH nurses.

Construct validity. Sample size is one of the main issues considered in determining whether factor analysis is appropriate for a data set. With regard to sample size for factor analysis, the general recommendation is “the larger, the better” (Pallant, 2013, p. 190). A sample size of 300 is desirable, but smaller samples with at least 150 cases should be adequate (Tabachnick & Fidell, 2013). On the other hand, many scholars

suggest that the sample size is not the primary concern but rather, the ratio of participants to items (Costello & Osborne, 2005; Pallant, 2013). For example, Nunnally (1978) recommended 10 cases for each item while Tabachnick and Fidell (2013) asserted that a 5 to 1 ratio is adequate. Based on the aforementioned a priori power analysis, a minimum of 85 participants was required to ensure adequate power for the regression analysis (Cohen, 1988).

A Power analysis using G*Power 3.1 (Faul, Erdfelder, Lang, & Buchner, 2007) was used to ensure an adequate sample size for the third research question using bivariate regression analysis. Power analysis is typically used at the beginning of a study to reduce the risk of Type II errors and strengthen conclusions about statistical validity (Polit & Beck, 2012). Polit and Beck (2012) outlined the four components in a power analysis as follows:

1. The *significance criterion*, α . Other things being equal, the more stringent this criterion, the lower the power.
2. The *sample size*, N . As sample size increases, power increases.
3. The *effect size* (ES). ES is an estimate of how wrong the null hypothesis is, that is, how strong the relationship between the independent variable and the dependent variable is in the population.

4. *Power*, or $1 - \beta$. This is the probability of rejecting the false null hypothesis (p. 422).

A second group of RN participants was recruited using the same process described in the previous section. Power analysis was used to ensure an adequate sample size for the second group of RNs for testing of the third research question.

Inclusion Criteria

Participation inclusion criteria will follow the prerequisites for certified Deaf interpreters (CDI) and nationally-certified interpreters posted on the RID website (www.rid.org). Certification candidates must be at least 18 years old. A CDI is hard of hearing or deaf and has demonstrated knowledge and understanding of deafness, interpreting, the Deaf community, and Deaf culture. CDIs have specialized experience and training in the use of communication enhancing tools and possess native or near-native fluency in ASL (RID, 2017a). National Interpreter Certification (NIC) is granted to an individual that demonstrates professional knowledge and skills that meet or exceed the minimum professional standards necessary to perform in a broad range of interpretation and transliteration assignments (RID, 2017b).

Inclusion criteria for nurses is being an RN and currently working as an RN in the United States. Participants will not be excluded based on years of experience because the responses of recent graduates may indicate how well and to what extent nursing programs

are preparing students to interact with Deaf ASL users, deaf that use other signing methods, non-signing deaf, and hard of hearing (DdHH) patients and CIs.

Exclusion Criteria

CIs that have been nationally certified for less than five years or report no experience in healthcare settings were excluded as participants for the content validity portion of the study.

RNs that that have been retired from direct patient care for more than three years or who do not have direct contact with patients were be excluded as a participants for the construct validity testing of the study. The beliefs of nurses that are currently interacting directly with patients, or those who have direct patient care experience within the last three years, are more relevant in the development of an instrument focusing on interaction with DdHH patients and CIs than the beliefs of nurses who are not involved in direct patient care.

Setting

Assessment for content validity of the DdHH-IBS/RN items was accomplished by email correspondence and face-to-face meetings of the primary investigator (PI) and content experts as needed. The construct validity phase was conducted online through ANA community forums, the *TNA Check-Up* electronic newsletter, and the AAMN (www.aamn.org), AACN (www.aacn.org), and AMSN (www.amsn.org) organizational websites. The ANA community forums are login and password protected communities

on the ANA website (www.ananursespace.org) open to members that are grouped by special interests such as (a) Nursing, (b) New RNs, (c) Advanced Practice Nurse Community, (d) Faculty Community, (e) Up and Comers, (f) Research, (g) RNs working toward BSN, and (h) Staff nurses greater than 50 years old. ANA members have access to all community forums listed above. These forums are sites where nurses from various backgrounds and geographical locations within the United States can ask questions, exchange ideas, discuss topics of interest, and post surveys and questionnaires for research. The membership lists of AMSN, AACN, and AAMN are the exclusive property of each organization and are maintained at each organizations' the national office. AMSN, AACN, and AAMN do not release member email addresses and handled the distribution of the DdHH-IBS/RN. All AMSN, AACN, and AAMN members received an invitation to participate in the study and a link to access the DdHH-IBS/RN through PsychData® (www.psychdata.com) directly from each respective organization.

Instrument Development

Deaf ASL users may identify as members of Deaf culture; however, the importance of competent communication has been overshadowed by the popularity of cultural awareness and understanding. Being aware that Deaf people communicate using ASL is not the same as knowing *how* to interact, as a nurse with little or no ASL proficiency, with a Deaf ASL user. Nor does this awareness prepare nurses for interaction with Deaf patients that use other forms of signed communication, deaf

patients who do not sign, hard of hearing patients, and CIs. As established in Chapter 1, interactions with DdHH individuals are shaped by a nurse's general beliefs about being DdHH and beliefs about DdHH interaction. Effective nurse – DdHH patient interaction is also influenced by the nurse's belief that he or she understands DdHH interaction and that he or she has the knowledge and resources to behave appropriately when interacting with DdHH patients. Therefore, the key to pursuing mutual goals beyond communication barriers is to explore nurses' general beliefs about DdHH and beliefs about how DdHH interaction works.

Initial item pool. An initial pool of items was generated through an extensive review of the literature from which dimensions of DdHH interaction were identified by definitive characteristics and categorized according to components of personal, interpersonal, and social systems (see Appendix F). Items that reflect both similar and different considerations for Deaf signers, non-signing deaf, and hard of hearing patients were included based on the literature and recommendations from DdHH communication content experts. Connections between each item and the descriptive characteristics of personal, interpersonal, and social dimensions of DdHH interaction are presented (see Appendix G). As stated in Chapter 2, the component of stress in interpersonal systems may be viewed as communication noise. Noise refers to interference of effective communication that influences the interpretation of conversations (Pierce, 1980; Shannon & Weaver, 1949). Therefore, communication noise is not confined to interpersonal

systems and was found to exist within and between the environments of all three systems. For example, psychological noise results from personal bias and preconceived notions individuals bring to conversations, whereas, physical noise is an external or environmental stimulus that distracts communicators from sending or receiving the intended message (Rothwell, 2016). Attention was paid to examples of noise interference pertaining to nurse – patient interpersonal communication including physiological, semantic, organizational, cultural, psychological, and physical or environmental.

Items were initially developed based on defining characteristics of effective DdHH communication and interaction supported by the literature. The focus of item generation was broadened to incorporate qualities essential to interacting effectively and appropriately with Deaf individuals that use non-ASL signing methods, deaf individuals who do not sign, and hard of hearing individuals. Seventy-four items were generated for the initial pool of items (see Appendix H). The item pool questionnaire also included one open-ended question that was designed to elicit suggestions or recommendations from Deaf and hearing CI and DdHH nurse content experts.

Content validity. Content validity (CV) measures the degree to which a sample of items, taken together in an instrument, constitute a sufficient operational definition of a construct and actually measure the content as intended (Polit & Beck, 2006; 2012). Steps of instrument development recommended by Waltz, Strickland, and Lenz (2010) were used for obtaining content validity as follows:

1. The content domains were be clearly defined as (a) general beliefs about being DdHH, (b) beliefs about signing interaction, (c) beliefs about interaction with the DdHH, and (d) beliefs about available resources for interacting with the DdHH.
2. Objectives that represent beliefs essential to DdHH interaction were clearly explicated.
3. An exhaustive set of items to measure each objective representing DdHH interaction beliefs were constructed.
4. The construct domains and definitions, a description of the population for whom the scale was developed, a copy of the directions was provided to nurse participants, and a content validity questionnaire with a copy of specific instructions for item evaluation was presented to a panel of six DdHH and hearing individuals that have experience in working with DdHH patients in healthcare settings to evaluate whether specific items represent the concepts to be measured in terms of relevance, sufficiency, and clarity.

Content experts were instructed to evaluate each survey item based on three criteria: (1) *relevance* of the item as to how well it aligns with the construct of beliefs toward DdHH and DdHH interaction; (2) *sufficiency* of the item as a measurement of personal, interpersonal, and social dimensions of DdHH interaction; and (3) *clarity* of item structure for understanding beliefs toward DdHH and DdHH interaction. Content experts

were asked to rate items using a four-point Likert-type scale, with scores ranging as follows: 1 = not relevant, 2 = somewhat relevant, 3 = quite relevant, 4 = highly relevant. The choice for sufficiency and clarity was be yes or no. Experts were asked to indicate sufficiency and clarity of each item by placing a *Y* in the appropriate box, to indicate yes. Experts were asked to indicate that items are insufficient or unclear by placing an *N* in the appropriate box, to indicate no. The questionnaire included one open-ended request for item recommendations or suggestions from content expert participants. Including an open-ended question at the end of the questionnaire was one method that increased rigor of the validation process because allowed content experts the opportunity to add content that may be missing from the questionnaire (Rutherford-Hemming, 2015).

Because more than two experts rated pool items, coefficient alpha was used as the index of CV for item review (Waltz, et al., 2010). The alpha coefficient quantifies the extent to which agreement exists between experts' ratings of items. Alpha coefficient values range from 0.00 to 1.00 indicating lack of agreement to complete agreement of expert ratings. Waltz et al. (2010) note that agreement refers to the similarities between the relative ordering or ranking of scores assigned by experts and should not be misinterpreted as meaning that identical ratings were assigned by all experts. Cronbach's alpha coefficient is most frequently used by nurse researchers to show internal consistency reliability of an instrument (DeVon et al., 2007). A coefficient alpha of .70 is acceptable for new scales,

whereas values over .90 may represent redundancies and indicate a need for instrument revision (DeVellis, 2017).

Construct validity. Construct validity consisted of an instrument that included a demographic questionnaire and the newly developed DdHH-IBS/RN. Construct validity is the degree to which an instrument measures the conceptual elements it is intended to measure (Cronbach & Meehl, 1955). Construct validation was introduced specifically for research that required the development of measures for which traditional views on validation were inappropriate (Cronbach & Meehl, 1955). Attention to construct validity is especially important in research where study variables are abstract because the validation process of concepts is encircled by a theoretical network (Carmines & Zeller, 1979). Carmines and Zellar (1979) noted that without this network, it would be impossible to empirically test measures of the concepts. However, the authors also warned, “this should not lead to the erroneous conclusion that only formal, fully developed theories are relevant to construct validation” (Carmines & Zellar, 1979, p. 23). The point is that construct validity is not confirmed indefinitely by a single occasion, but rather, by a pattern of consistent findings over time (Carmines & Zellar, 1979).

Data Collection

Data collection was conducted to test for validity and reliability of the DdHH-IBS/RN. A questionnaire consisting of content experts’ ratings of DdHH-IBS/RN pool items was collected and data was used to test content validity. The questionnaire

included an open-ended question for content expert suggestions and recommendations. The resulting DdHH-IBS/RN was administered to two groups of RNs to test scale validity and reliability. Basic demographic information was also collected from RN participants. Demographic information included questions about level of education, years of nursing experience, and prior DdHH interaction education and experience. This section will focus on data collection procedures for each phase of the study.

Content validity. The DdHH-IBS/RN pool of items and instructions for completing was delivered to the content experts via the internet as an email attachment. First, content experts were asked to evaluate each item based on relevance, sufficiency, and clarity. Next, content experts were instructed to rate each item for relevance, sufficiency, and clarity as proposed under content validity in the previous *Instrument Development* section of this paper. Finally, the questionnaire included one open-ended request for item recommendations or suggestions from content expert participants. The completed DdHH-IBS/RN item pool questionnaire was returned to the PI via the internet, as an email attachment. Face-to-face meetings or meetings via an internet platform such as Skype™ would have been an option for clarification or discussion; however, no clarification was needed between PI and content experts. As previously stated, the PI is not proficient in ASL and therefore, a certified ASL interpreter was available for face-to-face meetings with Deaf content experts as needed.

Construct validity with exploratory factor analysis. A recruitment flyer was posted on each ANA community forum and announced in the *TNA Checkup* newsletter, and included a link to access an electronic version of the demographic questionnaire and DdHH-IBS/RN through PsychData®. All AMSN, AACN, and AAMN members received an invitation to participate in the study and a link to access the DdHH-IBS/RN through PsychData® directly from the organization.

First, RN participants were asked to complete a demographic questionnaire that included age, gender, ethnicity, native language, level of nursing education, years of nursing experience, employment setting, education related to care of Deaf ASL users, and prior experience with d/Deaf people and sign. RN participants were then be asked to rate DdHH-IBS/RN items using a four-point Likert-type scale, with scores ranging as follows: 1 = strongly disagree, 2 = somewhat disagree, 3 = somewhat agree, 4 = strongly agree. Finally, RN participants were asked to click a “Submit” button upon completion of demographic questionnaire and DdHH-IBS/RN and the submissions was collected through PsychData®.

A second recruitment flyer was posted on each ANA community forum and distributed directly to members by the AMSN, AACN, and AAMN, and TNA. All invitations to participate included a link to an electronic version of the demographic questionnaire and DdHH-IBS/RN through PsychData®. Invitation content and data collection procedures for the second group were identical to that of the first group.

Data Analysis

Prior to data analysis, the PI conducted pre-analysis data screening procedures. Mertler and Vannatta (2013) explained that four main purposes for pre-analysis data screening are to assess accuracy of data, to address issues of incomplete data, to assess the effects of extreme values or outliers, and to assess the goodness of fit between the assumptions of a specific analysis procedure and the data. Pre-analysis data screening allowed the researcher to address issues regarding quality of data *before* the actual statistical testing began (Mertler & Vannatta, 2013).

Variable correlation. The strength of the correlation among the variables was an issue of concern in the assessment of appropriateness of the data for factor analysis. The Kaiser-Meyer-Olkin (Kaiser [KMO], 1974) test was used as a measure of sampling adequacy and Bartlett's (1954) test of sphericity was used to determine if the correlation matrix was suitable for factor analysis. The range of the KMO index is from 0 to 1; with a larger value being more desirable and .6 is suggested as the minimum value for a good factor analysis (Pallant, 2013; Tabachnick & Fidell, 2013). Bartlett's test of sphericity value that is statistically significant, or less than .05 ($p < .05$), indicates that factor analysis was appropriate.

This section will present the various analyses of data that were conducted in an attempt to answer the following research questions:

- What is the validity of the DdHH-IBS/RN?

Content validity. Content validity was tested by administering the item pool questions to six experts for relevancy ratings. Coefficient alpha was used as the index of CV in the first round of item review because more than two experts will rate pool items (Waltz, et al., 2010). Items with coefficient alpha values ranging between .70 and .90 were deemed acceptable and retained (DeVellis, 2017).

Factor analysis. Factor analysis is the process of determining which variables “cluster together” and it is used by researchers to measure the overlap or shared variance that exists among a set of variables in the development and evaluation of tests and scales (Mertler & Vannatta, 2013, p. 237). Factors can be described as a combination of variables that are correlated because they are measuring something in common; however, they are also fundamentally independent of other subsets (Tabachnick & Fidell, 2013). Generally, the researcher begins with a large number of individual scale items and by using factor analysis; the items can be reduced to form a smaller number of coherent subscales. Waltz et al. (2010) maintain that factor analysis is useful when a researcher wants to assess construct validity of a concept-based instrument, assess various factors related to a phenomenon, and empirically substantiate these factors. Exploratory factor analysis (EFA) was used employing principal axis factoring (PAF) to identify variables that were intercorrelated, explore underlying latent factors, and assist with item reduction (Furr & Bacharach, 2014; Fabrigar, Wegener, MacCallum, & Strahan, 1999). Although PAF and principal components analysis (PCA) are customary applications for EFA, PCA

is not technically a ‘factor’ analysis and PAF is the recommended choice when the objective of analysis is to identify latent constructs underlying measured variables (Furr & Bacharach, 2014, p. 82).

Factor extraction. The ‘eigenvalue greater than 1.0’ rule is commonly used to identify the number of factors to retain (Furr & Bacharach, 2014, p. 86). However, a general consensus in the literature revealed that eigenvalue is “among the least accurate methods for selecting the number of factors to retain” (Costello & Osborne, 2005, p. 2). Furr and Bacharach (2014) indicated that eigenvalues should not be used as a guideline for identifying the number of factors but rather, suggested using scree plot as a better way to identify the number of factors within a set of data.

Scree test. A scree test involves examining the graph or plot of eigenvalues and looking for a clear bend or point in the data where there is a noticeable flattening of the curve (Pallant, 2013). The datapoints above the bend or ‘break’ is usually the number of factors retained; however, this may be unclear if there is a cluster of datapoints near the bend and this does not include factors on the actual breaking point (Costello & Osborne, 2005, p. 3). Costello and Osborne (2005) advised that this can be tested by setting a projected number of factors to be retained and running multiple factor analyses. A scree plot of eigenvalues was examined for each wave of data and the results of these tests were explored in the factor loadings on the rotated component matrices (Furr & Bacharach, 2014; Pallant, 2013).

Factor rotation. Factor rotation is the process by which the solutions from the factor analysis are rendered more interpretable without altering the underlying mathematical structure (Mertler & Vannatta, 2013). Rotation is used to clarify the dimensions or meaning of the factors within a multidimensional scale (Furr & Bacharach, 2014). Direct oblimin rotation was used to interpret the correlation of factors. Kellar and Kelvin (2013) suggested that orthogonal varimax method is most desirable for instrument development, especially when the researcher is attempting to create subscales that are independent of one another. However, Furr and Bacharach (2014) suggested that oblique rotations are preferable to orthogonal rotations because the main goal of rotation is to clarify the nature of the factors and this depends on pattern of associations between the factors and the items of a scale. One important difference between oblique and orthogonal rotation is that orthogonal rotation forces factors to correlate, while oblique rotation allows factors to be correlated or uncorrelated (Furr & Bacharach, 2014). “Oblique rotations can produce results in which these associations are as clear as possible, allowing us to understand our scales as clearly as possible” (Furr & Bacharach, 2014, p. 90). For purposes of clarity, oblique direct oblimin rotation was used with EFA.

In oblique rotation, factor loadings range between -1 and +1 and can be interpreted as correlations between each item and each factor (Furr & Bacharach, 2014). The size and direction of loadings are important considerations in the interpretation of correlations between items and factors. Size refers to the approximation of loadings from

0 with stronger associations between an item and a factor being closer to -1 or +1 (Furr & Bacharach, 2014). Furr and Bacharach (2014) state that loadings above .30 or .40 can be interpreted as having reasonably strong associations and loadings of .70 or .80 can be interpreted as having very strong associations between items and factors. For this study, a .40 was the minimum acceptable factor loading retained.

➤ What is the reliability of the DdHH-IBS/RN?

After factor analysis was completed, the resulting DdHH-IBS/RN instrument was tested for reliability. Internal consistency is one indicator of a scale's reliability. This determines the degree to which the items, or sets of items, that make up the scale consistently measure the same underlying attribute or construct (Pallant, 2013). Cronbach's coefficient alpha is the most commonly used statistic to assess the internal consistency reliability of several items that the researcher wants to add together to obtain a summary or summated score (Morgan, Leech, Gloeckner, & Barrett, 2011; Pallant, 2013). The split-half approach to the internal consistency method was used to estimate reliability and stability of the instrument.

Cronbach's alpha. Two versions of Cronbach's alpha exist: the normal or 'raw' coefficient alpha and the alpha based on standardized items (Furr & Bacharach, 2014, p. 137). The researcher must choose one alpha value and this decision is based on how the items on a scale are summed or averaged. The raw coefficient alpha (Cronbach's α) is the most widely used method for estimating reliability or consistency of items that are

presumed to be measuring a single construct (Furr & Bacharach, 2014). The ‘standardized alpha’ may be used if the variances of test items are drastically different requiring the items to be standardized before summing or averaging them. Furr and Bacharach (2014) suggest that the standardized alpha could be used in instances such as if the items had different response scales or if the scores of different measures were combined to form a new measure that is, the different sets of scores would need to be standardized before they are combined.

Cronbach’s coefficient alpha was the index of internal consistency reliability for the study because the result is a single value for any given data set and the value is equal to the mean of the distribution of all possible split-half coefficients associated with a specific data set (Waltz et al., 2010, p. 149). DeVon et al., (2007) recommended computing alpha coefficients each time the tool is administrated to increase reliability and to ensure that the instrument is as concise as possible without losing necessary content. Cronbach’s alpha values vary depending upon the number of items in a scale, but a positive value above .7 is considered acceptable (Morgan et al., 2011; Nunnally, 1978; Pallant, 2013). Although a general rule of thumb that Cronbach’s alpha values greater than 0.7 are desirable, when interpreting the reliability of the scale in the study, the PI was mindful of the caveat that the α value may have been inflated with a large number of items and may have been deflated when items were less diverse (Waltz et al., 2010). High internal reliability may have indicated item redundancy whereas, low internal

reliability may have indicated a need for scale, or subscale restructuring or additional items (Elliott et al., 2001).

Split-half reliability. Split-half reliability is based on splitting a test into two separate parts and using the subtest scores to examine internal consistency, reliability, and stability of the total instrument (Furr & Bacharach, 2014). This approach followed the process explained by Furr and Bacharach (2014) in three steps. First, the DdHH-IBS/RN was split into two subtests: even numbered items were summed for one subtest and odd numbered items were summed for the other subtest. In the second step, the correlation between the two subtests was computed. “The split-half correlation reflects the degree to which the two parts of the test are consistent with each other” (Furr & Bacharach, 2014, p. 133). If the DdHH-IBS/RN is reliable, the split-half correlation will be consistent between the *even* half of the test and the *odd* half of the test. In the third step, the split-half correlation was computed using the Spearman-Brown formula to test for internal consistency estimates of reliability. An outcome as close as possible to 1 is desirable for the Spearman-Brown formula. One limitation of the split-half approach is the assumption that two halves of one test are parallel; that is, if test items are similar to each other, then randomly splitting the test into two parts should produce two parallel subtests (Furr & Bacharach, 2014).

The study attempted to answer the third research question using the following hypotheses:

H3_a: Registered nurses that have both more prior education and experience specific to DdHH interaction will have higher scores on the DdHH-IBS/RN than with either prior education or experience alone.

H3₀: Registered nurses that have both more prior education and experience specific to DdHH interaction will not have higher scores on the DdHH-IBS/RN than with either prior education or experience alone.

Confirmatory factor analysis. Confirmatory factor analysis (CFA) is often used to test a theory about underlying processes or relationship patterns that may occur among variables (DeVellis, 2017; Mertler & Vannatta, 2013). “The main purpose of confirmatory factor analysis is to confirm – or disconfirm – some *a priori* theory” (Mertler & Vannatta, 2013, p. 245). Therefore, CFA followed the EFA of the second group to verify the factor structure of the resulting DdHH-IBS/RN scale.

Follow-up analyses. Bivariate correlation, standard multiple regression, and independent-samples *t*-tests were used after CFA with the second group to evaluate the degree of the relationship between nursing education and experience specific to DdHH interaction and participant DdHH-IBS/RN scores. Correlation analysis was used to describe the strength and direction of the association between continuous variables. Pearson correlation coefficient (*r*) was analyzed to determine the bivariate associations between variables. Standard multiple regression utilized the relationship between the independent and dependent variables to predict participant DdHH-IBS/RN scores from

participant education and experience specific to DdHH interaction. This approach also provided an idea of how much variance in each of the dependent variables could be explained by each of the independent variables (Pallant, 2013; Mertler & Vannatta, 2013). Testing for group differences was accomplished by using independent samples t-tests to determine whether there was a difference between DdHH-IBS mean scores based on participants' reported education and experience specific to DdHH interaction.

This section has presented methods of data analysis that were used in attempt to answer the research questions for this study. Data was analyzed for content validity and reliability using the Statistical Package for the Social Sciences (SPSS, Version 25). The next section will discuss protection of participants and management of data.

Measures to Protect Human Subjects

Informed consent. Prior to administering the demographic questionnaire and DdHH-IBS/RN to the RNs, approval was obtained from Texas Woman's University (TWU) Institutional Review Board (IRB). IRB approval was not required for development, construction, or assessment of content validity. Once content validity was established, the newly developed DdHH-IBS/RN was included in an IRB application for permission to administer to a large and diverse group of RNs working in the United States.

In the construct validity phase, a recruitment flyer was posted on each community forum with a link to the study. When potential participants accessed the link, an

informed consent statement appeared and at the end of the informed consent text, a statement was included: If you have read and understand the above statements, please click on the "Continue" button below to indicate your consent to participate in this study. Every participant that submitted a survey was automatically assigned an internal number called the Respondent ID Number that confirmed successful submission of the data, recorded participation, and disconnected data from identity. Because the data was disconnected from identity through PsychData®, the data was aggregate and RN participants could not request that data be withdrawn from the study after it was submitted. This was stated on the informed consent.

Confidentiality. Ethical research practice standards to protect human participants represented in the study were followed. All data exchanged between content experts and PI remained confidential. Research records, both paper and electronic, remained secured and locked in an office under the PI's direct control. All demographic and DdHH-IBS/RN information for RNs were disconnected from identity upon submission through PsychData® and remained confidential. The data used for analysis was in aggregate.

Data management. Data was managed through a series of preparatory and screening steps by the researcher. These steps included assigning reviewing data for completeness, logging in data, screening data, and retrieving pieces of missing information when possible, and assigning identification numbers. The researcher

assessed data values and examined missing values. Before solutions can be implemented to resolve issues of missing data, researchers should understand factors such as the extent of missing data, the role of the variable with missing data, and the patterns associated with missing values (Polit & Beck, 2012). Polit and Beck (2012) described three missing values patterns: missing completely at random (MCAR), missing at random (MAR), and missing not at random (MNAR). In cases of missing data, the extent of the problem was examined on a variable-by-variable basis through frequency distributions and Missing Values Analysis (MVA) within SPSS version 25. Once the extent and patterning of missing values was assessed, the researcher decided how to address the problem. Polit and Beck (2012) recommended using three basic solutions to address missing values: deletions, imputations, and mixed modeling with repeated measures.

Listwise deletion drops any observation with any missing data on any variable involved. Therefore, if the percentage of missing is small, less than 5%, and the missing data are a random sample of the data set, Listwise deletion in SPSS version 25 would have been used based on the assumption of MCAR. However, if missing data were over 5%, an attempt would have been made to determine the missing value patterns of the data. Depending on these patterns, mixed modeling with repeated measures may have been used because in a mixed approach, only the value point is dropped and the remaining data is retained (Shin, 2009). Imputation is the ‘filling in’ of missing data with

values that are the best estimates of what they would have been, had the values not been missing (Polit & Beck, 2012). Imputations were not necessary for the collected data.

Summary

The body of work in this dissertation addressed the lack of reliable instruments to assess nurses' beliefs toward DdHH interaction through instrument development guided by TCM and King's (1981) TGA. The purpose of the study was to develop a valid and reliable instrument to measure registered nurses' beliefs toward DdHH interaction. The newly developed DdHH-IBS/RN was intended to outline essential characteristics of personal, interpersonal, and social dimensions of DdHH interaction. Findings of the research will help improve nursing interaction with DdHH patients and CIs based on knowledge items deemed as relevant, sufficient, and clear by Deaf and hearing CIs who work in healthcare settings, DdHH nurses or healthcare professionals, and signing nurses.

Effective collaboration between nurses, DdHH patients, and CIs has the potential to create a valid and reliable tool that can be used to enhance communication between nurses and DdHH individuals in healthcare settings, and create a pathway for better access to healthcare for DdHH adults. In the future, the DdHH-IBS/RN may be used to create evidence-based nursing education modules and to improve nursing care of DdHH patients. This study was the first to attempt to quantify beliefs toward DdHH interaction. Two waves of data were collected to increase rigor of the study and to support validity

and reliability of the instrument; however, the PI acknowledges that continued validation studies will be needed.

CHAPTER IV

RESULTS

The purpose of this quantitative methodological research study was to develop and test the validity and reliability of the D/deaf and hard of hearing interaction beliefs scale for registered nurses (DdHH-IBS/RN). Two waves of data collection and analyses were done to promote study rigor by providing validation beyond beginning psychometric evaluation typically done with new instrument development. The first wave of data was used to initially develop the scale by testing for content validity and obtaining preliminary construct validity and reliability. The second wave of data was used to build on this foundation to provide further validation of the scale. Each wave of validation will be discussed separately under each research question/hypothesis followed with a summary of results.

Initial Development and Validation of the DdHH-IBS/RN

Content and construct validity were tested to address the first research question: What is the validity of the DdHH-IBS/RN?

Content validity

A survey questionnaire including 10 demographic questions and 75 item pool questions was distributed to a purposive sample of one Deaf nurse, two hard of hearing nurses, two hearing CIs who work in healthcare settings, and one Deaf ASL and Signed Exact English (SEE) user who is the manager of an interpreter program in a large

metropolitan area (see Appendix H). Recruitment and data collection was accomplished through email correspondence. Content experts were asked to evaluate each item based on relevance, sufficiency, and clarity.

Relevancy ratings were based on a four-point Likert-type scale. Results of content validity are displayed for both the initial 75 items and the revised 58 items (see Appendix I). Content expert ratings for relevancy indicated that the 75-item D/deaf and Hard of Hearing Interaction Beliefs Scale for Registered Nurses (DdHH-IBS/RN) has excellent internal consistency reliability with a Cronbach alpha of .943. DeVellis (2017) noted that coefficient alpha values over .90 may represent redundancies and may indicate a need for instrument revision. However, the PI anticipated this result because item content was purposefully redundant and revision of scale items was anticipated. Items rated as unclear or insufficient by 3 or more content experts were individually reviewed. If the clarity or sufficiency of the item could not be improved upon, based on content suggestions and further discussion, the item was removed from the scale.

After removal of 17 items, the Content Validity Index (CVI) of the scale was calculated by determining the CVI for each of the 58 retained items. CVI was computed using Lynn's (1986) suggested method for computing items based on a 1-4 scale (DeVon et al., 2007). Ratings of 3 or 4 were added together for each item and then divided by 6; the number of content experts that reviewed items. The CVIs for each item were then summed and divided by 58; the total number of retained items on the instrument.

According to Lynn (1986), a value $>.83$ is necessary to establish validity. The average of CVIs for 58 items of the DdHH-IBS/RN yielded a value of .873 and therefore, the content validity criteria was met. Relevancy ratings of content experts for the 58-item DdHH-IBS/RN indicated that the scale has excellent internal consistency reliability with a Cronbach alpha of .913. The revised 58-item version of the DdHH-IBS/RN was distributed to the first group of registered nurse participants (see Appendix J).

Data Collection

Permission to administer the DdHH-IBS/RN to a large sample of nurses was granted by TWU IRB (see Appendix K). Recruitment began with several nursing organizations (e.g., AACN, AAMN, AMSN, and TNA) posting a recruitment flyer and survey link on their respective websites (see Appendix L). Due to receiving the 2018 Southern Nursing Research Society/National League for Nursing Dissertation Research Grant Award after notification of IRB approval, a request for modification was submitted to include a small incentive of a \$10 Amazon gift card for participants and the collection of participant emails solely for distributing gift cards (see Appendix M). The modification was approved by TWU IRB and recruitment continued (see Appendix K1).

The PI noted that some participants were spending a short time completing the survey questionnaire and some participants submitted duplicate emails. Therefore, the survey was locked and a second modification request was sent to TWU IRB to include the following statement on the recruitment announcement: “Please be advised that only

one gift card will be issued per email address and only to respondents who complete one survey and spend more than 10 minutes actively answering questions.” After the second modification was approved; recruitment continued until 410 surveys were completed (see Appendix K2). All participants answered the survey on PsychData® and the data was downloaded directly from the PsychData® site to SPSS version 25. No identifying information was collected. Participant emails were used only for gift card distribution and were not downloaded with the questionnaire data.

A third modification request was submitted to and approved by TWU IRB for the second wave of data collection (see Appendix K3). This modification included a request to distribute the newly revised 25-item DdHH-IBS/RN survey to a second group of registered nurses (see Appendix N). In addition to the 25 scale items, two demographic questions were added to the questionnaire and this will be discussed later in this chapter. The participant recruitment and survey questionnaire distribution were identical to that of the first group with a few minor details: the incentive was changed to a \$5 Amazon gift card, and gift cards were distributed to the first 150 participants that completed the survey, spent more than three minutes actively answering questions, and provided a valid email. The incentive was reduced to a \$5 Amazon gift card for 150 participants to reduce number of invalid cases (e.g., participants completing survey more than once, participants not meeting eligibility criteria) and to stay within an amount that would be grant funded. The modification for the amount of time spent answering questions was based on Huang,

Curran, Keeney, Poposki, and DeShon's (2011) recommendation that participants spend a minimum of 2 seconds per survey item. During the construct validity phase for the first group of RNs, 410 survey questionnaires were completed through PsychData®. Next, the data was screened to identify and remove invalid cases from the sample. After preparing the data from the first group for analysis, it was observed that there were no missing data out of 214 recorded cases.

Pre-Analysis Data Screening

Data were screened for invalid cases prior to data analysis. Assumption testing was performed to assess normality, linearity, and homoscedasticity of the data. Results of pre-analysis data screening procedures are presented in this section.

Invalid cases. Screening a dataset for invalid cases is an important part of data preparation. Invalid data are cases that reflect content nonresponsivity which is defined as responding without regard to item content (Meade & Craig, 2012), or careless responding (Curran, Kotrba, & Denison, 2010). Careless responding is a concern in data analysis because these types of responses can weaken correlations, reduce estimates of internal consistency reliability, and may cause inaccurate factor analytic results (Johnson, 2005). Cases were deemed invalid and removed if they meet the criteria outlined below.

Duplicate cases. Duplicate cases can be observed when respondents take a survey more than once and are detected by a unique identifier, such as email address.

According to Johnson (2005), duplicate cases will bias results and should be removed. There were forty-two ($n = 42$) duplicate cases identified and removed from the data.

Met exclusion criteria. Cases that did not meet the inclusion criteria outlined in the sampling strategy were excluded in order to meet the objectives of the study. Exclusion criteria for this study included respondents less than 18 years of age and nurses who have not worked directly with patients within the past 3 years. Respondents were asked not complete the survey if they had not worked directly with patients in the past 3 years and therefore, it was presumed that surveys submitted by respondents met exclusion criteria. No cases ($n = 0$) were excluded based on age.

Dropped out midway through survey. Respondents were informed that participation in this research is voluntary and they could stop taking the survey questionnaire at any time. However, Johnson (2005) recommended that respondents who stopped participating in a survey before completing 50% of the questionnaire should be removed from the data. All respondents completed the demographic questions; however, thirteen respondents ($n = 13$) did not begin scale items.

Response time. Respondents who complete a survey too quickly reflect content nonresponsivity or careless answering and should be removed (Curran et al., 2010; Meade & Craig, 2012). Huang et al. (2011) recommended removing cases in which respondents take less than 2 seconds per item to answer the survey. The questionnaire survey consisted of 15 demographic and 58 scale items, for a total of 73 items.

Therefore, cases in which respondents completed the survey in less than 146 seconds ($n = 152$) were removed.

Zero variance across items. Zero variance across items occurs when a respondent has answered each question with the same answer. This type of case is indicative of content nonresponsivity or careless answering and should be removed (Huang et al. 2011). Only four ($n = 4$) respondents had zero variance across all survey items.

Impossible values. Impossible values refer to values in a variable that are not theoretically feasible for that particular variable. For example, it would be impossible for a 34 year old person to be a registered nurse for 32 years. Likewise, it would be impossible for a 30 year old to have 30 years of professional or academic experience in DdHH interaction. Among the first sample, ten ($n = 10$) instances of impossible values were found and these cases were removed from the dataset.

Normality, linearity, and homoscedasticity. Three general assumptions are involved in multivariate statistical testing: normality, linearity, and homoscedasticity.

Normality. Normality refers to a symmetrical, bell-shaped, distribution curve that has the greatest frequency of scores in the center with scores declining in frequency towards the outward extremes. Data were tested on 214 cases based on mean scores of all 58 items of the DdHH-IBS/RN. A comparison of DdHH-IBS/RN mean score ($M = 4.08$, $SD \pm .395$) and the 5% trimmed mean score (4.06) indicated that the extreme scores

had little influence on the mean (Pallant, 2013). Univariate normality is a necessary condition for multivariate normality and therefore, Mertler and Vannatta (2013) recommended that variables be assessed for normality based on values for skewness and kurtosis. Skewness provides information about the symmetry of the distribution around the mean, whereas kurtosis provides a quantitative measure of the peakedness of the distribution (Mertler & Vannatta, 2013; Pallant, 2013). A histogram of the distribution of the DdHH-IBS/RN mean scores shows positive skewness for the data (1.127) and marked kurtosis (.757) (see Figure 2). However, statistics experts agree that almost all variables have a slight departure from normality and that significant skewness and/or kurtosis values, commonly found in larger samples of 200 or more cases, rarely deviate enough from normal to make a significant difference in the analysis (Field, 2013; Mertler & Vannatta, 2013; Pallant, 2013).

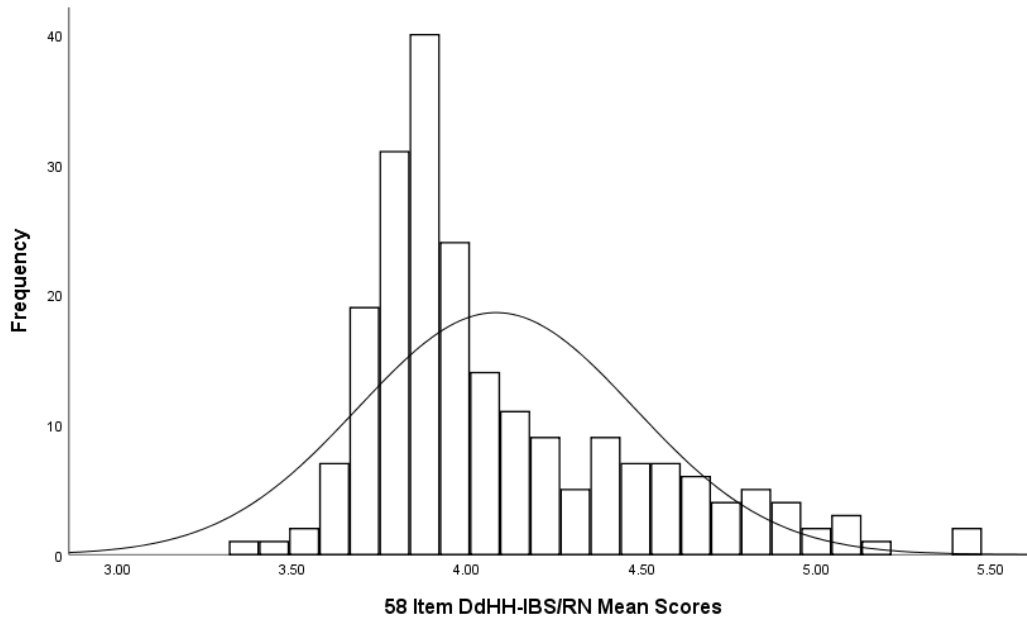


Figure 2. Histogram of 58 Item DdHH-IBS/RN Mean Scores.

The Kolmogorov-Smirnov statistic tests the null hypothesis that the population is normally distributed and also assesses the normality of the distribution of mean scores (Mertler & Vannatta, 2013; Pallant, 2013). A non-significant result (Sig. value $>.05$) indicates normality. In this case, the Sig. value was .000 and suggests violation of the assumption of normality.

Linearity. Linearity involves the assumption that a straight-line relationship exists between two variables. Mertler and Vannatta (2013) recommended assessing the residual plot to compare standardized residuals to the predicted values of the dependent variable, and to obtain information regarding homoscedasticity. Therefore, linear regression was

used to assess the relationship between the dependent variable, DdHH-IBS/RN mean scores, and independent variables of education and experience specific to DdHH interaction. The predicted probability (P-P) plot revealed no drastic deviation from the diagonal normality line and thus, the assumption of normal distribution and linearity of residuals was met (see Figure 3).

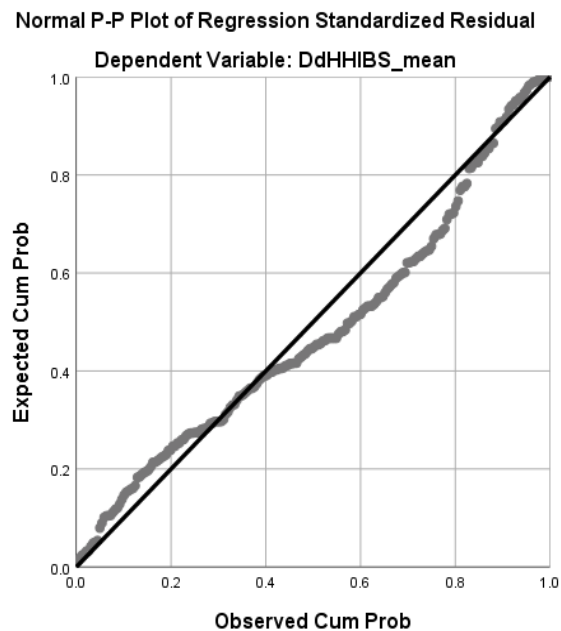


Figure 3. Predicted-Probability Plot for First Wave.

Homoscedasticity. Homoscedasticity refers to the distribution of residuals; whether residuals are equally distributed, or whether they tend to cluster together at some values and spread far apart at others values. The scatterplot showed a clustering of residuals on the left side of the plot with residuals widely disbursed above and to the right

of the cluster (see Figure 4). The results of the P-P plot suggested that the assumption of homoscedasticity was not met.

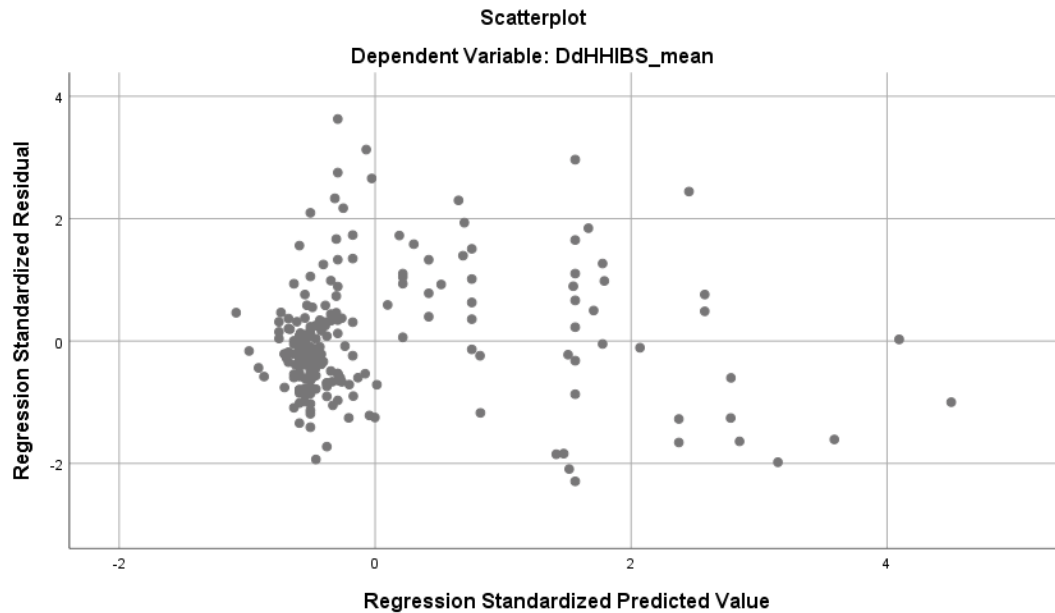


Figure 4. Scatterplot of Standardized Predicted Values by Standardized Residuals for First Wave.

Multicollinearity refers to the extent of correlation between variables. Multicollinearity is a concern because when two variables are highly correlated, the regression model will not be able to accurately associate variance in your outcome variable with the correct predictor variable, which leads to overlapping information and results in an unstable prediction equation (Mertler & Vannatta, 2013). Multicollinearity was assessed by checking two collinearity statistics: tolerance and variance inflation factor (VIF) values. Results of collinearity statistics are displayed in Table 1. Tolerance is a measure of

collinearity among independent variables. Values for tolerance range from 0 to 1, with values of 0.1 indicating a distinct problem of multicollinearity among independent variables. Table 8 shows that tolerance values for all four independent variables were greater than .5. The VIF indicates whether a strong linear association exists between a given predictor and all remaining predictors (Mertler & Vannatta, 2013; Stevens, 2001). VIF greater than 10 are generally a cause for concern; however all VIF values were less than 2, indicating that the assumption was met.

Table 1

Collinearity Statistics: Group 1

Independent Variable	Tolerance	VIF
Did your nursing education include communication and interaction with patients with hearing loss?	.674	1.483
Has any of your continuing nursing education included communication and interaction with patients with hearing loss?	.633	1.581
How many years of experience do you have interacting with deaf or hard of hearing people who DO NOT use sign to communicate?	.570	1.755
How many years of experience do you have interacting with Deaf people who use sign to communicate?	.597	1.674

Note. Dependent Variable: DdHH-IBS/RN mean

Summary of Pre-Analysis Data Screening

Overall, the sample contained 196 invalid cases. These cases included participants dropped out before they completed 50% of the survey, entered impossible values or zero variance across items, submitted duplicate cases, and/or completed the survey too fast. After the removal of invalid cases, the sample contained 214 cases that surpassed the minimum requirement of 150 participants. There were no missing data out of 214 recorded cases. Assessment of normality, linearity, and homoscedasticity showed a positively skewed and peaked distribution of DdHH-IBS/RN mean scores. Based on linear regression P-P and scatter plot results, the assumption of normal distribution and linearity of residuals was met and the assumption of homoscedasticity was not met. Collinearity statistics from linear regression showed that assumption of multicollinearity was met.

Main Study Findings Initial Sample

Main study findings for the initial sample including general demographics, demographics specific to DdHH communication and interaction, construct validity, and reliability analyses are presented in this section.

Demographics

Demographic data were collected in order to evaluate the background of the respondents. Table 2 displays descriptive information for the demographic variables. The majority of participants were female (64%) and White/Caucasian (79.4%).

Participant age ranged from 24 to 70 ($M = 34.16$, $SD \pm 8.035$). Descriptive information for demographic variables specific to level of nursing education and years of nursing experience is presented in Table 3. The largest percentage of participants hold a bachelor's degree (44.4%) in nursing and years of nursing experience ranged from 3 to 47 ($M = 8.91$, $SD \pm 7.574$).

Table 2

Frequencies and Percentages for Demographic Variables: Group 1

Demographic variable	<i>n</i>	%
Gender		
Female	137	64
Male	77	36
Ethnicity		
White/Caucasian	170	79.4
Hispanic	19	8.9
Black/African American	16	7.5
Asian	4	1.8
Native American or Alaskan Native	3	1.4
Native Hawaiian or Other Pacific Islander	1	.5
Multi-racial	1	.5
Age		
<i>N</i>		214
<i>M (SD)</i>		34.16 (8.310)
Range		24–70

Table 3

Frequencies and Percentages for Nursing Demographic Variables: Group 1

Nursing Demographic	<i>n</i>	%
Highest Level of Nursing Education		
Doctorate	1	.5
Masters	61	28.5
Bachelors	95	44.4
Diploma	31	14.5
Associates	26	12.1
Years of Nursing Experience		
<i>N</i>		214
<i>M (SD)</i>		8.91 (7.574)
Range		3–47

The largest percentage of participants reported metropolitan hospitals (36.0%) as their employment setting. Participants also reported working in free standing health centers (15.9%), rural hospitals (15.4%), extended care facilities (15%), and home health (12.1%). Twelve participants (5.6%) indicated employment setting as *other* than one of the categories provided. Other employment settings included academia and public schools.

Medical surgical nursing was the primary area of expertise reported by the largest percentage (23.8%) of respondents. Behavioral health (21.5%), critical care (20.6%),

emergency (14%), and home health (13.6%) were also among the primary areas of expertise of nurse respondents. Other (6.5%) areas of expertise included spinal cord injury, special procedure, same day surgery, quality and patient safety, oncology, obstetrics, geriatrics, case management, hospice, and education.

DdHH communication and interaction demographics. Demographic data regarding education and experience specific to DdHH interaction were collected in order to answer the third research question. The majority of respondents reported having both primary nursing education (79.4%) and continuing nursing education (82.2%) that included communication and interaction with patients with hearing loss. Respondents described the majority of experiences with HH people who do not sign as personal (55.6%) or professional (55.1%). Likewise, respondents described the largest percentages of experiences with Deaf people who sign as professional (55.6%) and personal (48.6%). Years of experience with HH people who do not sign and Deaf people who sign ranged from 0-41 and 0-42, respectively. However, the average experience among participants with HH people who do not sign was 6 years ($M = 5.85, SD \pm 5.873$) and 5 years with Deaf people who sign ($M = 5.04, SD \pm 5.439$).

Participants were asked to describe primary experiences with non-signing dHH people and Deaf signers from a selection of categories including personal, professional, academic, community, other, and none. Participants were instructed to select all categories that applied to their experiences and the *other* category asked participants to

specify the nature of their experience. Few participants reported having no experience interacting with non-signing dHH people (1.9%) and Deaf signers (1.9%). Respondents described the majority of primary experiences interacting with non-signing dHH people were described as personal (55.6%) or professional (55.1%). Likewise, respondents described most primary experiences interacting with Deaf signers as professional (55.6%) and personal (48.6%). Fewer nurse participants reported experience interacting with non-signing dHH in academic (35%), community (30%), and other (1.9%) environments. Other experiences with non-signing dHH included pastoral or spiritual work as a clergyman, having a child who is hard of hearing, and caring for patients in the clinical setting. Similarly, fewer participants reported experience with Deaf signers in academic (38.8%), community (32.7%) and other (1.4%) settings. Other experiences with Deaf signers reported by participants included pastoral or spiritual work as a clergyman, having a grandmother who was deaf the last 20 years of her life, having a child who is hard of hearing, and caring for a signing patient in the hospital.

Lastly, respondents were asked two questions regarding signing skills. Percentages of reported level of signing skills were as follows: none (11.7%), minimal (18.7%), basic (28.5%), intermediate(30.8%), and advanced (10.3%). The largest percentage of participants reported learning to sign in a college or community course (44.9%). Additional sign education sources online or self-study (28%), family and/or

friends (14%), or other (2.3%) sources including New York University Deafness Research and Training Center and precollege education.

Construct Validity

The 58 item D/deaf and Hard of Hearing Interaction Beliefs Scale for Registered Nurses (DdHH-IBS/RN) included 21 items that were written and scored in a negative format. Prior to conducting data analysis, reverse scoring was applied to the 21 negative DdHH-IBS/RN scale items. After reverse scoring of negative items, the 58 items of the DdHH-IBS were subjected to principal axis factoring (PAF) using SPSS version 25. Exploratory factory analysis (EFA) was done to identify variable correlations, assist with item reduction, and explore underlying latent factors. Oblique direct oblmin rotation was used to reveal the nature of associations between both factors and items on the scale.

Kaiser-Mayer-Olkin (KMO) and Bartlett's test of sphericity were done to determine that the data was be appropriate for factor analysis. The KMO index ranges from 0 to 1 and a value above .6 is desired for a good factor analysis (Pallant, 2013; Tabachnick & Fidell, 2013). The KMO measure of sampling adequacy was .867, exceeding the recommended value of .6 (Kaiser, 1970, 1974; Pallant, 2013; Tabachnick & Fidell, 2013). Bartlett's test of sphericity was used to determine suitability of the data correlation matrix for factor analysis. Bartlett's test of sphericity was significant ($\chi^2(84.12) = 1653, p < .001$) and deemed appropriate to proceed with factor analysis.

EFA with PAF was conducted to examine the proposed domains of D/deaf and hard of hearing interaction beliefs. The scree plot showed an obvious flattening after the third factor which indicated the presence of three factors (see Figure 5).

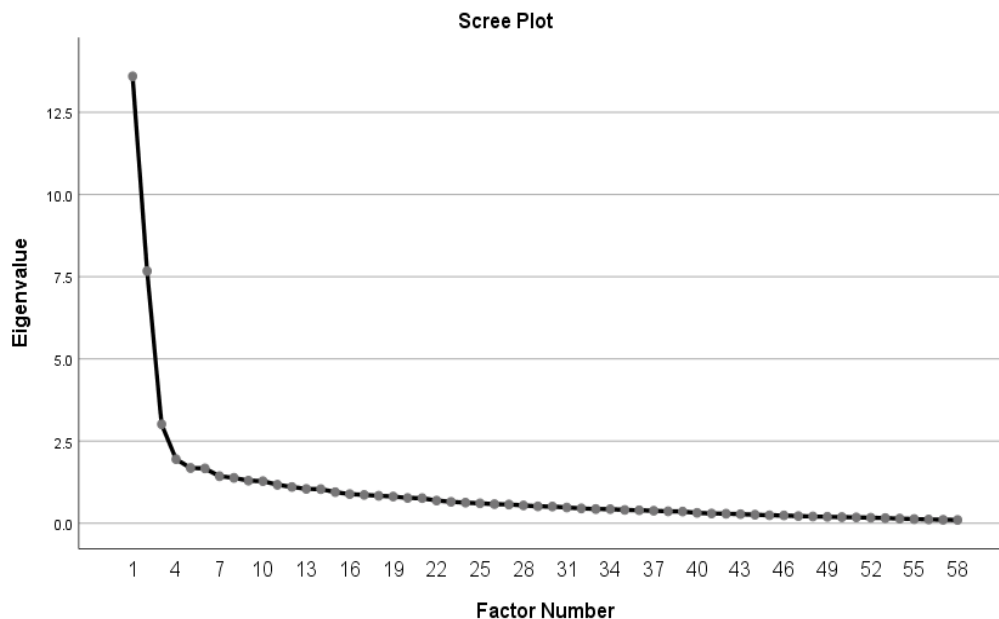


Figure 5. Scree Plot for First Wave.

The scree plot and eigenvalues suggested the possibility of 2, 3, and 4 factors. A series of factor analyses were conducted which resulted into two factors giving the most interpretable solution. Factor 1 accounted for 21.813% of variance and Factor 2 accounted for 12.357% of the variance. The correlations table revealed that some items were positively loaded, while others were negatively loaded. The communalities and factor matrix tables showed loadings of less than .4 and significant cross loading of multiple items. Items with factor loadings less than .4 and items that cross-loaded on

both factors were extracted from the item pool one at a time. Each time an item was omitted; EFA was run and reviewed for correlations and factor loadings of the items. The analyses resulted in 25 items with 12 items loading on the first factor and 13 items loading on the second factor.

The 25 items of the DdHH-IBS/RN were subjected to PAF. Prior to performing PAF, the suitability of data for factor analysis was assessed. Inspection of the correlation matrix revealed the presence of KMO index score was .916, which is above the suggested minimum value and indicates sampling adequacy (Kaiser, 1970, 1974; Pallant, 2013; Tabachnick & Fidell, 2013). Bartlett's test of sphericity was used to determine suitability of the data correlation matrix for factor analysis. Bartlett's test of sphericity was significant ($\chi^2(47.17) = 210, p < .001$), supporting the factorability of the correlation matrix.

The total variance explained showed that two factors accounted for 45.313% of the variance. Factor 1 accounted for 35.248% of variance and Factor 2 accounted for 10.065% of the variance. Although a few of the loadings on the communalities table were low, the decision was made to retain all 25 items. All 25 items had positive loadings on the correlations table and loadings greater than .4 on the factor matrix table. The pattern matrix is displayed in Table 4. The structure and pattern matrices showed each item loading on either Factor 1 or Factor 2 with loading values greater than .4 for all items.

Table 4

Pattern Matrix with Principal Axis Factoring and Oblimin Rotation with Kaiser Normalization: Group 1

Item	Factor	
	1	2
All deaf people should wear hearing aids.	.748	
Providing DdHH with certified sign language interpreters causes health care providers and organizations undue financial burden.	.478	
Deaf people should arrange for interpreter services before seeking medical treatment.	.784	
Most deaf people would like to hear.	.582	
Cochlear implants enable all deaf people to have functional hearing.	.723	
Family members are the best choice to interpret for a D/deaf person when discussing health-related information.	.880	
During healthcare interactions, most Deaf signers users prefer to get by without a certified interpreter.	.531	
The professional interpreter is usually a close personal friend and well-known by the Deaf individual.	.806	
Questions or responses for a DdHH person should be directed to hearing family members.	.860	
Deafness is a disorder that needs correcting.	.785	
I should over enunciate or exaggerate words when speaking to a DdHH patient.	.729	
All deaf people learn American Sign Language (ASL).	.720	

(Continued)

I should direct questions or responses to the Deaf person when the interpreter is present.	.445
Eye contact is important in American Sign Language (ASL) communication and interaction.	.623
I should stand facing towards and maintain eye contact with the Deaf patient when the interpreter is present.	.607
Adequate lighting is an important aspect of environmental control for DdHH individuals.	.530
I should minimize environmental noise when communicating with hard of hearing patients.	.407
Hearing nurses should apply multiple methods of communication with DdHH patients.	.573
I should allow time to become familiar with a person's ways of communicating.	.497
I should inform the team of healthcare providers and staff members of DdHH patients' communication preferences and accommodations.	.501
Visual aids can facilitate effective communication with DdHH patients.	.656

Note. Extraction Method: Principal Axis Factoring. Rotation Method: Oblimin with Kaiser Normalization.

Items for Factor 1 are listed in Table 5. These items were all negatively worded and therefore, reversed scored prior to data analysis. The 12 items in the first factor related to personal or social beliefs and accounted for 35% of the total variance. This factor was named Personal-Social Beliefs Domain and included items representative of

personal and social beliefs about DdHH patients and are related to the structure of DdHH interaction.

Table 5

Factor 1 Items for First Wave: Personal-Social Beliefs Domain

Item Number	Item
1	All deaf people should wear hearing aids
2	Providing DdHH with certified sign language interpreters causes health care providers and organizations undue financial burden.
6	Deaf people should arrange for interpreter services before seeking medical treatment.
9	Most deaf people would like to hear.
10	Cochlear implants enable all deaf people to have functional hearing.
11	Family members are the best choice to interpret for a D/deaf person when discussing health-related information.
13	During healthcare interactions, most Deaf signers users prefer to get by without a certified interpreter.
15	Questions or responses for a DdHH person should be directed to hearing family members.
14	The professional interpreter is usually a close personal friend and well-known by the Deaf individual.
18	Deafness is a disorder that needs correcting.
20	I should over enunciate or exaggerate words when speaking to a DdHH patient.
25	All deaf people learn American Sign Language (ASL).

Note. All factor 1 items were reverse scored prior to factor analysis.

The 13 items in the second factor related to interpersonal and accounted for 10% of the total variance. This factor was named Interpersonal Beliefs Domain and included concepts associated with the process of DdHH interaction. Items for Factor 2 are listed in Table 6. The component of interference, also referred to as stress or communication noise, which influences the interpretation of communication, was clearly evident in the items correlated on this factor.

Table 6

Factor 2 Items for First Wave: Interpersonal Beliefs Domain

Item Number	Item
3	I should direct questions or responses to the Deaf person when the interpreter is present.
4	American Sign Language (ASL) is a real language.
5	Eye contact is important in American Sign Language (ASL) communication and interaction.
7	Visual accessibility is an important aspect of environmental control for DdHH individuals.
8	I should stand facing towards and maintain eye contact with the Deaf patient when the interpreter is present.
12	When scheduling professional interpreter services, it is important to know a D/deaf individual's preferred sign language.
16	Adequate lighting is an important aspect of environmental control for DdHH individuals.
17	I should minimize environmental noise when communicating with hard of hearing patients.

(Continued)

- 19 Hearing nurses should apply multiple methods of communication with DdHH patients.
 - 21 Effective communication helps to reduce the stress DdHH may experience in healthcare settings.
 - 22 I should allow time to become familiar with a person's ways of communicating.
 - 23 I should inform the team of healthcare providers and staff members of DdHH patients' communication preferences and accommodations.
 - 24 Visual aids can facilitate effective communication with DdHH patients.
-

Reliability Analyses

What is the reliability of the DdHH-IBS/RN? The 25 DdHH-IBS/RN items were subjected to an inter-item and split-half reliability analyses to determine the internal consistency reliability of the scale items. As previously stated, the items with negative factor loadings were reverse scored prior to reliability analysis. Results revealed that the 25 items demonstrated high inter-item reliability (Cronbach's $\alpha = .916$). Next, the 12 Personal-Social Belief items and 13 Interpersonal Belief items were each subjected to reliability analysis. Results for each of the subscales revealed that both demonstrated high internal consistency reliability with (Cronbach's $\alpha = .932$) for Personal-Social Beliefs and (Cronbach's $\alpha = .855$) for Interpersonal Beliefs.

Split-half reliability analysis of the 25 scale items was performed to test for internal consistency estimates of reliability. Results of split-half reliability analysis are displayed in Table 7. Consistent correlation was found between the two subtests and the

Spearman-Brown coefficient was .941, both of which indicated high stability reliability for the DdHH-IBS/RN.

Table 7

Split-half Reliability for 25 Item DdHH-IBS/RN: Group 1

Reliability Statistics			
Cronbach's Alpha	Part 1	Value	.846
		N of Items	13 ^a
	Part 2	Value	.834
		N of Items	12 ^b
Correlation Between Forms			.889
Spearman-Brown Coefficient	Equal Length		.941
	Unequal Length		.941
Guttman Split-Half Coefficient			.938

^a. The items are: 20, 22, 21, 25, 6, 11, 18, 24, 5, 9, 17, 10, and 4.

^b. The items are: 4, 23, 13, 7, 19, 2, 12, 8, 16, 14, 3, 1, and 25.

Summary of Data Analysis

Analyses resulted in a 25-item DdHH-IBS/RN consisting of two factors. The Personal-Social Beliefs Domain included 12 items in the first factor and accounted for 35% of the total variance. The Interpersonal Beliefs Domain included 13 items loading on the second factor and accounted for 10% of the total variance. Reliability testing revealed high inter-item reliability for the DdHH-IBS/RN and high internal consistency reliability for the Personal-Social and Interpersonal subscales. Split-half reliability testing found consistent correlation between subtests and high stability reliability for the

DdHH-IBS/RN. Collection and analysis for the second wave of data will be presented in the next section. Second wave data was subjected to EFA, CFA, and follow-up analyses for further validation and refinement of the DdHH-IBS/RN.

Further Validation and Refinement of the DdHH-IBS/RN

A survey questionnaire containing 17 demographic questions and the revised 25 item DdHH-IBS/RN was administered to a second group of RNs. Questions related to education were modified on the second survey questionnaire. The two original questions regarding primary and continuing nursing education specific to individuals with hearing loss were rewritten to distinguish between education that included learning about communication and interaction with non-signing deaf and hard of hearing individuals and Deaf signers. Pre-analysis data screening of 195 survey questionnaires and analysis procedures for the second group of data were identical to those conducted for the first group of data.

Pre-Analysis Data Screening

Data were screened for invalid cases prior to data analysis. Assumption testing was preformed to assess normality, linearity, and homoscedasticity of the data. Results of pre-analysis data screening procedures for the second group of RNs followed the same criteria as described for the first group and the results are presented in this section.

Invalid cases. First data were screened for invalid cases. Four ($n = 4$) duplicate cases were identified and removed from the data. Exclusion criteria for this study

included respondents less than 18 years of age and nurses who have not worked directly with patients within the past 3 years. As with the first group, respondents were asked not to complete the survey if they had not worked directly with patients in the past 3 years and therefore, it was presumed that surveys submitted by respondents met exclusion criteria. Three cases ($n = 3$) were excluded based on age. Three respondents ($n = 3$) completed the demographic questions, but did not begin scale items. Cases in which respondents completed the survey in less than 84 seconds, 2 seconds per item, ($n = 8$) were removed (Huang et al., 2011). Three ($n = 3$) surveys with zero variance across all survey items and three ($n = 3$) instances of impossible values were found among the second sample and these cases were removed from the dataset.

Normality, linearity, and homoscedasticity. Three general assumptions are involved in multivariate statistical testing: normality, linearity, and homoscedasticity.

Normality. Data were tested on 172 cases based on mean scores of the 25-item DdHH-IBS/RN. A comparison of the Personal-Social subscale mean score ($M = 3.07$, $SD \pm .099$) and the 5% trimmed mean score (3.03) indicated that the extreme scores had little influence on the mean (Pallant, 2013). A comparison of the Interpersonal subscale mean score ($M = 5.25$, $SD \pm .046$) and the 5% trimmed mean score (5.31) also suggested that the extreme scores had little influence on the mean (Pallant, 2013). Personal-Social and Interpersonal variables were assessed for normality based on values for skewness and kurtosis. A histogram of Personal-Social subscale mean scores showed a distribution

with positive skewness (.511) and negative kurtosis (-1.176) (see Figure 6). A negative or platykurtic value implied that the distribution was too flat with too many cases in the extremes or tails of the curve (Mertler & Vannatta, 2013; Pallant, 2013). A histogram of Interpersonal subscale mean scores showed a distribution with negative skewness (-1.592) and positive kurtosis (2.335) (see Figure 7). Positive kurtosis values signified that the distribution was clustered in the center and rather peaked.

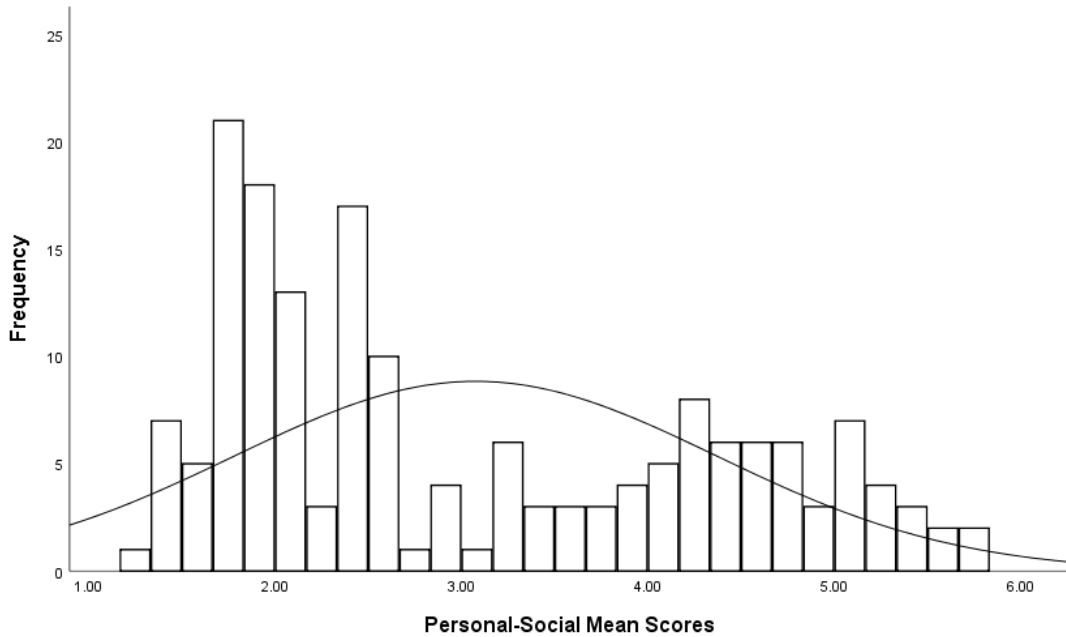


Figure 6. Histogram for Personal-Social Mean Scores for Second Wave.

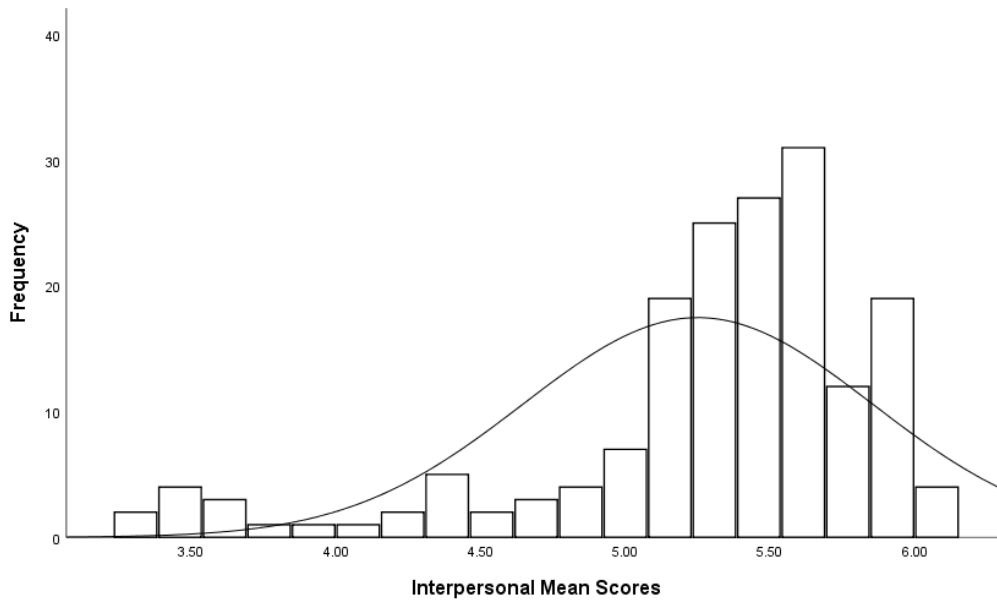


Figure 7. Histogram for Interpersonal Mean Scores for Second Wave.

The Kolmogorov-Smirnov statistic was used to test the null hypothesis that the population was normally distributed and to assess the normality of the distribution of subscale mean scores (Mertler & Vannatta, 2013; Pallant, 2013). A non-significant result (Sig. value > .05) indicates normality. The Sig. value for both Personal-Social and Interpersonal subscales was $p < .001$, which suggested violation of the assumption of normality.

Linearity. Linear regression was used to assess the relationship between the dependent variable, the 25-item DdHH-IBS/RN total mean scores, and independent variables of education and experience specific to DdHH interaction. Two questions regarding primary and continuing nursing education were modified in the questionnaire survey for

the second group of RNs. Rather than asking participants if their primary and continuing nursing education included communication and interaction with hearing loss, participants were asked if their primary and continuing nursing education included communication and interaction with (1) Deaf signers, and (2) non-signing deaf and hard of hearing patients. Therefore, two independent variables for education were added for the second wave of analyses. The predicted probability (P-P) plot revealed two deviations from the diagonal normality line and thus, normal distribution and linearity of residuals could not be assumed (see Figure 8).

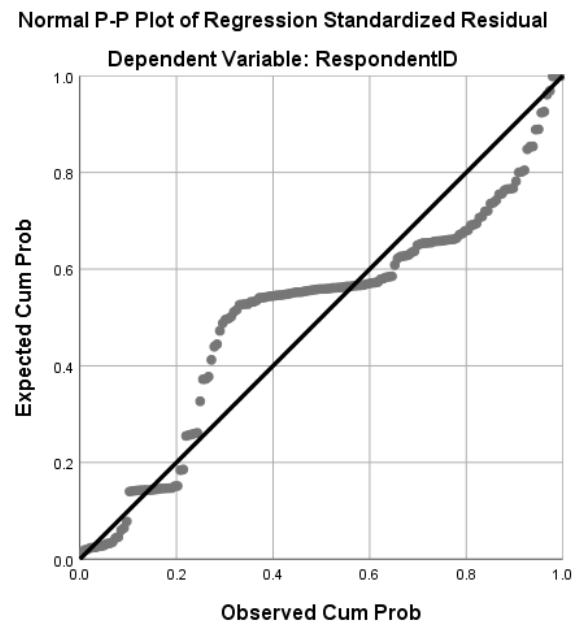


Figure 8. Predicted-Probability Plot for Second Wave.

Homoscedasticity. Homoscedasticity refers to the distribution of residuals; whether residuals are equally distributed, or whether they tend to cluster together at some values and spread far apart at others values. The scatterplot showed a clustering of residuals on the left side of the plot with residuals widely disbursed to the right of the cluster. The results of the P-P plot suggested that the assumption of homoscedasticity was not met (see Figure 9).

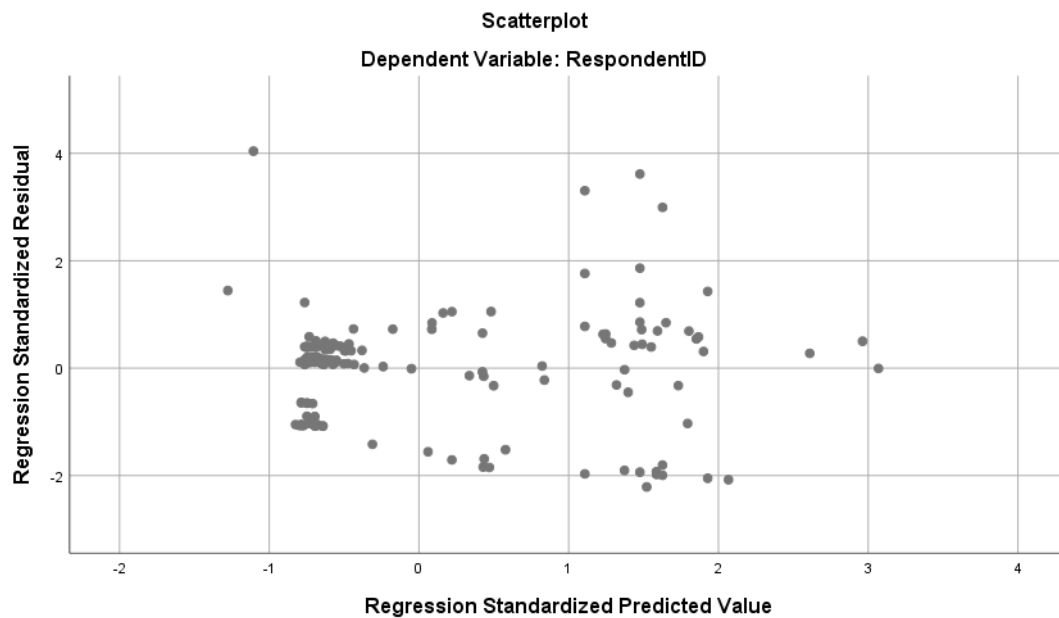


Figure 9. Scatterplot of Standardized Predicted Values by Standardized Residuals for Second Wave.

Multicollinearity was assessed by checking two collinearity statistics: tolerance and variance inflation factor (VIF) values. Tolerance is a measure of collinearity among independent variables and values of 0.1 indicate a problem. The VIF is an indicator of

strong linear associations between a given predictor and all remaining predictors, and a value greater than 10 is a cause for concern (Mertler & Vannatta, 2013; Stevens, 2001). Results of collinearity statistics are displayed in Table 8. Tolerance values for all four independent variables were greater than .2 and all VIF values were less than 4, indicating that the assumption was met.

Table 8

Collinearity Statistics: Group 2

Independent Variable	Tolerance	VIF
Did your nursing education include learning about communication and interaction with Deaf signers?	.372	2.689
Did your nursing education include learning about communication and interaction with non-signing deaf and hard of hearing patients?	.436	2.292
Has any of your continuing nursing education included communication and interaction with Deaf signers?	.292	3.428
Has any of your continuing nursing education included learning about communication and interaction with non-signing deaf and hard of hearing patients?	.320	3.128
How many years of experience do you have interacting with deaf or hard of hearing people who DO NOT use sign to communicate?	.594	1.683
How many years of experience do you have interacting with Deaf people who use sign to communicate?	.573	1.744

Note. Dependent Variable: DdHH-IBS/RN mean

Summary of Pre-Analysis Data Screening

Overall, the second sample contained 24 invalid cases. These cases included participants that completed the survey too fast, met the exclusion criterion for age, entered impossible values or zero variance across items, and/or submitted duplicate cases. After the removal of invalid cases, the second sample contained 172 cases which surpassed the minimum requirement of 150 participants. There were no missing data out of 172 recorded cases. Assessment of normality, linearity, and homoscedasticity showed a positively skewed and platykurtic bimodal distribution of DdHH-IBS/RN mean scores. Based on linear regression P-P and scatter plot results, the assumption of normal distribution and linearity of residuals was not met and the assumption of homoscedasticity was not met. Collinearity statistics from linear regression showed that assumption of multicollinearity was met.

Main Study Findings Second Sample

Main study findings for the second sample including general demographics, demographics specific to DdHH communication and interaction, construct validity, reliability analyses, and follow-up analyses are presented in this section.

Demographics

Demographic data were collected to evaluate the background of the respondents. Table 9 displays descriptive information for the demographic variables. The majority of

participants were female (58.7%) and White/Caucasian (80.8%). Participant age ranged from 21 to 77 ($M = 37.01$, $SD \pm 11.164$).

Table 9

Frequencies and Percentages for Demographic Variables: Group 2

Demographic variable	<i>n</i>	%
Gender Identity		
Female	101	58.7
Male	70	40.7
Other	1	.6
Ethnicity		
White/Caucasian	139	80.8
Hispanic	10	5.8
Asian	8	4.7
Black/African American	7	4.1
Native American or Alaskan Native	2	1.2
Native Hawaiian or Other Pacific Islander	2	1.2
Multi-racial	4	2.3
Age		
<i>N</i>		172
<i>M (SD)</i>	37.01 (11.164)	
Range		21–77

Descriptive information for demographic variables specific to level of nursing education and years of nursing experience is presented in Table 10. The largest percentage of

participants hold a bachelor's degree (65.7%) in nursing and years of nursing experience ranged from < 1 to 55 ($M = 10.62$, $SD \pm 9.685$).

Table 10

Frequencies and Percentages for Nursing Demographic Variables: Group 2

Nursing Demographic	<i>n</i>	%
Highest Level of Nursing Education		
Doctorate	10	5.8
Masters	27	15.7
Bachelors	113	65.7
Associates	16	9.3
Diploma	6	3.5
Years of Nursing Experience		
<i>N</i>		172
<i>M (SD)</i>	10.62 (9.685)	
Range		<1–55

The largest percentage of participants reported metropolitan hospitals (46.5%) as their employment setting. Participants also reported working in rural hospitals (24.4%), free standing health centers (20.3%), home health (2.9%) and extended care facilities (.6%). Nine participants (5.2%) indicated employment setting as *other* than one of the categories provided. Other employment settings included academia, suburban community hospital, occupational health clinic, small city resort area, and public-school.

The primary area of expertise reported by the majority of respondents was medical surgical nursing (51.2%). Emergency (17.4%), home health (9.9%), behavioral health (8.1%), and critical care (7.6%) were also among the primary areas of expertise of nurse respondents. Other (5.6%) areas of expertise included ambulatory care, family nurse practitioner – occupational and adult health, obstetrics, maternal/newborn, telemetry, and wound care.

DdHH communication and interaction demographics. Demographic data regarding education and experience specific to DdHH interaction were collected to answer the third research question. The majority of respondents reported having both primary nursing education (76.2%) and continuing nursing education (73.8%) that included communication and interaction with non-signing dHH patients. Likewise, a greater number of respondents reported having both primary nursing education (69.8%) and continuing nursing education (68%) that included communication and interaction with Deaf signers. Years of experience ranged from 0-40 with non-signing dHH and from 0-48 with Deaf signers. However, the average experience among participants with dHH people was 7 years ($M = 6.99, SD \pm 8.176$) and was 5 years ($M = 5.37, SD \pm 7.116$) with Deaf signers.

Participants in the second group were also asked to describe primary experiences with non-signing dHH people and Deaf signers from the same selection categories as the first group. As with the first group, participants were instructed to select all categories

that applied to their experiences and to specify the nature of the experience if *other* was selected. Few participants reported having no experience interacting with non-signing dHH people (2.9%) and Deaf signers (5.8%). The most common primary experiences interacting with non-signing dHH people were described as personal (68%) or professional (58.1%) by respondents. Likewise, respondents described experiences interacting with Deaf signers most often as professional (64%) and personal (60.5%).

Experiences interacting with non-signing dHH in community (40.7%), academic (19.8%), and other (.6%) environments were less frequent than those of a professional and personal nature; as were experiences interacting with Deaf signers in community (42.4%), academic (21.5%), and other (1.9%) settings. Other experiences with non-signing dHH people reported by one respondent included community health, adult day health center, and school health settings. Other experiences with Deaf signers reported by two respondents included having a neighbor who was deaf and caring for one or two signing patients in the hospital.

Lastly, respondents were asked two questions regarding signing skills. Percentages of reported level of signing skills were as follows: none (18.6%), minimal (18.6%), basic (15.7%), intermediate (42.4%), and advanced (4.7%). The largest percentage of participants reported learning to sign in a college or community course (41.3%). Additional sign education sources online or self-study (17.4%), family and/or

friends (18%), or other (4.7%) sources including church, precollege education, and serving as a nurse at a “Deaf camp”.

Construct Validity

The 25 item DdHH-IBS/RN included 12 items that were written and scored in a negative format. Reverse scoring was applied to the 12 negative DdHH-IBS/RN scale items prior to conducting data analysis. After reverse scoring of negative items, the 25 items of the DdHH-IBS/RN were subjected to PAF with oblique direct oblimin rotation using SPSS version 25. Data analysis procedure for the second group of RNs was identical to those for the first group of RNs.

Suitability of data for factor analysis was assessed. Inspection of the correlation matrix revealed the presence of KMO index score was .907, which is above the suggested minimum value and indicates sampling adequacy. Bartlett’s test of sphericity was used to determine suitability of the data correlation matrix for factor analysis. Bartlett’s test of sphericity was significant ($\chi^2(53.29) = 300, p < .001$), supporting the factorability of the correlation matrix.

EFA with PAF was conducted to examine the proposed Personal-Social and Interpersonal domains of DdHH interaction beliefs. The scree plot showed an obvious flattening after the third factor, which suggested the presence of three factors (see Figure 10).

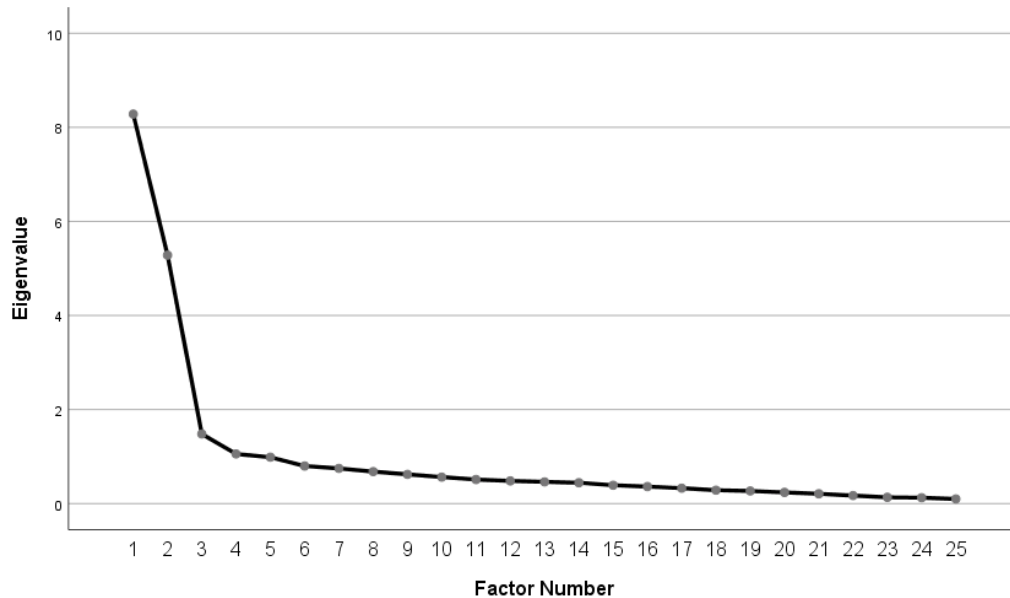


Figure 10. Scree Plot for Second Wave.

The scree plot and eigenvalues suggested the possibility of 2 and 3 factors. Factor analyses were conducted for both 2 and 3 factors. Results of these analyses indicated that two factors gave the most interpretable solution.

The total variance explained showed that two factors accounted for 50.688% of the variance. Factor 1 accounted for 31.683% of variance and Factor 2 accounted for 19.005% of the variance. The correlations table revealed that some items were positively loaded, while others were negatively loaded. The communalities table showed loadings less than .4; however, the factor matrix table showed no loadings less than .4 and cross loading on one item. Therefore, all 25 items were retained with 12 items loading on the

first factor and 13 items loading on the second factor. The pattern matrix is displayed in Table 11.

Table 11

Pattern Matrix with Principal Axis Factoring and Oblimin Rotation with Kaiser Normalization for 25 Item DdHH-IBS/RN: Group 2

Item	Factor	
	1	2
Visual aids can facilitate effective communication with DdHH patients.		
I should inform the team of healthcare providers and staff members of DdHH patients' communication preferences and accommodations.		.616
Eye contact is important in American Sign Language (ASL) communication and interaction.		.647
Adequate lighting is an important aspect of environmental control for DdHH individuals.		.748
When scheduling professional interpreter services, it is important to know a D/deaf individual's preferred sign language.		.554
Hearing nurses should apply multiple methods of communication with DdHH patients.		.595
I should allow time to become familiar with a person's ways of communicating.		.600
Effective communication helps to reduce the stress DdHH may experience in healthcare settings.		.690
Visual accessibility is an important aspect of environmental control for DdHH individuals.		.753
I should minimize environmental noise when communicating with hard of hearing patients.		.544
I should direct questions or responses to the Deaf person when the interpreter is present.		.568

(Continued)

I should stand facing towards and maintain eye contact with the Deaf patient when the interpreter is present.	.682
American Sign Language (ASL) is a real language.	.661
During healthcare interactions, most Deaf signers prefer to get by without a certified interpreter.	.584
Most deaf people would like to hear.	.578
Deafness is a disorder that needs correcting.	.788
I should over enunciate or exaggerate words when speaking to a DdHH patient.	.429
Cochlear implants enable all deaf people to have functional hearing.	.801
Deaf people should arrange for interpreter services before seeking medical treatment.	.746
Questions or responses for a DdHH person should be directed to hearing family members.	.839
All deaf people learn American Sign Language (ASL).	.900
Family members are the best choice to interpret for a D/deaf person when discussing health-related information.	.886
All deaf people should wear hearing aids.	.900
Providing DdHH with certified sign language interpreters causes health care providers and organizations undue financial burden.	.771
The professional interpreter is usually a close personal friend and well-known by the Deaf individual.	.907

Note. Extraction Method: Principal Axis Factoring. Rotation Method: Oblimin with Kaiser Normalization.

Items for Factor 1 are listed in Table 12. These items were all negatively worded and therefore, reversed scored prior to data analysis. All 12 items in the first factor were identified as representative of the Personal-Social Beliefs Domain of DdHH interaction in the second round of data analysis and accounted for 32% of the total variance.

Table 12

Factor 1 Items for Second Wave: Personal-Social Beliefs Domain

Item Number		
First Wave	Second Wave	Item
18	2	Deafness is a disorder that needs correcting.
13	4	During healthcare interactions, most Deaf signers users prefer to get by without a certified interpreter.
9	5	Most deaf people would like to hear.
20	8	I should over enunciate or exaggerate words when speaking to a DdHH patient.
10	9	Cochlear implants enable all deaf people to have functional hearing.
6	11	Deaf people should arrange for interpreter services before seeking medical treatment.
15	13	Questions or responses for a DdHH person should be directed to hearing family members.
25	15	All deaf people learn American Sign Language (ASL).
11	17	Family members are the best choice to interpret for a D/deaf person when discussing health-related information.
1	20	All deaf people should wear hearing aids.
2	22	Providing DdHH with certified sign language interpreters causes health care providers and organizations undue financial burden.
14	23	The professional interpreter is usually a close personal friend and well-known by the Deaf individual.

Note. All Factor 1 items were reverse scored prior to factor analysis.

All 13 items in the second factor were identified as representative of the Interpersonal Beliefs Domain of DdHH interaction in the second round of data analysis and accounted for 19% of the total variance. Items for Factor 2 are listed in Table 13.

Table 13

Factor 2 Items: Interpersonal Beliefs Domain for Second Wave

Item Number		Item
First Wave	Second Wave	
24	1	Visual aids can facilitate effective communication with DdHH patients.
23	3	I should inform the team of healthcare providers and staff members of DdHH patients' communication preferences and accommodations.
5	6	Eye contact is important in American Sign Language (ASL) communication and interaction.
16	7	Adequate lighting is an important aspect of environmental control for DdHH individuals.
12	10	When scheduling professional interpreter services, it is important to know a D/deaf individual's preferred sign language.
19	12	Hearing nurses should apply multiple methods of communication with DdHH patients.
22	14	I should allow time to become familiar with a person's ways of communicating.
21	16	Effective communication helps to reduce the stress DdHH may experience in healthcare settings.
7	18	Visual accessibility is an important aspect of environmental control for DdHH individuals.
17	19	I should minimize environmental noise when communicating with hard of hearing patients.
3	21	I should direct questions or responses to the Deaf person when the interpreter is present.
8	24	I should stand facing towards and maintain eye contact with the Deaf patient when the interpreter is present.
4	25	American Sign Language (ASL) is a real language.

Reliability Analyses

What is the reliability of the DdHH-IBS/RN? The 25 DdHH-IBS/RN items were subjected to an inter-item and split-half reliability analyses to determine the internal consistency reliability of the scale items. As previously stated, the items with negative factor loadings were reverse scored prior to reliability analysis. Results revealed that the 25 items demonstrated high inter-item reliability (Cronbach's $\alpha = .907$). Next, the 12 Personal-Social Belief items and 13 Interpersonal Belief items were each subjected to reliability analysis. Results for each of the subscales revealed that both demonstrated high internal consistency reliability with (Cronbach's $\alpha = .945$) for Personal-Social Belief items and (Cronbach's $\alpha = .882$) for Interpersonal Belief items.

Split-half reliability analysis of the 25 scale items was performed to test for internal consistency estimates of reliability. Results of split-half reliability analysis are displayed in Table 14. Consistent correlation was found between the two subtests and the Spearman-Brown coefficient was .947, both of which indicated high stability reliability for the DdHH-IBS/RN.

Table 14

Split-half Reliability for 25 Item DdHH-IBS/RN: *Group 2*

Reliability Statistics			
Cronbach's Alpha	Part 1	Value	.785
		N of Items	13 ^a
	Part 2	Value	.853
		N of Items	12 ^b
Correlation Between Forms			.899
Spearman-Brown Coefficient	Equal Length		.947
	Unequal Length		.947
Guttman Split-Half Coefficient			.945

a. The items are: 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, and 13.

b. The items are: 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, and 25.

Confirmatory Factor Analysis

A confirmatory factor analysis (CFA) was conducted to further examine the factor structure of the DdHH-IBS/RN. Whereas EFA is designed to locate patterns in the data without *a priori* stipulations, CFA is a theory testing strategy that uses a pre-determined factor model (Mvududu & Sink, 2013). CFA evaluates the ‘goodness of fit’ by testing the correlational structure of a data set against a hypothesized structure (Mvududu & Sink, 2013, p. 91). A general rule of thumb for acceptable model fit using root mean square error of approximation (RMSEA) standardized root mean square residual (SRMR) and comparative fit index (CFI) indices are RMSEA and SRMR $\leq .08$; and CFI $\geq .90$ (McDonald & Ho, 2002; Stenling, Ivarsson, Johnson, & Lindwall, 2015).

Results of the CFA indicated acceptable model fit, $\chi^2 (274) = 621.16$ ($p < .001$), RMSEA = .09, 90% CI [.08 - .10], CFI = .90, SRMR = .09. Inspection of individual path coefficients reflected results attained in the previous EFA and indicated that all items significantly loaded on corresponding factors ($p < .01$ for all loadings; Table 15). However, results indicated that several items had a large amount of residual variance. Residual variance indicates the percentage of variance in an item that was not explained by the factor. Items with a large amount of residual variance ($> .50$) impart error variance into a total score when it is calculated, such as when taking a mean of all items. Specifically, items with greater than 50% unexplained variance included items 1, 5, 6, 7, 10, 11, 12, 15, 16, 19, 22, 23, and 24 (see Table 16). Although this issue is not cataclysmic, these high variances indicate that some items may not work well in defining Personal-Social and Interpersonal factors. While some residual variances were large, it is worth restating that all path coefficients were statistically significant ($p < .01$). Overall, these results supported the hypothesized structure of the scale and provided some evidence for its factorial validity, although some items may have room for further improvement.

Table 15

Results of Confirmatory Factor Analysis for the DdHH-IBS/RN

Item Number	Item	Personal	Interpersonal	Residual Variance
1	Visual aids can facilitate effective communication with DdHH patients.	0.332		0.889
3	I should inform the team of healthcare providers and staff members of DdHH patients' communication preferences and accommodations.	0.654		0.427
6	Eye contact is important in American Sign Language (ASL) communication and interaction.	0.676		0.572
7	Adequate lighting is an important aspect of environmental control for DdHH individuals.	0.767		0.663
10	When scheduling professional interpreter services, it is important to know a D/deaf individual's preferred sign language.	0.548		0.716
12	Hearing nurses should apply multiple methods of communication with DdHH patients.	0.581		0.543
14	I should allow time to become familiar with a person's ways of communicating.	0.597		0.412
16	Effective communication helps to reduce the stress DdHH may experience in healthcare settings.	0.699		0.793

(Continued)

18	Visual accessibility is an important aspect of environmental control for DdHH individuals.	0.73	0.359
19	I should minimize environmental noise when communicating with hard of hearing patients.	0.542	0.700
20	I should direct questions or responses to the Deaf person when the interpreter is present.	0.583	0.459
24	I should stand facing towards and maintain eye contact with the Deaf patient when the interpreter is present.	0.657	0.662
25	American Sign Language (ASL) is a real language.	0.696	0.273
3	Deafness is a disorder that needs correcting.	0.757	0.643
4	During healthcare interactions, most Deaf signers users prefer to get by without a certified interpreter.	0.58	0.151
5	Most deaf people would like to hear.	0.533	0.511
8	I should over enunciate or exaggerate words when speaking to a DdHH patient.	0.455	0.227
9	Cochlear implants enable all deaf people to have functional hearing.	0.801	0.468
11	Deaf people should arrange for interpreter services before seeking medical treatment.	0.736	0.706
13	Questions or responses for a DdHH person should be directed to hearing family members.	0.852	0.165

(Continued)

15	All deaf people learn American Sign Language (ASL).	0.921	0.660
17	Family members are the best choice to interpret for a D/deaf person when discussing health-related information.	0.879	0.383
20	All deaf people should wear hearing aids.	0.914	0.172
22	Providing DdHH with certified sign language interpreters causes health care providers and organizations undue financial burden.	0.786	0.568
23	The professional interpreter is usually a close personal friend and well-known by the Deaf individual.	0.91	0.516

Note. All loadings sig. at $p < .001$

Follow-up Analyses

Follow-up analyses including correlation, standard multiple regression, and independent samples *t*-tests were conducted for the second wave of data to further address the third research hypothesis: Registered nurses that have both more prior education and experience specific to interacting with DdHH will have higher scores on the DdHH-IBS/RN than with either prior education or experience alone.

Correlation analysis. Bivariate correlation was used for the second wave of data to investigate the relationship between Personal-Social and Interpersonal subscale mean scores and participants' experience specific to DdHH interaction using Pearson correlation coefficient (*r*). Pearson (*r*) values were interpreted using Cohen's (1988)

suggested guidelines: .10 to .29 = weak, .30 to .49 = moderate, and .50 to 1.0 = strong. Based on scoring of the DdHH-IBS/RN, higher mean scores on the subscales were associated with more positive beliefs and lower scores were associated with less positive beliefs toward DdHH interaction. Pearson correlations of Personal-Social and Interpersonal subscales with measures of experience specific to DdHH interaction are summarized in Table 16. Years of experience interacting with non-signing deaf and hard of hearing individuals and Personal-Social mean scores shared a weak positive correlation ($r = .293$, $n = 172$, $p < .001$) with more experience associated with more positive beliefs toward DdHH interaction. No other correlations between experience and subscale mean scores were reported at the $p < .01$ level.

Table 16

Pearson Correlations of Personal-Social and Interpersonal Subscales with Measures of Experience Specific to DdHH Interaction

	Personal-Social ^a	Interpersonal ^b
Years of Experience with non-signing deaf and hard of hearing	.293*	.142
Years of Experience with Deaf signers	.211	.077

Note. DdHH = Deaf signers, non-signing deaf, and hard of hearing.

^a $n = 172$. ^b $n = 172$. *Correlation is significant at the 0.01 level (2-tailed).

Multiple regression. Standard multiple regression was conducted to determine the accuracy of the independent variables (primary nursing education specific to non-

signing deaf and hard of hearing; primary nursing education specific to Deaf signers; continuing nursing education specific to non-signing deaf and hard of hearing; continuing nursing education specific to Deaf signers; years of experience with non-signing deaf and hard of hearing; and years of experience with Deaf signers) predicting Personal-Social and Interpersonal subscale mean scores. Review of the tolerance statistics indicated that all independent variables were tolerated in both models.

Personal-Social model. Regression results indicated that the overall model moderately predicted Personal-Social subscale mean scores [$R^2 = .605$, $R^2_{\text{adj}} = .591$, $F(6, 171) = 42.14$, $p < .001$]. This model accounted for 59.1% of variance in Personal-Social subscale mean scores. A summary of regression coefficients is presented in Table 22 and indicated that one (primary nursing education specific to Deaf signers) of the six variables significantly contributed to the model and also made the largest unique contribution ($Beta = .475$, $p < .001$).

Interpersonal model. Regression results indicated that the overall model had no significance in predicting Interpersonal subscale mean scores [$R^2 = .100$, $R^2_{\text{adj}} = .068$, $F(6, 171) = 3.07$, $p = .007$]. This model accounted for 6.8% of variance in Interpersonal mean scores. A summary of regression coefficients is presented in Table 17 and indicated that none of the six variables significantly contributed to the model.

Table 17

Multiple Linear Regression Predicting Personal-Social and Interpersonal Positive Beliefs toward DdHH Interaction from Nursing Education and Experience Specific to DdHH Interaction

Dependent variable	<u>Unstandardized</u>		<u>Standardized</u>		
	B	SE	β	<i>t</i>	<i>p</i>
Personal-Social Beliefs					
Primary nursing education specific to non-signing deaf and hard of hearing	-.567	.22	-.187	-2.58	.011
Primary nursing education specific to Deaf signers	1.335	.23	.475	5.93	<.001
Continuing nursing education specific to non-signing deaf and hard of hearing	.671	.25	.229	2.64	.009
Continuing nursing education specific to Deaf signers	.651	.25	.235	2.59	.011
Years of experience with non-signing deaf and hard of hearing	.009	.01	.057	.91	.366
Years of experience with Deaf signers	.027	.01	.151	2.33	.021
Interpersonal Beliefs					
Primary nursing education specific to non-signing deaf and hard of hearing	-.264	.16	-.187	-1.71	.090
Primary nursing education specific to Deaf signers	.407	.16	.310	2.56	.011

(Continued)

Continuing nursing education specific to non-signing deaf and hard of hearing	-.033	.18	-.026	-.19	.853
Continuing nursing education specific to Deaf signers	.176	.18	.129	.99	.326
Years of experience with non-signing deaf and hard of hearing	.005	.01	.065	.68	.499
Years of experience with Deaf signers	.004	.01	.042	.43	.670

Note. Model Predicting Personal-Social Beliefs, $F(6,171) = 42.14$, $p < .001$, $R^2_{adj} = .591$. Model Predicting Interpersonal Beliefs, $F(6,171) = 3.07$, $p = .007$, $R^2_{adj} = .068$.
^a $n = 214$. ^b $n = 214$.

Independent samples *t*-tests. Multiple independent samples *t*-tests were conducted on the second round of data to evaluate the degree of difference in the relationships between Personal-Social and Interpersonal subscale mean scores and participants' reported education and experience specific to DdHH interaction. As previously described, primary and continuing education were categorized into groups based on whether education was specific to non-signing deaf and hard of hearing individuals or Deaf signers. Years of experience with non-signing deaf and hard of hearing was categorized into two groups based on four or fewer years of experience and five or more years of experience. Experience with Deaf signers was categorized into two groups based on three or fewer years of experience or four or more years of experience. The division point for years of experience was determined by SPSS to create two statistically similar groups and thus, the division point for the first wave of RNs and the

second wave of RNs was different. The following results were categorized according to Personal-Social and Interpersonal subscales.

Personal-Social subscale. Six independent sample *t*-tests were conducted to compare differences of Personal-Social mean scores by nursing education and experience. A summary of the means standard deviations for the Personal-Social subscale are displayed in Table 18. The first independent samples *t*-test was conducted to compare mean scores of participants who had primary nursing education specific to interaction with non-signing deaf and hard of hearing individuals to mean scores of participants who did not have primary nursing education specific to interaction with non-signing deaf and hard of hearing individuals. Results revealed that participants with no primary nursing education specific to interaction with non-signing deaf and hard of hearing individuals had significantly higher Personal-Social mean scores ($M = 4.12$, $SD = 1.13$) than participants with primary nursing education specific to interaction with non-signing deaf and hard of hearing individuals ($M = 2.75$, $SD = 1.17$), $t(170) = -6.60$, $p < .001$, $d = 1.191$. The second independent samples *t*-test was conducted to compare mean scores of participants who had primary nursing education specific to interaction with Deaf signers to mean scores of participants who did not have primary nursing education specific to interaction with Deaf signers. Results revealed that participants with no primary nursing education specific to interaction with Deaf signers had significantly higher Personal-Social mean scores ($M = 4.47$, $SD = .87$) than participants with primary

nursing education specific to interaction with Deaf signers ($M = 2.47$, $SD = .93$), $t(170) = -13.21$, $p < .001$, $d = 2.220$.

The third independent samples t -test was conducted to compare mean scores of participants who had continuing nursing education specific to interacting with non-signing deaf and hard of hearing individuals to mean scores of participants who did not have continuing nursing education specific to interacting with non-signing deaf and hard of hearing individuals. Results revealed that participants with no continuing nursing education specific to interacting with non-signing deaf and hard of hearing individuals had significantly higher Personal-Social mean scores ($M = 4.45$, $SD = .93$) than participants with continuing nursing education specific to interacting with non-signing deaf and hard of hearing individuals ($M = 2.59$, $SD = 1.03$), $t(170) = -10.66$, $p < .001$, $d = 1.895$. The fourth independent samples t -test was conducted to compare mean scores of participants who had continuing nursing education specific to interacting with Deaf signers to mean scores of participants who did not have continuing nursing education specific to interacting with Deaf signers. Results revealed that participants with no continuing nursing education specific to interacting with Deaf signers had significantly higher Personal-Social mean scores ($M = 4.34$, $SD = .93$) than participants with continuing nursing education specific to interacting with Deaf signers ($M = 2.48$, $SD = .98$), $t(170) = -11.79$, $p < .001$, $d = 1.947$.

No significant differences were found between years of experience with deaf and hard of hearing individuals or Deaf signers and Personal-Social subscale mean scores. Aforementioned skewness and kurtosis of the Personal-Social subscale suggested that the data violated the assumption of normality and therefore, *t*-test results were confirmed with nonparametric Mann–Whitney *U* tests.

Table 18

Means and Standard Deviations for Personal-Social Scores by Nursing Education and Experience

Variable	<i>n</i>	<i>M</i>	<i>SD</i>	<i>t</i>	<i>p</i>	<i>d</i>
Primary nursing education specific to non-signing deaf and hard of hearing (PNEdHH)						
No	41	4.12	1.13	-6.60	< .001	1.191
Yes	131	2.75	1.17			
Primary nursing education specific to Deaf signers (PNED)						
No	52	4.47	.87	-13.21	< .001	2.220
Yes	120	2.47	.93			
Continuing nursing education specific to non-signing deaf and hard of hearing (CNEdHH)						
No	45	4.45	.93	-10.66	< .001	1.895
Yes	127	2.59	1.03			

(Continued)

Continuing nursing education specific to Deaf signers (CNED)				-11.79	< .001	1.947
No	55	4.34	.93			
Yes	117	2.48	.98			
Years of experience with non- signing deaf and hard of hearing [‡] (YOEdHH)				-0.22	.823	0.039
≤ 4	87	3.05	1.22			
5 +	85	3.10	1.37			
Years of experience with Deaf signers (YOED)				1.52	.130	0.233
≤ 3	100	3.20	1.30			
4 +	72	2.90	1.27			

Note. PNEdHH Mann–Whitney $U = 1197$, $p < .001$. PNEd Mann–Whitney $U = 546$, $p < .001$. CNEdHH Mann–Whitney $U = 692$, $p < .001$. CNEd Mann–Whitney $U = 722$, $p < .001$. YOEdHH Mann–Whitney $U = 3477$, $p = .499$. YOED Mann–Whitney $U = 3010$, $p = .067$. [‡] Equal variances not assumed statistics reported.

Interpersonal subscale. Six independent sample t -tests were conducted to compare differences of Interpersonal mean scores by nursing education and experience. A summary of the means standard deviations for the Interpersonal subscale are displayed in Table 19. The second independent samples t -test was conducted to compare mean scores of participants who had primary nursing education specific to Deaf signers to mean scores of participants who did not have primary nursing education specific to Deaf signers. Results revealed that participants with no primary nursing education specific to Deaf signers had significantly higher Interpersonal mean scores ($M = 5.50$, $SD = .45$) than participants with primary nursing education specific to Deaf signers ($M = 5.14$, $SD =$

.63), $t(170) = -3.75$, $p < .001$, $d = .658$. Differences between the other five variables and Interpersonal mean scale scores were not statistically significant. Normality tests for the Interpersonal subscale suggested that data violated the assumption and therefore, t -test results were confirmed with nonparametric Mann–Whitney U tests.

Table 19

Means and Standard Deviations for Interpersonal Scores by Nursing Education and Experience

Variable	<i>n</i>	<i>M</i>	<i>SD</i>	<i>t</i>	<i>p</i>	<i>d</i>
Primary nursing education specific to non-signing deaf and hard of hearing (PNEdHH)						
No	41	5.36	.61			
Yes	131	5.22	.60			
				-1.33	.183	.231
Primary nursing education specific to Deaf signers (PNED)						
No	52	5.50	.45			
Yes	120	5.14	.63			
				-3.75	<.001	.658
Continuing nursing education specific to non-signing deaf and hard of hearing (CNEdHH)						
No	45	5.46	.58			
Yes	127	5.18	.60			
				-2.76	.006	.475

(Continued)

Continuing nursing education specific to Deaf signers (CNED)				-2.78	.006	.461
No	55	5.29	.61			
Yes	117	5.21	.56			
Years of experience with non-signing deaf and hard of hearing (YOEdHH)				.77	.442	.153
< = 4	87	5.29	.55			
5 +	85	5.21	.65			
Years of experience with Deaf signers (YOED)				2.38	.018	.363
< = 3	100	5.34	.52			
4 +	72	5.12	.68			

Note. PNEdHH Mann–Whitney $U = 1999$, $p = .013$. PNED Mann–Whitney $U = 1775.50$, $p < .001$. CNEdHH Mann–Whitney $U = 1637$, $p < .001$. CNED Mann–Whitney $U = 1964.50$, $p < .001$. YOEdHH Mann–Whitney $U = 3552.50$, $p = .656$. YOED Mann–Whitney $U = 2834$, $p = .017$.

Summary of Results

The 25-item DdHH-IBS/RN was subjected to a second wave of data collection and analysis to further refine and validate the instrument. Results of EFA for the second wave were similar to those of the first wave and indicated 2 factors as the most favorable solution. Item loadings were also identical with the 12 items identified as the Personal-Social Beliefs Domain in the first factor and the 13 items identified as the Interpersonal Beliefs Domain in the second factor. The first factor (Personal-Social) accounted for 32% of the total variance and the second factor (Interpersonal) accounted for 19% of the total variance.

Reliability testing revealed high inter-item reliability for the DdHH-IBS/RN and high internal consistency reliability for the Personal-Social and Interpersonal subscales. Split-half reliability testing found consistent correlation between subtests and high stability reliability for the DdHH-IBS/RN. Results of the CFA indicated acceptable model fit. Inspection of individual path coefficients indicated that all path coefficients were statistically significant; however, high residual variance among several items suggested that some items might not work well in defining Personal-Social and Interpersonal factors. Although some items may have room for further improvement, overall CFA results supported the hypothesized structure of the scale and provided some evidence for its factorial validity.

Results of correlation analyses revealed a weak positive correlation between years of experience interacting with non-signing deaf and hard of hearing individuals and Personal-Social mean scores. Regression results indicated that the overall model moderately predicted Personal-Social subscale mean scores and had no significance in predicting Interpersonal subscale mean scores. Independent samples *t*-tests showed significant differences between participants with and participants without prior education and experience specific to DdHH interaction on both Personal-Social and Interpersonal subscale mean scores. Implications of results, limitations, and conclusions of this study, and recommendations for future research will be presented in Chapter 5.

Chapter V

CONCLUSIONS, IMPLICATIONS, AND RECOMMENDATIONS

This chapter consists of five sections. The first section gives an overview of the study and the purposes behind the research. The second section provides a discussion of the relationship between the study's findings and the research questions/hypotheses and current literature. The third section describes the limitations and strengths of the study. The fourth section identifies implications of this research for theory, nursing education, standards of nursing practice, and policy. The final section offers recommendations for future research.

Overview and Purpose of Study

The purpose of this study was to develop and test the psychometric properties of the newly developed D/deaf and Hard of Hearing Interaction Beliefs Scale, an instrument designed to measure nurses' beliefs toward interaction with Deaf ASL users, deaf that use other signing methods, non-signing deaf, and HH individuals (DdHH), and certified interpreters (CIs). In Chapter 2, a literature review established that cultural competence alone is inadequate to address the interpersonal, social, and environmental barriers that people who are DdHH encounter in the hearing world. Relevant literature also revealed that education and experience associated with DdHH interaction is lacking in nursing, as are instruments to measure knowledge, beliefs, attitudes, and behavior of nurses practicing in the United States. Suggested gaps in nursing education may be attributed to

the complex and multidimensional nature of the rules associated with DdHH interaction. Therefore, the concepts in King's (1981) TGA and TCM were used to categorize the procedural and structural rules of DdHH interaction into personal, interpersonal, and social domains. The goal of the DdHH-IBS/RN was to measure the construct of belief associated with the personal, interpersonal, and social components of DdHH interaction. A conceptual framework of Nurse – DdHH patient – Interpreter interaction provided an organizing framework for item generation and initial scale domains (see Appendix A). Content validity analysis resulted in a 58 item DdHH-IBS/RN instrument that was used in the main analysis.

Discussion of Findings

Exploratory factor analyses with PAF produced two factors as the best solution, rather than the original four factors or domains proposed in the conceptual framework. Item loadings revealed a pattern in which items were either associated with personal-social beliefs or interpersonal beliefs of the proposed DdHH interaction framework. Factor 1, Personal-Social Beliefs Domain encompassed items such as perception, self, authority, power, control, status, and decision-making that relate to the structure of DdHH interaction. The literature suggested that DdHH interaction is influenced by internal processes that form beliefs because what a person believes as actuality and truth precedes knowledge and behavior (Connors & Halligan, 2015, Fishbein & Ajzen, 1975; Tullet et al., 2013; Wyer & Albarracín, 2005). Factor 2, Interpersonal Beliefs Domain

included items associated with the process of DdHH interaction. In other words, beliefs about how interactions between hearing and DdHH individuals should appear and flow. The second factor included items involving role, interaction, communication, transaction, and stress or noise. Revision of the conceptual framework illustrates the connection between beliefs and personal, interpersonal, and social components of Nurse – DdHH – Interpreter transaction (see Appendix A1). Beliefs formed by an individual's way of making sense of the world and beliefs constructed by socially dominant forces are directly related to what an individual believes about appropriate interaction with others.

Most beliefs exist beyond a person's immediate awareness and often involve a self-referential element that may not be present in knowledge (Connors & Halligan, 2015, Fishbein & Ajzen, 1975; Wyer & Albarracín, 2005). For example, a person may learn a fact in school and be aware of evidence to support this piece of knowledge. However, if knowledge contradicts belief, a person may reject the information and neglect to incorporate this piece of information into their concept of physical reality and referential framework for goals and actions (Tullet et al., 2013). This phenomenon may help to explain the results of personal-social and interpersonal mean scores in relation to education and experience specific to DdHH. Results of independent samples *t*-tests showed that nurses reporting no primary and no continuing nursing education specific to DdHH interaction had higher mean scores on personal-social and interpersonal subscales of the DdHH-IBS/RN than nurses reporting both education and experience specific to

DdHH interaction. Similar results were found regarding nursing experience with non-signing deaf and hard of hearing and Deaf signers with only a slight increase in personal-social subscale mean scores among nurses with five or more years of experience with non-signers.

Various factors may account for these results. First, the questions regarding education referred to “patients with hearing loss” rather than having separate questions specific to Deaf signers, non-signing deaf, hard of hearing, and CIs. Questions regarding education were modified for the second wave of data collection to specifically address education with non-signing deaf and hard of hearing individuals and Deaf signers. Second, self-report and using dichotomous (Yes/No) responses may not have been the best choice to answer this research question.

Finally, the question must be asked: what does education specific to DdHH interaction mean to nurses and to the nursing profession? Responses from the survey indicated that many nurses might not understand the difference between Deaf, deaf, and hard of hearing. More importantly, it is highly possible that the majority of respondents did not understand the questions or did not have a sufficient understanding of what constitutes “education regarding patients with hearing loss”. In hindsight, the PI acknowledges that questions regarding education and experience may have not been an appropriate comparison for the beliefs scale because beliefs precede knowledge and experience. Therefore, certain positive or negative beliefs toward Deaf signers, deaf and

hard of hearing non-signers, and DdHH interaction can be developed prior to and regardless of nursing education and experience.

A review of item response frequencies revealed more about what nurses believe about the process and structure of DdHH interaction. Agreement with Interpersonal domain items suggested more positive beliefs toward DdHH interaction. Many positive beliefs toward the process of DdHH interaction among nurse participants were noted. The tangible aspects of DdHH interaction included signed communication, eye contact, sender-receiver proximity, visibility, and environmental noise. Out of 13 items on the Interpersonal subscale, at least 90% of respondents in the first group of nurses ($n = 214$) agreed with ten items. Likewise, at least 90% of respondents in the second group of nurses ($n = 172$) agreed with 10 items. Nurse participants were also found to have positive beliefs about effective communication; more specifically, (1) taking time to learn about a patient's communication needs, (2) applying multiple methods of communication with DdHH patients, (3) directing questions and responses to a Deaf person when the interpreter is present, and (4) informing healthcare team regarding a DdHH individual's communication preferences. Nurse participants also agreed that it is important to know a D/deaf individuals' preferred sign language when scheduling professional interpreter service and that American Sign Language (ASL) is a real language.

Agreement with items in the Personal-Social domain suggested more negative beliefs about DdHH interaction. Out of 12 items in the Personal-Social subscale, more

than 50% of respondents in both samples agreed with all items to some degree. Most nurses agreed that all deaf people learn ASL, which may indicate the belief that all sign language is ASL, and contradicts the belief that it is important to know a D/deaf individual's preferred sign language when scheduling a professional interpreter. The portion of the question "when scheduling a professional interpreter" is also significant because while the majority of nurse respondents agreed that this is "important", the majority of respondents also agreed that (1) Deaf people should arrange for interpreter services before seeking medical treatment; (2) during healthcare interactions, most Deaf signers prefer to get by without a certified interpreter; (3) family members are the best choice are the best choice to interpret for a D/deaf person when discussing health-related information; and (4) the professional interpreter is usually close personal friend and well-known by the Deaf individual.

Noteworthy findings were associated with the social constructs of power and control. Participant responses strongly indicated the belief that it is acceptable to relinquish a DdHH person's autonomy and self-determination to a hearing person. This belief is apparent in at least 65% of respondents from both groups who agreed that "questions or responses for a DdHH person should be directed to hearing family members" and at least 60% of respondents from both groups who agreed that "during healthcare interactions, most Deaf signers prefer to get by without a certified interpreter".

In Chapter 2, audism was introduced as “the notion that one is superior based on one's ability to hear or to behave in the manner of one who hears” (Lane, 1992, p. 12). Nurses have an obligation and responsibility to promote the health and well-being of others through knowledge, skill, advocacy, and education. However, nurse participants agreed with all items toward beliefs that align with the medical model of deafness as a disorder. Specifically, 77% of nurse participants in Group One ($n = 214$) and 66% of participants in Group Two ($n = 172$) agreed that deafness is a disorder that needs correcting. Over 85% of respondents in both groups agreed that most deaf people would like to hear. Nurse participant responses also indicated the belief that all hearing loss can and should be corrected. For example, at least 70% of respondents in both groups agreed that cochlear implants enable all deaf people to have functional hearing and more than 62% of respondents in both groups agreed that all deaf people should wear hearing aids.

Nurses’ responses to items in the Personal-Social domain indicate more negative beliefs toward DdHH individuals. A review of the literature revealed that lack of nurses’ knowledge regarding Deaf cultural and linguistic differences, ASL communication access, DdHH interaction, professional responsibilities and legal obligations continue to be among the communication barriers for DdHH individuals in healthcare environments (Pendergrass et al., 2017a; Sheppard, 2014; Ruesch, 2018). Regardless of education specific to DdHH interaction that participants claim to have had in their primary and/or continuing education, participants beliefs toward DdHH interaction reflect a lack of basic

understanding of physiological, cultural, legal and ethical implications when caring for patients with diverse communication needs.

Limitations

Limitations for the study included generalizability, self-reported data, and measurement of nursing education and experience specific to DdHH interaction. Generalizability was limited to registered nurses in the United States. Nurses were recruited through four professional organizations. Participants in the first and second group overall were diverse in their age, educational background, employment setting, expertise, and years of nursing experience. Although the needed number of participants was met to conduct initial psychometric testing, a larger sample could be obtained to further generalize nurses across the United States and Canada. Global generalization of DdHH interaction would also be feasible by replacing ASL with the sign language appropriate for the geographical area of interest. For example, ASL could be replaced by Brazilian Sign Language (BSL) or Greek Sign Language (GSL) to explore DdHH interaction beliefs in Brazil and Greece, respectively.

Data were self-reported via an online survey through PsychData. Accurate output of self-reported data is directly related to accurate input. Unless the researcher is on site and participants have the opportunity to ask questions for clarification, a participant may have interpreted items in a way different than intended by the researcher. A drastic change in enrollment occurred after incentive gift cards were offered and there were

concerns that the survey link may have been shared outside of the intended population. Measures were taken to identify fraudulent submissions and questionable or invalid data was removed through the prescreening process.

Measurement of nursing education and experience specific to DdHH interaction was insufficient to accurately assess these variables. Questions regarding education and experience were included in the demographic portion of both survey questionnaires. After data analysis of the first group, questions regarding education were modified to specifically address education with non-signing deaf and hard of hearing individuals and Deaf signers. The differences in DdHH-IBS/RN mean scores and participants' reported education and experience were similar for both groups. Group similarities in both the education and experience reported, and in the association between these variables and mean scores, further supports two limitations: (a) a common definition of education and experience specific to DdHH interaction is lacking, and (b) education and experience may not be an appropriate measure of positive or negative beliefs toward DdHH interaction, or any beliefs for that matter.

Conclusions

Psychometric analysis of two separate groups of data conclude that the newly developed DdHH-IBS/RN is a reliable and valid scale to measure nurses' beliefs towards DdHH interaction. Results of CFA indicated acceptable model fit. Overall, CFA results supported the hypothesized structure of the scale and provided some

evidence for its factorial validity. Further validation of the instrument in a more controlled setting is recommended.

Theoretical Implications

A conceptual model was developed based on Imogene King's (1981) Theory of Goal Attainment (TGA) and Transactional Communication Model (TCM). The concept of *belief* was integrated into the model and refers to what a person accepts as real or true and how an individual reacts to the environment based on this personal reality. Thus, personal beliefs influence interpersonal and social interaction. The theoretical framework revealed the perspective and context of this research project by adding beliefs as a construct that precedes knowledge and action and as the initial thread that weaves personal, interpersonal, and social systems together. No framework for interaction with DdHH individuals was found in the literature. Inclusion of a third sender/receiver was particularly important in this case because the focus of this study was interaction between hearing nurses and Deaf signers, non-signing deaf, and hard of hearing patients. Therefore, a third sender/receiver was added to King's (1981) TCM. The third person represents the interpreter that can be a human being or technological means of alternative or adaptive communication. The addition of the third person illustrates how interaction and transaction may be aided or further complicated depending on the situation.

Implications for Nursing Education, Practice, and Policy

This study reported the psychometric properties of a new instrument to measure nurses' beliefs toward interacting with DdHH individuals. Reliability and validity were established for the total scale, as well as for the Personal-Social and Interpersonal subscales. However, results also indicated that nurses might not understand what education and experience specific to DdHH interaction means. A better understanding of DdHH interaction and nurses' beliefs toward interacting with DdHH individuals has implications for nursing education, practice, and policy.

Effective nurse-patient communication is a cornerstone of nursing competence and adequate patient care. However, a review of the literature found that education and experiences specifically designed to prepare nurses to interact with Deaf signers, non-signing deaf and hard of hearing patients, and CIs is lacking. The results of this study revealed several interesting details about nurses' beliefs; not only toward DdHH interaction, but also about education and experience specific to DdHH interaction and the differences between Deaf, deaf, and hard of hearing. An overwhelming majority of participants in both groups reported that their primary nursing education and continuing education included communication and interaction with Deaf signers, non-signing deaf, hard of hearing patients, and CIs. Although there were significant differences between nurses with and without education and experience specific to DdHH interaction, the results were *flipped*, meaning that nurses with no education and less experience

consistently had higher Personal-Social and Interpersonal subscale scores than nurses with education and more experience. This *flipped* result may indicate that nurses may believe that their nursing education included both communication and interaction with Deaf signers and non-signing deaf and hard of hearing patients. More importantly, the participants may actually believe that they are prepared to competently interact with DdHH people in a healthcare environment. However, the Personal-Social and Interpersonal subscale mean scores indicate that nurses who believe that they have this knowledge and experience, in actuality, have less positive beliefs about interacting with DdHH patients and CIs.

Because beliefs precede knowledge and action, results from this scale may help educators to capture nurses' beliefs toward DdHH interaction, to develop relevant education modules and simulation experiences, and to better understand the success or failure of education modules specific to DdHH interaction. Understanding the beliefs nurses' hold toward DdHH interaction may shed light on nurses' general beliefs toward Deaf signers, non-signing deaf and hard of hearing individuals as well as the importance of appropriate and effective interaction with patients that have diverse communication needs. This understanding can lead to the development of standards of practice and organizational policies that reflect federal laws that mandate equal communication access for all. Attention to equal communication access can create a nursing culture that views

communication diversity not as a barrier, but as an opportunity to open doors and promote every patient's right to autonomy and self-determination.

Recommendations for Future Research

The topic of communication between hearing nurses and DdHH patients is one that may be too broad for one instrument to effectively attend to the diverse communication needs of each group. Although many similarities in rules of social interaction exist among DdHH, hearing people often do not understand the important differences when communicating with Deaf ASL users, Deaf people who use other forms of sign, Deaf people who identify with the hearing world, deaf non-signers, and deaf-blind individuals. Future research should focus on testing educational modules that integrate communication diversity experiences throughout all levels of nursing curricula, continuing education, and annual competency training. Education and experiences that introduce a variety of experiences will better prepare nurses to respond appropriately to patients and family members with diverse communication needs.

Deaf signers were included in item content development and validation for the scale; however, establishing ongoing communication and trust between the hearing, non-signing nurse researcher and Deaf signers was a challenge. Partnering with a Deaf signing nurse for future projects with Deaf signers may help in establishing more fluid and trusting relationships. Also, continuing to improve American Sign Language fluency

through classes and more casual interactions with Deaf ASL users would be beneficial to a nurse researcher working with Deaf ASL users.

Future research for the DdHH-IBS/RN should focus on item refinement and development. Ideally, distribution and data collection should be conducted in a more controlled environment to ensure that only nurses complete the survey. Belief items could be incorporated into a DdHH education module pretest/posttest knowledge questionnaire for nursing students or staff nurses to explore whether individual beliefs about DdHH interaction are influenced by education. However, the more important question here is, what is the relationship between beliefs toward DdHH interaction and actual nurse behaviors? The answer may lie in the observable interaction in an actual encounter between a nurse and DdHH patient, and a nurse, DdHH patient, and CI. A measurement of these behaviors, such as an observational checklist, could be developed to use in a simulation experience involving nurses or nursing students, DdHH patients, and CIs. DdHH-IBS/RN scores could be compared with observational checklist scores to examine the relationship between beliefs and behavior.

This survey and the developed observational checklist could also be used in future research emphasizing the importance of measures to identify and accommodate the needs of Deaf signers, non-signing deaf, and hard of hearing patients. Then, the relationship between nurses' beliefs and interaction behaviors could be tested with the Centers for Medicare & Medicaid Services (CMS, 2017) quality measures such as patient length of

stay, patient satisfaction, readmission rates, and healthcare acquired conditions for DdHH individuals.

Summary

The purpose of this methodological study was to develop a valid and reliable instrument to measure registered nurses' beliefs toward interaction with DdHH patients and CIs. An initial pool of items to assess registered nurses' beliefs toward DdHH interaction was developed based on an extensive review of literature. Item pool content was validated by six content experts including one Deaf signer, one Deaf nurse, two hard of hearing nurses, and two hearing CIs. The initial DdHH-IBS/RN consisted of 58 items. The first wave of data collection and analyses resulted in a 25-item DdHH-IBS/RN consisting of two factors: Personal-Social Beliefs Domain and Interpersonal Beliefs Domain. The 25-item DdHH-IBS/RN was subjected to a second wave of data collection and analysis to further refine and validate the instrument. Results of EFA for the second wave were similar to those of the first wave and indicated 2 factors as the most favorable solution. Multiple analyses for both waves of data collection found the DdHH-IBS/RN to have high inter-item reliability, high stability reliability, and high internal consistency reliability for the subscales. CFA results supported the hypothesized structure of the scale and provided some evidence for its factorial validity; however, items may have room for further improvement.

In the future, the DdHH-IBS/RN may be used to create evidence-based nursing education modules and to improve nursing care of DdHH patients. This study was the first to attempt to quantify beliefs toward DdHH interaction. Psychometric analyses support the validity and reliability of the DdHH-IBS/RN; however, the findings from this initial study only serve as a starting point for an ongoing and extensive body of research.

REFERENCES

- Adib Hajbaghery, M., & Rezaei Shahsavarloo, Z. (2014). Assessing the nursing and midwifery students competencies in communication with patients with severe communication problems. *Nursing and Midwifery Studies*, 3(2), e18143. Retrieved from <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4228534>
- Adib-Hajbaghery, M., & Razaee-Shahsavarloo, Z. (2015). Nursing students' knowledge of and performance in communicating with patients with hearing impairment. *Japan Journal of Nursing Science*, 12, 135-144. doi: 10.1111/jjns.12057
- Agency for Health Care Research and Quality. (2014). Improving cultural competence to reduce health disparities for priority populations. Retrieved from <http://effectivehealthcare.ahrq.gov/ehc/products/573/1934/cultural-competence-protocol-140709.pdf>
- Ajzen, I., & Fishbein, M. (1972). Attitudes and normative beliefs as factors influencing behavioral intentions. *Journal of Personality and Social Psychology*, 21(1), 1-9. doi: 10.1037/h0031930
- Allen, T. (1986). Patterns of academic achievement among hearing impaired students. In A. Schildroth & M. Krachmer (Eds.), *Deaf Children in America*. San Diego, CA: College Hill Press.
- Alligood, M. R. (2010). Family healthcare with king's theory of goal attainment. *Nursing Science Quarterly*, 23(2), 99-104. doi: 10.1177/0894318410362553.

- Alligood, M. R. (2014). *Nurse theorists and their work* (8th ed.). St. Louis, MO: Elsevier.
- Alselay, S. A., & Alrashed, A. M. (2015). Patient-nurse-relationship with in deaf and hard of hearing (D&HH) population. *Journal of Nursing and Health Science*, 4(1), 81-85. doi: 10.9797/1959-04128185
- American Nurses Association. (2015). *Nursing: Scope and standards of practice* (3rd ed.). Silver Spring, MD: American Nurses Association. Retrieved from <http://www.nursesbooks.org>
- Americans with Disabilities Act of 1990, Pub. L. No. 101-336, § 2, 104 Stat. 328 (1991). Retrieved from http://library.clerk.house.gov/reference-files/PPL_101_336_AmericansWithDisabilities.pdf
- American Speech-Language-Hearing Association. (2017). Augmentative and alternative communication. Retrieved from https://www.asha.org/public/speech/disorders/AAC/#what_is
- Anonymous. (2016). *Communication in the real world: An introduction to communication studies*. Minnesota: University of Minnesota Libraries Publishing. Retrieved from <https://doi.org/10.24926/8668.0401>
- Baker, C. (1977). Regulators and turn-taking in American Sign Language discourse. In L. Friedman (Ed.), *On the other hand: New perspectives on American Sign Language* (pp. 215–236). New York: Academic Press.

- Barnett S. (1999). Clinical and cultural issues in caring for deaf people. *Family Medicine*, 31(1), 17-22. Retrieved from <https://www.ncbi.nlm.nih.gov/pubmed/9987607>
- Barnett, S., & Franks, P. (2002). Health care utilization and adults who are deaf: Relationship with age at onset of deafness. *Health Services Research*, 37(1), 105-120. Retrieved from <https://www.ncbi.nlm.nih.gov/pubmed/11949915>
- Barnett, S. L., Matthews, K. A., Sutter, E. J., DeWindt, L. A., Pransky, J. A., O'Hearn, A. M.,...Pearson, T. A. (2017). Collaboration with Deaf communities to conduct accessible health surveillance [Brief Report]. *American Journal of Preventative Medicine*, 52(3S3), S250–S254. Retrieved from <https://doi.org/10.1016/j.amepre.2016.10.011>
- Barnett, S., McKee, M., Smith, S. R., & Pearson, T. A. (2011). Deaf sign language users, health inequities, and public health: Opportunity for social justice. Centers for Disease Control and Prevention. *Preventing Chronic Disease: Public Health Research, Practice, and Policy*, 8(2), 1-6. Retrieved from www.cdc.gov/pcd/issues/2011/mar/10_0065.htm
- Barnlund, D. C. (1970). Transactional model of communication in K. K. Sereno and C. D. Mortensen (Eds.), *Foundations of Communication Theory* (p. 99). New York, NY: Harper and Row.
- Bartlett, G., Blais, R., Tamblyn, R., Clermont, R. J., & MacGibbon, B. (2008). Impact of patient communication problems on the risk of preventable adverse events in

- acute care settings. *Journal of the Canadian Medical Association*, 178(12), 1555-1562. Retrieved from www.cmaj.ca/cgi/content/full/178/12/1555/DCi
- Bartlett, M. S. (1954). A note on the multiplying factors for various chi square approximations. *Journal of the Royal Statistical Society*, 16, 296-298. Retrieved from <http://www.jstor.org/stable/2984057>
- Bechter, F. (2008). The deaf convert culture and its lessons for deaf theory. In H. D. Bauman (Ed.). *Open your eyes: Deaf studies talking* (pp. 60-82). Minneapolis, MN: University of Minnesota Press.
- Berkman, N. D., Sheridan, S. L., Donahue, K. E., Halpern, D. J., Viera, A., Crotty, K., Holland, A.,Viswanathan, M. (2011). Health literacy interventions and outcomes: An updated systematic review. Evidence Report/Technology Assessment No. 199. (Prepared by RTI International–University of North Carolina Evidencebased Practice Center under contract No. 290-2007-10056-I). AHRQ Publication Number 11- E006. Rockville, MD: Agency for Healthcare Research and Quality. Retrieved from <https://www.ahrq.gov/downloads/pub/evidence/pdf/literacy/literacyup.pdf>
- Berman, B.A., Jo, A., Cumberland, W. G., Booth, H., Britt, J., Stern, C., & Bastani, R. (2013). Breast cancer knowledge and practices among D/deaf women. *Disability and Health Journal*, 6(4), 303-316. doi: 10.1016/j.dhjo.2013.05.001

- Blackwell, D.L., Lucas, J.W., & Clarke, T.C. (2014). Summary health statistics for U.S. adults: National Health Interview Survey, 2012. National Center for Health Statistics. *Vital Health Statistics*, 10(260). 1-161. Retrieved from https://www.cdc.gov/nchs/data/series/sr_10/sr10_260.pdf
- Blevins, S. (2015). Teaching patients with hearing loss. *MEDSURG Nursing*, 24(2), 128-129. Retrieved from <https://www.ncbi.nlm.nih.gov/pubmed/26306382>
- Britto, F. D., & Sampen, M. M. (2010). Communication difficulties and strategies used by the nurses and their team in caring for the hearing impaired. *Einstein*, 8(1), 80-85. doi: 10.1590/S1679-45082010AO1339
- Brown, H. L., Hughes-Bell, A., & McDuffie, A. W. (2015). Caring for patients who are deaf or hard of hearing. *American Academy of Physician Assistants*, 28(12), 50-55. doi: 10.1097/01.JAA.0000473363.92597.91
- Burton, W. C. (2013). *Burton's Legal Thesaurus* (5th ed.). New York, NY: McGraw-Hill.
- Cabral, L., Muhr, K., & Savageau, J. (2013). Perspectives of people who are Deaf and hard of hearing on mental health, recovery, and peer support. *Community Mental Health Journal*, 49, 649-657. doi: 10.1007/s10597-012-9569-z
- Caceres, B. A. (2015). King's theory of goal attainment: Exploring functional status. *Nursing Science Quarterly*, 28(2), 151-155. doi: 10.1177/0894318415571601

Campbell, C. A. (1967). Towards a definition of belief. *The Philosophical Quarterly*, 17(68), 204-220. Retrieved from <http://www.jstor.org/stable/2218155> Accessed: 16-02-2018 00:24 UTC

Carmines, E. G., & Zeller, R. A. (1979). *Reliability and validity assessment*. In M. S. Lewis-Beck (Ed.), Series: Quantitative applications in the social sciences. Newbury Park, CA: Sage.

Centers for Disease Control and Prevention. (2014a). Manually coded English. Parent's guide: Building language. National Center on Birth Defects and Developmental Disabilities. Retrieved from <https://www.cdc.gov/ncbddd/hearingloss/parentsguide/building/manual-english.html>

Centers for Disease Control and Prevention. (2014b). Finger spelling. Parent's guide: Building language. National Center on Birth Defects and Developmental Disabilities. Retrieved from <https://www.cdc.gov/ncbddd/hearingloss/parentsguide/building/finger-spelling.html>

Centers for Disease Control and Prevention. (2014c). Speech reading. Parent's guide: Building language. National Center on Birth Defects and Developmental Disabilities. Retrieved from

<https://www.cdc.gov/ncbddd/hearingloss/parentsguide/building/speech-reading.html>

Centers for Medicare & Medicaid Services (2017). Quality measures. Retrieved from <https://www.cms.gov/Medicare/Quality-Initiatives-Patient-Assessment-Instruments/QualityMeasures/index.html>

Clarke, P. N., Killeen, M. B., Messmer, P. R., & Sieloff, C. L. (2009). Imogene M. King's scholars reflect on her wisdom and influence on nursing science. *Nursing Science Quarterly*, 22(2), 128-133. doi: 10.1177/0894318409332568

Cohen, J. (1988). A power primer. *Psychological Bulletin*, 112(1), 155-159. Retrieved from <http://www2.psych.ubc.ca/~schaller/528Readings/Cohen1992.pdf>

Cohen-Mansfield, J., Parpura, A., & Golander, H. (2006). Utilization of self-identity roles for designing interventions for persons with dementia. *The Journals of Gerontology: Series B*, 61(4), 202-212. Retrieved from <https://doi.org/10.1093/geronb/61.4.P202>

Commission on Education of the Deaf. (1988). Toward equality: A report to the President and Congress of the United States. Washington, D.C: U.S. Government Printing Office. Retrieved from <http://files.eric.ed.gov/fulltext/ED303932.pdf>

Communication. (n.d.). Retrieved from <https://www.merriam-webster.com/dictionary/communication>

- Connors, M. H., & Halligan, P. W. (2015). A cognitive account of belief: A tentative road map. *Frontiers in Psychology*, 5(1588), 1-14. doi: 10.3389/fpsyg.2014.01588
- Cooper, A., Rose, J., & Mason, O. (2004). Measuring the attitudes of human service professionals towards deafness. *American Annals of the Deaf*, 148(5), 385-389. doi: 10.1353/aad.2004.0001
- Costello, A. B., & Osborne, J. W. (2005). Best practices in exploratory factor analysis: Four recommendations for getting the most from your analysis. *Practical Assessment, Research & Evaluation*, 10(7), 1-9. Retrieved from <http://pareonline.net/pdf/v10n7.pdf>
- Critchfield, M. L. (2015). Six questions: How student nurses utilize the transcultural assessment model for self-reflection. *RN Idaho*, 37(4). Retrieved from http://www.nursingald.com/uploads/publication/pdf/1146/ID2_15.pdf
- Cronbach, L. J., & Meehl, P. E. (1955). Construct validity in psychological tests. *Psychological Bulletin*, 52(4), 281-302. Retrieved from <http://dx.doi.org/10.1037/h0040957>
- Curran, P. G., Kotrba, L., & Denison, D. (2010). Careless responding in surveys: Applying traditional techniques to organizational settings. Paper Presented at the 25th Annual Conference of the Society for Industrial/Organizational Psychology. Atlanta, GA.

Czerniejewski, E. M. (2012). *A system to enhance patient-provider communication in hospitalized patients who use American Sign Language*. (Master's thesis).

Retrieved from <http://ir.uiowa.edu/etd/2850>

DeVellis, R.F. (2017). *Scale development: Theory and applications* (4th ed.). Thousand Oaks, CA: SAGE Publications.

DeVito, J. A. (2016). *Essentials of human communication* (9th ed.). New York, NY: Pearson.

DeVon, H. A., Block, M. E., Moyle-Wright, P., Ernst, D. M., Hayden, S. J., Lazzara, D. J.,...Kostas-Polston, E. (2007). A psychometric toolbox for testing validity and reliability. *Journal of Nursing Scholarship*, 39(2), 155-164. doi: 10.1111/j.1547-5069.2007.00161.x

Dewey, J., & Bentley, A. (1949). *Knowing and the known*. Boston, MA: Beacon Press.

DeWinter, J. C., Dodou, D., & Wieringa, P. A. (2009). Exploratory factor analysis with small sample sizes. *Multivariate Behavioral Research*, 44(2), 147-81. doi: 10.1080/00273170902794206.

DiPietro, L. J., Knight, C. H., & Sams, J. S. (1981). Health care delivery for deaf patients: The provider's role. *American Annals of the Deaf*, 126(2), 106-112. Retrieved from <https://doi.org/10.1353/aad.2012.1505>

- Diamond, L. C., Schenker, Y., Curry, L., Bradley, E. H., Fernandez, A. (2008). Getting by: Underuse of interpreters by resident physicians. *Journal of General Internal Medicine*, 24(2), 256-262. doi: 10.1007/s11606-008-0875-7
- Divi, C., Koss, R. G., Schmaltz, S. P., & Loeb, J. M. (2007), Language proficiency and adverse events in US hospitals: A pilot study. *International Journal for Quality in Health Care*, 19(2), 60-67. doi: 10.1093/intqhc/mz1069
- Dolnick, E. (1993). Deafness as culture. *The Atlantic Monthly*, 273(3), 37-49. Retrieved from http://gallyprotest.org/atlantic_monthly.pdf
- Doornbos, M. M. (1995). Using King's systems framework to explore family health in the families of the young chronically mentally ill. In M. A. Frey & C. L. Sieloff (Eds.), *Advancing King's systems framework and theory of nursing* (pp. 192-205). Thousand Oaks, CA: Sage
- Doornbos, M. M. (2007). King's conceptual system and family health theory in the families of adults with persistent mental illnesses—an evolving conceptualization. In C. L. Sieloff & M. A. Frey (Eds.), *Middle-range theory development using King's conceptual system* (pp. 31-49). New York: Springer.
- Eagly, A. H., and Chaiken, S. (1993). *The psychology of attitudes*. Orlando, FL: Harcourt Brace Jovanovich.

- Elliott, T. E., Regal, R. R., Elliott, B. A., & Renier, C. M. (2001). Design and validation of instruments to measure knowledge. *Journal of Cancer Education*, 16(3), 157-162. doi: 10.1080/08858190109528759
- Emmorey, K., Thompson, R., & Colvin, R. (2009). Eye gaze during comprehension of American Sign Language by native and beginning signers. *Journal of Deaf Studies and Deaf Education*, 14(2), 237-243. doi: 10.1093/deafed/enn037
- Fabrigar, L. R., Wegener, D. T., MacCallum, R. C., & Strahan, E. J. (1999). Evaluating the use of exploratory factor analysis in psychological research. *Psychological Methods*, 4(3), 272-299. Retrieved from <http://www.w.statpower.net/Content/312/Handout/Fabrigar1999.pdf>
- Faul, F., Erdfelder, E., Lang, A. G. & Buchner, A. (2007). G*Power 3: A flexible statistical power analysis program for the social, behavioral, and biomedical sciences. *Behavior Research Methods*, 39(2), 175-191. Retrieved from <http://www.gpower.hhu.de/en.html>
- Federal Communications Commission. (2017). Video relay services. Retrieved from <https://www.fcc.gov/consumers/guides/video-relay-services>
- Ferguson-Coleman, E., Keady, J., & Young, A. (2014). Dementia and the Deaf community: Knowledge and service access. *Aging & Mental Health*, 18(6), 674-682. doi: 10.1080/13607863.2014.880405

- Field, A. (2013). *Discovering statistics using IBM SPSS statistics* (4th ed.). Los Angeles, CA: Sage.
- Fileccia, J. (2011). Sensitive care for the deaf: A cultural challenge. *Creative Nursing*, 17(4), 174-179. doi:10.1891/1078-4535.17.4.174.
- Filho, E. P., Goes da Silva, J. P., Freitas, F. F., Alves, S. R., & Costa, K. N. (2013). Perception of nursing students on the communication with people with visual and hearing disabilities. *Journal of Nursing: Federal University of Pernambuco (UFPE) On Line*, 7(1), 747-754. doi: 10.5205/reuol.3161-26181-6-LE.0703201314
- Finke, E. H., Light, J., & Kitko, L. (2008). A systematic review of the effectiveness of nurse communication with patients with complex communication needs with a focus on the use of augmentative and alternative communication. *Journal of Clinical Nursing*, 17(16), 2102-2115. doi: 10.1111/j.1365-2702.2008.02373.x
- Fishbein, M., & Ajzen, I. (1975). *Belief, attitude, intention, and behavior: An introduction to theory and research*. Reading, MA: Addison-Wesley.
- Frey, M. A. (2010). King's conceptual system and theory of goal attainment in nursing practice. In M. R. Alligood (Ed.), *Nursing theory: Utilization & application* (4th ed., pp. 189- 212). St. Louis, MO: Mosby-Elsevier.

- Frey, M. A., Ellis, D. A., & Naar-King, S. (2007). Testing theory with intervention research. In C. L. Sieloff & M. A. Frey (Eds.), *Middle-range theory development using King's conceptual system* (pp. 273-286). New York: Springer.
- Furr, R.M. & Bacharach, V.R. (2014). *Psychometrics: An introduction* (2nd ed.). Thousand Oaks, CA: Sage.
- Gallaudet University. (2010). *American sign language ranking and number of users*. Retrieved from <http://libguides.gallaudet.edu/content.php?pid=114804&sid=991835>
- Gallaudet University. (2015). *American Deaf culture*. Retrieved from <https://www.gallaudet.edu/clerc-center/info-to-go/deaf-culture/american-deaf-culture.html>
- Gichane, M. W., Heap, M. Fontes, M., & London, L. (2017). “They must understand we are people”: Pregnancy and maternity service use among signing Deaf women in Cape Town. *Disability and Health Journal* 10, 434-439. doi: 10.1016/j.dhjo.2017.03.016
- Giger, J. N., & Davidhizar, R. (2002). The Giger and Davidhizar transcultural assessment model. *Journal of Transcultural Nursing*, 13(3), 185-188. doi: 10.1177/10459602013003004

- Guadagnoli, E., & Velicer, W. F. (1988). Relation of sample size to the stability of component patterns. *Psychological Bulletin*, 103(2), 265-75. doi: 10.1037//0033-2909.103.2.265
- Hallam, R. S., & Corney, R. (2014). Conversation tactics in persons with normal hearing and hearing-impairment. *International Journal of Audiology*, 53(3):174-81. doi: 10.3109/14992027.2013.852256
- Halligan, P. W. (2006). Beliefs: Shaping experience and understanding illness. In P. W. Halligan & M. Aylward (Eds.), *The power of belief: Psychosocial influence on illness, disability and medicine* (pp. 11-26). Oxford, UK: Oxford University Press.
- Halligan, P. W. (2007). Belief and illness. *Psychologist* 20(6), 358–361. Retrieved from <https://thepsychologist.bps.org.uk/volume-20/edition-6/belief-and-illness>
- Harrington, T. (2002). What is audism? Introduction Gallaudet University Library. Retrieved from <http://libguides.gallaudet.edu>
- Harrington, T. (2016). *ASL: Ranking and number of users*. Gallaudet University Library. Retrieved from <http://libguides.gallaudet.edu>
- Hauser, P., O'Hearn, A., McKee, M., Steider, A., & Thew, D. (2010). Deaf epistemology: deafhood and deafness. *American Annals of the Deaf*, 154(5), 486-492. Retrieved from <https://www.ncbi.nlm.nih.gov/pubmed/20415284>

- Hawala-Druy, S., & Hill, M. H. (2012). Interdisciplinary: Cultural competency and culturally congruent education for millennials in health professions. *Nurse Education Today*, 32, 722-778. doi: 10.1016/j.nedt.2012.05.002
- Hearing Loss Association of America. (2017). Communicating with hard-of-hearing and Deaf patients. *Guide for Effective Communication in Healthcare*. Retrieved from <http://hearingloss.org>
- Heiphetz, L., Spelke, E. S., Harris, P. L., & Banaji, M. R. (2013). The development of reasoning about beliefs: Fact, preference, and ideology. *Journal of Experimental Social Psychology*, 49(3), 559–565. doi:10.1016/j.jesp.2012.09.005
- Hemsley, B., Baladin, S., & Worrall, L. (2011). Nursing the patient with complex communication needs: Time as a barrier and a facilitator to successful communication in hospital. *Journal of Advanced Nursing*, 68(1), 116-126. doi: 10.1111/j.1365-2648.2011.05722.x
- Hickey, S., Merz, E. L., Malcarne, V. L., Gunsauls, D. C., Huanf, J., & Sadler, G. R. (2013). Breast cancer education for the Deaf community in American Sign Language. *Oncology Nursing Forum*, 40(3), E86-E91. doi: 10.1188/13.ONF.E86-E91
- Hinkin, T. R. (1995). A review of scale development practices in the study of organization. *Journal of Management*, 21(5), 967-988. Retrieved from <https://doi.org/10.1177%2F014920639502100509>

- Hinkin, T. R. (1998). A brief tutorial on the development of measures for use in survey questionnaires. *Organizational Research Methods*, 2(1), 104-121. doi: 10.1177/109442819800100106
- Hinkin, T. R., Tracey, J. B., &ENZ, C. A. (1997). Scale construction: Developing reliable and valid measurement instruments [Electronic version]. *Journal of Hospitality & Tourism Research*, 21(1), 100-120. doi: 10.1177/109634809702100108
- Hoang, L., LaHouse, S. F., Nakaji, M. C., & Sadler, R. G. (2011). Assessing deaf cultural competency of physicians and medical students. *Journal of Cancer Education*, 26, 175-182. doi: 10.1007/s13187-010-0144-4
- Holcomb, T. K. (2013). *Introduction to American Deaf culture*. New York, NY: Oxford University Press.
- Hornáková, A., & Hudáková, A. (2013) Effective communication with deaf patients. *JAHr: European Journal of Bioethics*, 4(7), 157. Retrieved from http://hrcak.srce.hr/index.php?show=clanak&id_clanak_jezik=162608
- Huang, J. L., Curran, P. L., Keeney, J., Poposki, E. M. & DeShon, R. P. (2011) Detecting and Deterring Insufficient Effort Responding to Surveys. *Journal of Business Psychology*. doi 10.1007/s10869-011-9231-8
- Hubbard, L. J., D'Andrea, E., & Carman, L. A. (2018). Promoting the best practice for perinatal care of Deaf women. *Nursing for Women's Health*, 22(2), 126-136. doi: 10.1016/j.nwh.2018.02.002

- Humphries, T. (1977) *Communicating across cultures (deaf-hearing) and language learning* (Doctoral dissertation). Cincinnati, OH: Union Institute and University. Retrieved from <https://search.proquest.com/docview/302878949/abstract>
- Humphrey, J. H., & Alcorn, J. A. (2007) *So you want to be an interpreter?* Seattle, WA: H & H Publishing.
- Iezzoni, L. I., O'Day, B. L., Killeen, M., & Harker, H. (2004). Communicating about health care: Observations from persons who are deaf or hard of hearing. *Annals of Internal Medicine*, 140(5), 356-363. Retrieved from <https://www.ncbi.nlm.nih.gov/pubmed/14996677>
- Institute for Quality and Efficiency in Health Care. (2017). *Hearing loss and deafness: Normal hearing and impaired hearing*. Pub Med Health: Informed Health Online. U. S. National Library of Medicine. Retrieved from <https://www.ncbi.nlm.nih.gov/pubmedhealth/PMH0089568/>
- Johnson, J. A. (2005). Ascertaining the validity of individual protocols from web-based personality inventories. *Journal of Research in Personality*, 39(1), 103-129. doi:10.1016/j.jrp.2004.09.009
- Juckett, G., & Unger, K. (2014). Appropriate use of medical interpreters. *American Family Physician*, 90(7), 476-480. Retrieved from <http://www.aafp.org/afp/2014/1001/p476.html>

- Kaiser, H. (1970). A second generation little jiffy. *Psychometrika*, 35, 401-15.
- Kaiser, H. (1974). An index of factorial simplicity. *Psychometrika*, 39(1), 31-36.
- Retrieved from <http://link.springer.com/article/10.1007/BF02291575#page-1>
- Kannapell, B. (1989). Inside the deaf community. In S. Wilcox (Ed.), *American deaf culture* (pp. 21-29). Burtonsville, MD: Linstok Press, Inc.
- Kellar, S. P., & Kelvin, E. A. (2012). *Munro's statistical methods for health care research* (6th ed.). Philadelphia, PA: Lippincott, Williams & Wilkins.
- King, I. M. (1981). *A theory for nursing: Systems, concepts and process*. New York, NY: Wiley.
- King, I. M. (1995) A systems framework for nursing. In M. A. Frey & C. L. Sieloff (Eds.). *Advancing King's systems framework and theory of nursing* (pp. 14-22). Thousand Oaks, CA: Sage.
- King, I. M. (1999). A theory of goal attainment: Philosophical and ethical implications. *Nursing Science Quarterly*, 12, 292-296. doi: 10.1177/08943189922107205
- King, I. M. (2007). King's conceptual system, theory of goal attainment, and transaction process in the 21st century. *Nursing Science Quarterly*, 20(2), 109-116. doi: 10.1177/0894318407299846
- Krizinger, J., Schneider, M., Swartz, L., & Braathen, S. H. (2014). "I just answer 'yes' to everything they say": Access to health care for deaf people in Worcester, South

- Africa and the politics of exclusion. *Patient Education and Counseling*, 94, 379-383. <http://dx.doi.org/10.1016.j.pec.2013.12.006>
- Kruglanski, A. W., & Stroebe, W. (2005). The influence of beliefs and goals on attitudes: Issues of structure, function, and dynamics. In D. Albarracín, B. T. Johnson, & M. P. Zanna (Eds.), *The handbook of attitudes* (pp. 323-368). Mahwah, NJ: Lawrence Erlbaum Associates.
- Kuenburg, A., Fellingner, P., & Fellingner, J. (2016). Health care access among deaf people. *Journal of Deaf Studies and Deaf Education*, 21(1), 1-10. doi: 10.1093/deafed/env042
- Kuhn, A. (1975). *Unified social science*. Homewood, IL: Dorsey Press.
- Kutner M., Greenberg E., Jin Y., and Paulsen, C. (2006). *The health literacy of America's adults: Results from the 2003 National Assessment of Adult Literacy* (NCES 2006-483). Washington, DC: United States Department of Education, National Center for Education Statistics. Retrieved from <http://eric.ed.gov/PDFS/ED493284.pdf>.
- Lane, H. (1992). *The mask of benevolence: Disabling the deaf community*. New York, NY: Knopf.
- Lane, H. (2010). *When the mind hears: A history of the deaf*. New York, NY: Random House.

- Lapinski, J., Colonna, C., Sexton, P., & Richard, M. (2015). American Sign Language and Deaf culture competency of osteopathic medical students. *American Annals of the Deaf*, 160(1), 36-47. doi: 10.1353/aad.2015.0014
- LaVigne, M., & Vernon, M. (2003). An interpreter isn't enough: Deafness, Language, and due process. *Wisconsin Law Review*, 5, 843-935. Retrieved from <http://njdc.info/wp-content/uploads/2014/10/An-Interpreter-Isnt-Enough-Deafness-Language-And-Due-Process-.pdf>
- Liddell, S. (1980). *American Sign Language syntax*. The Hague, the Netherlands: Mouton.
- Liddell, S. (2003). *Grammar, gesture, and meaning in ASL*. Cambridge, MA: Cambridge University Press.
- Lieu, C. C., Sadler, G. R., Fullerton, J. T., & Stohlmann, P. D. (2007). Communication strategies for nurses interacting with patients who are deaf. *MEDSURG Nursing*, 16(4), 237-245. Retrieved from <https://www.ncbi.nlm.nih.gov/pubmed/17907696>
- Lin, F. R., Ferrucci, L., Metter, E. J., An, Y., Zonderman, A. B., & Resnick, S. M. (2011b). Hearing loss and cognition in the Baltimore Longitudinal Study of Aging. *Neuropsychology*, 25(6), 763-770. Retrieved from <http://dx.doi.org/10.1037/a0024238>

- Ljubicic, M., Zubcic, S., & Sare, S. (2017). Communication between nurses and deaf people in health institutions. *Central Bohemia University International Conference on Innovations in Science and Education*, 5, 1-8.
doi: <http://www.journals.cz/index.php/CBUIC/article/view/1052>
- Loftin, C., Hartin, V., Branson, M., & Reyes, H. (2013). Measures of Cultural Competence in Nurses: An Integrative Review. *The Scientific World Journal*, 2013, 289101. <http://doi.org/10.1155/2013/289101>
- Ludders, B. B. (1987). Communication between health care professionals and deaf patients. *Health & Social Work*, 12(4), 303-10. Retrieved from <https://www.ncbi.nlm.nih.gov/pubmed/3679018>
- Lunza, S., & Emma, N. (2017). Experiences of registered nurses on communication with Deaf patients at Katutura state hospital, Namibia. *International Journal of Medicine*, 5(1), 82-86. doi: 10.14199-ijm.v5i6.7301
- Lynn, M. R. (1986). Determination and quantification of content validity. *Nursing Research*, 35(6), 382-385. doi: 10.1097/00006199-198611000-00017
- Machado, W. C. A., Machado, D. A., Figueiredo, N. M. A., Tonini, T., Miranda, R. S., & Oliveria, G. M. B. (2013). Sign language: How the nursing staff interacts to take care of deaf patients? *Revista de Pesquisa Cuidado é Fundamental Online*, 3 (5), 283-292. doi: 10.9789/2175-5361.2013v5n3p283

- Marschark, M. (2007). *Raising and educating a deaf child*. New York, NY: Oxford University Press.
- Marschark, M., & Spencer, P. (Eds). (2010). *The Oxford handbook on deaf studies, language, and education* (Vol. 1). New York, NY: Oxford University Press.
- Matthews, J. L., Parkhill, A. L., Schlehofer, D. A., Starr, M. J., and Barnett, S. (2011). Role-reversal exercise with Deaf Strong Hospital to teach communication competency and cultural awareness. *American Journal of Pharmaceutical Education*, 75(3), 1-10. Retrieved from <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC3109807/>
- Maul, L., Regenstein, M., Andres, E., Wright, R., & Wynia, M.K. (2012). Using a risk assessment approach to determine which factors influence whether partially bilingual physicians rely on their non-English language skills or call an interpreter. *Joint Commission Journal of Quality and Patient Safety*, 38(7), 328–336. Retrieved from <https://www.ncbi.nlm.nih.gov/pubmed/22852193>
- McDonald, R.P. (1985). *Factor analysis and related methods*. Hillside, NJ: Lawrence Erlbaum Associates, Inc.
- McDonald, R. P., and Ho, M-H. R. (2002). Principles and practice in reporting structural equation analyses. *Psychological Methods*, 7(1), 64-82. doi: 10.1037//1082-989X.7.1.64

- McKee, M. (2013). Caring for older patients who have significant hearing loss. *American Family Physician*, 87(5), 360-362. Retrieved from <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4120069/>
- McKee, M. M., Barnett, S. L., Block, R. C., & Pearson, T. A. (2011). Impact of communication on preventive services among Deaf American Sign Language users. *American Journal of Preventive Medicine*, 41(1), 75-79. Retrieved from doi: 10.1016/j.amepre.2011.03.004
- McKee, M. M., Paasche-Orlow, M., Winters, P. C., Fiscella, K., Zazove, P., Sen, A., & Pearson, T. (2015). Assessing health literacy in Deaf American Sign Language users. *Journal of Health Communication*, 20(2), 92–100. Retrieved from <http://doi.org/10.1080/10810730.2015.1066468>
- Meade, A. W., & Craig, S. B. (2012). Identifying careless responses in survey data. *Psychological Methods*, 17(3), 437-55. doi: 10.1037/a0028085
- Meador, H. E., & Zazove, P. (2005). Health care interactions with Deaf culture. *Journal of the American Board of Family Medicine*, 18(3), 218-222. doi: 10.3122/jabfm.18.3.218
- Mertler, C., & Vannatta, R. (2013). *Advanced and multivariate statistical methods* (5th ed.). Glendale, CA: Pyrczak.

- Methodological design. (n. d.) *Miller-Keane Encyclopedia and Dictionary of Medicine, Nursing, and Allied Health, Seventh Edition*. (2003). Retrieved from <https://medical-dictionary.thefreedictionary.com/methodological+design>
- Middleton, A., Niruban, A., Girling, G., & Myint, P. K. (2010). Communicating in a healthcare setting with people who have hearing loss. *British Medical Journal*, 341(7775), 726-729. doi: 10.1136/bmj.0462
- Middleton, A., Turner, G. H., Bitner-Glindzicz, M., Lewis, P., Richards, M., Clarke, A., & Stephens, D. (2010). Preferences for communication in clinic from deaf people: A cross-sectional study. *Journal of Evaluation in Clinical Practice*, 16, 811-817. doi: 10.1111/j.1365-2753.2009.01207.x
- Mindess, A. (2014). *Reading between the signs: Intercultural communication for sign language interpreters* (3rd ed.). Boston, MA: Intercultural Press.
- Mitchell, R. E. & Karmacher, M. A. (2004). Chasing the mythical ten percent: Parental hearing status of deaf and hard of hearing students in the United States. *Sign Language Studies*, 4(2), 138-163. Retrieved from <https://doi.org/10.1353/sls.2004.0005>
- Moore, M. S., & Levitan, L. (2003). *For hearing people only*. (3rd ed.). Deaf Life Press: Rochester, NY.

- Morgan, G. A., Leech, N. L., Gloeckner, G. W., & Barret, K. C. (2011). *IBM SPSS for introductory statistics: Use and interpretation* (4th ed.). New York, NY: Routledge.
- Munoz-Baell, I. & Ruiz, M. (2000). Empowering the deaf. Let the deaf be deaf. *Journal Epidemiology and Community Health*, 54(1), 40-44. doi: 10.1136/jech.54.1.40
- Mvududu, N. H., & Sink, C. A. (2013). Factor analysis in counseling research and practice. *Counseling Outcome Research and Evaluation*, 4(2), 75–98.
<https://doi.org/10.1177/2150137813494766>
- Nagakura, H., Schneider, G., Morris, J., Lafferty, K. A., & Palmer, C. G. S. (2015). Assessing Deaf awareness training: knowledge and attitudes of recent genetic counseling graduates. *Journal of Genetic Counseling*, 24, 104-116. doi: 10.1007/s10897-014-9742-3
- Naseribooriabadi, T., Sadoughi, F., & Sheikhtaheri, A. (2017). Barriers and facilitators of health literacy among D/deaf individuals: A review article. *Iranian Journal of Public Health*, 46(11), 1465-1474. Retrieved from <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC5696685/pdf/IJPH-46-1465.pdf>
- National Association of the Deaf. (2017a). Position statement on health care access for deaf patients. Retrieved from <https://www.nad.org/about-us/position-statements/position-statement-on-health-care-access-for-deaf-patients/>

National Association of the Deaf (2017b). What is American Sign Language? Retrieved from <https://www.nad.org/resources/american-sign-language/what-is-american-sign-language>

National Association of the Deaf (2017c). Video Relay Services. Retrieved from <https://www.nad.org/resources/technology/telephone-and-relay-services/video-relay-services/>

National Association of the Deaf (2017d). Video Remote Interpreting. Retrieved from <https://www.nad.org/resources/technology/video-remote-interpreting/>

National Center for Education Statistics. (2006). National Assessment of Adult Literacy (NAAL): A first look at the literacy of America's adults in the 21st century. Retrieved from <http://nces.ed.gov/pubsearch/pubsinfo.asp?pubid=2006470>.

National Council on Interpreting in Health Care. (n. d.). FAQ - Healthcare professionals: Information about providing language access services. Retrieved from <http://www.ncihc.org/faqs-for-healthcare-professionals>

National Cued Speech Association (2017). Definition of cued speech. Retrieved from <http://www.cuedspeech.org/cued-speech-definition>

National Institute on Deafness and Other Communication Disorders. (2017). Hearing Loss and Older Adults. Retrieved from <https://www.nidcd.nih.gov/health/hearing-loss-older-adults>

- National Institutes of Health. (2015). Hearing aids. National Institute on Deafness and Other Communication Disorders. NIH Pub. No. 99-4340.
Retrieved from https://www.nidcd.nih.gov/health/hearing-aids#hearingaid_01
- National Institutes of Health. (2016). Cochlear Implants. National Institute on Deafness and Other Communication Disorders. NIH Publication No. 00-4798.
Retrieved from <https://www.nidcd.nih.gov/health/cochlear-implants>
- Neisser, A. (1983). *The other side of silence: Sign language and the deaf community in America*. Washington, DC: Gallaudet University Press.
- Neuhauser, L., Ivey, S. L., Huang, D., Engelman, A., Tseng, W., Dahrouge, D.,...Kealey, M. (2013). Availability and readability of emergency preparedness materials for Deaf and hard-of-hearing and older adult populations: Issues and assessments. *PLOS ONE*, 9(2), 1-11. Doi: 10.1371/journal.pone.0055614
- Nicholls, G., & Ling, D. (1982). Cued speech and the reception of spoken language. *Journal of Speech and Hearing Research*, 25(2), 262–269. Retrieved from <https://www.ncbi.nlm.nih.gov/pubmed/7120965>
- Nielsen-Bohlman, L., Panzer, A. M., & Kindig, D. A. (Eds). (2004). *Health literacy: A prescription to end confusion*. Institute of Medicine Committee on Health Literacy. Washington, DC: The National Academies Press. Retrieved from <https://doi.org/10.17226/10883>.
- Nunnally, J. O. (1978). *Psychometric theory*. New York, NY: McGraw-Hill.

- Padden, C. (1980). The Deaf community and the culture of deaf people. In C. Baker & R. Battison (Eds.), *Sign language and the Deaf community: Essays in honor of William C. Stokoe*. Silver Spring, MD: National Association of the Deaf.
- Padden, C. & Humphries, T. (1988). *Deaf in American: Voices from a culture*. Cambridge, MA: Harvard University Press.
- Padden, C., & Humphries, T. (2005). *Inside Deaf culture*. Cambridge, MA: Harvard University Press.
- Pagano, M. P., O'Shea, E. R., Campbell, S. H., Currie, L. M., Chamberlin, E., & Pates, C. A. (2015). Validating the Health Communication Assessment Tool (HCAT). *Clinical Simulation in Nursing*, 11(9), 402-410. doi: 10.1016/j.ecns.2015.06.001
- Pallant, J. (2013). *SPSS survival manual: A step by step guide to data analysis using IBM SPSS* (5th ed.). London, UK: McGraw-Hill.
- Pandhi, N., Schumacher, J. R., Barnett, S., & Smith, M. A. (2011). Hearing loss and older adults' perceptions of access to care. *Journal of Community Health*, 36(5), 748-755. doi: 10.1007/s10900-011-9369-3
- Parker R., & Ratzan, S.C. (2010). Health literacy: A second decade of distinction for Americans, *Journal of Health Communication*, 15(Suppl 2), 20-33. doi: 10.1080/10810730.2010.501094

Patient Protection and Affordable Care Act, 81 FR § 31375 et seq. (2010). Retrieved from <https://www.federalregister.gov/documents/2016/05/18/2016-11458/nondiscrimination-in-health-programs-and-activities>

Pedhazur, E. J., & Schmelkin, L. P. (1991). *Measurement, design, and analysis: An integrated approach*. Hillsdale, NJ: Lawrence Erlbaum Associates, Inc.

Pendergrass, K. M., Nemeth, L., Newman, S. D., Jenkins, C. M., & Jones, E. G. (2017a). Nurse practitioner perceptions of barriers and facilitators in providing health care for deaf American Sign Language users: A qualitative socio-ecological approach. *Journal of the American Association of Nurse Practitioners*, 29, 316-323. doi: 10.1002/2327-699924.12461

Pendergrass, K. M., Newman, S. D., Jones, E., & Jenkins, C. H. (2017b). Deaf: A concept analysis from a cultural perspective using the Wilson method of concept analysis development. *Clinical Nursing Research* [Epub ahead of print]. doi: 10.1177/1054773817719821.

Pereira, P. C., & Fortes, P. A. (2010). Communication and information barriers to health assistance for deaf patients. *American Annals of the Deaf*, 55(1), 31-37. doi:10.1353/aad.0.0128

Pierce, J. R. (1980). *An introduction to information theory: Symbols, signals and noise* (2nd ed.). New York, NY: Dover Publications.

- Polit, D. F., & Beck, C. T. (2006). The content validity index: Are you sure you know what's being reported? Critique and recommendations. *Research in Nursing & Health*, 29, 489-497. doi: 10.1002/nur.20147
- Polit, D. F., & Beck, C. T. (2012). Qualitative data analysis. In D. F. Polit & C. T. Beck (Eds.), *Nursing research: Generating and assessing evidence for nursing practice* (9th ed.) (pp. 556-581). Philadelphia, PA: Lippincott Williams & Wilkins.
- Preminger, J. E., Oxenbøll, Barnett, M. B., Jensen, L. D., & Laplante-Levesque, A. (2015). Perceptions of adults with hearing impairment regarding the promotion of trust in hearing healthcare service delivery. *International Journal of Audiology*, 54, 20-28. doi: 10.3109/14992027.2014.939776
- Press Ganey. (2012). The rising tide measure: Communication with nurses. White paper. Retrieved from <http://www.pressganey.com/resources/white-papers/the-rising-tide-measure-communication-with-nurses-white-paper>
- Registry of Interpreters for the Deaf. (2017a). Certified Deaf interpreter. Retrieved from <http://www.rid.org/rid-certification-overview/cdi-certification/>
- Registry of Interpreters for the Deaf. (2017b). National interpreter certification. Retrieved from <http://www.rid.org/rid-certification-overview/nic-certification/>
- Registry of Interpreters for the Deaf (2017c). About RID. Retrieved from <http://www.rid.org/about-rid/>

Rehabilitation Act of 1973, Pub. L. No. 93-112, 87 Stat. 394 codified at 29

U.S.C. § 701 et seq. (1973). Retrieved from

<https://www.gpo.gov/fdsys/pkg/STATUTE-87/pdf/STATUTE-87-Pg355.pdf>

Reise, S. P., Walker, N. G., & Comrey, A. L. (2000). Factor analysis and scale revision.

Psychological Assessment 12(3), 287-297. doi: 10.1037//1040-3590.12.3.287

Richardson, K. J. (2014). Deaf culture: Competencies and best practices. *The Nurse*

Practitioner, 39(5), 20-28. Retrieved from

<http://www.nursingcenter.com/cearticle?an=00006205-201405000-00006>

Rothwell, J. D. (2016). *In the company of others: An introduction to communication* (5th

ed.). New York: Oxford University Press.

Rudd, R. (2010). Improving Americans' health literacy. *New England Journal of*

Medicine, 363(24), 2283-85. doi: 10.1056/NEJMp1008755

Ruesch, A. L. (2018). Exploring and educational assessment tool to measure registered

nurses' knowledge of hearing impairment and effective communication strategies:

A USA study. *Nurse Education in Practice*, 28, 144-149. doi:

10.1016/j.nepr.2017.10.017

Rutherford-Hemming, T. (2015). Determining content validity and reporting a content

validity index for simulation scenarios. *Nursing Education Perspectives*, 36(6),

389-393. doi: 10.5480/15-1640

- Sacks, L., Nakaji, M., Harry, K. M., Oen, M., Malcarne, V. L., & Sadler, G. R. (2013). Testicular cancer knowledge among deaf and hearing men. *Journal of Cancer Education, 28*, 503-508. doi: 10.1007/s13187-013-0493-x
- Sathyanarayana Rao, T. S., Asha, M. R., Jagannatha Rao, K. S., & Vasudevaraju, P. (2009). The biochemistry of belief. *Indian Journal of Psychiatry, 51*(4), 239-241. doi: 10.4103/0019-5545.58285
- San, E. O. (2015). Using clinical simulation to enhance culturally competent nursing care: A review of the literature. *Clinical Simulation in Nursing, 11*, 228-243. doi: 10.1016/j.ecns.2015.01.004
- Schein, J. D. (1989). *At home among strangers*. Washington, DC: Gallaudet University Press.
- Schenker, Y., Pérez-Stable, E. J., Nickleach, D., & Karliner, L. S. (2011). Patterns of interpreter use for hospitalized patients with limited English proficiency. *Journal of General Internal Medicine, 26*(7), 712-717. doi: 10.1007/s11606-010-1619-z
- Schwab, D.P. (1980). Construct validity in organization behavior. In B.M. Staw & L.L. Cummings (Eds.) *Research in organizational behavior (Vol. 2, 3-43)*. Greenwich, CT: JAI Press.
- Schwitzgebel, E. (2015). Belief. In N. Zalta (Ed.), *The Stanford encyclopedia of philosophy*. Retrieved from <https://plato.stanford.edu/archives/sum2015/entries/belief/>

- Shannon, C. E., & Weaver, W. (1949). *A mathematical model of communication*. Urbana, IL: University of Illinois Press.
- Sheppard, K. (2014). Deaf adults and health care: Giving voice to their stories. *Journal of the American Association of Nurse Practitioners*, 26(9), 504-510.
doi:10.1002/2327-6924.12087
- Shin, J. H. (2009). Application of repeated-measures analysis of variance and hierarchical linear model in nursing research. *Nursing Research*, 58(3), 211-217.
doi: 10.1097/NNR.0b013e318199b5ae
- Singleton, J., & Tittle, M. (2000). Deaf parents and their hearing children. *Journal of Deaf Studies and Deaf Education*, 5(3), 221-236. Retrieved from
<https://doi.org/10.1093/deafed/5.3.221>
- Sirch, L., Salvador, L., & Palese, A. (2016). Communication difficulties experienced by deaf male patients during their in-hospital stay: Findings from a qualitative descriptive study. *Scandinavian Journal of Caring Sciences*, 31, 368–377. doi: 10.1111/scs.12356
- Skøt, L., Jeppsen, T., Mellentin, A. I., & Elklit, A. (2017). Accessibility of medical and psychosocial services following disasters and other traumatic events: Experiences of Deaf and hard-of-hearing individuals in Denmark. *Disability and Rehabilitation*, 39(24), 2468-2476. doi: 10.1080/09638288.2016.1236154

- Smeltzer, S. C., Avery, C., & Haynor, P. (2012). Interactions of people with disabilities and nursing staff during hospitalization. *American Journal of Nursing*, 112(4), 30-37. doi: 10.1097/01.NAJ.0000413454.07369.e3
- Smith, T. B. (1996). Deaf people in context: Interpreting, discourse, American Sign Language. *Dissertation Abstracts International*, 57, 12A. (UMI No. 9716924).
- Smith, M. B. (2013). *More than meets the eye: Revealing the complexities of an interpreted education*. Washington, DC: Gallaudet University Press.
- Smith S. R., & Chin, N. P. (2012). Social determinants of health in deaf communities. In J. Maddock (Ed.), *Public health: Social and behavioral health* (pp. 449-460). InTech, doi: 10.5772/38036. Retrieved from <http://www.intechopen.com/books/public-health-social-and-behavioral-health/social-determinants-of-health-disparities-deaf-communities>
- Spradley, T. S., & Spradley, J. P. (1985). *Deaf like me*. Washington, D.C: Gallaudet College Press.
- Statistical Package for the Social Sciences (Version 25) [Computer software]. Armonk, NY: IBM Corporation.
- Steinberg, A. G., Wiggins, E. A., Barmada, C. H., & Sullivan, V. J. (2002). Deaf women: Experiences and perceptions of healthcare system access. *Journal of Women's Health*, 11(8), 729-741. Retrieved from <https://www.ncbi.nlm.nih.gov/pubmed/12570039>

- Stenling, A., Ivarsson, A., Johnson, U., & Lindwall, M. (2015). Bayesian structural equation modeling in sport and exercise psychology. *Journal of Sport and Exercise Psychology*, 37(4), 410-420. doi: 10.1123/jsep.2014-0330.
- Stevens, J. (2001). *Applied multivariate statistics for the social sciences* (4th ed.). Hillsdale, NJ: Lawrence Erlbaum Associates.
- Stevens, S. S. (1968). Measurement, statistics, and the schemapiric view. *Science*, 161(3844), 849-856. Retrieved from <http://science.sciencemag.org/content/161/3844/849>
- Stokols, D. (2000). Social ecology and behavioral medicine: Implications for training, practice, and policy. *Behavioral Medicine*, 26(3). 129-138. doi: 10.1080/08964280009595760
- Tabachnick, B., & Fidell, L. (2013). *Using multivariate statistics* (6th ed.). Boston, MA: Pearson.
- The Joint Commission (2010). Advancing effective communication, cultural competence, and patient- and family-centered care: A roadmap for hospitals. Oakbrook Terrace, IL: The Joint Commission. Retrieved from <https://www.jointcommission.org/assets/1/6/ARoadmapforHospitalsfinalversion727.pdf>

- Thew, D., Smith, S. R., Chang, C., & Starr, M. (2012). The deaf strong hospital program: A model of diversity and inclusion training for first-year medical students. *Academic Medicine*, 87, 1496-1500. doi: 10.1097/ACM.0b013e31826d322d
- Thompson, R., Emmorey, K., & Kluender, R. (2006). The relationship between eye gaze and agreement in American Sign Language: An eye-tracking study. *Natural Language and Linguistic Theory*, 24, 571–604. doi: 10.1007/s11049-005-1829-y
- Traxler C. (2000). Measuring up to performance standards in reading and mathematics: Achievement of selected Deaf and hard-of-hearing students in the national norming of the 9th Edition Stanford Achievement Test. *Journal of Deaf Studies and Deaf Education*, 5(4), 337-348. doi: 10.1093/deafed/5.4.337
- Tullett, A. M., Prentice, M. S., Teper, R., Nash, K. A., Inzlicht, M., & McGregor, I. (2013). Neural and motivational mechanics of meaning and threat. In K. D. Markman, T. Proulx, & M. J. Lindberg (Eds.), *The psychology of meaning* (pp. 401-419). Washington, DC: American Psychological Association.
- U. S. Assistive Technology Act of 1998, Pub. L. No. 108-364, 118 Stat. 1707, 29 U.S.C. § 3001. Retrieved from <https://www.gpo.gov/fdsys/pkg/PLAW-108publ364/html/PLAW-108publ364.htm>
- U. S. Census Bureau (2015). Detailed languages spoken at home and ability to speak English for the population 5 years and over: 2009-2013. American Community Survey 2009-2013. Retrieved from <http://www.census.gov>

U. S. Department of Health and Human Services. (2012). Toolkit for Making Written Material Clear and Effective. Centers for Medicare and Medicaid Services.

Retrieved from <https://www.cms.gov/Outreach-and>

[Education/Outreach/WrittenMaterialsToolkit](https://www.cms.gov/Outreach-and)

U. S. Department of Justice. (2003). ADA Business brief: Communicating with people who are deaf or hard of hearing in hospital settings. Civil Rights Division

Disability Rights Section. Retrieved from <https://www.ada.gov/hospcombr.htm>

Uysal, A., Bağdat, A., Koçulu, B., Kan, F. & Aydın, T. (2014). Attitudes of nursing students toward people with disabilities. *Nurse Education Today*, 34, 878-884.

Retrieved from <http://dx.doi.org/10.1016/j.nedt.2013.09.001>

Van Cleve, J. V. (Ed.) (1987). *Gallaudet encyclopedia of deaf people and deafness*. New York, NY: McGraw-Hill.

Vaupel, P., Schaible, H., & Mutschler, E. (2015). *Anatomie, physiologie, pathophysiologie des menschen* (7th ed.). Stuttgart, Germany: Wissenschaftliche Verlagsgesellschaft.

Velonaki, V. S., Kampouroglou, G., Velonaki, M., Dimakopoulou, K., Sourtzi, P., & Kalokerinou, A. (2015). Nurses' knowledge, attitudes and behavior toward Deaf patients. *Disability and Health Journal*, 8, 109-117. Retrieved from <http://dx.doi.org/10.1016/j.dhjo.201.08.005>

- Waltz, C. F., Strickland, O. L., & Lenz, E. R. (2017). *Measurement in nursing and health research* (5th ed.). New York, NY: Springer.
- West, R., & Turner, L. (2014). *Introducing communication theory: Analysis and application* (5th ed.). New York, NY: McGraw Hill.
- Wicks, M. N., Rice, M. C., & Talley, C. H. (2007). Further explorations of family health within the context of chronic obstructive pulmonary disease. In C. L. Sieloff & M. A. Frey (Eds.), *Middle-range theory development using King's conceptual system* (pp. 215-236). New York: Springer.
- Widner-Kolberg, M. (2014). Hard of hearing is not deaf. *The American Journal of Nursing*, 114(2), 11. doi: 10.1097/01.NAJ.0000443750.46453.ea
- Willis, D. S. & Thurston, M. (2015). Working with the disabled patient: Exploring student nurses views for curriculum development using a swot analysis. *Nursing Education Today*, 35, 383-387. doi: 10.1016/j.nedt.2014.10.013
- World Federation of the Deaf. (2016). *Deaf culture*. Retrieved from <https://wfdeaf.org/our-work/focus-areas/deaf-culture>
- World Health Organization. (2001). International Classification of Functioning, Disability and Health, WHO, Geneva. Retrieved from <http://www.who.int/classifications/icf/en/>
- Wyer, R.S., & Albarracín, D. (2005). Belief formation, organization, and change: Cognitive and motivational influences. In D. Albarracín, B. T. Johnson, & M. P.

- Zanna (Eds.), *The handbook of attitudes* (pp. 273-322). Mahwah, NJ: Lawrence Erlbaum Associates.
- Young, A., & Hunt, R., (2011). *Research with d/Deaf people*. National Institutes for Health Research School for Social Care Research Methods Review. Retrieved from http://eprints.lse.ac.uk/41800/1/SSCR_Methods_Review_9_web.pdf
- Yuskel, C., & Unver, V. (2016). Use of simulated patient method to teach communication with Deaf patients in the emergency department. *Clinical Simulation in Learning*, 12(7), 281-289.
doi: <http://dx.doi.org/10.1016/j.ecns.2016.03.007>
- Zazove, P., Meador, H. E., Reed, B. D., & Gorenflo, D. W. (2013). Deaf persons' English reading levels and associations with epidemiological, educational, and cultural factors. *Journal of Health Communication*, 18(7), 760-772. doi: 10.1080/10810730.2012.743633

APPENDIX A

Nurse – DdHH – Interpreter Model of Transaction

Appendix A

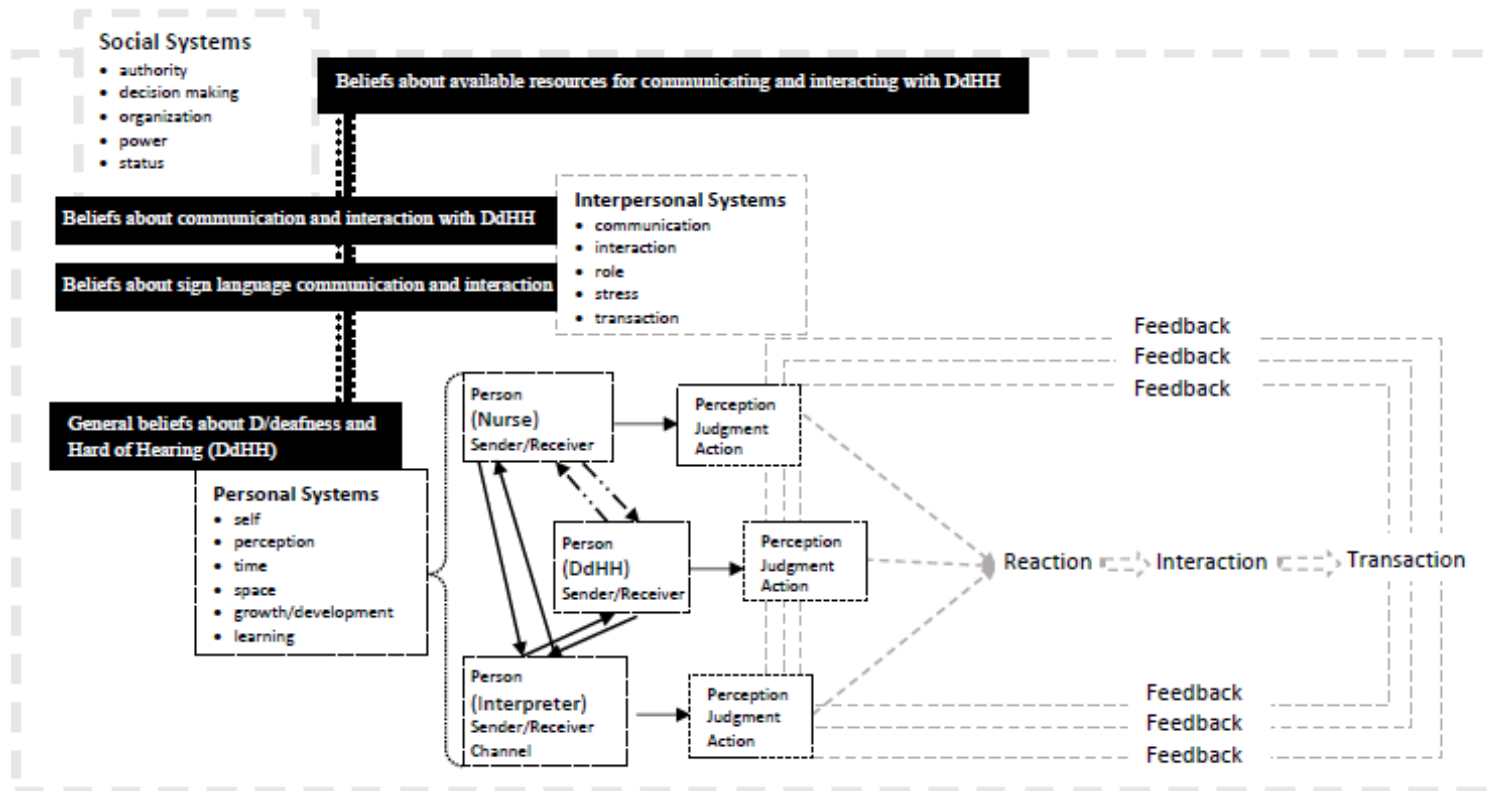


Figure 1. Nurse – DdHH – Interpreter model of transaction. Adapted from “Dynamic interacting systems.” by I. King, 1981, *A theory for nursing: Systems, concepts, process*, p. 11. New York, NY: Delmar and “A process of human interactions that lead to transactions: A model of transaction.” by I. King, 1981, *A theory for nursing: Systems, concepts, process*, p. 61. New York, NY: Delmar.

Appendix A1

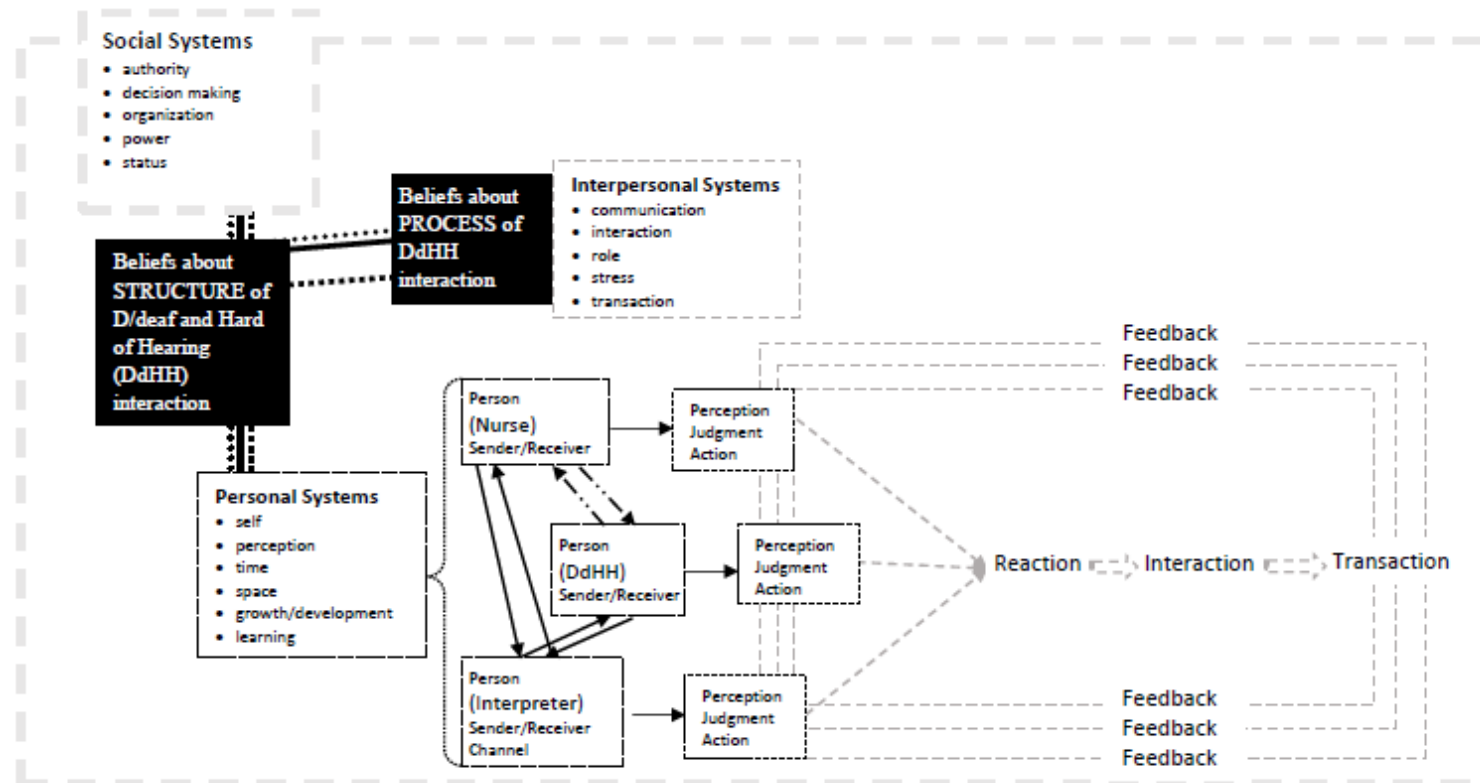


Figure 11. Revised Nurse – DdHH – Interpreter model of transaction. Adapted from “Dynamic interacting systems.” by I. King, 1981, *A theory for nursing: Systems, concepts, process*, p. 11. New York, NY: Delmar and “A process of human interactions that lead to transactions: A model of transaction.” by I. King, 1981, *A theory for nursing: Systems, concepts, process*, p. 61. New York, NY: Delmar.

APPENDIX B

Additional Definitions Relevant to DdHH Communication and Interaction

Appendix B

Additional Definitions Relevant to DdHH Communication and Interaction

Augmentative and alternative communication (AAC) refer to all forms of non-oral communication that are used to express ideas, wants, and needs. Augmentative AAC is used to supplement existing speech whereas, alternative AAC is used in place of speech that is nonfunctional or absent (American Speech-Language-Hearing Association [ASHA], 2017). AAC unaided communication relies on the user's body to convey messages and include facial expressions, gestures, body language, and sign language (ASHA, 2017). AAC aided communication requires the use of tools or electronic devices such as paper and pencil, picture books, communication boards, and devices that produce written or voice output (ASHA, 2017).

Cochlear Implant (CI) is a small, electronic device that consists of an external portion that sits behind the ear and a second portion that is surgically implanted under the skin. CIs may give a person that is deaf or hard of hearing a representation of sounds in the environment and/or help him or her to understand speech. CI implants do not restore “normal” hearing and not all deaf and hard of hearing people are eligible for this device (National Institutes of Health [NIH], 2016).

Conceptually Accurate Signed English (CASE) or Pidgin Signed English (PSE) are similar communication methods in which a combination of signs based on ASL or Manually Coded English (MCE) are used. However, CASE and PSE are not the same. MCE is not used with CASE. CASE uses ASL concepts in English word order and involves more English mouth movements than PSE (S. Sheppard, personal

communication, February 22, 2018). Fingerspelling is often used with CASE to spell out words that do not have a sign such as proper names or people and places (Centers for Disease Control and Prevention [CDC], 2014a).

Cued Speech is a visual mode of communication that uses handshapes and placements in combination with the mouth movements of speech to make the distinct units of a spoken language look different from each other (National Cued Speech Association, 2017).

Fingerspelling is a manual form of communication which hand shapes are used to represent the letters in the alphabet and spell out words. Fingerspelling is primarily used with ASL and other modes of communication such as CASE, MCE, and TC (CDC, 2014b).

Hearing aids are small electronic devices with three basic parts: a microphone, amplifier, and speaker. The hearing aid receives sound through a microphone and sends them to the amplifier which then sends them to the ear through a speaker (NIH, 2015).

Manually Coded English (MCE) is made up of signs that are a visual code for spoken English. MCE borrows many hand shapes and hand motions from ASL, but unlike ASL, the grammar, word order, and sentence structure of MCE are similar to the English language (CDC, 2014a). Also, MCE is based on word composition, rather than conceptual meaning of the word. For example, the word Butterfly is signed as butter + airplane and these differences often cause frustration for members of the Deaf community (S. Sheppard, personal communication, February 22, 2018). The best-known forms of MCE are Seeing Essential English (SEE-1) and Signed Exact English (SEE-2) (Levitan

& Moore, 2003). The goal for these systems is to represent the sound one hears as a “normal” hearing person which may be why this approach has been largely unsuccessful for individuals who have diminished hearing levels or do not hear at all (S. Sheppard, personal communication, February 22, 2018). For purposes of clarity, SEE is often referred to as the practice of using sign language that depicts English vocabulary and grammatical structure.

National Association of the Deaf (NAD) website (www.nad.org) describes the organization as the United States’ leading civil rights organization of, by and for Deaf and hard of hearing individuals. The NAD scope of advocacy covers many areas including early intervention, education, employment, health care, technology, telecommunications, youth leadership, and interpreter certification.

Office of Deaf and Hard of Hearing Services (DHHS) Board for Evaluation of Interpreters (BEI) certification program is responsible for testing and certifying the skill level of individuals seeking to become certified interpreters in Texas. The Texas Health and Human Services (www.hhs.texas.gov) website states that “the primary goal of the BEI certification program is to ensure that prospective interpreters are proficient in their ability to meaningfully and accurately comprehend, produce, and transform ASL to and from English”. To work as a BEI-certified interpreter, a person must have the skills, experience, education, and other job-related requirements of the position. The NAD endorses national recognition of the BEI certification exams. The eligibility requirements for a BEI certificate follow the general criteria set forth by the NIC and Registry of Interpreters for the Deaf (RID), and requires a passing score on the requisite examination

for the certificate level sought. Texas BEI levels include Basic, Advanced, Master, Intermediary, Oral, Court Interpreter, Medical Interpreter, and Trilingual certifications.

Registry of Interpreters for the Deaf, Inc. (RID, 2017c) is a national membership organization that plays a leading role in advocating for excellence in the delivery of interpretation and transliteration services between people who use sign language and people who use spoken language. In collaboration with NAD, RID supports and encourages growth of the interpreting profession through the establishment of national standards for practice and the NIC.

Speech reading, or lip reading, is the practice of watching the movements of a speaker's mouth and face, in an attempt to understand what the speaker is saying. Some words cannot be read and speech or lip reading is not a successful method of communication when used alone. For example, a proficient speech or lip reader might be able to decipher only 4 to 5 words in a 12-word sentence (CDC, 2014c).

Technology as defined by the United States Assistive Technology Act of 1998, refers to any assistive or adaptive "product, device, or equipment, whether acquired commercially, modified or customized, that is used to maintain, increase, or improve the functional capabilities of individuals with disabilities" (p. 118). Assistive technology service refers to "any service that directly assists an individual with a disability in the selection, acquisition, or use of an assistive technology device" (p. 118).

Total Communication (TC) a method of communication that combines both speech and sign or fingerspelling (Van Cleve, 1987). TC has also been referred to as both a philosophy of incorporating manual, oral, and aural modes of communication and

a right of deaf individuals to have access to a wide spectrum of useful forms of communication (Moore and Levitan, 2003).

Transliteration is a sign system in which the source is spoken in English and target is a visual form of English (CASE). In the context of this paper, the only actual languages are English and ASL. CASE, MCE, and SEE are all sign systems, but not languages (S. Sheppard, personal communication, February 22, 2018). In ASL, transliteration means English signing that incorporates grammatical features of ASL, and is often used for making auditory information accessible in a visual way (Humphrey & Alcorn, 2007).

Video Relay Service (VRS) enables a Deaf or hard of hearing (DdHH) sign language user to make and receive telephone calls with a non-signing, hearing person through a qualified interpreter. VRS conversations have the potential to flow smoothly, more naturally, and faster than communicating by typing. VRS is closer to ‘functionally equivalent’ telephone services for the deaf and hard of hearing than any other form of relay service (NAD, 2017c). VRS is a subsidized program funded by the Federal Communications Commission (FCC); free for all callers. However, VRS requires that both sender and receiver have video conferencing equipment or a videophones, and a high speed Internet connection (NAD, 2017c). VRS is not the same as video remote interpreting and should not be used in circumstances when caller and receiver are at the same location (FCC, 2017).

Video Remote Interpreting (VRI) uses videoconferencing technology to enable communication between a signing and non-signing party in a face to face meeting

through an off-site interpreter. The interpreter is not physically present, but is available via video. VRI is a convenient resource for parties in need of interpreter services when or where an interpreter is not available to be present on site. However, many Deaf individuals have reported that VRI is not functionally equivalent to an on-site interpreter (S. Sheppard, personal communication, February 22, 2018). Furthermore, VRI is not appropriate for every circumstance in healthcare settings due to stress, illness, medication effects, and unfamiliar environmental factors (NAD, 2017d, Richardson, 2014).

Videophone is an assistive device that allows Deaf and hard-of-hearing people to visually sign with another person in real time over the phone.

Appendix C

Measuring DdHH Interaction Competence in Nursing

Appendix C

Measuring DdHH Interaction Competence in Nursing

First Author (Year; Origin)	Primary Aim	Framework/ Design	Sample/ Setting	Data Collection	Measurement	Analyses	Key Findings	Deaf Inclusion
Adib-Hajbaghery (2014; Iran)	Investigate Iranian nursing and midwifery students' competencies in communication with patients with severe communication problems.	Cross-sectional	Senior Students 71 = nursing 22 = midwifery (n = 93)	Instrument designed through a literature review (4 articles). 5 part instrument: Demographic Knowledge questionnaire and two checklists for evaluation of skills needed for communication with patients with severe communication problems (speech and hearing).	Knowledge questionnaire; 10 multiple-choice questions, correct answers scored as "one" therefore, knowledge scores ranged between 0 and 10 9-10=high 7-8 =average 5-7=low 0-4=very low Skills assessment checklist; 15 items.	Independent samples t-test and Fisher's exact test. Content validity of knowledge questionnaire was confirmed by seven nurse instructors, one audiologist, and one speech therapist (All hearing). Reliability of knowledge questionnaire was confirmed through split-half method after administering to 20 nursing students.	None of the students had a high level of knowledge and skills in communication with patients with deafness. More than 90% showed a low or very low skill in communication with d/Deaf patients. The difference in knowledge and skills scores between nursing and midwifery students was not significant.	No

Section 1; 4 items; yes=2, no=0	Pearson correlation coefficient of the test halves ($r = 0.76$).	Healthcare team not prepared to care for deaf patients and lack of knowledge puts patients at risk for misdiagnosis and inappropriate treatment.
Section 2; 9 items on 4-choice Likert	Content validity of skill assessment checklists confirmed by seven nurse instructors, one audiologist, and one speech therapist (All hearing).	Lack of knowledge may be related to the content of effective communication with deaf patients in the nursing and midwifery curricula.
Section 3; communication with a simulated patient.	Reliability of skills checklist confirmed through inter-raters' reliability.	
The overall score of this checklist ranged from 0-41.	Raters included seven nurse instructors, one audiologist, and one speech therapist (All hearing).	
High (35-41)		
Average (29-34)		
Low (21-28)		
Very low (0-20).		
Choice of "I do not understand" was included in all items of the checklist if the observer was uncertain about the occurrence of a behavior –	Kappa agreement coefficient range from 0.6-1. Raters included seven nurse instructors, one	

					when film was reviewed, the appropriate option was marked	audiologist, and one speech therapist (All hearing). Cronbach's alpha coefficient was used to assess internal consistency and was 0.75 for hearing checklist.		
Adib-Hajbaghery (2015; Iran)	Investigate nursing students' knowledge of and performance of communicating with patients' hearing impairment (HI).	Cross-sectional	Senior nursing students (n = 71) Persian Sign Language	Instrument designed through a literature review (4 articles). 1. Demographic questionnaire 2. Knowledge questionnaire 3. Performance assessment checklist Two stages: Students first conducted interview with a simulated patient with hearing	Demographic questionnaire included questions about education and previous experience with patients with HI. Knowledge questionnaire; 7 multiple-choice items Checklist for assessment skills in communication with a patient with HI; 14 items	Content validity of knowledge questionnaire was confirmed by 7 nursing instructors and 1 audiologist (all hearing). Reliability confirmed through a split-half method; Pearson correlation coefficient of the test halves (r = 0.76). Content validity of performance assessment; inter-	Nursing students are lacking knowledge and skills required for effective communication with patients with HI. May be attributed to content of nursing curricula, few opportunities to care for HI patients, and inadequate role models.	No

impairment who experienced chest pain and then, answered knowledge questionnaire.	Section 1 4 items; yes=2, no=0	observer reliability method.	None of the students knew sign language.
	Section 2 8 items with 4-part Likert	Kappa agreement coefficient range from 0.6-1 for different items.	Significant correlations: Knowledge scores and performance of students in communicating with patients with HI.
	Section 3 Communication with a simulated patient	Cronbach's alpha coefficient; internal consistency of checklist 0.75 for total 0.72-0.78 for subscales.	14.1% expressed that asking the patient is the best way of receiving feedback from a patient with HI.
	Total score of the checklist ranged from 0-38.	SPSS version 11.5	
	Very good (38)	$p < 0.05$	
	Good (28-37)		
	Moderate (19-27)	Descriptive statistics; analyze data related to demographics, knowledge, and performance.	63.4% expressed that patient's relatives could be used to receive the patient's feedback.
	Weak (9-18)		
	Extremely weak (0-8)		
	Choice of "I do not understand" was included in all items of the checklist if the observer was uncertain about the occurrence of a	Kolmogorov-Smirnov test; normal distribution of data. Independent sample t-test; differences in	74.6% selected the wrong choice for the first step in dealing with

behavior – when film was reviewed, the appropriate option was marked.	knowledge and performance scores in terms of gender, academic semester; previous clinical and personal experience, and training in communication with this population.	patients with HI. 85.9% did not introduce themselves to the patient. 98.6% did not assess the severity of HI in the patient.
	Pearson correlation coefficient; association between knowledge and performance mean scores and performance subscales.	97.2% did not ask the patient about the preferred method of communication. 69% tried lip movements.
		47.9 used writing methods.
		16.9% tried to be completely face to face with the patient throughout the interview session.

Alselai (2015; Saudi Arabia)	Describe nurses' relationship with deaf and hard of hearing (D&HH) population; nurses' communication skills, preferred methods of communicating, and usage of interpretation services.	Descriptive	Nurses (n = 140) Non-random stratified sample 3 hospitals (hearing diseases, speech disorders, and ENT clinics)	3 part questionnaire: •Demographic •Nurses' communication skills in dealing with D&HH patients (6 questions) •Communication methods with D&HH patients (4 questions) •Interpretation Services (5 questions) Instrument adapted from a study seeking to enhance communication for patients using American Sign Language (Czerniejewski , 2012). It aims to describe nurse-patient relationship within D&HH population by describing	Descriptive analysis	Descriptive analysis (SPSS)	Results showed need to equip nurses with adequate deafness communication skills and the need to employ interpreter services properly to improve quality of care provided to D&HH patients. Significant findings: Less than one fourth of participants believe that communicating with D&HH patients is very critical. More than half did not know sign language, did not have instruction on communicating with deaf patients in nursing school, and did not	No
------------------------------	--	-------------	--	---	----------------------	-----------------------------	---	----

nurses' skills
in
communicating
, what
communication
methods nurses
prefer, and use
of interpreter
services by
nurses when
communicating
with this
population.

receive in-
service training
on
communicating
with D&HH
patients.

Paper and pen
was the
preferred
method of
communication
regardless of
availability of
other means of
communication.

May indicate
lack of
knowledge
regarding
English literacy
levels of deaf
patients, and
lack of training
or instruction
on effective
modes of
communication
for D&HH.

Most nurses
report that they
would use a
device to ask
the patient if
they want an

						interpreter which may indicate discomfort in communicating with deaf patients. Shortage in communication methods including specialized interpreters. Most of the nurses are unaware of the interpreter services available for D&HH patients.	
Hornáková (2013; Slovakia)	Discover whether students successfully handle professional communication with deaf patients.	None noted Descriptive	Nursing, midwifery, and emergency care students (<i>n</i> = 80)	Questionnaire survey No information on data collection method.	7 questions: 1 =yes/no 6 =4 options	No analysis method mentioned – only results.	Most respondents have communication problems with deaf patients even with theoretical training in nursing programs and professional training in hospitals. No

Various causes for communication problems were cited, but lack of interest from the patient's point of view was the most common.

Future training programs should prepare healthcare professionals for interaction, communication, and negotiation of communication barriers with deaf patients. Training should focus on required knowledge and skills that would facilitate effective communication with deaf patients.

Filho (2013; Brazil)	Know the perception of nursing students about their communication skills with people with visual and hearing disabilities.	Qualitative Exploratory Descriptive	Senior undergraduate nursing students (<i>n</i> = 30) 3 nursing schools; 1 public and 2 private Brazilian Sign Language - LIBRAS	Interview Semi-structured script “Do you feel qualified to communicate with a person who has a visual of hearing disability?”	Interview transcript	Content analysis	Three categories identified: 1. Need to learn to communicate with people with visual and hearing disabilities. 2. Personal experiences needed in communication with people with visual and hearing disabilities. 3. Skills to appropriately communicate with people with visual and hearing disabilities.	No
Ljubicic (2017; Croatia)	Examine the difficulties in communication upon a deaf person's arrival into a health institution.	Cross-sectional	Nurses (<i>n</i> = 40) 4 medical departments in 1 hospital	Paper-and-pencil questionnaire	30 item questionnaire 4 demographic questions 26 questions regarding communication	Descriptive Statistics; distribution of frequencies, measures of central tendency and dispersion of results.		No

					n 5 point Likert	Mann-Whitney U and Kruskal- Wallis tests; differences between variables		
					No information on source of items for questionnaire.	Spearman rank correlation coefficient; associations between variables		
						$p < 0.05$		
						MedCalc Statistical Software		
Lunza (2017; Namibia)	Explore the experience of registered nurses' communication with Deaf patients during health care provision	Qualitative Cross- sectional Explorative Descriptive	Nurses ($n = 10$) Purposive sampling State hospital	Interview guide (3 main questions)	Theme identification using TESCH's method	Thematic analysis	Nurses lack of sign language knowledge compromises communication with Deaf patients. Lack of sign language knowledge among people who are deaf was also cited as a barrier to effective communication.	No

Machado (2013; Brazil)	Identify how the professional staff of a university hospital interacts to care for their deaf patients considering the knowledge of Brazilian Sign Language (LIBRAS) as a principle component in caring for this population	Descriptive Exploratory Transversal quantitative	Health professionals Nurses = 11 Nursing technicians = 23 Nursing assistants = 3 (n = 37) In-patient units; University Hospital	Questionnaire with open and closed questions.	Questionnaire with open and closed questions.	Descriptive statistics; socio-demographic profiles and mastery levels of LIBRAS Content analysis 3 main axes: 1. Provide care for Deaf patients without mastery 2. Never provide care for Deaf patients 3. LIBRAS mastery	Sixteen nursing professionals reported experience with providing care for deaf patients and using the following methods of communication: 12 mime/gesturing 4 lip reading 8 writing 1 drawing 1 interpreter Nurses were insecure when interacting with deaf patients because they did not know sign language, lacked communication skills to convey information, and lacked academic training and experience to implement effective and appropriate	No
------------------------	---	---	---	---	---	--	---	----

							communication methods.	
Pendergrass (2017; United States)	Examine NP perceptions of barriers and facilitators in providing health care for deaf ASL users Address knowledge gap between perspectives of deaf ASL users and healthcare providers	Qualitative Descriptive Socio-ecological model (SEM)	Nurse practitioners (NP) (<i>n</i> = 10) Primary medical, Mental health, outpatient and inpatient, rural and urban settings	Semi-structured individual interviews via telephone	Categorization matrix - SEM	Deductive content analysis approach NVivo 10.0	Barriers identified at all levels of the SEM. NPs preferred interpreters to facilitate visit, but were unaware of role in achieving effective communication. Unaware of legal requirements. Professional interpreter considered as “last resort” and methods such as gesturing, note-writing, lip reading, and use of ad hoc interpreters were all seen as facilitators. Resources are needed to provide	No

							awareness of Deaf communication needs and legal requirements for practicing and student NPs.	
							Protocols for interpreter use and access need to be established.	
Uysal (2014; Turkey)	To investigate the attitude of Turkish nursing students towards people with disabilities and demographic variables that mostly influence this attitude.	Qualitative	Undergraduate Nursing Students N = 587 2 Nursing schools and 2 health schools 3 cities	Self-administered questionnaire	4 Part Questionnaire: (1) Demographic (2) Background on disability (3) Contact/experiences with disabled people (4) Attitudes Toward Disabled persons scale	SPSS 16 Kolmogorov-Smirnov test Mann-Whitney U-test for variables with 2 categories Kruskal-Wallis test for variables with more categories P < 0.05	Age, education, prior knowledge, and experience in caring for disabled people in family and social life were found statistically significant factors for having positive attitudes.	No Disability terminology used
Velonaki (2015; Greece)	Examine Greek nurses' knowledge, attitudes, and	Cross-sectional Correlational	Nurses (n = 198)	Self-reported Questionnaire:	Demographic = Binary and ordinal scales	Construct validity Internal consistency	Lack of relevant knowledge and education was observed.	No

practices toward Deaf people and determine the factors that influence these parameters.

2 public hospitals 2 public health centers	1. Demographic	Knowledge = Scale of 13 multiple choice questions	reliability; Cronbach's alpha.	Relevant education was found to be positively correlated with knowledge.
	2. Knowledge related to Deaf people	6 Deaf rights	Test-retest reliability of Knowledge scale; paired <i>t</i> -test	
	3. Attitudes (ATDP)	4 Deaf communication	Categorical variables; absolute and relative frequencies	Self-efficacy was found to be positively correlated with contact with Deaf people. (Participants who reported avoiding taking care of Deaf patients had a statistically significantly lower mean self-efficacy score)
	4. Self-efficacy	3 Sign language knowledge	Mean differences between variables; independent samples <i>t</i> -test and one-way ANOVA; normal distribution	
	5. Interest in education	Scores range 0-39 (wrong answer = 0, don't know = 1, right answer = 3)		No correlation was found between the contact and knowledge scores and between relevant education or contact and attitudes
		ATDP = 27-item 5-point Likert	Mann-Whitney U test and Kruskal Wallis tests; assess differences in non-normal distribution	
		Self-efficacy 4 questions 1(negative) to 4 (positive); Total score varies from 4-16	Pearson correlation coefficient and Spearman rank	
		Interest in education = 1 four choice question (analyzed as		

					positive or negative)	correlation; evaluate linear relationships between various variables and scores Chi square and Fisher's exact test; differences in distributions of categorical variables <i>p</i> -values based on two-sided hypotheses Bonferroni; correct for multiple comparisons SPSS Version 18	Majority were interested in attending a relevant education program (64.8%)	
Willis (2015; Scotland)	Explore student nurses' strength and weakness when working with people with disabilities and identify opportunities and threats to developing their knowledge and skills to meet the	Qualitative - Exploratory Descriptive	1 st year nursing students (<i>n</i> = 25) 1 nursing school	SWOT analysis after 3 hour disability session (presentation and practical exercise)	Post-it notes Discussion	Thematic analysis	Communication was viewed as both a strength and weakness and was identified as an essential skill to working effectively with disabled persons.	No Disability terminology used

	needs of this population.						Students acknowledged that clinical staff were not always experts in working with disabled persons.	
							Integration of disability into the nursing curriculum is needed.	
Yuskel (2016; Turkey)	Provide the student nurses experience of communicating with deaf patients to develop a pathway for nursing students to use during communication with deaf patients.	Qualitative – Descriptive	Senior nursing students who served as emergency department interns at a university hospital. (n = 22)	Semi-structured debriefing session. Repeating simulation 3 times improved students' learning of communication skills to provide services to deaf patients.	Debriefing after simulation experience.	Thematic analysis (Systematic text condensation method).	Seven main themes identified: 1. Patient preferences 2. Sitting position during training 3. Speech speed and content 4. Body language 5. Preparation 6. Eye contact 7. Preparing a pathway for communication with deaf patients Repetition of simulation	No Hearing students played role of Deaf patient

produced
improvement in
students'
learning of
communication
skills to provide
services to deaf
patients.

APPENDIX D

Measuring DdHH Interaction Competence in Other Health Professions

Appendix D

Measuring DdHH Interaction Competence in Other Health Professions

First Author (Year; Origin)	Primary Aim	Framework/ Design	Sample/ Settings	Data Collection	Measurement	Analyses	Deaf Inclusion
Hoang (2011;United States)	Assess Deaf cultural competency of physicians and medical students compared with that of medical student participants of a 2-year Deaf Community Training program.	Survey Control group vs. convenience sample	*DCT Medical students (n=22) Medical faculty (n=131) Non-DCT medical students (n=211) *DCT = Deaf Community Training program (A 2- year program at University of California, San Diego (UCSD) School of Medicine)	Survey questionnaire 6 multiple choice 28 true-false (plus an “I don’t know” option) Also asked respondents to list up to 5 problems they thought deaf patients may face when hospitalized Survey questions were created based on a review of the literature, project team members’ prior experience, and guidance from the	A binary coding system was used for all items 1=correct, 0=incorrect	SPSS version 14.0 Responses summed to create an overall, continuous sum score where greater scores indicated more knowledge. Analysis of variance and <i>t</i> - tests were used to analyze the Knowledge sum score Chi-square tests were used to compare responses to individual items among the three study groups.	Yes

Lapinski, (2015; United States)	Examine the effectiveness of a workshop on Deaf culture and basic medical American Sign Language (ASL) for increasing osteopathic student physicians' confidence and knowledge when interacting with ASL-using patients.	Cross-sectional Pretest/Posttest	Osteopathic Medical Students Pretest (n=33) Workshop (n=29) Posttest (n=26)	project's Deaf community advisory group. Quantitative: Self-rated confidence when interacting with Deaf patients, a basic medical ASL quiz, and a standardized patient encounter Qualitative: Student evaluation	4 point Likert scale Standardized grading sheet created for study	SPSS 18.0 $p = .05$ Paired-sampled <i>t</i> -tests Intraclass correlation coefficient Standardized patient encounter was graded separately by two investigation. Validity measured with an intraclass correlation. A two-way mixed model analysis was used. Reliability of the student evaluation was tested by having two separate researchers review evaluations and record emerging themes. A third researcher verified themes.	Yes
---------------------------------------	--	---	--	--	--	--	-----

Matthews (2011; United States)	Implement a role- reversal exercise to increase first- year pharmacy students' awareness of communication barriers in the health care setting, especially for deaf and hard- of-hearing patients.	Qualitative	First-year pharmacy students N = 65 Faculty members (small group facilitators) N = 12	Observation Student survey Faculty survey Reflective writing (students)	Debriefing Role-play exercise Consent form Panel discussion Surveys Reflective Writing Faculty Survey	Not included	Yes
Nagakura, (2015; United States)	Assess Deaf awareness training (DAT) of recent genetic counseling graduates and its impact on knowledge of deafness and Deaf culture, and attitudes toward deaf people.		Genetic counseling graduates (within 5 years) (n = 135)	Survey Questionnaire: 1. Demograph ics 2. Deaf Awareness Training (defined as graduate education on Deaf culture and language) 3. Knowledge of deafness and Deaf cultural competency items from Hoang et al. (2011) 4. Attitudes towards deaf people	Knowledge: Survey questionnaire 6 multiple choice 28 true-false (plus an "I don't know" option) Attitudes towards deafness scale (Cooper et al., 2004): 22-item 5 point Likert scale	Univariate statistics for demographics Classification into two groups: DAT/noDAT Independent <i>t</i> - tests (quantitative outcome variables) Chi-square (categorical outcome variables) SPSS version 19 $\alpha = 0.05$ Online survey program Qualtrics	No

*–Attitudes
towards
deafness
scale
Cooper et
al. (2004)*

APPENDIX E

Attitudes to Deafness Scale

Appendix E

Attitudes to Deafness Scale

Please rate each of the following on a scale of 1-6.

Scale: 1 = Strongly Disagree 2 = Disagree 3 = Somewhat Disagree
4 = Somewhat Agree 5 = Agree 6 = Strongly Agree

1. Deaf couples should receive genetic counseling to avoid having children.
2. Deaf children should learn to speak to communicate with hearing parents.
3. I would like to have deafer friends.
4. Deaf schools and deaf clubs create deaf “ghettos.”
5. Deaf people should learn speech rather than sign language.
6. Deaf people are handicapped.
7. More research should be done to find cures for deafness.
8. Deaf children should be taught in sign language.
9. Hearing children of deaf parents are at risk of emotional deprivation.
10. Deaf people are safe drivers.
11. I would like to have more deaf colleagues.
12. Deaf people should learn to lip-read.
13. Interpreters should be available for deaf people at work.
14. Deaf people should automatically receive help in their home environment.
15. All deaf people should be offered corrective surgery.
16. Training more professionals to work with deaf clients would be a waste of time
17. Having a deaf colleague would cause problems in the workplace.
18. Deaf people are physiologically impaired.
19. Deaf people should not be viewed as “impaired.
20. I would like to see more deaf people at the clubs/societies I attend.
21. Having a deaf friend would be difficult.
22. Deaf people have their own culture.

Cooper, Rose, and Mason (2004). Copyright © Gallaudet University Press.

APPENDIX F

Dimensions of DdHH Interaction

Appendix F

Dimensions of DdHH Interaction

System/Components	Characteristics	Descriptions of Characteristics
Personal Systems		
Self	Deaf vs. deaf Hard-of-hearing Disability labels	Deaf refers to individuals who were born with limited hearing or developed hearing loss before developing a spoken language and who use ASL as their primary language. Not all deaf people sign or identify with Deaf culture. Not all Deaf sign using ASL. Deaf cultural identity is formed through a sense of connectedness based on communication. Not all who experience the auditory condition of deafness identify with Deaf culture. Only people who are deaf can claim Deaf cultural identity. The Deaf community rejects the use of the term <i>hearing-impaired</i> as demeaning and the use of this term is discouraged. Deaf people refer to themselves as DEAF. Deaf culture identity is not based on level of deafness or speaking ability. One's ability to speak is irrelevant for a culturally Deaf adult. Asking about the details of one's audiological status is considered rude unless the individual offers this information.
Perception	Disability labels Visual Accessibility	Feelings of mistrust and lack of rapport with the medical establishment result in Deaf patients opting for familiar or less effective treatments because they may not understand something new.

Deaf people may compensate for lack of information access by assuming an attitude of disinterest.

Deaf people may compensate for lack of information access by filling in the information gaps with their own ideas.

Fear of misunderstanding healthcare providers, or receiving bad or incorrect information, are barriers to Deaf people seeking healthcare services unless sick.

Common reasons Deaf individuals delay seeking medical attention: negative feelings, lack of knowledge, lack of information or informed consent, inadequate accommodation consideration for appointments, and poor communication.

Deaf individuals report pervasive feelings of disempowerment and exclusion in healthcare settings.

D/deaf male hospital patients described communication experiences with feelings of vulnerability, disempowerment, and discrimination.

Although Deaf individuals recognized primary care services as being available for dementia-related concerns, respondents did not view diagnosis as a gateway to healthcare access.

A general mistrust of the effectiveness of healthcare services and support for dementia was identified and related to widespread failures in communication and the inability of both Deaf and hearing organizations to the needs of Deaf people.

Overestimating Deaf ASL users' English proficiency can lead to misunderstandings and substandard care in healthcare environments
Overconfidence in one's language abilities can be problematic when hearing HCPs attempt to communicate and interact with Deaf patients without a certified interpreter.

The decision to depend on one's own limited language skills versus hiring an interpreter is a common pitfall among HCP because it is much easier to ask questions in another language than to understand the response.

		Negative attitudes of HCPs toward individuals with diverse healthcare needs, have been related to miscommunication between patient and provider, mistrust of the healthcare system, and has been cited as the primary reason for why individuals with diverse needs do not access healthcare services. Current research specific to HCPs and Deaf ASL users has found that negative attitudes toward the Deaf among medical doctors, medical students, and genetic counselors were significantly related to a limited knowledge of Deaf culture, lack of exposure to d/Deaf patients, and little confidence in their ability to interact competently with Deaf ASL users.
Time	Orientation 3-way communication	Deaf Standard Time (DST) may simply be an excuse for being habitually late, but DST is phenomenon acknowledged by the Deaf community. DST can be traced to earlier times when Deaf people did not have access to texting or videophones and moment of face-to-face communication. ASL grammatical syntax of time, noun, adjective, and verb (TNAV) and English sentence syntax of noun, then verb; may cause misunderstanding. Nurses may view time as a barrier because of the time it takes to learn a person's communication methods. Time perceived as a barrier may be related to nurses avoiding direct communication with the patient and preferring that others communicated on behalf of patient. Nurses may view time a facilitator when successful in assisting with the basic needs of the patient by applying multiple communication strategies. Time as a facilitator may be related to nurses valuing communication and allowing extra time for interaction to become familiar with a person's ways of communicating.
Space	Proximity Eye-contact Body positioning Face-to-Face Privacy	DdHH rely on close, face-to-face communication. Native ASL signers show a preference for eye contact and expect visual attention during conversation.

	Environmental control DdHH – Nurse – Interpreter	Eye contact signals attention by the addressee in ASL. Looking away from the signer signals the desire for a conversational turn in ASL. Changes in eye gaze signal shifting roles within conversation, marking verb agreement and referencing to word expression in ASL. Even subtle changes in eyebrow configuration marks syntactic meanings such as conditional clauses and yes–no questions in ASL. In Deaf culture, it is also considered extremely rude for a speaker to cover his or her mouth when speaking. In Deaf culture, it is also considered extremely rude for a speaker to turn his or her back to the group when speaking. It is also considered rude to face an interpreter when speaking to a Deaf signers. Nurses should know to stand face forward and maintain eye contact with the DdHH person. Nurses should know that the Deaf person will be looking at the interpreter. Questions should be directed to the person being asked. Nurses should know better than to ask the interpreter, to ask the Deaf person a question. For sign language users, inclusion, visual accessibility, avoidance of visual distractions, and adequate lighting are important aspects of environmental control.
Growth/Development	D/deaf in hearing family D/deaf in hearing world Deaf schools	90% of deaf children have two hearing parents. 90% of parents with deaf children have no prior experience with deaf people or sign language and therefore, communication between parent and child is compromised. 90% of deaf children do not achieve intelligible speech despite years of intensive speech therapy.

		90% of Deaf signers were raised in speaking environments and converted to sign language later in life. Most hearing parents with a deaf child do not know sign language. It is not unusual for a hearing adult to know the medical history of his/her deaf sibling better than does that sibling. Neither is it unusual for deaf adult to have to write to a parent or a school official for information about past medical history. Sometimes there is no source of information. Language barriers within the family may result in the loss of a Deaf adult's knowledge of family history or his or her childhood health history.
Learning	Literacy/Health literacy	Few people who are deaf report fluency in English. English is a second language for many d/Deaf adults. Language proficiency often varies depending on whether a person is <i>prelingually</i> deaf, at birth or before language acquisition, or <i>postlingually</i> deaf, after language acquisition or later in life; and on a person's family dynamics and educational opportunities. The average Deaf ASL user reads English at or below a sixth grade level. Literacy levels vary widely among d/Deaf adults, regardless of whether the primary language is ASL or English. Deaf people may be 6.9 times more likely to have inadequate health literacy than hearing English speaking people. Inadequate health literacy among D/deaf adults has been associated lower health care communication and information knowledge; lower ability to participate in decision making about health care and treatment options; and lower adherence to medical instructions and recommendations.

D/deaf people are at an increased risk of a “low fund of information” which refers to the knowledge accumulated incidental information through media access and casual conversation.

Language concordance between Deaf ASL using patients and HCPs has been identified as an important determinant of whether patients will seek to understand and adhere to provider recommendations.

ASL concordant health information materials have also been associated with appropriate and timely healthcare utilization among the Deaf population.

Use of ASL appropriate materials is related Deaf patients’ improved health knowledge.

ASL accessible instruments are critical in meeting the needs of Deaf ASL users.

Nurses are at a disadvantage when expected to communicate effectively with Deaf patients in practice because ASL communication and interaction are generally not included in nursing program curricula.

Collective findings of the literature revealed that the knowledge, education, and skill required to competently care for Deaf ASL using patients and their families is lacking in nursing practice and education.

Lack of HCP’s knowledge of cultural and linguistic differences of Deaf ASL users is a barrier to effective communication.

Lack of HCP’s knowledge of cultural and linguistic differences of Deaf ASL users results in misunderstandings and negative outcomes for Deaf patients.

One fundamental misconception among HCPs is that ASL users understand general medical terms.

Many terms common in healthcare such as allergy, cholesterol, bowel, and body mass index (BMI), have little meaning for Deaf patients.

Interpersonal Systems		
Communication	American Sign Language Other methods of sign Certified Interpreters Speech Lip reading Videophones/VRI Texting	Deaf individuals often depend on friends, family members, interpreters, and technological devices to relay information from ASL to spoken language and vice versa. Not all people who are deaf know American Sign Language (ASL). Not all people who are deaf know sign. ASL is a unique visual, spatial, and gestural language. ASL is used by Deaf people in the United States and Canada. ASL is a language with its own grammatical rules and syntax with which users incorporate a fingerspelling alphabet, hand signs, body movements, and facial expressions to communicate. ASL is the primary language of Deaf culture. ASL is not English. ASL has no written form. ASL has a grammatical syntax of time, noun, adjective, and verb (TNAV). ASL has the capacity to describe physical reality and hypothetical abstractions. ASL is considered to be the most accessible language for d/Deaf people. English only offers fragmented language access because of its limited visibility when spoken and ungrammatical structure when translated verbatim to signed English. In the United States, other forms of English-based signed communication methods exist. ASL is also dynamic and signage may differ slightly depending on geographic region, education, or personal preference.

ASL is not universal.

Sign languages vary across the globe.

Some Deaf ASL users may use a combination of methods or gestures to simplify communication for hearing people.

The combination of other signing methods and/or gestures is not ASL.

Variations in sign language are important to know when requesting interpreter services for a patient whose primary method of communication is sign language.

Multiple methods may be necessary to communicate with a Deaf individual if the nurse does not know ASL and an interpreter is not readily available.

Written communication is not always the best way to exchange information, especially medical or health related information, with someone who is deaf.

Note writing in English is most appropriate for brief and uncomplicated messages.

Note writing should never be regarded as an effective method to convey detailed instructions or health information for Deaf ASL users.

Lip reading is an inadequate method of communicating with d/Deaf individuals.

The majority of English sounds are not clearly visible on the lips.

Even the most proficient lip readers understand less than 30% of verbal communication.

Speak normally and clearly, and avoid shouting and over-enunciating in the presence of a d/Deaf patient.

Poor communication has been associated with delayed preventative healthcare services.

Poor communication has been associated with inability to participate in shared decision making and informed consent.

Patients with communication differences may be three times more likely to experience a preventable adverse events than patients without such problems.

Health disparities experienced by Deaf ASL users related to communication barriers is widespread and well documented.

Deaf women in the hospital for maternity services reported inadequate interpreter services requiring note writing to communicate while in labor and delivery, and some reported experiencing mistreatment from hospital staff.

Interpersonal factors, in addition to poor communication, hindered access to health care services for d/Deaf and hard of hearing males and females.

Interpersonal factors included lack of adequate communication within the family, not being addressed directly by HCPs, and pervasive feelings of disempowerment and exclusion.

Deaf often feel frustration due to communication barriers, but their lives improve dramatically in situations in which their language is spoken, signed, or accommodated.

Interpreter services are essential for effective communication between Deaf ASL users and HCPs who are not fluent in sign language.

ASL accessible materials, utilization of certified ASL interpreters and video relay interpreting services are among multiple ways to connect with Deaf patients and to support nurse-patient communication.

Use of an interpreter is often the preferred method of communication of the majority of Deaf people.

Deaf ASL users prefer using use sign language during healthcare consultations.

50% of sign language users prefer to communicate via a sign language interpreter.

43% of Deaf ASL users prefer communicating with a signing HCP.

		Only 5% of the Deaf participants who used speech and sign to communicate said that they could manage spoken communication regarding in depth health information with HCPs who have no knowledge of Deaf cultural and linguistic differences. Video Relay Services (VRS), also known as Video Relay Interpreter (VRI) or Video Interpreter Service (VIS), offer HCPs an alternative strategy for communicating with Deaf patients. VRS, enables a deaf or hard of hearing person to make and receive telephone calls through a qualified ASL interpreter. VRS is closer to ‘functionally equivalent’ telephone services for the deaf and hard of hearing than any other form of relay service. VRS is not appropriate in every situation. For ASL users, VRS conversations have the potential to flow smoothly, more naturally, and faster than communicating by typing. VRS requires that both sender and receiver have video conferencing equipment or a videophones, and a high speed Internet connection. Challenges to VRS utilization are equipment availability, HCPs operational knowledge, and appropriate use of a virtual interpreter. In healthcare environments, it is especially important for nurses to consider the effects of illness, stress, medications, and environmental conditions – as well as patient preference, before choosing strategies to facilitate effective nurse-patient communication.
Interaction	Proximity Eye-contact Body positioning Face-to-Face DdHH patient-Nurse-Interpreter Privacy	Deaf ASL users rely on close, face-to-face communication. Native ASL signers show a preference for eye contact and expect visual attention during conversation. Eye contact signals attention by the addressee in ASL.

Looking away from the signer signals the desire for a conversational turn in ASL.

Changes in eye gaze signal shifting roles within conversation in ASL.

Changes in eye gaze marks verb agreement and reference to word expression in ASL.

Even subtle changes in eyebrow configuration marks syntactic meanings such as conditional clauses and yes–no questions in ASL.

Deaf cultural and personal touch practices differ from cultures that communicate through spoken language.

Deaf people are thought to hug more often than hearing people and there are noticeable differences between a Deaf hug and a ‘hearing hug’.

Deaf people hug when meeting and parting, they hug a wider range of people, and the Deaf hug has more body contact than the hearing hug.

A wave of the hand or a vigorous tap on the shoulder or arm is perfectly acceptable and maybe even expected when the signer wants to have the attention of someone else.

Flickering lights on and off or stopping one’s foot are acceptable attention getting methods depending on the circumstances and group size.

Flapping one’s arms in front of a Deaf person’s face or grabbing a Deaf person forcefully is similar to shouting “HELLLOOOOOO!!!!!!” directly into a hearing person’s ear and this is unnecessary and considered rude.

In Deaf culture, it is considered extremely rude for a speaker to cover his or her mouth or to turn his or her back to the group when speaking.

In Deaf culture, it is considered rude to face an interpreter when speaking to a Deaf ASL users.

Nurses should know to stand face forward and maintain eye contact with the Deaf person.

Role

DdHH patient-Nurse-Interpreter

Nurses should know that the Deaf person will be looking at the interpreter.

Questions should be directed to the person being asked.

Barriers to communication and interaction include not being addressed directly by HCPs.

ASL accessible materials, utilization of certified ASL interpreters and video relay interpreting services are among multiple ways to connect with Deaf patients and to support nurse-patient communication.

Nonprofessional interpreters may not be aware of the Health Insurance Portability and Accountability Act (HIPPA) protections and the need for confidentiality.

Professional interpreters are usually not a close personal friend, known to the Deaf individual.

Depending on a hearing child of a Deaf adult for interpreting needs is never appropriate.

Standards of professional practice require that a registered nurse assesses communication ability, health literacy, resources, and preferences of healthcare consumers to inform the interprofessional team and others.

Competencies for effective communication also require that register nurses incorporate appropriate alternative strategies for healthcare consumers with language and communication differences.

The ability to assess ASL communication needs, to access interpreter services, and to use ASL or VRS is not prevalent among HCPs.

Nurse communication plays a critical role in health care systems.

Certified Deaf Interpreter (CDI) is hard of hearing or deaf and has demonstrated knowledge and understanding of interpreting, deafness, the Deaf community, and Deaf culture.

Stress

Noise
Lights
Visibility
Environmental control

CDIs have specialized experience and training in the use of gesture, mime, props, drawings and other tools to enhance communication.

CDIs possess native or near-native fluency in ASL.

Nationally-certified interpreters have earned the National Interpreter Certification (NIC) by demonstrating professional knowledge and skills that meet or exceed the minimum professional standards necessary to perform in a broad range of interpretation and transliteration assignments.

Interpreters who have had limited training or have only passed screening tests administered by an employer are not considered certified.

Qualified healthcare interpreter is defined as an individual, who demonstrates a high level of proficiency in at least two languages and has the appropriate training, professional skills, and experience to interpret with accuracy while adhering to the National Council on Interpreting in Health Care (n.d.; NCIHC) Code of Ethics and Standards of Practice.

Examples of noise interference pertaining to nurse-patient interpersonal communication include physiological, semantic, organizational, cultural, psychological, and environmental.

Expecting a Deaf patient to read lips, especially in an unfamiliar healthcare environment, may cause emotional stress and miscommunication resulting in unnecessary harm.

Deprivation of incidental information may have lasting effects on a d/Deaf person's quality of interpersonal relationships, ability to express thoughts and feelings, and ability to handle environmental stressors.

For sign language users, inclusion, visual accessibility, avoidance of visual distractions, and adequate lighting are important aspects of environmental control.

Also, flickering lights on and off can be an acceptable substitute for knocking on the door prior to entering a room.

Transaction		Deaf individuals' quality of life improves dramatically in situations in which their language is spoken, signed, or accommodated.
Social Systems		
Authority	Medical vs. cultural view of deafness	In healthcare environments, deafness is viewed as a pathological condition; an impairment, disability, or disorder that needs correcting.
		Most Deaf adults view deafness as a natural characteristic, and feel quite capable and complete. Use of the same word (Deaf/deaf) to define both audiological ability and the socio-cultural identity of a linguistic minority continues to be a problem when identifying factors that may influence access to quality health care for Deaf ASL users. As a linguistic minority, D/deaf people are 'handicapped' by communication barriers and an inadequate level of understanding about their language and culture by the majority. Some Deaf ASL users have reported experiencing mistreatment from hospital staff. Despite federal law that mandates equal communication access for D/deaf people in healthcare settings, interpreter underutilization continues to be a problem. Underutilization of certified interpreters has occurred in situations where interpreters were available and HCPs were aware of negative implications. Research has shown that health disparities and adverse outcomes among Deaf people are related to communication barriers and the lack of knowledge and skill of providers to competently address the needs of culturally Deaf clients. In the United States, federal laws such as the Rehabilitation Act of 1973, the Americans with Disabilities Act of 1990 (ADA), and the Patient Protection and Affordable Care Act of (ACA, 2010), are meant to protect the rights of individuals to equal access and opportunity to participate in and benefit from healthcare services, and effective communication for individuals who are deaf or hard of hearing.

		The ADA applies to all public and private healthcare services including clinics, emergency room care, inpatient and outpatient services, surgery, and educational classes. Effective nurse-patient communication, underutilization of interpreters and alternative communication methods continue to be barriers in healthcare environments. Lack of nurses' knowledge regarding Deaf cultural and linguistic differences, ASL communication access, professional responsibilities and legal obligations continue to be among the communication barriers for Deaf ASL users in healthcare environments.
Decision Making	Collective Peer group importance Inclusion	Deaf adults may rely on a trusted member of the Deaf community, rather than family members, for support when seeking information and making decisions. Methods of communication should be based on patient preference. Deaf often feel frustration due to communication barriers, but their lives improve dramatically in situations in which their language is spoken, signed, or accommodated.
Organization	Deaf community Information sharing	The Deaf community includes both nonhearing and hearing individuals such as signing Deaf, family members, friends, teachers, and interpreters. The Deaf community often becomes a surrogate family because membership offers easy communication, role models to emulate, and a positive identity. Inclusion of D/deaf communities in research focused on improving healthcare access and services for this underrepresented population.
Power	Information access	Roots of disability do not lie in an inability to hear, but rather, in the lack of environmental control in a predominantly hearing society. Roots of disability do not lie in an inability to hear, but rather, in the failure of societal structure that enables the participation of D/deaf citizens. Deprivation of incidental information may have lasting effects on a D/deaf person's quality of interpersonal relationships, ability to express thoughts and feelings, and ability to handle environmental stressors.

		D/deaf people may compensate for lack of information access by assuming an attitude of disinterest or by filling in the information gaps with their own ideas.
		D/deaf individuals lack access to equitable healthcare services and health information materials.
		There is a lack in Deaf ASL user health surveillance.
		There is a need for ASL accessible materials.
		There is a need for interprofessional collaboration to facilitate dissemination of information and inclusion of d/Deaf communities.
		Despite patient preference, professional interpreters are rarely used in healthcare settings.
		HCPs often depend on ad hoc interpreters, such as family or friends, during healthcare consultations.
		One source of disconnect for the Deaf is lack of ASL accessible health information materials including printed medication instructions, disease specific prevention, screening, and treatment brochures, educational videos, and mass media announcements.
		Problems with using ad hoc interpreters include nonequivalent interpretations and misunderstandings related to unfamiliarity with medical terminology, unsolicited advice or opinions, and embarrassment when communicating about personal or sexual issues.
		Healthcare and health-related information is routinely inaccessible for d/Deaf adults.
Status	Deaf community	Acceptance into the Deaf community is based on two conditions: adoption of a cultural view of deafness and proficiency in ASL.
		Inclusion of D/deaf communities in research focused on improving healthcare access and services for this underrepresented population.

Audism is the idea that one is superior based on one's ability to hear or to behave in the manner of a hearing person.

Audism is reflected in the attitude of hearing superiority among corporate institutions and society in general.

Societal audism is based on a history of hearing people making decisions about or for d/Deaf individuals without including D/deaf individuals in the decision making process.

Examples include:

- making statements about D/deaf people
- authorizing views of D/deaf people
- describing D/deaf people
- teaching about them D/deaf people
- governing where D/deaf people they go to school

Audism is the hearing way of dominating, restructuring, and exercising authority over the deaf community. It includes such professional people as administrators of schools for deaf children and of training programs for deaf adults, interpreters, and some audiologists, speech therapists, otologists, psychologists, psychiatrists, librarians, researchers, social workers, and hearing aid specialists.

Audism can come in many forms.

Audists may be hearing or deaf.

Nurses have an obligation and responsibility to promote the health and well-being of others through knowledge, skill, advocacy, and education.

Audism has no place in nursing practice.

APPENDIX G

Pool Item Categorization According to Personal, Interpersonal, and Social Dimensions of DdHH Interaction

Appendix G

Pool Item Categorization According to Personal, Interpersonal, and Social Dimensions of DdHH Interaction

Personal Systems

Item	Description of Characteristics
1. Deaf people have their own culture.	Deaf refers to individuals who were born with limited hearing or developed hearing loss before developing a spoken language and who use ASL as their primary language.
2. Deaf cultural identity is based on American Sign Language (ASL) communication.	Deaf cultural identity is formed through a sense of connectedness based on communication.
3. All deaf people communicate with American Sign Language (ASL).	- Not all people who are deaf sign or identify with Deaf culture. - Not all Deaf sign using ASL.
4. <i>Hearing-impaired</i> is the most acceptable term when referring to a Deaf person.	The Deaf community rejects the use of the term <i>hearing-impaired</i> as demeaning and the use of this term is discouraged.
5. Most Deaf adults view deafness as a natural characteristic, and feel quite capable in managing their lives.	Most Deaf adults view deafness as a natural characteristic, and feel quite capable and complete.
6. Nurses should determine the audiological status and speaking ability of Deaf American Sign Language (ASL) user patients.	- Deaf culture identity is not based on level of deafness or speaking ability. - One's ability to speak is irrelevant for a culturally Deaf adult. - Asking about the details of one's audiological status is considered rude unless the individual offers this information.
7. Negative attitudes toward deaf people are related to limited knowledge about how to	Current research specific to HCPs and Deaf ASL users has found that negative

communicate and interact with Deaf American Sign Language (ASL) users.

attitudes toward the Deaf among medical doctors, medical students, and genetic counselors were significantly related to a limited knowledge of Deaf culture, lack of exposure to d/Deaf patients, and little confidence in their ability to interact competently with Deaf ASL users.

8. Nurses should rely on their own sign language skills versus utilizing interpreter services.

- The decision to depend on one's own limited language skills versus hiring an interpreter is a common pitfall among HCP because it is much easier to ask questions in another language than to understand the response.

9. Many Deaf people delay seeking medical treatment because they are unsure of how to arrange for interpreter services.

- Common reasons Deaf individuals delay seeking medical attention: negative feelings, lack of knowledge, lack of information or informed consent, inadequate accommodation consideration for appointments, and poor communication.

10. Most deaf people can acquire intelligible speech with years of intensive speech therapy.

- 90% of deaf children do not achieve intelligible speech despite years of intensive speech therapy.

11. Most nursing programs prepare graduates with the knowledge and skill to competently communicate and interact with Deaf American Sign Language (ASL) using patients, their family members, and ASL interpreters.

- Collective findings of the literature revealed that the knowledge, education, and skill required to competently care for Deaf ASL using patients and their families is lacking in nursing practice and education.

12. Language barriers within the family may result in the loss of a Deaf adult's knowledge of family history or his or her childhood health history.

- It is not unusual for a hearing adult to know the medical history of his/her deaf sibling better than does that sibling.
- Neither is it unusual for deaf adult to have to write to a parent or a school official for information about past medical history. Sometimes there is no source of information.

- 13. Deaf people usually have deaf children.
 - 14. Most hearing parents of deaf children are proficient in American Sign Language (ASL).
 - 15. American Sign Language (ASL) users understand general medical terms.
 - 16. English language proficiency varies depending on whether a person was born deaf or became deaf later in life.
 - 17. English language proficiency depends on a deaf person's family dynamics and educational opportunities.
 - 18. English is a second language for most Deaf American Sign Language (ASL) users.
 - 19. Health literacy affects a deaf person's ability to participate in decision making about their own healthcare.
 - 20. Health literacy affects a Deaf person's adherence to medical instructions and recommendations.
- Language barriers within the family may result in the loss of a Deaf adult's knowledge of family history or his or her childhood health history.
 - 90% of deaf children have two hearing parents.
 - Most hearing parents with a deaf child do not know sign language.
 - One fundamental misconception among HCPs is that ASL users understand general medical terms.
 - Many terms common in healthcare such as allergy, cholesterol, bowel, and body mass index (BMI), have little meaning for Deaf patients.
 - Language proficiency often varies depending on whether a person is *prelingually* deaf, at birth or before language acquisition, or *postlingually* deaf, after language acquisition or later in life; and on a person's family dynamics and educational opportunities.
 - English is a second language for many D/deaf adults.
 - Inadequate health literacy among Deaf adults has been associated lower health care communication and information knowledge; lower ability to participate in decision making about health care and treatment options; and lower adherence to medical instructions and recommendations.

21. Most deaf Americans are fluent in English.	• Few people who are deaf report fluency in English.
22. The average Deaf American Sign Language (ASL) user reads English above a sixth grade level.	• The average Deaf ASL user reads English at or below a sixth grade level.
23. Health literacy levels of Deaf American Sign Language (ASL) users are equal to those of hearing English speakers.	• Deaf people may be 6.9 times more likely to have inadequate health literacy than hearing English speaking people.

Interpersonal Systems

Item	Descriptions of Characteristics
1. Allowing time to become familiar with a person's ways of communicating is a standard of competent nursing practice.	• Time as a facilitator may be related to nurses valuing communication and allowing extra time for interaction to become familiar with a person's ways of communicating.
2. American Sign Language (ASL) and English grammar and sentence structure are the same.	• Unlike English, ASL has a grammatical syntax of time, noun, adjective, and verb (TNAV).
3. The written form of American Sign Language (ASL) is English.	• ASL has no written form.
4. American Sign Language (ASL) is a simplified form of English.	• ASL is not English. • ASL is a language with its own grammatical rules and syntax with which users incorporate a fingerspelling alphabet, hand signs, body movements, and facial expressions to communicate.
5. Facial expressions of Deaf American Sign Language (ASL) users are distracting and unnecessary.	
6. Deaf American Sign Language (ASL) users expect visual attention during conversation.	• Native ASL signers show a preference for eye contact and expect visual attention during conversation.
7. Eye contact is important in American Sign Language (ASL) communication and interaction.	• Deaf ASL users rely on close, face-to-face communication.

8. Looking away from the signer signals the desire for a conversational turn in American Sign Language (ASL).
9. Changes in eye gaze signal shifting roles within conversation, word expression, and verb agreement in American Sign Language (ASL).
10. Furrowing of the eyebrows in American Sign Language (ASL) signifies anger.
11. Subtle changes in eyebrow configuration marks meaning (such as conditional clauses or yes – no questions) in American Sign Language (ASL).
12. In Nurse – Deaf American Sign Language (ASL) user – ASL interpreter communication, nurses should stand facing towards and maintain eye contact with the Deaf patient.
13. In Nurse – Deaf American Sign Language (ASL) user – ASL interpreter communication, the nurse should stand facing towards and maintain eye contact with the professional interpreter when speaking.
14. In Nurse – DdHH - interpreter communication, nurses should
 - Native ASL signers show a preference for eye contact and expect visual attention during conversation.
 - Eye contact signals attention by the addressee in ASL.
 - Looking away from the signer signals the desire for a conversational turn in ASL.
 - Changes in eye gaze signal shifting roles within conversation, marking verb agreement and referencing to word expression in ASL.
 - Even subtle changes in eyebrow configuration marks syntactic meanings such as conditional clauses and yes–no questions in ASL.
 - Even subtle changes in eyebrow configuration marks syntactic meanings such as conditional clauses and yes–no questions in ASL.
 - Nurses should know to stand face forward and maintain eye contact with the Deaf person.
 - It is also considered rude to face an interpreter when speaking to a Deaf ASL users.
 - Questions should be directed to the person being asked.

- direct questions or responses to the Deaf person.
15. Adequate lighting is an important aspect of environmental control for DdHH individuals.
 16. Visual accessibility is an important aspect of environmental control for DdHH individuals.
 17. It is acceptable for the nurse to cover his/her mouth when talking about something that does not concern the Deaf person present.
 18. Deaf people hug more often than hearing people.
 19. Effective attention getting methods include flapping one's arms in front of a DdHH person's face or grabbing a DdHH person forcefully on the shoulder.
 20. In Nurse – Deaf signer – interpreter communication, the interpreter should stand between the nurse and the Deaf person.
 21. In Nurse – Deaf signer – interpreter communication, the nurse directs all questions or responses to the professional interpreter.
- Nurses should know better than to ask the interpreter, to ask the Deaf person a question.
 - For people with deafness and hearing loss, inclusion, visual accessibility, avoidance of visual distractions, and adequate lighting are important aspects of environmental control.
 - For people with deafness or hearing loss, inclusion, visual accessibility, avoidance of visual distractions, and adequate lighting are important aspects of environmental control.
 - In Deaf culture, it is also considered extremely rude for a speaker to cover his or her mouth when speaking.
 - Deaf people are thought to hug more often than hearing people and there are noticeable differences between a Deaf hug and a 'hearing hug'.
 - Flapping one's arms in front of a Deaf person's face or grabbing a Deaf person forcefully is similar to shouting "HELLLOOOOOOOO!!!!!!!!!!" directly into a hearing person's ear and this is unnecessary and considered rude.
 - Nurses should know to stand face forward and maintain eye contact with the Deaf person.
 - Nurses should know that the Deaf person will be looking at the interpreter.
 - Questions should be directed to the person being asked.

22. Deaf cultural and personal touch practices differ from cultures that communicate through spoken language.
23. A wave of the hand or a vigorous tap on the shoulder or arm is acceptable when the signer wants the attention of someone else.
24. Competent nurses inform other healthcare professionals and staff members of a DdHH person's communication preferences and accommodations.
25. Assessment of a person's communication preferences is a standard of competent nursing practice.
26. Hearing nurses should apply multiple methods of communication with DdHH patients.
27. Nurses should try to communicate with a D/deaf person until an interpreter is present.
28. When arranging for a qualified interpreter, it is important to know a Deaf individual's preferred sign language.
- Deaf cultural and personal touch practices differ from cultures that communicate through spoken language.
 - Deaf people hug when meeting and parting, they hug a wider range of people, and the Deaf hug has more body contact than the hearing hug.
 - A wave of the hand or a vigorous tap on the shoulder or arm is perfectly acceptable and maybe even expected when the signer wants to have the attention of someone else.
 - Standards of professional practice require that a registered nurse assesses communication ability, health literacy, resources, and preferences of healthcare consumers to inform the interprofessional team and others.
 - Multiple methods may be necessary to communicate with a Deaf individual if the nurse does not know ASL, or other forms of sign, and an interpreter is not readily available.
 - Variations in sign language are important to know when requesting interpreter services for a patient whose primary method of communication is sign language.

29. It is acceptable to use a child as an interpreter for their D/deaf parent.
 30. Interpreters who have been trained and screened by an employer are considered to be certified.
 31. American Sign Language (ASL) is the only form of sign language in the United States.
 32. Note writing is an effective method to convey detailed instructions or health information for Deaf signers and non-signing deaf.
 33. The majority of English sounds are clearly visible on the lips.
 34. Proficient lip readers can understand most of what is verbalized.
 35. Nurses should speak loudly, slowly, and over-enunciate words when speaking to a patient who is deaf.
- Depending on a hearing child of a Deaf adult for interpreting needs is never appropriate.
 - Interpreters who have had limited training or have only passed screening tests administered by an employer are not considered certified.
 - ASL is used by Deaf people in the United States and Canada.
 - In the United States, other forms of English-based signed communication methods exist.
 - ASL is also dynamic and signage may differ slightly depending on geographic region, education, or personal preference.
 - Written communication is not always the best way to exchange information, especially medical or health related information, with someone who is deaf.
 - Note writing in English is most appropriate for brief and uncomplicated messages.
 - Note writing should never be regarded as an effective method to convey detailed instructions or health information for Deaf ASL users.
 - Lip reading is an inadequate method of communicating with d/Deaf individuals.
 - The majority of English sounds are not clearly visible on the lips.
 - Even the most proficient lip readers understand less than 30% of verbal communication.
 - Speak normally and clearly, and avoid shouting and over-enunciating in the presence of a d/Deaf patient.

36. Poor communication in healthcare environments is associated with a patient's inability to participate in shared decision making and informed consent.
 - Poor communication has been associated with delayed preventative healthcare services.
 - Poor communication has been associated with inability to participate in shared decision making and informed consent.
37. Patients with communication differences are more likely to experience a preventable adverse event than patients without such problems.
 - Patients with communication differences may be three times more likely to experience a preventable adverse events than patients without such problems.
38. During healthcare interactions, most Deaf signers prefer to get by without a qualified interpreter.
 - Use of an interpreter is often the preferred method of communication of the majority of Deaf people.
 - Deaf ASL users prefer using sign language during healthcare consultations.
 - 50% of sign language users prefer to communicate via a sign language interpreter.
39. The professional interpreter is usually a close personal friend and well-known by the Deaf individual.
 - Professional interpreters are usually not a close personal friend, known to the Deaf individual.
40. Video Interpreter Services (VIS) enable a deaf or hard of hearing person to communicate through a qualified American Sign Language (ASL) interpreter.
 - Video Relay Services (VRS), also known as Video Relay Interpreter (VRI) or Video Interpreter Service (VIS), offer HCPs an alternative strategy for communicating with Deaf patients.
 - VRS, enables a deaf or hard of hearing person to make and receive telephone calls through a qualified ASL interpreter.
 - VRS is closer to 'functionally equivalent' telephone services for the deaf and hard of hearing than any other form of relay service.

- | | |
|---|---|
| <p>41. Video Interpreter Services (VIS) are appropriate for every situation when communicating with Deaf American Sign Language (ASL) user patients.</p> <p>42. Nurses should consider factors such as illness, stress, medications, and environmental conditions – as well as patient preference, when considering strategies to facilitate effective communication with Deaf American Sign Language (ASL) users.</p> <p>43. Flickering lights on and off may be an acceptable substitute for knocking on the door prior to entering a deaf person's room.</p> | <ul style="list-style-type: none"> • VRS is not appropriate in every situation.
 • In healthcare environments, it is especially important for nurses to consider the effects of illness, stress, medications, and environmental conditions – as well as patient preference, before choosing strategies to facilitate effective nurse-patient communication.
 • Also, flickering lights on and off can be an acceptable substitute for knocking on the door prior to entering a room. |
|---|---|

Social Systems

Item	Descriptions of Characteristics
1. The Americans with Disabilities Act of 1990 (ADA) is intended to protect the rights of Deaf American Sign Language (ASL) users.	• In the United States, federal laws such as the Rehabilitation Act of 1973, the Americans with Disabilities Act of 1990 (ADA), and the Patient Protection and Affordable Care Act of (ACA, 2010), are meant to protect the rights of individuals to equal access and opportunity to participate in and benefit from healthcare services, and effective communication for individuals who are deaf or hard of hearing.
2. In the United States, the Patient Protection and Affordable Care Act of (ACA, 2010) requires that a qualified interpreter be provided upon patient request.	
3. The Americans with Disabilities Act of 1990 (ADA) only applies to public health centers.	• The ADA applies to all public and private healthcare services including clinics, emergency room care, inpatient and outpatient services, surgery, and educational classes.

4. Audism is the idea that one is superior based on one's ability to hear.
 5. Audism is the hearing way of exercising authority over and making decisions for people who are deaf.
 6. In healthcare environments, deafness is viewed as a disorder that needs correcting.
 7. Family members are the best choice to interpret for a Deaf person when discussing medical and health-related information.
 8. It is the responsibility of the healthcare organization or provider to provide a qualified interpreter for a Deaf person.
- Audism is the idea that one is superior based on one's ability to hear or to behave in the manner of a hearing person.
 - Audism is the hearing way of dominating, restructuring, and exercising authority over the deaf community. It includes such professional people as administrators of schools for deaf children and of training programs for deaf adults, interpreters, and some audiologists, speech therapists, otologists, psychologists, psychiatrists, librarians, researchers, social workers, and hearing aid specialists.
 - In healthcare environments, deafness is viewed as a pathological condition; an impairment, disability, or disorder that needs correcting.
 - HCPs often depend on ad hoc interpreters, such as family or friends, during healthcare consultations.
 - Problems with using ad hoc interpreters include nonequivalent interpretations and misunderstandings related to unfamiliarity with medical terminology, unsolicited advice or opinions, and embarrassment when communicating about personal or sexual issues.
 - The Americans with Disabilities Act of 1990 (ADA) and the Patient Protection and Affordable Care Act of (ACA, 2010), mandate the provision of equal access and opportunity to participate in and benefit from healthcare services, and effective communication for individuals who are deaf or hard of hearing.

9. Most nurses know how to assess American Sign Language (ASL) communication needs, to access interpreter services, and to operate video relay services.
 10. It is a Deaf person's responsibility to provide a qualified interpreter.
 11. Health information materials in English are easy for most deaf Americans to read.
 12. My place of employment has established policies and procedures to accommodate the needs of Deaf sign language users.
- Research has shown that health disparities and adverse outcomes among Deaf people are related to communication barriers and the lack of knowledge and skill of providers to competently address the needs of culturally Deaf clients.
 - Despite federal law that mandates equal communication access for d/Deaf people in healthcare settings, interpreter underutilization continues to be a problem.
 - One source of disconnect for the Deaf is lack of ASL accessible health information materials including printed medication instructions, disease specific prevention, screening, and treatment brochures, educational videos, and mass media announcements.
 - Effective nurse-patient communication, underutilization of interpreters and alternative communication methods continue to be barriers in healthcare environments.
 - Lack of nurses' knowledge regarding Deaf cultural and linguistic differences, ASL communication access, professional responsibilities and legal obligations continue to be among the communication barriers for Deaf ASL users in healthcare environments.

APPENDIX H

Item Pool for DdHH Interaction Beliefs Scale for Registered Nurses

Appendix H

Item Pool for DdHH Interaction Belief Scale for Registered Nurses

D/deaf and Hard of Hearing Interaction Beliefs Scale for Registered Nurses
Content Expert Demographics:
You identify as: Deaf_____ deaf_____ hard of hearing_____ hearing_____ Primary method of communication: English_____ ASL_____ other form of signed communication_____ Are you proficient in ASL? Yes_____ No_____ Are you proficient in other forms of signed communication? Yes_____ No_____ If yes, please specify:_____ Are you a certified sign language interpreter? Yes_____ No_____ Are you a certified medical interpreter? Yes_____ No_____ How many years of experience do you have interpreting for DdHH in healthcare settings? _____ Please list interpreter credentials: _____ Are you a nurse? Yes_____ No_____ If yes, please answer the next three questions: List and specify credentials: _____ How many years of experience do you have working with DdHH individuals? _____ Briefly describe your experience (personal, direct patient care, research, etc....) _____ Are you a healthcare professional (other than a nurse)? Yes_____ No_____

If yes, please answer the next three questions:

List and specify credentials: _____

How many years of experience do you have working with DdHH individuals? _____

Briefly describe your experience (personal, direct patient care, research, etc....) _____

Initial Item Pool:

Instructions: Please evaluate each item based on relevance, sufficiency, and clarity in representing beliefs that nurses' should have to facilitate effective communication and interaction with DdHH patients and sign language interpreters.

1. The choice for **sufficiency** and **clarity** will be yes = Y or no = N.

- Place a **Y** in the appropriate box if item is sufficient and/or clear.
- Place an **N** in the appropriate box if the item is *NOT* sufficient and/or clear.

2. Place a mark √ in one box to rate each item for **relevance** on a scale with scores ranging as follows:

1 = not relevant, 2 = somewhat relevant, 3 = quite relevant, 4 = highly relevant

3. Please include item recommendations or suggestions in the space provided at the end of this document.

Key: **D** (Deaf) = Deaf American Sign Language (ASL) users

d (deaf) = deaf signers that use other forms of signed language and non-signing deaf

HH = hard of hearing

* (+ positive / – negative)

		Sufficient	Clear	Not Relevant	Somewhat Relevant	Quite Relevant	Highly Relevant
General beliefs about D/deafness and Hard of Hearing (DdHH): Refers to what an individual nurse accepts as actuality or truth regarding Deaf culture, deaf signers, deafness, and hearing loss. These beliefs relate to how individuals make sense of others and the environment. These beliefs may be influenced by education and experience; and can be based on fact, preference, or personal ideals.		yes = Y no = N		1	2	3	4
+	• Deaf people have their own culture.						
–	• <i>Hearing-impaired</i> is the most acceptable term to use when referring to a DdHH person.						
–	• All deaf people should wear hearing aids.						
–	• Cochlear implants enable deaf people to have normal hearing						
+	• D/deaf adults are capable of managing their lives.						
–	• Deaf sign language users are disabled.						
–	• People who have hearing loss are disabled.						
–	• Deaf people usually have deaf children.						
–	• Most deaf people can acquire intelligible speech with years of intensive speech therapy.						
–	• Parents of deaf children are usually deaf themselves.						

–	• Health information materials in English are easy for most D/deaf Americans to read.						
+	• English language proficiency varies depending on whether a person was born deaf or became deaf later in life.						
+	• Health literacy may effect a deaf person’s ability to participate in decision making about their own healthcare.						
+	• Health literacy may effect a Deaf person’s adherence to medical instructions and recommendations.						
–	• Most D/deaf Americans are fluent in English.						
–	• Deafness is a disorder that needs correcting.						
–	• Most deaf people would like to hear.						
–	• Hearing people are more intelligent than DdHH people.						
–	• Deaf people read lips better than hearing people.						
Beliefs about sign language communication and interaction (ASL and other forms of sign language): Refers to what an individual nurse accepts as actuality or truth regarding signed language communication with Deaf American Sign Language (ASL) users, deaf signers, and sign language interpreters. These beliefs relate to communication, interaction, transaction and role of the nurse in communicating with Deaf ASL users, deaf signers, and sign language interpreters.				Not Relevant	Somewhat Relevant	Quite Relevant	Highly Relevant
+	• American Sign Language (ASL) is a real language.						
–	• All deaf people learn American Sign Language (ASL).						
+	• Eye contact is important in American Sign Language (ASL) communication and interaction.						

–	• Deaf people should arrange for interpreter services before seeking medical treatment.						
–	• Deaf people should pay for sign language interpreter services.						
–	• Most hearing parents of deaf children are proficient in American Sign Language (ASL).						
–	• American Sign Language (ASL) users understand general medical terms.						
–	• American Sign Language (ASL) is a simplified form of English.						
–	• Facial expressions of Deaf American Sign Language (ASL) users are distracting and unnecessary.						
–	• Furrowing of the eyebrows has grammatical meaning in American Sign Language (ASL).						
+	• I should stand facing towards and maintain eye contact with the Deaf patient when the interpreter is present.						
–	• Interpreters should stand between the nurse and the Deaf patient.						
+	• I should direct questions or responses to the Deaf person when the interpreter is present.						
+	• Personal touch practices in Deaf culture differ from cultures that communicate through spoken language.						
–	• Family members are the best choice to interpret for a D/deaf person when discussing health-related information.						
+	• I should try to communicate with a D/deaf sign language user until an interpreter is present.						
+	• When scheduling professional interpreter services, it is important to know a D/deaf individual's preferred sign language.						
–	• I should determine the speaking ability of D/deaf sign language using patients.						

–	I should assess the hearing level of Deaf American Sign Language (ASL) user patients.						
–	I should rely on my own sign language skills versus utilizing interpreter services.						
–	During healthcare interactions, most Deaf American Sign Language (ASL) users prefer to get by without a qualified interpreter.						
–	The professional interpreter is usually a close personal friend and well-known by the Deaf individual.						
–	Accessing a certified interpreter is a waste of time.						
+	Effective communication helps to reduce the stress DdHH may experience in healthcare settings.						
Beliefs about communication and interaction with DdHH (strategies for communicating and interacting): Refers to what an individual nurse accepts as actuality or truth regarding communication and interaction with DdHH patients. These beliefs relate to communication, interaction, transaction, and the role of the nurse in communicating and interacting with DdHH patients and sign language interpreters in general.				Not Relevant	Somewhat Relevant	Quite Relevant	Highly Relevant
+	A wave of the hand or a vigorous tap on the shoulder or arm is acceptable when the signer wants the attention of someone else.						
–	Questions or responses for a DdHH person should be directed to hearing family members.						
+	Adequate lighting is an important aspect of environmental control for DdHH individuals.						
+	Visual accessibility is an important aspect of environmental control for DdHH individuals.						
+	I should minimize environmental noise when communicating with hard of hearing patients.						

–	It is acceptable for the nurse to cover his/her mouth when talking about something that does not concern the DdHH person present.						
–	Providing detailed instructions in written English is the best practice for D/deaf patient education.						
+	Hearing nurses should apply multiple methods of communication with DdHH patients.						
–	Proficient lip readers can understand most of what is verbalized.						
–	All people who are deaf will need an American Sign Language (ASL) interpreter.						
+	Video Relay Service (VRS) enables DdHH signers and hearing people to communicate over the telephone through a certified interpreter.						
+	Video Relay Service (VRS) is a free service for all callers.						
–	I should speak loudly, slowly, and over-enunciate words when speaking to a patient who is deaf.						
+	Communication impacts quality of care in healthcare environments.						
+	Video Remote Interpreting (VRI) enables a DdHH signer and hearing person to communicate face-to-face through a qualified sign language interpreter.						
–	Video Remote Interpreting Services (VRI) are appropriate for every situation when communicating with DdHH patients.						
+	Flickering lights on and off may be an acceptable substitute for knocking on the door prior to entering a deaf person's room.						
–	I should assess the speaking ability of all patients who are deaf or hard of hearing.						
+	I should allow time to become familiar with a person's ways of communicating.						

+	I should inform the team of healthcare providers and staff members of communication preferences and accommodations for DdHH patients.						
+	I should be aware that deprivation of incidental information may increase stress levels of DdHH.						
Beliefs about available resources for communicating with DdHH (education and training, organizational and community resources, organizational policies, and legal provisions): Refers to what an individual nurse accepts as actuality or truth regarding available resources for communicating with Deaf ASL users, deaf signers, non-signing deaf, and hard of hearing. These beliefs relate to the education and training, laws, organizational policies, and community resources relevant to DdHH communication and interaction in healthcare environments.				Not Relevant	Somewhat Relevant	Quite Relevant	Highly Relevant
+	My nursing program prepared me to competently interact with patients who are D/deaf.						
+	My nursing program prepared me to competently interact with patients who are hard of hearing.						
+	My nursing program prepared me to competently interact with sign language interpreters.						
+	My place of employment has established policies and procedures to accommodate the needs of DdHH.						
+	The Americans with Disabilities Act of 1990 (ADA) is intended to protect the rights of Deaf American Sign Language (ASL) users.						
–	The Americans with Disabilities Act of 1990 (ADA) only applies to public health centers.						
–	The Americans with Disabilities Act of 1990 (ADA) requires that all deaf people have interpreters present during hospitalization.						
+	I should be aware of referral resources for patients with sudden hearing loss due to illness or injury.						

+	I should be aware of DdHH networking groups on social media (e.g. Facebook).						
+	I should be aware of referral resources for parents of a child that is newly diagnosed as deaf.						
—	Providing DdHH with certified sign language interpreters causes health care providers and organizations undue financial burden.						
What other cultural norms or characteristics of DdHH communication and interaction should nurses be aware of?							

APPENDIX I

Results of Content Validity and Reliability Analyses for Initial Item Pool of D/deaf and
Hard of Hearing – Interaction Beliefs Scale for Registered Nurses

APPENDIX I

Results of Content Validity and Reliability Analyses for Initial Item Pool of D/deaf and Hard of Hearing – Interaction Beliefs Scale for Registered Nurses

Reliability Statistics					
Cronbach's Alpha			N of Items		
.943			75		
.913			58		
Content Expert Ratings					
Item	Not Relevant	Somewhat Relevant	Quite Relevant	Highly Relevant	Item Content Validity Index
1	0	1	1	4	.83
2	0	1	1	4	.83
3	1	0	4	1	.83
4	0	1	1	4	.83
5	0	0	3	3	1.00
6	1	1	2	2	.67
7	1	2	1	2	.50
8	1	1	3	1	.67
9	1	4	1	0	.17
10	2	1	1	2	.50
11	1	0	0	5	.83
12	0	1	0	5	.83
13	0	0	0	6	1.00
14	0	0	0	6	1.00
15	1	0	0	5	.83

16	2	0	0	4	.67
17	1	1	2	2	.67
18	2	0	1	3	.67
19	0	1	1	4	.83
20	0	1	0	5	.83
21	1	0	3	2	.83
22	0	0	1	5	1.00
23	0	1	0	5	.83
24	1	0	0	5	.83
25	0	1	1	4	.83
26	0	0	1	5	1.00
27	0	1	1	4	.83
28	0	0	4	2	1.00
29	0	0	4	2	1.00
30	0	0	1	5	1.00
31	0	1	1	4	.83
32	0	0	0	6	1.00
33	0	0	1	5	1.00
34	0	1	1	4	.83
35	0	1	2	3	.83
36	0	1	0	5	.83
37	3	1	2	0	.33
38	3	1	2	0	.33
39	3	1	2	0	.33
40	1	0	1	4	.83

41	1	0	1	4	.83
42	0	2	2	2	.67
43	0	0	0	6	1.00
44	0	0	2	4	1.00
45	1	0	1	4	.83
46	0	0	2	4	1.00
47	0	0	2	4	1.00
48	0	0	1	5	1.00
49	1	0	2	3	.83
50	0	2	1	3	.67
51	0	0	0	6	1.00
52	0	1	2	3	.83
53	0	1	2	3	.83
54	0	0	4	2	1.00
55	0	0	2	4	1.00
56	1	0	2	3	.83
57	0	0	0	6	1.00
58	0	0	0	6	1.00
59	0	0	2	4	1.00
60	0	1	2	3	.83
61	0	3	2	1	.50
62	0	0	1	5	1.00
63	0	0	2	4	1.00
64	0	0	1	5	1.00
65	0	0	0	6	1.00

66	0	0	0	6	1.00
67	0	0	0	6	1.00
68	0	0	1	5	1.00
69	0	0	2	4	1.00
70	2	0	0	3	.50
71	1	0	2	3	.83
72	0	1	0	5	.83
73	3	0	0	3	.50
74	0	1	0	5	.83
75	0	2	2	2	.67

	Content Validity Index	N of Items
	.827	75
	.873	58

Note. Items removed from item pool included: 5, 7, 8, 11, 18, 26, 28, 31, 37, 38, 39, 50, 53, 61, 70, 71, and 73.

APPENDIX J

D/deaf and Hard of Hearing Interaction Beliefs Scale for Registered Nurses

APPENDIX J

D/deaf and Hard of Hearing Interaction Beliefs Scale for Registered Nurses

Demographic Questionnaire:

Have you had direct patient care experience within the last 3 years?

If **no**, please stop here and do not complete the survey.

If **yes**, please continue with the survey.

1. What is your gender identity?
 - A. Male
 - B. Female
 - C. Other
2. What is your age?
_____ years
3. What is your race/ethnicity?
 - A. Native American or Alaska Native
 - B. Asian
 - C. Black or African American
 - D. Hispanic or Latino
 - E. Native Hawaiian or Other Pacific Islander
 - F. White
 - G. Multi-racial
4. What is your highest level of nursing education?
 - A. Diploma
 - B. Associates
 - C. Bachelors
 - D. Masters
 - E. Doctorate
5. How many years have you been a registered nurse?
_____ years
6. Employment Setting
 - A. Metropolitan Hospital
 - B. Rural Hospital

- C. Freestanding Health Center (Clinic/Office)
- D. Home Health
- E. Extended Care Facility
- F. Other, please specify: _____

7. Primary area of expertise

- A. Medical-Surgical
- B. Emergency
- C. Critical Care
- D. Home Health
- E. Behavioral Health
- F. Other, please specify: _____

8. Did your nursing education include communication and interaction with patients with hearing loss?

- A. Yes
- B. No

9. Has any of your continuing nursing education included communication and interaction with patients with hearing loss?

- A. Yes
- B. No

10. Please describe your **primary** experiences with hard of hearing people:

- A. None
- B. Personal
- C. Professional
- D. Academic
- E. Community
- F. Other: Please specify: _____

11. Please describe your **primary** experiences with Deaf people:

- A. None
- B. Personal
- C. Professional
- D. Academic
- E. Community
- F. Other: Please specify: _____

12. How many years of experience do you have interacting with Deaf people who use sign to communicate?

_____ years

13. How many years of experience do you have interacting with deaf or hard of hearing people who do not use sign to communicate?

_____ years

14. What is your level of signing skill?

- A. None
- B. Minimal
- C. Basic
- D. Intermediate
- E. Advanced

15. Where did you learn your signing skills?

- A. Not Applicable
- B. Family/Friends
- C. College/Community Course
- D. Online/Self-Study
- E. Other: Please specify: _____

Instructions: Please evaluate each item based on your beliefs about interacting with Deaf, deaf, and hard of hearing (DdHH) individuals. 1. Please answer each item and only provide one response for each item. 2. Place a mark √ in one box to indicate whether you agree or disagree with each item based on a scale with scores ranging as follows: 1 = strongly disagree, 2 = moderately disagree, 3 = mildly disagree, 4 = mildly agree, 5 = moderately agree, and 6 = strongly agree	Strongly Disagree	Moderately Disagree	Mildly Disagree	Mildly Agree	Moderately Agree	Strongly Agree
D/deaf and Hard of Hearing – Interaction Beliefs Scale for Registered Nurses						
	1	2	3	4	5	6
1. My nursing program prepared me to competently interact with patients who are D/deaf.						
2. <i>Hearing-impaired</i> is the most acceptable term to use when referring to a Deaf person.						
3. All deaf people should wear hearing aids.						
4. Providing DdHH with certified sign language interpreters causes health care providers and organizations undue financial burden.						
5. Deaf sign language users are disabled.						
6. English language proficiency varies depending on whether a person was born deaf or became deaf later in life.						
7. Most hearing parents of deaf children are proficient in American Sign Language (ASL).						
8. Health literacy may effect a Deaf person's adherence to medical instructions and recommendations.						
9. English is often a second language for Deaf American Sign Language users.						

10. My nursing program prepared me to competently interact with sign language interpreters.						
11. I should direct questions or responses to the Deaf person when the interpreter is present.						
12. Deaf people read lips better than hearing people.						
13. American Sign Language (ASL) is a real language.						
14. It is acceptable for the nurse to cover his/her mouth when talking about something that does not concern the DdHH person present.						
15. Eye contact is important in American Sign Language (ASL) communication and interaction.						
16. Deaf people should arrange for interpreter services before seeking medical treatment.						
17. Visual accessibility is an important aspect of environmental control for DdHH individuals.						
18. Health literacy may effect a deaf person's ability to participate in decision making about their own healthcare.						
19. American Sign Language (ASL) is a signed form of English.						
20. I should be aware of referral resources for parents of a child that is newly diagnosed as deaf.						
21. Furrowing of the eyebrows has grammatical meaning in American Sign Language (ASL).						
22. I should stand facing towards and maintain eye contact with the Deaf patient when the interpreter is present.						
23. Most deaf people would like to hear.						
24. Cochlear implants enable all deaf people to have functional hearing.						
25. Family members are the best choice to interpret for a D/deaf person when discussing health-related information.						

26. I should try to communicate with a D/deaf sign language user until an interpreter is present.						
27. When scheduling professional interpreter services, it is important to know a D/deaf individual's preferred sign language.						
28. During healthcare interactions, most Deaf signers prefer to get by without a certified interpreter.						
29. The professional interpreter is usually a close personal friend and well-known by the Deaf individual.						
30. Accessing a certified interpreter is a waste of time.						
31. Personal touch practices in Deaf culture differ from cultures that communicate through spoken language.						
32. A wave of the hand or a tap on the shoulder or arm is acceptable when the signer wants the attention of someone else.						
33. Questions or responses for a DdHH person should be directed to hearing family members.						
34. Adequate lighting is an important aspect of environmental control for DdHH individuals.						
35. Deaf people should pay for interpreter services.						
36. I should minimize environmental noise when communicating with hard of hearing patients.						
37. Deafness is a disorder that needs correcting.						
38. Hearing nurses should apply multiple methods of communication with DdHH patients.						
39. I should over enunciate or exaggerate words when speaking to a DdHH patient.						
40. Proficient lip readers can understand most of what is verbalized.						

41. Video Relay Service (VRS) enables DdHH signers and hearing people to communicate over the telephone through a certified sign language interpreter.						
42. Video Relay Service (VRS) is a free service for all callers.						
43. Communication impacts quality of care in healthcare environments.						
44. Video Remote Interpreting (VRI) enables a DdHH signer and hearing person to communicate face-to-face through a certified interpreter.						
45. Effective communication helps to reduce the stress DdHH may experience in healthcare settings.						
46. Flickering lights on and off may be an acceptable substitute for knocking on the door prior to entering a deaf person's room.						
47. I should allow time to become familiar with a person's ways of communicating.						
48. I should inform the team of healthcare providers and staff members of DdHH patients' communication preferences and accommodations.						
49. I should be aware that deprivation of incidental information may increase stress levels of DdHH.						
50. Visual aids can facilitate effective communication with DdHH patients.						
51. Deaf people have their own culture.						
52. My nursing program prepared me to competently interact with patients who are hard of hearing.						
53. All deaf people learn American Sign Language (ASL).						
54. My place of employment has established policies and procedures to accommodate the needs of DdHH.						
55. The Americans with Disabilities Act of 1990 (ADA) is intended to protect the rights of individuals with diverse communication needs.						

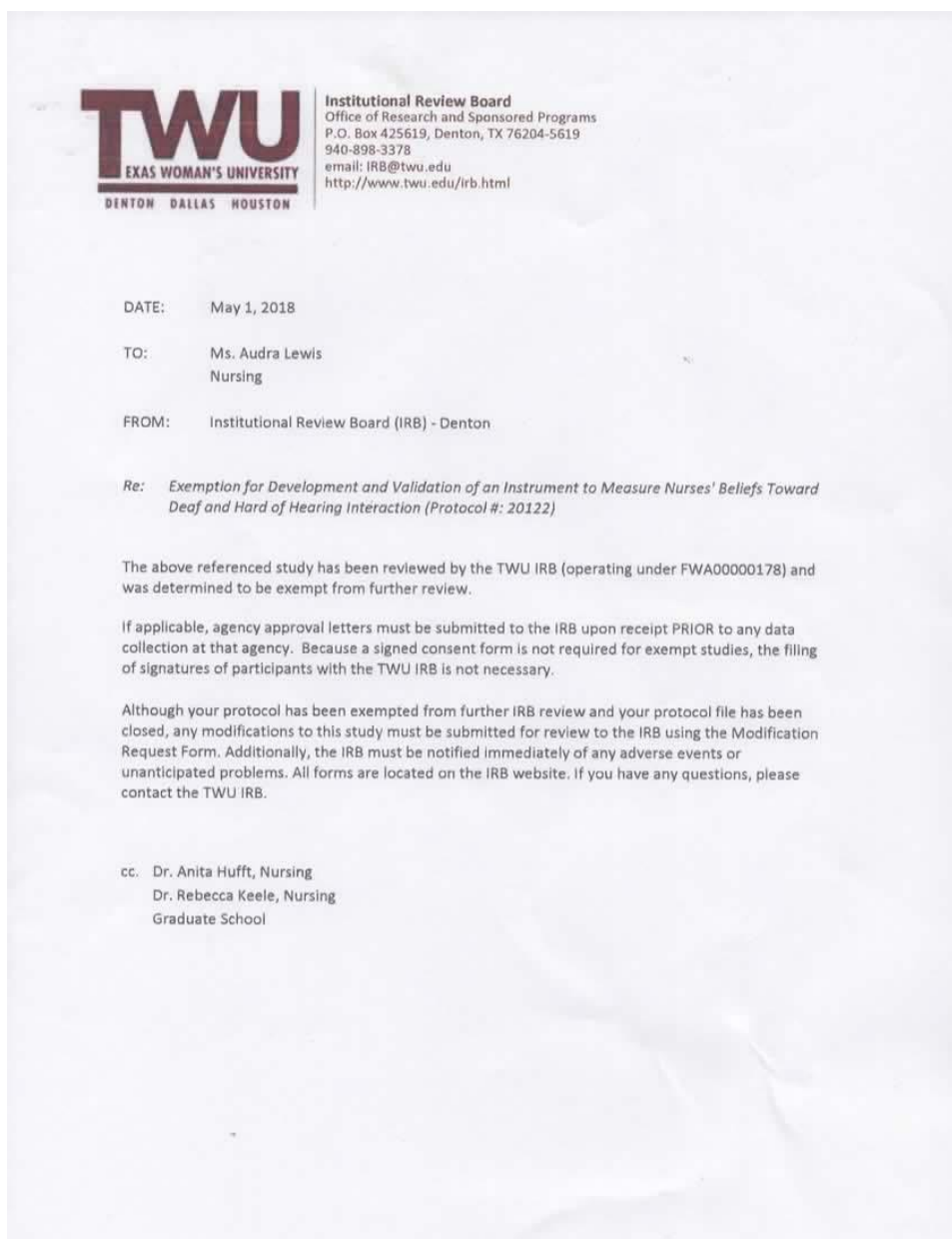
56. I should be aware of referral resources for patients with sudden hearing loss due to illness or injury.						
57. Facial expressions are part of American Sign Language (ASL) grammar.						
58. Video Remote Interpreting Services (VRI) are appropriate for every situation when communicating with Deaf patients that sign.						

APPENDIX K

Texas Woman's University Institutional Review Board Approval

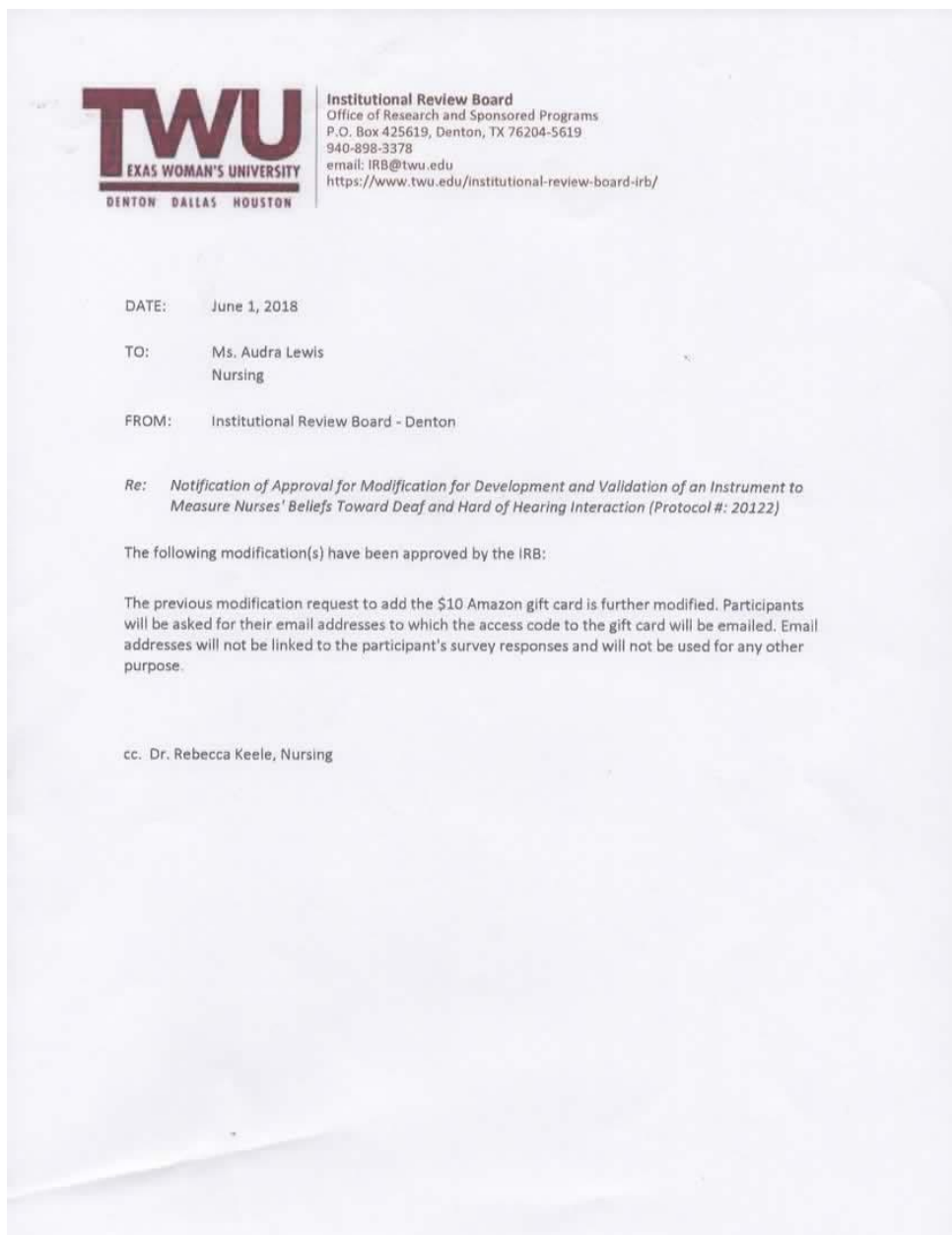
APPENDIX K

Institutional Review Board Approval



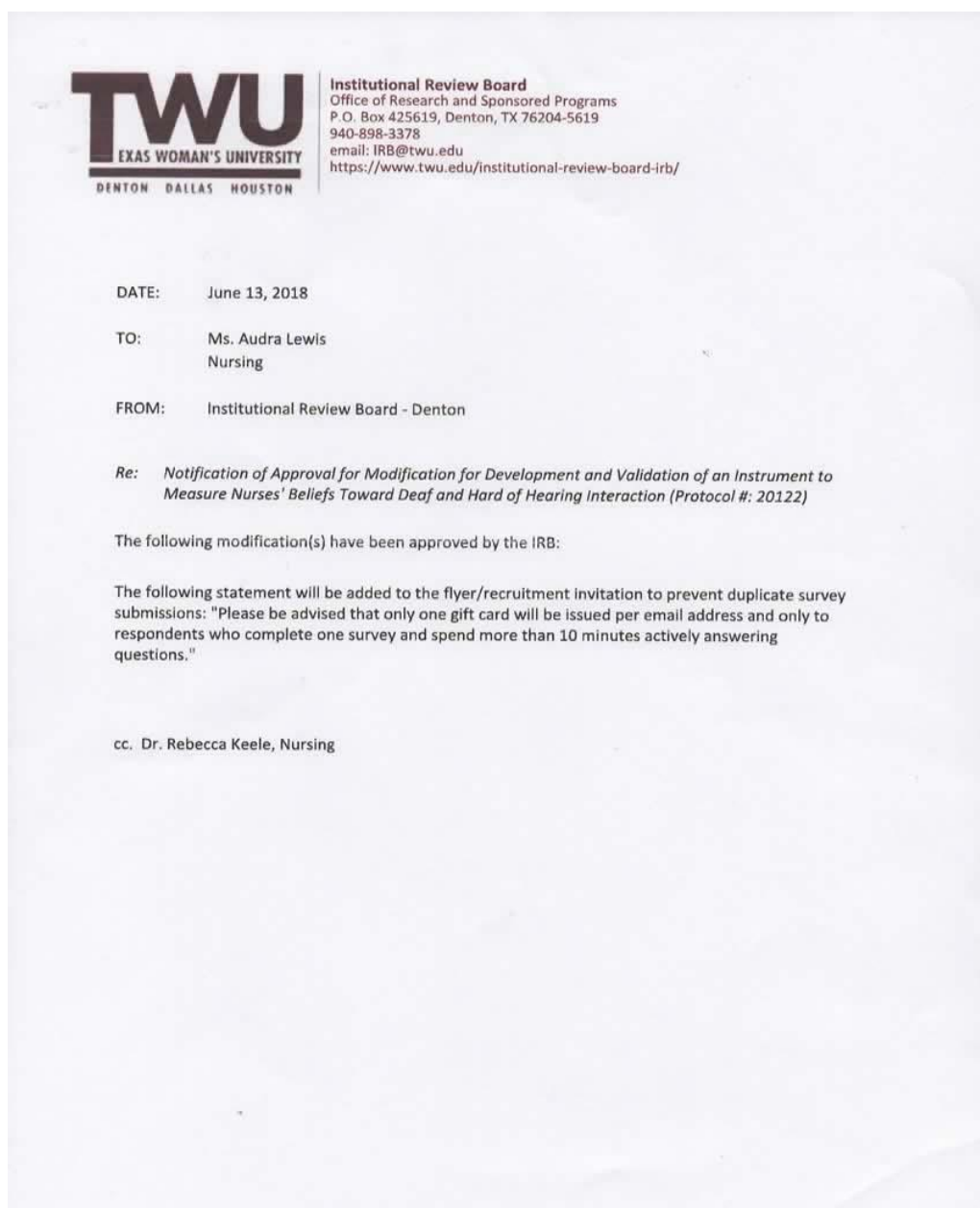
APPENDIX K1

Notification of Approval for First Modification



APPENDIX K2

Notification of Approval for Second Modification



APPENDIX K3

Notification of Approval for Third Modification



Institutional Review Board
Office of Research and Sponsored Programs
P.O. Box 425619, Denton, TX 76204-5619
940-898-3378
email: IRB@twu.edu
<https://www.twu.edu/institutional-review-board-irb/>

DATE: July 6, 2018

TO: Ms. Audra Lewis
Nursing

FROM: Institutional Review Board - Denton

Re: Notification of Approval for Modification for Development and Validation of an Instrument to Measure Nurses' Beliefs Toward Deaf and Hard of Hearing Interaction (Protocol #: 20122)

The following modification(s) have been approved by the IRB:

1. The number of items based on factor analysis has been changed to 25 instrument items and a few demographic questions have been added.
2. The incentive will decrease from \$10 to \$5 since the testing burden is reduced.
3. The first 150 respondents to submit a completed survey, who spend more than 3 minutes actively answering questions will receive the \$5 gift card incentive.

cc. Dr. Rebecca Keele, Nursing

APPENDIX L

Participant Recruitment Flyer

Attachment L

Participant Recruitment Flyer



**Nurses Beliefs Toward Deaf and Hard
of Hearing Interaction**



Nurses Needed for Research Study

Complete Survey and Receive a \$10 Amazon Gift Card!

My name is Audra Lewis and I am a doctoral student at Texas Woman's University in the College of Nursing working under the supervision of Rebecca Keele, Ph.D., PHCNS-BC. You are being asked to participate in this study because you work directly with patients. The purpose of this research is to develop an instrument to measure registered nurses' beliefs toward interaction with Deaf American Sign Language users, deaf that use other signing methods, non-signing deaf, and hard of hearing (DdHH) patients and certified interpreters.

You are being asked to complete a demographic questionnaire and the DdHH – Interaction Beliefs Scale for Registered Nurses. The scale consists of 15 demographic questions and 58 scale items and should take approximately 30 minutes to complete. No personal identifying information will be collected. Data is disconnected from identity through PsychData® and therefore, participants cannot request that data be withdrawn from the study after it is submitted. However, participation is voluntary and you may stop at any time.

Although every effort will be made to maintain your anonymity, there is a potential risk of loss of confidentiality in all email, downloading, electronic meetings and internet transactions. There is also a risk of loss of confidentiality if you chose to complete the surveys in a public setting. *Please complete surveys in a private setting to protect your confidentiality and please do not submit completed surveys more than once.*

I would greatly appreciate your assistance on this important project. If you have any questions, please feel free to contact me and/or Dr. Keele, my dissertation chair.

Sincerely,

Audra Lewis, PhD(c), RN, CHSE
ALewis19@twu.edu
817-608-6480

Rebecca Keele, PhD, PHCNS-BC
RKeele@twu.edu
940-898-2456

Please click on the link to begin the survey – by clicking on the following link, you are providing consent to participate in this study.

APPENDIX M

2018 Southern Nursing Research Society/National League for Nursing Dissertation

Research Grant Award

APPENDIX M

2018 Southern Nursing Research Society/National League for Nursing Dissertation Research Grant Award

From: Amy McGuire <amcguire@nlm.org>
Date: May 23, 2018 at 2:07:37 PM CDT
To: "audralewis@gmail.com" <audralewis@gmail.com>,
"AUDRA.LEWIS@tccd.edu" <AUDRA.LEWIS@tccd.edu>
Cc: "McNelis, Angela (angelamcnelis@email.gwu.edu)"
<angelamcnelis@email.gwu.edu>, Mary Lou Zemaitis <zemaitis@msn.com>,
"Barbara Patterson" <bpatterson@nlm.org>, Janice Brewington
<jbrewington@nlm.org>, "Crosse, Ann M." <AMCrosse@kellenccompany.com>

Subject: Selected - 2018 SNRS/NLN Dissertation Research Award (Lewis)

Dear Ms. Lewis:

It is with great pleasure that we inform you that you have been selected to receive the **2018 Southern Nursing Research Society/NLN Dissertation Research Grant Award**. Congratulations! This is a wonderful honor and you should feel very proud of yourself for your outstanding research proposal – *Development of the Nurses' Attitudes to Deaf/Hard of Hearing (DHH) Interaction Scale* - and for your work to advance the science of nursing education.

The NLN and SNRS are thrilled to present you with an award check for \$5,000. The funds will be mailed to your institution's grants office **by July 1, 2018**. We will be contacting the Grants Office Director as listed in your application. **Please let Amy McGuire know if there have been any changes to this contact.**

This year's research awards will be formally announced at the **NLN Education Summit** which will be held September 12 - 14 in Chicago, IL. Award recipients will be recognized following the CEO Summit Address, midday on **Thursday, September 13**. We hope that you are able to attend this special event to celebrate your award along with the other recipients. **Please let Ms. McGuire know if you are able to attend the award ceremony.** She will send you a unique link to allow you to register with a discounted rate.

Attached is a copy of NLN's *Doctoral Research Grant Award Guidelines* for your review. Please note that the NLN asks awardees to either submit a poster abstract for a future NLN Education Summit or prepare a brief, final report explaining the outcomes of your study.

Again, our most sincere congratulations!

Regards,

Janice Brewington, PhD, RN, FAAN

NLN Chief Program Officer

Angela M. McNelis, PhD, RN, FAAN, ANEF, CNE

Chair, NLN Research Review Panel

Amy McGuire | Administrative Coordinator, NLN Chamberlain Center | National League for Nursing |

www.nln.org |

amcguire@nlm.org | Tel: 202-909-2509 | The Watergate | 2600 Virginia Avenue NW, 8th Fl, Washington, DC



Office of Research and Sponsored Programs
P.O. Box 425619, Denton, TX 76204-5619
940-898-3375 FAX 940-898-4416

DATE: June 4, 2018

TO: Dr. Donna Scott Tilley, Vice Provost for Research
Dr. Alan Utter, Provost and Vice President for Academic Affairs

FROM: Ms. Tracy Lindsay, Director of Operations

RE: Notification of Funding for New Project (2018-086)

Principal Investigator(s): Ms. Audra Lewis & Dr. Rebecca Keele, Nursing - Denton

Funding Agency: National League for Nursing (Jointly Funded with Southern Nursing Research Society - Doctoral Research Grant Program) - Private

Project Title: Development of the Nurses' Attitudes to Deaf/Hard of Hearing (DHH) Interaction Scale

Amount Funded: \$5,000.00

Budget Period: 5/23/2018 to 6/30/2019

Project Type: Research

Account #: 19.350.10.0802.x.00700568

Description:

cc: Dr. Anita Hufft, Nursing
Dr. Damon Cottrell, Nursing - Denton
Dr. Rebecca Keele, Nursing - Denton
Ms. Audra Lewis, Nursing - Denton
Ms. Barbara Newton, Office of the Controller - Grant Accounting

ORSP: Request to Establish an Account for a New Project

PRINCIPAL INVESTIGATOR: Ms. Audra Lewis & Dr. Rebecca Keele

DEPARTMENT: Nursing - Denton

FUNDING AGENCY: National League for Nursing (Jointly Funded with Southern Nursing Research Society - Doctoral Research Grant Program) - Private

PROJECT TITLE: Development of the Nurses' Attitudes to Deaf/Hard of Hearing (DHH) Interaction Scale

AMOUNT FUNDED: \$5,000.00

BUDGET PERIOD: 5/23/2018 to 6/30/2019

PROJECT TYPE: Research

SUGGESTED ACCOUNT #: 19.350.10.0802.007xxx68

Budget Office Information	Object Code	Category	Amount
	7000	Staff Salaries	\$0.00
	7100	Faculty Salaries	\$0.00
	7200	Wages	\$0.00
	8000	Fringe Benefits	\$0.00
	8100	M&O	\$3,250.00
	8200	Travel	\$0.00
	8300	Capital	\$1,750.00
	8400	Student Support	\$0.00
	8500	Indirect Costs / F&A	\$0.00
TOTAL			\$5,000.00

If you have any questions, please contact Ms. Tracy Lindsay, Office of Research Sponsored Programs, at extension 3377.

May 31, 2018

TWU Proposal # 2018-086

APPENDIX N

Revised D/deaf and Hard of Hearing – Interaction Beliefs Scale for Registered Nurses

APPENDIX N

Revised D/deaf and Hard of Hearing – Interaction Beliefs Scale for Registered Nurses

Demographic Questionnaire:

Have you had direct patient care experience within the last 3 years?

If **no**, please stop here and do not complete the survey.

If **yes**, please continue with the survey.

1. What is your gender identity?
 - A. Male
 - B. Female
 - C. Other
2. What is your age?
3. What is your race/ethnicity?
 - A. Native American or Alaska Native
 - B. Asian
 - C. Black or African American
 - D. Hispanic or Latino
 - E. Native Hawaiian or Other Pacific Islander
 - F. White
 - G. Multi-racial

4. What is your highest level of education?
 - A. Diploma
 - B. Associates
 - C. Bachelors
 - D. Masters
 - E. Doctorate
5. How many years have you been a nurse?
6. Employment Setting
 - A. Metropolitan Area Hospital
 - B. Rural Hospital
 - C. Freestanding Health Center (Clinic/Office)
 - D. Home Health
 - E. Extended Care Facility
 - F. Other
7. Primary area of expertise
 - A. Medical/Surgical
 - B. Emergency
 - C. Critical Care
 - D. Home Health
 - E. Behavioral Health
 - F. Other
8. Did your nursing education include learning about communication and interaction with Deaf signers?
 - A. Yes
 - B. No

9. Did your nursing education include learning about communication and interaction with *non-signing* deaf and hard of hearing patients?
- A. Yes
B. No
10. Has your continuing nursing education included learning about communication and interaction with Deaf signers?
- A. Yes
B. No
11. Has your continuing nursing education included learning about communication and interaction with *non-signing* deaf and hard of hearing patients?
- A. Yes
B. No
12. How many years of experience do you have interacting with deaf or hard of hearing people who DO NOT use sign to communicate?
13. Please describe your primary experiences with hard of hearing people (Select all that apply):
- A. None
B. Personal
C. Professional
D. Academic
E. Community
F. Other (please specify): _____
14. How many years of experience do you have interacting with Deaf people who use sign to communicate?

15. Please describe your primary experiences with Deaf people (Select all that apply):

A. None

B. Personal

C. Professional

D. Academic

E. Community

F. Other (please specify): _____

16. What is your level of signing skill?

A. None

B. Minimal

C. Basic

D. Intermediate

E. Advanced

17. Where did you learn your signing skills?

A. Not Applicable

B. Family/Friends

C. College/Community Course

D. Online/Self-Study

E. Other: Please specify: _____

D/deaf and Hard of Hearing – Interaction Beliefs Scale for Registered Nurses						
Instructions: Please evaluate each item based on your beliefs about interacting with Deaf, deaf, and hard of hearing (DdHH) individuals. 1. Please answer each item and only provide one response for each item. 2. Place a mark √ in one box to indicate whether you agree or disagree with each item based on a scale with scores ranging as follows: 1 = strongly disagree, 2 = disagree, 3 = somewhat disagree, 4 = somewhat agree, 5 = agree, 6 = strongly agree	Strongly Disagree	Moderately Disagree	Mildly Disagree	Mildly Agree	Moderately Agree	Strongly Agree
	1	2	3	4	5	6
1. Visual aids can facilitate effective communication with DdHH patients.						
2. Deafness is a disorder that needs correcting.						
3. I should inform the team of healthcare providers and staff members of DdHH patients' communication preferences and accommodations.						
4. During healthcare interactions, most Deaf signers prefer to get by without a certified interpreter.						
5. Most deaf people would like to hear.						
6. Eye contact is important in American Sign Language (ASL) communication and interaction.						
7. Adequate lighting is an important aspect of environmental control for DdHH individuals.						
8. I should over enunciate or exaggerate words when speaking to a DdHH patient.						
9. Cochlear implants enable all deaf people to have functional hearing.						
10. When scheduling professional interpreter services, it is important to know a D/deaf individual's preferred sign language.						

11. Deaf people should arrange for interpreter services before seeking medical treatment.						
12. Hearing nurses should apply multiple methods of communication with DdHH patients.						
13. Questions or responses for a DdHH person should be directed to hearing family members.						
14. I should allow time to become familiar with a person's ways of communicating.						
15. All deaf people learn American Sign Language (ASL).						
16. Effective communication helps to reduce the stress DdHH may experience in healthcare settings.						
17. Family members are the best choice to interpret for a D/deaf person when discussing health-related information.						
18. Visual accessibility is an important aspect of environmental control for DdHH individuals.						
19. I should minimize environmental noise when communicating with hard of hearing patients.						
20. All deaf people should wear hearing aids.						
21. I should direct questions or responses to the Deaf person when the interpreter is present.						
22. Providing DdHH with certified sign language interpreters causes health care providers and organizations undue financial burden.						
23. The professional interpreter is usually a close personal friend and well-known by the Deaf individual.						
24. I should stand facing towards and maintain eye contact with the Deaf patient when the interpreter is present.						
25. American Sign Language (ASL) is a real language.						

APPENDIX O

Curriculum Vitae

APPENDIX O

Curriculum Vitae

Audra Janine Lewis
audralewisrn@gmail.com

Education

Degree	Field of Study	Institution & Location	Date of Graduation
BA	English	Texas Tech University, Lubbock, TX	1991
ASN	Nursing	Hardin Simmons University, Abilene, TX	1996
BSN	Nursing	Texas Tech University Health Science Center Lubbock, TX	2006
MSN	Nursing Administration	Texas Tech University Health Science Center Lubbock, TX	2008
PhD	Nursing Science	Texas Woman's University Denton, TX	2018

Experience

Academic Rank/Title of Position	Employer	Dates
Program Manager – Simulation Training Center	Texas Health Resources Ft. Worth, TX	9/2018
Visiting Professor – Medical/Surgical Clinical Faculty	Chamberlain College of Nursing Irving, TX	7/2016 – 5/2018
Assistant Professor of Nursing – Simulation	Tarrant County College District Fort Worth, TX	8/2013 – 8/2018
Clinical Educator – Women's Services	Texas Health Harris Methodist Hospital – HEB, Bedford, TX	1/2013 – 8/2013
Nursing Instructor (Full-time)	South Plains College Levelland, TX	8/2010 – 1/2013
Clinical Nursing Instructor (Part- time)	South Plains College Levelland, TX	4/2010 – 5/2010
Staff Nurse – Perioperative Services/GI/Pain	High Plains Surgery Center Lubbock, TX	3/2007 – 8/2010

Staff Nurse	North Star Surgical Center Lubbock, TX	9/2006 – 3/2008
Teacher – Health Science Technology Education	Plano Independent School District – Vines High School Plano, TX	7/2005 – 8/2006

Honors

Southern Nursing Research Society (SNRS)/National League for Nursing (NLN)
Dissertation Research Grant Award, 2018.

International Nursing Association for Clinical Simulation and Learning (INACSL) –
CAE Simulation Fellowship (Cohort 4), 2016.

Sigma Theta Tau, International, 2008.

The National Scholars Honor Society, 2008.

Mary Nell Sowell Presidential Scholarship, 2008.

Publications

Lewis, A. (2018). Fluency in nursing education and simulation: A concept analysis.
Nursing Education Perspectives, 39(1), 19-22.
doi:10.1097/01.NEP.0000000000000245

Presentations

2018. *Deaf and Hard of Hearing Interaction Belief Scale for Nurses*, Dissertation
Research Presentation, Hearing Wellness Expo, Ft. Worth, TX.

2017. *Deaf Culture, Communication, and Nursing Competence*, Poster Presentation,
International Nursing Association for Clinical Simulation and Learning, Washington,
DC.

2017. Kamath, S., Ortiz-Borchardt, M., Blust, K., **Lewis, A.**, Wise, A., & Singh, S.
Creating an Interactive Mental Health Scenario, Poster Presentation, International
Nursing Association for Clinical Simulation and Learning, Washington, DC.
2016. *Destinación Simulación: Perú*, Presentation, Center for Global Nursing
Scholarship, Texas Woman's University, Houston, TX.

2016. *Deaf Culture, Communication, and Nursing Competence*, Poster Presentation,
Texas Woman's University Doctoral Colloquim, Denton, TX.

2016. Herrmann, R., **Lewis, A.**, & Schussler, Z., *Impact of Maternal Characteristics on Birth Weight, Method of Delivery, and Breastfeeding*, Poster Presentation, Texas Woman's University Doctoral Colloquium, Denton, TX .

Professional Affiliations

Southern Nursing Research Society, 2018.

Academy of Medical-Surgical Nurses, 2018.

International Nursing Association for Clinical Simulation and Learning, 2016.

Society for Simulation in Healthcare, 2014.

National League for Nursing, 2013.

Sigma Theta Tau International, Honor Society of Nursing (Beta Beta), 2008.

Texas Nurses Association, 1996

American Nurses Association, 1996.

Professional Activities

Nursing Education Perspectives – Manuscript Reviewer, 2016 – Present.

Program Effectiveness Committee – Chair

Tarrant County College, School of Nursing, Fort Worth, TX, 2016 – 2018.

Program Effectiveness Committee – Co-chair

Tarrant County College, School of Nursing, Fort Worth, TX, 2015 – 2016.

Peer Review Committee – Member

Tarrant County College, School of Nursing, Fort Worth, TX, 2015 – 2018.

Program Effectiveness Committee – Member

Tarrant County College, School of Nursing, Fort Worth, TX, 2014 – 2015.

Teaching Effectiveness Committee Member

Tarrant County College , School of Nursing, Fort Worth, TX, 2013 – 2014.

Social Service

Project Lead, Birthday-In-A-Bag, Tarrant Area Food Bank, Fort Worth, TX, 2015 – 2016.

Co-Leader, Blue Zones Health Initiative, Tarrant County College, Trinity River East Campus, Fort Worth, TX, 2015 – 2016.