HEARING LOSS MANAGEMENT IN ACUTE CARE

by © Leanna Rowe

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Abstract

Background: With the prevalence of hearing loss on the rise, nurses in acute care are not equipped to address the complex and unmet health care needs of individuals living with hearing loss. **Purpose:** Develop a comprehensive toolkit to assist nurses in managing the care of individuals living with hearing loss/Deafness. **Methods:** An integrative literature review was completed to identify the health care challenges individuals with hearing loss/Deafness face and whether current nursing knowledge and practice is inclusive to the needs of this patient population. In an environmental scan, existing nursing toolkits were reviewed for educational content and format. Nurses from a General Surgery acute care inpatient unit were consulted, along with a surgical nursing manager and a community stakeholder, to obtain their perspectives on the learning needs of nurses in the management of patients with hearing loss, and the best method of delivery of a comprehensive toolkit. **Results:** The major findings were that nurses felt they could not provide comprehensive nursing care specific to the needs of patients who have hearing loss or who identify as Deaf due to lack of education, resources, and training. A comprehensive toolkit consisting of five online educational hearing loss modules and a physical unit resource was developed to address the learning needs of nurses and support nurses in their practice. The educational modules are comprised of information on hearing loss and Deafness, hearing loss technology, nursing strategies, communication strategies and hearing loss resources. **Conclusion:** Nurses can utilize the nursing toolkit to enhance their knowledge and ability to care for patients with hearing loss. It is the expectation that this toolkit will improve patient outcomes, quality of care and environment of safety for nurses and patients living with hearing loss and Deafness.

Key words: Hearing loss, Deafness, nursing care, toolkits, hearing loss education, resources

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Introduction

Hearing loss is the fourth leading contributor to years lived with disability worldwide (Wilson et al., 2017). One in five Canadians aged 20 to 79 or 4.6 million people have some type of measured hearing loss (Feder et al., 2015). Hearing loss can result from several things including an accident, illness, exposure to certain drugs/chemicals and genetics. The most common causes of hearing loss are prolonged loud noise exposure and aging (Canadian Hard of Hearing Association [CHHA], 2019). The prevalence of hearing loss continues to rise with age as 78% of adults aged 60-79 have some form of hearing loss (Statistics Canada, 2016). Since Newfoundland and Labrador has one of the oldest populations in Canada, with 43% of people over the age of 50, individuals accessing services within our health care system are more likely to have some form of hearing loss.

Hearing loss can have a huge impact on a wide variety of life factors including physical, mental, and social health and can lead to a reduction in quality of life (Bennion & Forshaw, 2011). Additionally, addressing the needs of hearing-impaired patients in the hospital setting can be challenging, given that critical health-related information must be exchanged while balancing patient safety and comprehensive care (Funk et al., 2018). This gives rise to the need for more education and awareness for nurses caring for this patient population. With the prevalence of hearing loss on the rise, nurses in acute care need to be equipped to address the complex and unmet health care needs of individuals living with hearing loss.

Goal and Objectives

The primary goal of this practicum project was to develop a comprehensive educational module along with a physical unit toolkit to assist general surgery nurses in managing the care of individuals living with hearing loss/Deafness.

The objectives addressed in this practicum project were the following:

1. Identification of the challenges of individuals living with hearing loss/Deafness during hospitalization and current nursing strategies for this population;
2. Identification of the learning needs of nurses on a general surgery nursing unit in caring for individuals with hearing loss;
3. Review of the existing educational resources currently available to guide nurses in providing care to individuals with hearing loss;
4. Development of a comprehensive toolkit to educate nurses and guide nursing care for individuals with hearing loss; and
5. Demonstration of advanced nursing practice competencies related to research, education, leadership and optimizing health systems.

Overview of Methods

In this practicum project, three methods were used to acquire the relevant information for the development of a comprehensive toolkit for nurses. An integrated literature review was conducted first to identify what, if any, health care challenges individuals with hearing loss/Deafness face and whether current nursing practice is inclusive to the needs of this patient population. Furthermore, the literature review provided insight into the specific knowledge level nurses have on topics related to hearing loss/Deafness and the care for these individuals. Second, an environmental scan was completed that consisted of a review of existing nursing toolkits, if any, within Newfoundland and Labrador and Canada wide that are utilized in caring for this patient population. The purpose of the environmental scan was to find the educational content and format of any toolkits currently in use and whether the toolkits are effective to provide ideas

on the development of a new nursing toolkit. Last, nurses from a general surgery unit were consulted along, with a surgical nursing manager and a community stakeholder, to obtain their perspectives on the learning needs of nurses in the management of patients with hearing loss, and the best method of delivery of a comprehensive toolkit. The consultations also served to determine what specific learning needs nurses from a general surgery unit had with respect to caring for individuals with hearing loss and how to deliver the toolkit in a way that nurses could easily access it. The findings from the integrated literature review along with the environmental scan and consultations will be used to create a comprehensive toolkit to improve nursing management of patients living with hearing loss.

Summary of the Literature Review

The integrative literature review served to summarize the existing literature on the topic of hearing loss and examine the needs of nurses and this patient population within acute care. The literature was also used to highlight strategies that can utilized when caring for individuals living with hearing loss and support the need for education in this area. Additionally, the literature review informed the content and issues that need to be addressed within an educational toolkit for nurses. The complete integrative literature review can be found in Appendix I.

Methods

An integrative literature search was conducted using The Cumulative Index to Nursing and Allied Health Literature (CINAHL), and Google Scholar. With hearing technology being a relatively new development, the search parameters included articles up to 20 years old. The search focused on articles that were written in English and comprised of participants greater than 19 years of age who identified as having a hearing loss or culturally Deafened. Articles were excluded if the research was primarily physician or audiologists based as the literature review

was focused on existing literature pertinent to nursing care of individuals with hearing loss. The search resulted in 316 articles to choose from. After applying the inclusion and exclusion criteria further only 36 articles remained. Quantitative research studies were critically examined using the guidelines and appraisal toolkit published by the Public Health Agency of Canada [PHAC] (2014). All qualitative research studies were critically appraised using the Critical Appraisal Skills Programme [CASP] (2018) criteria.

Key Findings

Impacts of Hearing Loss/Deafness

There are physical and psychosocial considerations that nurses must consider when caring for individuals with hearing loss/Deafness that are unique to this population and can impact their health care experiences.

Physical. The literature review found that individuals with hearing loss ranging from mild to severe were at increased risk of falls. The risk of falls increased with the severity of hearing loss (Girard et al., 2013; Grue et al., 2009; Lin & Ferrucci, 2012), leading to injury and risk of hospitalization related to falls (Chang et al., 2018; Genther et al., 2015**).** Researchers found that individuals with hearing loss are more likely to experience loss of function related to the degree of their hearing loss (Chen et al., 2014; Dalton et al., 2003; Grue et al., 2009). The research was unable to determine the mechanism behind the association between hearing loss and falls but considering these findings, it is imperative for nurses to recognize the increased risk of physical injury and recognize potential safety concerns in the hospital environment. The results from the literature indicate that it is important for nurses to include hearing loss assessment as part of a physical assessment to remain vigilant and implement preventative strategies for individuals with hearing loss/Deafness who could be at an increased fall risk.

There were associations found in the literature between hearing loss and loss of function in everyday life. It was reported that with increasing severity of hearing loss, there was an association with the loss of ability to complete activities of daily living and instrumental activities of daily living (Chen et al., 2014; Dalton et al., 2003; Grue et al., 2009). These findings highlight the needs for improved methods of assessing individuals with hearing loss so that nurses can promote independence, provide education on coping strategies, and encourage use of hearing assistive technology to mitigate any loss of function associated with hearing loss.

Nurses should also be cognizant of the association between hearing loss, comorbidity, and mortality. There were two studies found that individuals with hearing loss having a higher number of chronic conditions, including atherosclerotic vascular disease, diabetes, depression, and lower self-rated health (Genther et al., 2014; Pandhi et al., 2011). One study found that even in the absence of chronic disease and depression, older individuals with hearing loss had a 20% increased risk of mortality compared to those with normal hearing (Genther et al., 2014). While further research is warranted into the association of comorbidity and mortality in individuals with hearing loss/Deafness, nurses should be vigilant in their health assessment of hearing loss because while it is not clear how they are interrelated, providing a holistic nursing approach that addresses individual physical needs could have improved outcomes for patient care.

Psychosocial. Individuals with hearing loss can experience a psychosocial impact on their nursing care related to their hearing loss. Patients with hearing loss/Deafness reported feeling embarrassed, isolated, and ashamed of their hearing loss. These feelings had potential to affect how patients interact with nurses as fear of miscommunication and inconveniencing nursing staff would cause patients to avoid social interactions (Bennion & Forshaw, 2011; Funk et al., 2018; Steinberg et al., 2006). Individuals with hearing loss/Deafness reported that the fast

paced, noisy environment of acute care compounded with unfamiliar accents left many feeling vulnerable. They also reported misunderstanding surrounding receiving medical information and a lack of understanding from nursing staff on how Deaf people communicate (Funk et al., 2018; Steinberg et al., 2006). Additionally, Deaf women in one study reported living in fear being thought of as "dumb" and stigmatized because of their use of sign language to communicate and found difficulty understanding simple medical terms (Ubido et al., 2002).

These findings are concerning because the experiences of individuals living with hearing loss/Deafness receiving medical care should not be of fear and isolation. It highlights a lack of knowledge and sensitivity about hearing loss/Deafness and its psychosocial implications on the part of medical professionals, including nursing staff. It would be beneficial to improve nurses' understanding of the hospital experience of patients with hearing loss/Deafness to accommodate the needs of this population and to improve their health care experiences.

Communication. Patients felt that the quality of nursing care was impacted by miscommunication (Barnett et al., 2013; Mick et al., 2014; Pandhi et al., 2011; Reed et al., 2019). Use of assistive hearing devices in hospital to improve communication such as pocket talkers were reported as favorable by patients and nursing staff, however patients had concerns about using their own personal assistive listening equipment for fear of breaking or misplacing it (Funk et al., 2018; Kimball et al., 2018). Deaf adults shared that the differences in communication, culture, and linguistics between health care providers and themselves often led to misinterpretation, misdiagnosis, and stereotyping (Ubido et al., 2002; Woodcock & Pole, 2007). They described feeling confused, not understanding medications that were prescribed, and undergoing examinations and procedures without understanding what was happening (Sheppard, 2014). Additionally, culturally Deaf adults felt differently towards hearing technology use then

those that identified as having hearing loss. They favored knowledge on communication techniques, provision of interpreting services for the Deaf, and practitioners who tried to improve communication over assistive technology use (Steinberg et al., 2006).

Communication breakdown left individuals with hearing loss less satisfied with the information provided to them about what was wrong, and the follow-up care received after initial treatment. Patients often misunderstood medical information resulting in poor adherence to treatment recommendations and undesirable clinical outcomes (Barnett et al., 2013). Not only was miscommunication found to cause lack of understanding in patients, but it has also led to medical errors with negative consequences. In one study, 29% of health care providers stated that hearing loss in older patients resulted in errors without negative consequences to patients at least "a couple of times a year" (Smith et al., 2020).

The physical, psychosocial and communication impacts of hearing loss have weakened the overall quality and satisfaction of care provided to individuals with hearing loss/Deafness. Miscommunication created confusion, misunderstanding, resentment, and frustration. Hearing loss was independently associated with lower ratings of patient physician communication and overall satisfaction in the quality of care received (Barnett et al., 2013; Mick et al., 2014; Pandhi et al., 2011; Reed et al., 2019). Individuals with hearing loss reported lower odds of having favorable ratings of their health care experiences than those with normal hearing (Mick et al., 2014). Those who reported greater levels of hearing impairments and communication challenges expressed more difficulty in having questions answered about their treatment or prescriptions (Barnett et al., 2013).

Patient safety is paramount in nursing, and it is the responsibility of the nurse to provide a safe environment physically and psychosocially. Nurses need to be aware that hearing loss and

Deafness exists on a broad spectrum and no individual with hearing loss/Deafness communicates in the same way. Nurses need the knowledge to be able to appropriately recognize and assess individual communication needs to provide tailored nursing interventions that protect the patient and their health care experience. Additionally, nurses need the support of hearing loss resources and need to be able to access these resources easily. Furthermore, addressing the knowledge gaps nurses have with respect to hearing loss/Deafness in the areas of communication, assistive hearing technologies, and hearing loss resources will provide nurses with an improved understanding of this patient population so that they can advocate for patient safety amongst the interdisciplinary team and improve their health care experiences.

Nursing Knowledge Gaps

Hearing Loss Assessment/Screening. According to the literature, nurses have educational and training needs with respect to detecting hearing loss or Deafness. In the literature, nurses claimed responsibility for conducting hearing assessment as part of routine patient assessment (Heron and Wharrad, 2000). However, findings from the review indicated that nursing staff used varied means of hearing assessment and they were largely unaware of the patient's hearing ability as most assessments conducted were incorrect (Heron and Wharrad, 2000). These findings are problematic as most nurses are reporting they are completing hearing assessments but the nursing staff in these studies were largely unaware of their patient's hearing ability or degree of hearing impairment (Heron and Wharrad, 2000; McShea, 2015). Furthermore, nurses are not screening patients for hearing loss due to lack of knowledge of hearing assessment, low priority, overconfidence in their ability to detect hearing loss, assuming patients would self-disclose their hearing loss, and screening was too time consuming (Wallhagen and Pettengill, 2008). These findings are indicative of a lack of consistency in

nursing assessments of hearing loss and nurses need an improved understanding of how to conduct hearing assessment, testing, and documentation.

Communication Strategies. It is important that nurses are quickly able to determine the presence of a hearing loss to ensure that measures are being taken to maximize a person's ability to communicate (Heron & Wharrad, 2000). In the literature, there was a discrepancy found in how nurses rated their proficiency in communication skills and how patients felt nurses communicated with them. Nurses reported feeling very comfortable with their communication skills while caring for individuals with hearing loss, despite having no formal training, no awareness of hearing loss resources, and no knowledge of the purpose and benefits of hearing assistive devices such as a pocket talker (Smith et al., 2016). Nurses also reported using communication strategies that are contraindicated with communicating with individuals with hearing loss because the prevent individuals from speechreading, obtaining visual cues from facial expressions, and limiting their right to privacy and autonomy in participating in their health care decisions (Smith et al., 2016).

Researchers of these studies found that communication between health professionals and patients with hearing loss/Deafness is often exchanged without knowledge and understanding of the individual communication needs or preferences (Heron & Wharrad, 2000; Middleton et al., 2010). In the literature, nurses would make assumptions that a non culturally deaf adult speech user is content with their hospital consultations in speech, and a culturally Deaf sign language user would prefer to use a sign language interpreter (Middleton et al., 2010). However, these generalized assumptions based on a limited knowledge of hearing loss/Deafness and the language intricacies and needs of this patient population. Interestingly, despite not having consultations in their preferred communication choice, many individuals with hearing loss and

some with Deafness were satisfied if there was good deaf awareness from the health professional which was indicated by a knowledge of how to facilitate an environment for lipreading/speech reading. These results are indicative of the desire of individuals with hearing loss/Deafness to be understood and be able to communicate with their health care professionals (Middleton et al., 2010). The findings demonstrate a lack of knowledge of patient specific communication strategies nurses can employ to provide comprehensive care to this population. It also indicates that nurses are unaware of how approach the individual or their caregivers to identify individual needs while respecting the individual, their health care rights, and their specific communication requirements.

Hearing Technology. There was limited research found on hearing technology that specifically examined nursing competence in caring for hearing devices. The findings of the one study found was limited in its generalizability but its results echo some similarities in other studies where hearing technology was mentioned. Nurses reported feeling very confident in their ability to correctly put in a hearing and change a hearing aid battery (Heron & Wharrad, 2000). Despite the confidence level in the application of a hearing aid, many nurses reported feeling unsure of their abilities to clean a hearing aid. These findings are concerning because hearing aid care extends beyond being able to insert the device in the ear. The effectiveness of a hearing aid depends largely on cleaning and adjusting for the correct settings to use in the hospital environment. The findings for the study by Heron and Wharrad (2000) cannot speak to the entire nursing proficiency with hearing devices, considering the research was conducted over twenty years ago. However, the research findings are more relevant now because with the emergence of advanced hearing loss technology it is important for nurses to have a general understanding of the importance of these devices and be able to perform the basic care for these technologies.

Nursing Education and Training. Nursing education and training in caring for individuals with hearing loss was examined by researchers within the literature review. One researcher examined nursing knowledge is the areas of hearing impairment, hearing aids, communication strategies, and accessibility to care for an individual with hearing loss. Knowledge deficits were found in all four areas and the only characteristic associated with high scores in the knowledge testing was whether the nurse had indicated they received education on hearing impairment and/or communication strategies (Ruesch, 2018). A compulsory training course was developed for nurses to assist them in clinical practice using patient-centered communication techniques and role playing (Nørgaard et al., 2013). Nurses had a significant improvement from their baseline assessment of their own communication efficacy skills with patients right after the training course and again in six months when they were re-tested.

These findings show promise for the usefulness of nursing education and training that would provide them with the knowledge and clinical support necessary to care for individuals with hearing loss/Deafness. Early education and training that begins in nursing school would serve as a foundation in which nurses can build upon existing communication and practical skills that they can carry with them throughout their nursing career to better address the needs of individuals living with hearing loss/Deafness who require nursing care.

Nursing Toolkits

The literature search found one toolkit that was developed for nurses to manage hearing loss in acute care (Holmes, 2014). As part of a pilot study, the toolkit was developed after using questionnaires and focus groups for patients and staff to determine issues related to hearing loss and communication. There were eight practice recommendations that were developed from the data which were to implement a hearing loss pathway to guide staff, ensure training, provide

access to a hearing loss support kit that includes hearing assistive technology, information on screening patients, improve communication, ensure hearing difficulties are recorded, provide hearing aid storage boxes, and appoint hearing loss champions (Holmes, 2014).

The toolkit was designed with the purpose of assisting nurses to identify hearing loss in acute care, improve the use of hearing assistive technology and access to hearing aid support while in hospital. It also aimed to increase staff knowledge and expertise on how to communicate effectively with people with hearing loss, how to use communication equipment, reduce the misplacement and misuse of hearing aids and increase the identification and recognition of hearing loss in patients. Unfortunately, it is unknown from the literature and a subsequent internet search whether this toolkit has been implemented into practice or has since been evaluated. Despite limited available information on the effectiveness of this toolkit, through consultation with patients and staff, it is clear there is a lack of support and education surrounding hearing loss particularly with respect to communication. The findings from the literature review also support the need for further nursing support and educational opportunities which can be supported with an on-unit toolkit which can be easily accessible to nurses.

In summary, the literature review reflects a lack of knowledge and awareness nurses have towards hearing loss/Deaf concepts with respect to hearing loss detection, screening, communication, and assistive listening devices. Patients with hearing loss are experiencing an overall reduced quality of care and feeling excluded from participating in their health care plan. The literature supports the need for training and education for nurses specific to individuals who are living with hearing loss or Deafness. Important topics for nursing education that arose from the literature are more knowledge of the physiology of hearing loss/Deafness and its impacts, hearing loss assessment, communication strategies, and assistive technologies. These knowledge

gaps can be addressed with the development of a comprehensive nursing tool kit to educate nurses on caring for patients with hearing loss in acute care. It is the expectation that the development of this toolkit will improve not only patient outcomes, but also the quality of care and environment of safety for nurses and patients with hearing loss.

Summary of Environmental Scan

An environmental scan was necessary to determine if any resources, such as existing toolkits, are utilized in other acute care settings locally, nationally, and internationally. Identifying any existing resources or toolkits could provide ideas of hearing loss topics being utilized in current nursing practice, identify any videos or diagrams that could be useful and identify strategies to improve the accessibility of educational content within a comprehensive toolkit to nurses. Additionally, the purpose of conducting the environmental scan was to potentially identify any recurring themes or essential components that should be included. The complete environmental scan report can be found in Appendix II.

Methods

The environmental scan was completed in three parts. Surgical nurse managers and community stakeholders were contacted in addition to an international online search for existing nursing resources in managing hearing loss and patient care. The first step in the environmental scan was to determine if nurses in Newfoundland and Labrador or across Canada have an existing policy or resource in place to identify and manage individuals with hearing loss admitted to an acute care facility. Through an online search, surgical nurse managers were identified from a major hospital from each of the four regional health authorities in Newfoundland. A national search was conducted by contacting a nursing manager from 13 of the largest (most inpatient beds) urban hospitals with inpatient surgical services from each province and territory. Nurse

managers were contacted via email and asked if they could share the existence of any educational materials, toolkits, hearing loss policies or resources they have available for their surgical nurses caring for individuals with hearing loss. This search yielded two resources, a physical unit toolkit and informational resource and policy that guided nurses in their practice.

The second step was contacting via e-mail a contact person from two local non-profit groups who work with individuals with hearing loss/Deafness. The purpose of reaching out to these community groups was to identify whether they have developed their own educational resources for nurses or have a library of resources or information that could contribute to the development of a toolkit for nurses caring for individuals with hearing loss. This yielded one resource, which is currently in use on nursing units of a main hospital within the largest health authority in Newfoundland and Labrador.

The last part of the environmental scan consisted of an international search conducted through an online search engine to identify if there are any hearing loss toolkits utilized by nurses on a global level. It was determined that three international toolkits that were found could be utilized for information purposes to help inform the content of the toolkit developed from this practicum project.

Key Findings

There are a variety of different strategies that are used in nursing toolkits and patient resources to aid in the care of individuals with hearing loss that are utilized across Canada and internationally. Four of the five toolkits included information on how patients with hearing loss and nurses can access resources such as hearing loss services such as sign language interpreters, audiologists, and non-profit organizations that specialize in the field of hearing loss and/or Deafness. Information on procuring assistive listening devices should patients or nurses require

them was also included in the resource information within the toolkits. Strategies involving patient self-identification and disclosure of hearing loss appeared to be a focus for several of the toolkits such as posters and stickers. In one of the toolkits, patients were given a card indicating the presence of a hearing loss/Deafness that they were able to provide to members of the health care team if they should need to. Three of the toolkits implemented universally utilized and recognized blue ear symbols that signifies a hearing loss which were made into stickers.

There are strategies that were not well represented throughout all the toolkits. Overall, there was a lack of general information on hearing loss/Deafness to educate patients and nursing staff. Only one toolkit contained posters and brochures that provided nurses with information on the etiology of hearing loss, and only one toolkit that included a brochure for patients concerning hearing loss. Three of the five toolkits included communication between patients and nurses as a strategy in managing hearing loss in acute care. Several toolkits used a form for patients on admission to hospital to complete so they had an opportunity to identify their hearing loss and specific communication needs. Several toolkits utilized communication pictograms that could be used to aid communication. The results of the scan indicate that best practices in patient safety, communication, education, policies, and procedures that can guide nursing staff is unknown. Furthermore, poor evaluation of already existing toolkits makes it difficult to understand what strategies have the biggest impact on patient safety and holistic nursing care.

While there were several toolkits found, there was no toolkit that was suitable to adapt for the purposes of this project. The vast differences between toolkits, inconsistencies in strategies used and lack of a clear evaluation of any of them made it difficult to ascertain whether they were suitable. However, the toolkits found during the environmental scan provided many ideas as to what components to include in a newly developed toolkit such as a comprehensive resource

list, information about assistive hearing technologies, an assistive listening device for patients, and tools that can be used to aid communication such as communication pictograms.

Summary of Consultations

The overall goal of the consultations was to determine the educational content and method of delivery of a toolkit for nurses caring for patients living with hearing loss on a general surgery inpatient unit at a major St. John's hospital in Newfoundland. Additionally, the consultations served to identify whether nurses supported the idea of the development of a hearing loss toolkit and whether they felt it would be useful in practice. The complete consultation report can be found in Appendix III.

Methods

There were three sources that were consulted for this project: the staff nurses on a surgical nursing unit, a surgical nurse manager, and a community stakeholder who is an expert in the needs of individuals with hearing loss. Consultation data were collected from staff nurses through a survey. A short questionnaire was disseminated to the surgical nurses regarding caring for an individual with hearing loss. The questionnaire was anonymous and voluntary. It was completed online and consisted of 18 questions surrounding patient care, knowledge of hearing loss topics, hearing loss screening, communication, documentation, assistive listening devices, hearing loss resources and barriers to using hearing loss toolkits. There are a total of 54 nurses who are employed in the general surgery unit that was selected for the survey questionnaire. Nurses in this unit range from newly graduated baccalaureate nurses to nurses who have been employed to the unit for over 20 years. A total of 31 general surgery nurses completed the online survey questionnaire for an overall response rate of 57%.

Information was collected from the surgical nurse manager and the community

stakeholder in the form of individual semi-structured interviews. The interview for the surgical nurse manager took place in person and the interview for the community stakeholder was conducted through an online based video conference. The interview took approximately 30 minutes for each interview and notes were taken during the interview. Interview questions related to improving care for those with hearing loss and identifying features that could contribute to an effective learning resource for the nurses on the unit and the development of a comprehensive toolkit.

Key Findings

The major findings from the consultations were that 80% of nurses felt they could not provide comprehensive nursing care specific to the needs of patients who have hearing loss or who identify as Deaf. Two nurses reported that difficulty communicating with this patient population caused concern for patient safety and comprehensive nursing care due to a lack of knowledge on communication strategies, training, and supportive nursing resources. The results indicated that 94% of the nurses who completed the survey are not very to only somewhat knowledgeable of hearing loss topics and 93.6% of nurses surveyed have very little knowledge of American Sign Language or cultural Deafness (83.9%). All participants in the consultations process felt that hearing loss screening is important, yet there was limited knowledge of formalized screening and hearing loss assessment among nurses. Nurses varied on their chosen methods of communication strategies and the strategies lacked consistency amongst all surveyed nurses.

The two other consultants supported the use of hearing assistive technologies in nursing care; however, it was recognized that nurses need knowledge and training to use these tools effectively. The surgical nurse manager felt that there needed to be an improvement on specific

care strategies for individuals who have hearing loss for these individuals to have an improved inpatient experience. They felt nurses lacked knowledge particularly in the areas of communication and of resources within and outside of the health authority for patients with hearing loss. In addition to this, 77.4% of nurses had little to no knowledge of hearing loss resources and desired to have more resources available to them. Both the consultants felt that documentation of a hearing loss needs to be stronger and more consistent, and communication to other members of the health care team with respect to patient care of those with hearing loss should be clearer.

Two barriers identified to hearing loss education and the use of a comprehensive toolkit were that there was not enough time and not enough awareness of existing toolkits. Nurses also found the existing unit toolkit difficult to access, identified it needed to be updated/replenished, and said there was no certification or continuing education recognition. Both consultants and 92.1% of nurses felt that hearing loss education should be mandatory to ensure consistency in training among staff members and to improve nursing care for this patient population. Nurses were asked what they would like to see included in comprehensive toolkit comprising of educational modules and a physical unit resource. Their top choices were information on communication strategies, accessing hearing loss resources, hearing loss screening/assessment, and a hearing loss pathway. Nurses also reported they would like hearing aid storage boxes and hearing loss identification forms. For the educational component of the comprehensive toolkit, nurses wanted information on screening/assessment, general information on hearing loss/Deafness, communication strategies, and information on accessing resources.

An objective of the consultations was to identify what the best method of delivery for the hearing loss toolkit to engage all staff nurses in the educational and physical components of a

hearing loss toolkit on the nursing unit. Staff nurses and the other consultants preferred an online self-learning module that could be available to them at home/work as the best method of educational delivery. It was evident through the consultations that nurses would be more inclined to complete self-education and training online on their own time as the busy workday does not often allow them the opportunity to have learning experiences while working. Furthermore, the educational component will include information about the physical unit toolkit so nurses can be familiar with its components, so that it can be utilized appropriately in identifying and managing a patient with hearing loss/Deafness.

Summary of the Hearing Loss Toolkit

A comprehensive toolkit including a hearing loss educational module and physical unit resource was developed to address the learning needs of nurses and promote quality care for patients who live with hearing loss or who identify as Deaf. As a result of the integrative literature review, the environmental scan and the consultations process, an online educational module was developed for nurses to avail of at their convenience both at work and at home. The educational module is supported with a physical unit toolkit that will be comprised of the necessary tools and information that nurses need on hand to care for patients with hearing loss/Deafness.

The educational module is based on Knowles' Adult Learning Theory. Adults have a diverse range of life experiences, interests, and preferred styles of learning. It is important to take this background into consideration to provide effective education (Bryan et al., 2009). Adults are self-directed learners who do best when asked to use their previous life experiences and apply new knowledge to solve real-life problems (Candela, 2016). This theory was taken in account when developing the educational modules for the hearing loss toolkit. Educational modules can

be completed at the pace of each learner and builds on nurses' previous knowledge and experiences in the physiology of hearing loss, cultural care, clinical skills, and therapeutics relationships. Throughout each learning module, there are activities and opportunities for nurses to test and evaluate their knowledge and understanding of caring for patients with hearing loss through mini quizzes at the end of each module. Nurses can evaluate whether they feel adequately prepared to provide comprehensive care for individuals with hearing loss/Deafness or whether they need further learning opportunities or resources. Through using the principles of the adult learning theory, a comprehensive toolkit will actively involve nurses in the learning process, help them understand the importance of addressing their knowledge gaps surrounding hearing loss/Deafness, and build on their previous experiences of caring for individuals with hearing loss (Candela, 2016).

The educational component of the toolkit is composed of five modules, and they are:

- Module One: What is Hearing Loss?
- Module Two: Hearing Loss Technology
- Module Three: Nursing Strategies
- Module Four: Communication Strategies
- Module Five: Hearing Loss Resources

The comprehensive hearing loss toolkit including the five online educational modules and the contents of the physical unit resource can be found in Appendix IV. Each educational module of the toolkit will be briefly described next.

Module One: What is Hearing Loss?

The first module is an introductory module to hearing loss/Deafness and subtopics include information on hearing loss, hearing loss statistics and prevalence as well as the types,

causes, and why hearing loss is a concern in health care. Module one sets the foundation for the learner to understand the broad scope of hearing loss, the intricacies of cultural Deafness and its relevancy to nursing practice.

Module Two: Hearing Loss Technology

The second module is education on hearing loss technology, which includes information on hearing loss treatments such as hearing aids and cochlear implants. Subtopics include information on the various types and products of assistive listening devices. The module concludes with basic assistive listening device troubleshooting and care. This module incorporates video links on the function of hearing aids, cochlear implants, and assistive listening devices, and how to provide their basic care and troubleshooting.

Module Three: Nursing Strategies

The third module transitions into a focus on acute care nursing with respect to caring for individuals with hearing loss/Deafness. Included in this module is a pathway nurses can follow from admission to discharge for their patients, which includes nursing strategies for hearing loss assessment, accommodation, education, empowerment, and advocacy. This module incorporates education on how nurses can assess for hearing loss within their scope of practice and provides specific strategies nurses can incorporate into their care plan to address individual needs.

Module Four: Communication Strategies

The fourth module is a module comprised of the numerous ways nurses can communicate with this patient population. This module has various subtopics including nursing specific communication strategies and the utilization of communication tools to communicate. This module also incorporates a link to a hearing loss simulator so nurses can understand the communication experiences of individuals with hearing loss in a variety of settings. There is a

focus on Deaf individuals, the use of sign language in this module and nursing care for Deaf individuals with sensitivity and respect to their culture and language. The module concludes with education on nursing documentation and communication with the interdisciplinary team.

Module Five: Hearing Loss Resources

The educational component concludes with a final module on hearing loss resources, which includes a comprehensive list of accessible hearing loss resources, information, and community supports within Eastern Health that can aid in nursing care for individuals with hearing loss/Deafness.

Physical Unit Resource

The physical unit resource is comprised of physical information such as brochures for patients, general information on hearing loss, and physical copies of the information included in the online educational module such as information to access resources, hearing loss screening/assessment, communication strategies and hearing loss technologies. Identification posters for bedsides and stickers for patient charts, hearing aid storage boxes, communication pictograms, and an assistive listening device such as a pocket talker will be included. The complete list of components can be found in Appendix IV.

Advanced Nursing Practice Competencies

Advanced nursing practice is integrating nursing education, knowledge and expertise in complex decision making to address the health needs of individuals (Canadian Nurses Association, 2019). The Canadian Nurses Association (CNA) National Framework for Advanced Nursing Practice outlines advanced nursing practice as six competency categories: direct comprehensive care, health system optimization, education, research, leadership, and consultation and collaboration. During the development of this practicum project, several of

these advanced nursing practice competencies were demonstrated and are described below. The advanced nursing practice competencies of direct comprehensive care and consultation and collaboration were not directly related to the development of this practicum project.

Research Competencies

The CNA (2019) states that advanced practice nurses are "committed to developing, synthesizing, critiquing, and applying research to practice" (p.32). This competency was demonstrated through the integrative literature review where relevant nursing research articles were appraised. Using the findings from the environmental scan and the consultations, along with the findings from the literature review, were synthesized to justify the need for a comprehensive nursing toolkit. Research methods such as surveys, interviews, and analyzing data were used in conducting the environmental scan and during consultations with acute care nursing staff, managers, and community stakeholders.

Educational Competencies

The CNA framework (2019) states that "advanced practice nurses are committed to professional growth and learning for all health care providers" (p.31). They are also committed to the growth and learning for nursing students, patients, and their families related to health and wellness. In part of the process in the development of the toolkit, I identified the learning needs of acute care nurses to address those needs through the development of a comprehensive toolkit. Through the environmental scan and consultations process, I had an opportunity to learn from other health care authorities locally and worldwide to optimize nursing care for individuals with hearing loss/Deafness. Despite being familiar with many aspects of hearing loss and Deafness, I expanded my own knowledge base by identifying topics to include in this toolkit, which I would

have not considered had I not completed a literature review, consulted with others, and conducted an environmental scan.

Leadership Competencies

Advanced practice nurses are required to be "leaders in their fields by acting as agents of change, improve care, and seek new effective ways to practice and promote advanced practice nursing" (CNA, 2019, p.33). I believe that through the development of a nursing toolkit to care for individuals with hearing loss/Deafness I have demonstrated a leadership role. Through my own personal experiences with hearing loss, and through my own professional nursing practice, I recognized the opportunity to improve the health care experiences of individuals with hearing loss/Deafness and improve the confidence and skills for the nurses caring for them. As a nurse with hearing loss, I have been approached by colleagues for assistance in caring for others with hearing loss/Deafness, so I saw an opportunity to advocate for enhanced nursing care for this group as well as enhanced education and support for myself and my peers. Throughout this project, I have demonstrated a commitment to enact a change in the way we care for individuals living with hearing loss/Deafness through comprehensive and consistent nursing practice.

Optimizing Health System Competencies

According to the CNA (2019), advanced practice nurses "contribute to the functioning of health systems by advocating, promoting innovation in client care, and facilitating equitable, client-centered care" (p. 30). With an increasing prevalence of hearing loss, it is prudent to acknowledge the impact hearing loss/Deafness has on nursing care and the way in which nurses respond to this rising challenge. There is an increasing societal demand for equitable access to health care and nursing care should be moving towards a more inclusive approach to caring for individuals with disabilities. With this toolkit, I have provided a resource necessary for nurses in

our health care system so that nurses may be better informed on caring and advocating for their patients. Additionally, as this toolkit can be adapted for use in other Regional Health Authorities in Newfoundland and Labrador, and for use in other clinical programs and services across all disciplines of health care.

Next Steps

Publication

The next step for the dissemination of the toolkit is to write a nursing article for publication in the nursing journal *Canadian Nurse.* An online journal devoted to nursing, *Canadian Nurse* is comprised of information, opinions, and stories committed to all practices of nursing. The article will be written with a focus on drawing attention to managing the care of individuals with hearing loss/Deafness in acute care nursing. The purpose for publishing an article in a nursing journal is to draw attention to potential health care experiences that individuals with hearing loss are facing and the lack of knowledge that nurses must support these individuals due to an underwhelming existence of nursing education and training in this area. Creating awareness about hearing loss/Deafness is the first step to sparking a change in nursing practice, where nurses can be more readily equipped to deal with the needs of this population.

Pilot and Implementation

With the completed comprehensive toolkit, which is comprised of the educational modules and physical unit resource, I would like to consult with a small focus group of nurses and the community stakeholder. Consulting with nurses and the community stakeholder who were instrumental in the development of the toolkit would serve to review the toolkit and provide feedback on the toolkits design, accessibility, educational content, and quality. This is important

to ensure that no important hearing loss/Deafness aspects have been missed and nursing learning needs have been addressed before disseminating the toolkit on a larger scale.

Lastly, the Learning and Development Department within Eastern Health will be contacted to add the educational resource to their online learning platform. If the request is approved, the online modules will be available on the employee intranet for all nurses in all areas of practice within Eastern Health. In collaboration with the community stakeholders and Eastern Health the physical unit resource and its components will be developed and disseminated to all nursing units within Eastern Health. It is the anticipation that creating awareness on hearing loss in health care, will support nursing leaders in advocating for compulsory hearing loss training and contribute to the development of a comprehensive hearing loss and accessibility policies for patients in acute care.

Evaluation

Once the toolkit is implemented, an evaluation will consist of two methods: completion of an evaluation form at the end of the online modules and an audit of the physical unit resource to determine if the individual components were being used and its effectiveness. At the end of each online module, a link will be provided to complete an online evaluation form which will be sent to me upon completion. The evaluation form will consist of questions that will allow nurses to rate the usefulness of the information presented, comment on the delivery of the educational content, and provide feedback in general. The physical unit resource will have a paper evaluation to determine whether the components of the physical unit resource were helpful in nursing practice, what can be done to improve the resource, and whether they require additional components to assist them in their care of individuals with hearing loss/Deafness. The physical

unit resource evaluation sheet will be collected on a bi-monthly basis. Based on the feedback received, any revisions, if required, will be implemented.

Conclusion

Individuals living with hearing loss face unique challenges when navigating health care services such as lack of appropriate identification, support, and management. Nurses' attitudes towards hearing loss, knowledge of managing the care of inpatients with hearing loss, and deficits in knowledge have the potential to limit nurses in providing sensitive and appropriate care. Nurses lack the resources needed for quick and effective identification, and management of patients with hearing loss in acute care. Through conducting extensive background research and consultation, key elements needed for managing the care of individuals with hearing loss have been highlighted and a thorough understanding of what nurses' need has been developed. This knowledge has been translated into the development of a comprehensive nursing toolkit that includes both a physical unit resource and supportive educational online modules for nurses. Through evidence-based practice, nurses can utilize the nursing toolkit to enhance their knowledge and ability to care for patients with hearing loss. It is the expectation that the development of this toolkit will improve not only patient outcomes, but also the quality of care and environment of safety for nurses and patients with hearing loss.

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Appendices

Appendix A: Integrative Literature Review

Hearing Loss Management in Acute Care and Implications for Nursing Practice: An Integrative Literature Review

Leanna Rowe

Memorial University of Newfoundland and Labrador

Hearing loss is the fourth leading contributor to years lived with disability worldwide (Wilson et al., 2017). One in five Canadians aged 20 to 79 or 4.6 million people have some type of measured hearing loss (Feder et al., 2015). Hearing loss can result from several things including an accident, illness, exposure to certain drugs/chemicals and genetics. The most common causes of hearing loss are prolonged loud noise exposure and aging (Canadian Hard of Hearing Association [CHHA], 2019). The prevalence of hearing loss continues to rise with age as 78% of adults aged 60-79 have some form of hearing loss (Statistics Canada, 2016). Since Newfoundland and Labrador has one of the oldest populations in Canada, with 43% of people over the age of 50, individuals accessing services within our health care system are more likely to have some form of hearing loss. Hearing loss can have a huge impact on a wide variety of life factors including physical, mental, and social health and can lead to a reduction in quality of life (Bennion & Forshaw, 2011). Additionally, addressing the needs of hearing-impaired patients in the hospital setting can be challenging, given that critical health-related information must be exchanged while balancing patient safety and comprehensive care (Funk et al., 2018). This gives rise to the need for more education and awareness for nurses caring for this patient population. With the prevalence of hearing loss on the rise, nurses in acute care need to be equipped to address the complex and unmet health care needs of individuals living with hearing loss. This integrative literature review will serve to summarize the existing literature on the topic of hearing loss and management of the needs of this patient population within acute care. The literature will be used to highlight strategies that can utilized when caring for this population and support the need for education in this area. Additionally, the literature review will provide content on the issues that need to be addressed within an educational resource for nurses.

Literature Search Methods

To determine the most appropriate ways of identifying and managing hearing loss in acute care patients, an integrative literature search was conducted using The Cumulative Index to Nursing and Allied Health Literature (CINAHL), and Google Scholar. A librarian at the Health Sciences Library was consulted to optimize the search and to assist with the key terms to use. The search took place from May to early June of 2020, and initially sought to include articles less than ten years old (i.e., from 2010-2020). However, it was found there were large gaps in the years of publication as most research appeared to be conducted prior to the year 2010. With hearing technology being a relatively new development, the search parameters were changed to include articles up to 20 years old. Inclusion and exclusion criteria were developed to help guide the search, and focused on articles that were written in English, and comprised of participants greater than 19 years of age who identified as having a hearing loss or culturally Deaf. Articles were excluded if they were more than 20 years old, and if the research was primarily physician or audiologists based as the literature review was focused on existing literature pertinent to nursing care of individuals with hearing loss. There was a vast amount of non-research-based literature found (e.g., opinion pieces, literature commentaries) not included in this review, rather the search focused on quantitative and qualitative research studies.

The literature review was designed to answer: “How can nurses improve the care of patients with hearing loss?”, “How can nurses identify and manage hearing loss?”; and “What strategies and tools are best for identifying, communicating, and managing hearing loss in acute care?”. The search concentrated on terms such as: “hearing loss”; “identification”; “acute care”; “nursing”; “communication”; “management”; and grew to include “hearing disorders”; “education”; “communication barriers”; and “health care”. Abstracts incorporating the terms

were retrieved from CINAHL and reviewed for inclusion or exclusion, and if included, the entire article was reviewed. The process was then repeated for Google Scholar.

The search for “hearing loss” and “acute care” only returned 26 articles. Most of the articles returned were focused on hearing loss in the pediatric patient population and others were primarily physician and audiologist based. After consulting with a librarian from the Health Sciences Library (HSL) at Memorial University of Newfoundland, the search was broadened to include “hearing disorders” and “nursing”. This returned 238 articles within the last 10 years. The search parameters were widened to include articles from the last 20 years and to include research-based articles only which resulted in 316 articles to choose from. After applying the inclusion and exclusion criteria further, one article that focused on audiologists was removed so only 36 articles remained.

Quantitative research studies were critically appraised using the guidelines and appraisal toolkit published by the Public Health Agency of Canada [PHAC] (2014). All qualitative research studies were critically appraised using the Critical Appraisal Skills Programme [CASP] (2018) criteria. These guides were used to develop summary tables for quantitative and qualitative research studies found in the literature search. The literature summary table can be found in Appendix A. The table summarizes the purpose of the study, the design, the methods used, key results, and comments regarding the quality of the study and its limitations. The authors’ names will have a bolded font in the text to indicate that further study details can be found in the table.

Background

Hearing loss has broad definitions that are dependent on varying degrees of loss, onset of the loss and its etiology. The definitions of hearing loss and subsequently the varying degrees of hearing loss will be reviewed as well as the prevalence of hearing loss within our population.

Hearing Loss

Hearing loss is the reduced ability to hear sound that can occur at any age (Health Canada, 2012). In most cases, hearing loss is age related (presbycusis). It can also be triggered by loud noises or infections or may be hereditary. Hearing loss may occur very suddenly, although in most cases it is gradual, and signs of hearing loss can be subtle and surface slowly (CHHA, 2019). The part of the ear involved determines the type of hearing loss. Depending on the cause, hearing loss can be mild or severe, temporary, or permanent, but it is never reversible (HealthLink BC, 2019). Modern technology can make hearing easier and more comfortable again using digital technology such as hearing aids, cochlear implants, and assistive listening devices.

Despite the advances of modern technology, hearing loss is more than difficulty hearing but rather an understanding disorder. Understanding sound requires much more than turning the volume up (Hearing Loss Association of America, n.d). In addition to noise, distance and environment affect hearing ability. High costs of these technologies as well as limited access to care for individuals with hearing loss leave many individuals unable to appropriately diagnose and manage their hearing loss (Funk et al., 2018). The World Health Organization (2020) describes an individual with hearing loss as a person who is not able to hear as well as someone with normal hearing, audiometrically measured as thresholds of 25 decibels or better in both ears. Disabling hearing loss is a loss greater than 40 decibels in the better hearing ear in adults

and leads to difficulty in hearing conversational speech or loud sounds (World Health Organization, 2020).

Culturally Deaf

Not all people with hearing loss choose to avail of modern-day hearing technologies. Individuals who identify as Deaf are a part of a cultural group where most adults consider themselves a member of a non-disabled culture (Middleton et al., 2010). Members of the Deaf culture share many cultural aspects that are unique to their community such as humor, insight, theatrical performances, experiences, and Deaf historical icons (Sheppard, 2014). Culturally Deaf adults are typically born with profound hearing loss, or hearing loss that occurred at an early age, often prelingually (before the onset of speech development). The use of American Sign Language (ASL) is regarded as the foundation of the Deaf culture, and for individuals who identify as Deaf it can be their primary and only form of communication (Lieu et al., 2007). English language proficiency levels can often vary as English is typically learned as a second language within this cultural group. Additionally, English is never aurally reinforced as members of the Deaf community view their deafness as a natural characteristic and choose not to modify this with hearing assistive technology. Some Deaf persons may be fluent in ASL, know little to no English, and scarcely lip read, while others may use limited ASL along with verbal communication and lip reading. This variability may present its own unique cultural and linguistical challenges when communicating with Deaf individuals (Lieu et al., 2007).

Prevalence

Hearing Loss and Aging. Hearing loss is one of the fastest growing health epidemics in Canada. In 2012/2013, the most recent data available, the Canadian Health Measures Survey (CHMS) that included audiometric evaluation to measure hearing loss in the population

concluded that about one in five Canadians aged 20-79, an estimated 4.6 million adults, had audiometrically measured hearing loss (Feder et al., 2015). Measured hearing loss rose sharply after age 40, to reach 65% of people at ages 70-79. For Canadians in the age group 65 years or older, hearing loss is projected to double from 5 million in 2011 to 10.4 million by 2036 (Feder et al., 2017). The prevalence of hearing loss rises with advancing age. Prevalence statistics from Statistics Canada (2016) collected from 2012 to 2015 reported adults aged 60-79 were significantly more likely to have hearing loss (78%) compared with younger adults aged 40-59 (40%) and 20 to 39 (15%). Males (47%) were significantly more likely to have hearing loss compared to 32% of females.

The CHMS reported that for 12% of Canadian adults, hearing loss was mild, and these people would be less likely to be aware of or self-report their hearing difficulty. In Canada, the prevalence of hearing loss has typically been estimated through self-reports. This creates a large disparity between measured and self-reported prevalence that suggests that hearing loss is often underrecognized (Feder et al., 2015). Most Canadians with measured hearing loss were not aware they had any hearing problems (Statistics Canada, 2016). The low self-reported prevalence in both the Statistics Canada (2016) and CHMS report may reflect the insidious nature of hearing loss and the tendency for individuals to unknowingly compensate and/or blame background noise for hearing difficulties, especially in cases of mild or high-frequency hearing loss (Feder et al., 2015).

In 2019, 21.5 % of the population in the province of Newfoundland and Labrador was aged 65 and over. Its median age was estimated to be 47.1 years, which was the highest in Canada. These statistics are indicative of a rapidly aging population in Newfoundland and Labrador. In just a little over 10 years, the median age in the province went from the lowest (31.8

years in 1993) to the highest (40.7 years in 2005) in the country (Statistics Canada, 2019). According to Cloutier et al. (2018), data taken from the Canadian Survey on Disability found that Newfoundlanders and Labradorians with a hearing disability identified as persons whose daily activities were limited because of difficulties with their ability to hear, even with their hearing aid or cochlear implant. Individuals aged 15 years and younger comprised 21.4% of the population with a hearing disability compared to an estimated 9% of those 15-24 years of age, 13.7% of those 25-44 years of age, 29.8% of those 45-64 years of age and 29.5% for the population 65 years and older. While these statistics demonstrate that hearing loss does not only affect the aging population, the likelihood of experiencing years lived with hearing disability increases with age (Cloutier et al., 2018).

Noise Induced Hearing Loss. Noise induced hearing loss is caused by overexposure to loud sounds. In some cases, the damage is only temporary, however repetitive exposure to excessive noise for long periods of time can cause permanent damage (CHHA, 2019). Noise induced hearing loss has mainly been linked to excessive noise in the workplace. With the rise of recreational noise, such as listening to music or mowing the lawn, teenagers and young adults can experience permanent hearing loss caused by over exposure to loud noise from a variety of everyday activities. Statistics Canada (2016) reported 53% of Canadians aged 3 to 79 have used earbuds or headphones to listen to music, movies, or other types of audios within last 12 months prior to taking the survey. One-third of those individuals regularly listened at a volume that was at or above three quarters of the maximum volume (Statistics Canada, 2016).

Not only are Canadians exposed to recreational noises, but noise is also one of the most common occupational health hazards (Canadian Centre for Occupational Health and Safety, 2014). More than four out of every 10 Canadians between the ages of 16 and 79 years reported

being exposed to hazardous workplace noise, either in a present or past job. Of these individuals, 38% of workers (an estimated 4 million Canadians) had some degree of measured hearing loss compared with 33.5% who reported not being exposed to hazardous workplace noise (Feder et al., 2017). Over 11 million Canadians worked in noisy environments in 2012 and 2013, or had done so in the past, and 6.1 million of these people were classified as "vulnerable" to noise (Ramage-Morin & Goselin, 2018). In 2017, Workplace NL, the provincial organization that handles workers' compensation and insurance, reported hearing loss injuries climbed hitting 10.6 people per 10,000 workers (CBC News, 2018). The industrialization of the Newfoundland and Labrador workforce is to blame. Loud industries in the goods producing sector, such as construction and fish processing to name a few, employ over 143,000 Newfoundlanders and Labradorians (Statistics Canada, 2019). The industrialization of the fishing industry in Newfoundland and Labrador has put people who work in fish plants at a risk of being five times more likely to suffer hearing loss. The rate of hearing loss injury in fish processing alone is 46.9 per 100 workers compared to a provincial injury rate of 9.9 (Workplace NL, 2018).

Culturally Deaf. Determining the prevalence of Deaf individuals in Canada, and subsequently in Newfoundland and Labrador, has been difficult to capture. A fully credible census of Deaf people has not been conducted in Canada. The Canadian Association of the Deaf (2015) estimates there are over 357,000 culturally Deaf Canadians. The challenges in capturing prevalence data for this community lies within the lack of accessibility to the census for Deaf people as well as the use of plain language in the census forms. The use of written questions for people whose first language is visual and gestural can often be confusing and intimidating to the Deaf. Additionally, survey or census questions lack cultural sensitivity. Questions typically ask individuals to disclose whether they "self-identify" as having a hearing "disability" or "hearing

loss" which eliminates a large part of the Deaf population who do not view themselves as disabled by the absence of hearing (Canadian Association of the Deaf, 2015).

Literature Review

Hearing loss has been shown to have impacts beyond the physical loss of hearing for many individuals. Epidemiological research has linked hearing loss to having physical and psychosocial implications that nurses should be aware of to adequately assess and manage the care of these individuals. In the last 20 years, many important studies have surfaced linking hearing loss to other disabling comorbidities. Hearing loss can have a huge impact on psychosocial factors that can lead to a reduction in quality of life (Funk et al., 2018). People living with hearing loss can face stigma and isolation and have been found to report a decreased quality of life and dissatisfaction with nursing care.

Physical Impact

Falls. There were three studies that examined the association between increased risks of falls and hearing loss. Of these studies, one was a case control analysis where **Girard et al. (2013)** examined a case group (n=72 newly retired workers admitted to hospital after a fall) and a control group (n=216 workers from other industrial sectors). Two of the studies were cross-sectional designs (Grue et al. 2009; Lin & Ferrucci, 2012). **Lin and Ferrucci (2012)** used a cross-sectional analysis to examine a sample of 2017 community dwelling adults (40-69 years old). Similarly, **Grue et al. (2009)** examined a cross-section of 770 patients over the age of 75 years admitted to a medical ward in an acute care hospital. All the studies utilized different outcome measures to determine fall history and hearing loss. Girard et al. (2013) utilized audiometric data, hospitalization records, and death registries to estimate the risk of falls leading to hospitalization and injuries associated with the falls. Lin and Ferrucci (2012) used

standardized pure tone audiometric assessment and measurement of fall history based on retrospective self-report through interviewer administered questionnaire. Grue et al. (2009) interviewed, assessed the patients and family members, and reviewed hospital records. Grue et al. (2009) did not use standardized audiometric testing to assess hearing loss; hearing loss was considered present if the researcher felt that the patient required a quiet setting to be able to hear normal speech. The data collection period for the study conducted by Lin and Ferruci (2013) was the preceding 12 months from the study initiation, Grue et al. (2009) collected data over three months, and Girard et al. (2013) followed the sample population over the course of 10 years.

Girard et al. (2013) utilized case control analysis, which is a moderate design. It is a high-quality study due to the longitudinal trajectory of the case control analysis. Girard et al. (2013) controlled for confounders by matching each case of hospitalization for a fall with controls to consider socioeconomic variables, general health hazards, and specific occupational risks. Researchers also conducted a sensitivity analysis to control for aging and associated hearing loss (Girard et al., 2013). Two of the studies were cross-sectional studies, which is a weak design (Grue et al. 2009; Lin & Ferrucci, 2012). Lin and Ferruci (2019) was a medium quality study while the research conducted by Grue et al. (2009) was a low-quality study. Lin and Ferruci (2012) adjusted their results for multiple confounders such as demographic factors, cardiovascular factors, and vestibular balance function. In contrast, the study by Grue et al. (2009) did not control for the variability of their sample population, therefore it is unknown whether demographic factors or other variables impacted the results of this low-quality study. Sensory impairments could be underreported in the study by Grue et al. (2009) because the data collection method was based on observations and interviews, not actual hearing measures.

Two studies that examined the association between hearing loss and falls found a significant increase in risk of falls associated with hearing loss (Grue et al. 2009; Lin & Ferrucci, 2012). Lin and Ferrucci (2012) determined that for every 10-dB increase in hearing loss, there was a significant 1.4-fold (95% CI, 1.3-1.5, $p < 0.001$) increase in the odds of an individual reporting a fall over the preceding 12 months of the study period. The cross-sectional study conducted by Grue et al. (2009) found comparable results. They categorized hearing loss by the level of loss but found that even having a mild hearing impairment significantly increased the probability of having one fall (OR 1.5, 95% CI = 1.0, 2.2, p 0.0047). Those that had moderate hearing impairment or greater had an even greater risk (OR = 2.6, 95% CI = 1.2, 5.5, p = 0.009) of falling (Grue et al. 2009).

Girard et al. (2013) examined whether the severity of noise induced hearing loss increased the risk of falls that led to hospitalizations due to falls. The case control analysis by Girard et al. (2013) categorized their sample population into groups based on the severity of the measured hearing loss. Researchers found that there was a significant progressive increase in the risk of hospitalizations due to a fall with increasing degrees of noise induced hearing loss (OR=1.97-CI 95%; 1.001-3.876, p = .0495). Furthermore, this was the only study that examined injuries associated with the falls. Researchers found that injuries among the industrial workers were serious, including 52 cases of fractures and 15 cases of internal trauma to head or trunk. Six of the cases admitted to hospital died during the hospital stay related to the fall, however it was not clear whether the fall was the main cause of death (Girard et al., 2013).

Neither Grue et al. (2009) nor Girard et al. (2013) were able to determine the mechanism behind the association between hearing loss and falls in their studies. Grue et al. (2009) postulated that their results could have been indirectly related to decreased physical activity and

decreased vestibular function, common in older adults. Similarly, Girard et al. (2013) reported circumstances surrounding falls, fall locations, and risk factors were unknown. Lin and Ferruci (2012) however, used more rigorous controls to determine that vestibular balance function did not impact the association between hearing loss and falls significantly.

The results of the two cross-sectional analyses indicated a significant association between hearing loss and falls. However, both studies postulated that this association is only present in older adults (Grue et al. 2009; Lin & Ferruci 2012). Due the research design of the study conducted by Girard et al. (2013) it was determined that hearing loss at a younger age was still associated with falls. Furthermore, the longitudinal case control analysis allowed researchers to observe falls among retired men (mean duration of monitoring period was 6.8 years), who were relatively young when they experienced falls, and of whom a large proportion were likely exposed to noise over a period until they reached retirement age. This directly contradicts the findings of both cross-sectional studies (Grue et al. 2009; Lin & Ferruci 2012) that concluded that there was increasing associations between hearing loss and falls only with increasing age.

Overall, despite the variability of the quality of the research designs as well as their strengths, the evidence from all three studies are indicative of a relationship between hearing loss, falls, and risk of hospitalizations related to falls. A higher incidence of falling in individuals with hearing loss could be contributed to cochlear and vestibular dysfunction which help control balance (Grue et al., 2009; Girard et al., 2013), but their respective contribution to fall risks remains to be determined (Lin & Ferruci, 2012) Furthermore, falls associated with hearing loss can lead to increased risk of hospitalizations and subsequent injuries (Girard et al., 2013). Considering these findings, it is imperative for nurses to recognize potential safety concerns when managing the care of an individual with hearing loss. Further research into associations

between hearing loss and falls for all age groups is warranted to develop nursing care plans that protect the safety of individuals with hearing loss while receiving nursing care and the prevention of injuries due to falling.

Loss of Function. There were three cross sectional studies found that examined the loss of function in individuals with hearing loss (Chen et al., 2014; Dalton et al., 2003; Grue et al., 2009). **Grue et al. (2009)** investigated 770 patients who were 75 years or older with hearing loss in acute care medical wards. **Dalton et al. (2003)** examined a sample of 2,688 community dwelling adults aged 53-97 years. Similarly, **Chen et al. (2014)** retrospectively examined the results of 2,190 well-functioning, community dwelling older adults aged 70-79 years.

Grue et al. (2009) examined the association between hearing loss and loss of daily functioning. Daily functioning was assessed according to instrumental activities of daily living (IADL) such as housework, meal preparation, social life, managing finances, shopping, and the ability to get places beyond walking distance. Hearing loss was considered present if that patient required a quiet setting to be able to hear normal speech. Dalton et al. (2003) assessed health-related quality of life for those with hearing loss by using measures of functions such as activities of daily living (ADL). The Hearing Handicap Inventory for the Elderly-Screening version (HHIE-S) along with additional questions regarding communication difficulties were used to determine perceived hearing handicap. Information on global function was obtained by interview and the Short Form 36 Health Survey (SF-36) was used to assess health-related quality of life. Pure tone audiometry was utilized to assess for hearing loss. Chen et al. (2014) examined whether hearing loss was associated with objectively measured declines in physical functioning. Standardized and validated audiometric assessments were used to measure hearing loss and the Short Physical Performance Battery (SPPB) measured physical performance. Additionally,

researchers conducted interviews every six months on incident physical disability and need for nursing care.

All three studies were cross-sectional studies with a weak design (Chen et al., 2014; Dalton et al., 2003; Grue et al., 2009). However, the studies all varied in their quality of research and subsequent research findings. The study by Grue et al. (2009) was a low-quality study because hearing loss may have been underreported; the study method was based on observations and interviews, and not measures of actual hearing. In an earlier medium quality study, Dalton et al. (2003) utilized a standardized measure of hearing loss to determine the severity of hearing loss, which gave a more accurate depiction of the prevalence of hearing loss among study participants. However, Dalton et al. (2003) utilized subjective measures of data collection in which quality of life, ADLs and IADLs were self-reported, leaving potential for residual confounding by other comorbid conditions. While the large size of the sample gave strength to the analyzes conducted by Dalton et al. (2003), the cross-sectional design of the study made it impossible for researchers to determine if the individuals' hearing loss preceded the perceived reduction in quality of life. In the high-quality study by Chen et al. (2014), their results were robust due to adjustment for multiple potential confounders and sensitivity analyses. Further contributing to the quality of their study was the use of a standardized audiometric testing protocol and objective measurements of physical performance.

Grue et al. (2009) and Dalton et al. (2003) found significant associations between hearing loss and loss of function in everyday life. Grue et al. found that the likelihood for having IADL loss was elevated for moderate hearing impairment (OR 7.8, 95% CI = 2.8, 22.0, $p < 0.001$) compared with mild hearing impairment (OR 1.6, 95% CI = 1.2, 2.3, $p = 0.003$). Dalton et al. found that severity of hearing loss was associated with ADL and IADL impairments in most age

groups. Individuals with a moderate to severe hearing loss were significantly more likely than individuals without hearing loss to have impaired ADL and IADL after age, sex, education, arthritis, other chronic diseases, and impaired visual acuity were controlled for (ADL OR = 1.54, 95% CI = 1.06-2.24, $p < 0.001$: IADL OR = 1.54, 95% CI = 1.18-2.00, $p < 0.001$) (Dalton et al., 2003; Grue et al., 2009). Chen et al. (2014) also found a decreased in physical function using a different measure. Chen et al. observed non-linear declines in SPPB scores that accelerated over time for all hearing groups over the 11-year study period. Baseline SPPB scores were significantly lower in those with mild (OR = 10.14, 95% CI = 10.04-10.25, $p < 0.01$) and moderate or greater hearing impairment (OR = 10.04, 95% CI = 9.90-10.19, $p < 0.01$). SPPB scores were lower in those with mild (OR = 7.35, 95% CI = 7.12-7.58, $p < 0.5$) and moderate or greater hearing impairment (OR = 7.00, 95% CI = 6.69-7.32, $p < .01$) compared to normal hearing individuals. Additionally, Chen et al. determined that hearing loss in older adults was independently associated with poorer physical functioning over a 10-year follow up period, as well as a 31% increased risk of incident disability and need for nursing care in women (Chen et al., 2014).

While the research presented significant associations between loss of function and hearing loss Chen et al. (2014) was the only study that used standardized measurements for hearing loss and objective measurements of physical performance. These findings highlight the need for improved methods of identifying individuals with hearing loss. Improving services to patients with hearing loss such as providing hearing aids and assistive listening devices as well as teaching coping strategies can potentially help mitigate any loss of function associated with hearing loss.

While Chang et al. (2018) found that individuals who have hearing loss have difficulty communicating with health care providers, the lack of controls for confounders made it difficult to determine whether communication challenges was the reason why individuals with hearing loss had increased risks of hospitalization and readmission. None the less, it is reasonable to conclude that hearing loss in individuals that remain underrecognized and untreated could cause barriers to communication between patients and nurses. Hospitals are often noisy, chaotic settings where understanding speech can be challenging for those with hearing loss (Chang et al., 2018). Thus, further investigation into the mechanistic basis behind the higher rates of hospitalizations, readmissions, and its association with individuals with hearing loss is warranted. Attending to hearing difficulties using improved communication strategies by nurses could improve the quality of hospital care.

Comorbidities and Mortality. Two cross-sectional studies were conducted that examined the associations between hearing loss, comorbidity, and mortality. Both studies took place in the Unites States and obtained data from previous prospective observational studies that examined population health (Genther et al., 2014; Pandhi et al., 2011). In a sample of 6524 community dwelling individuals who graduated high school in 1957, **Pandhi et al.** investigated whether those in their sample population with hearing loss were more likely to report decreased satisfaction in care. **Genther et al.** utilized 1,958 older adults greater than 70 years of age in their sample population to determine whether audiometric hearing loss is associated with mortality in older adults. Both studies included measurements of hearing loss, chronic conditions, and cardiovascular risk factors that have been previously found in research to be associated with hearing loss such as hypertension, diabetes mellitus, stroke history and smoking status. Pandhi et al. used telephone interviews followed by a 54-page mail-out, mail-back surveys of participant

self-reports to obtain data. Genther et al. utilized a standardized measure of audiometric assessments to determine the participants' level of hearing loss and information on death was obtained from family members, obituaries, and death certificates. Prespecified algorithms based on self-reported and physician diagnoses, recorded medications, and laboratory data were used to define the presence of chronic diseases. Smoking status and stroke history were based on interview-administered questionnaires (Genther et al., 2014; Pandhi et al., 2011).

Both studies designs were rated as weak designs due to their cross-sectional nature. The study by Genther et al. (2015) utilized a cross-sectional analysis at different points over an 8-year study period. Furthermore, there were robust adjustments made for confounders, which contributed to this medium quality study. The study by Pandhi et al. (2011) was a low-quality study. While Pandhi et al. had a much larger sample size, it should be taken into context as it represents individuals who were attending Wisconsin high schools in the 1950s. Therefore, the results of this study are limited in geographical and racial/ethnic diversity. Additionally, the results are subject to misclassification bias as hearing loss was based on self-report unlike the use of standardized audiometric testing in the higher quality study conducted by Genther et al. (Genther et al., 2014; Pandhi et al., 2011).

Pandhi et al. (2011) found that 18% of men and women that were hard of hearing had a higher mean number of chronic conditions, including atherosclerotic vascular disease, diabetes, depression, and lower self-rated health ($p < 0.001$). In the study by Genther et al. (2014), when confounders such as chronic conditions and depression were controlled for, older individuals with hearing loss had a 20% increased risk of mortality compared with normal hearing. Furthermore, as hearing loss worsened, the hazard of mortality continued to increase, plateauing at higher levels of hearing impairment (Genther et al., 2014). The results indicated that hearing

loss as measured through audiometric testing, was associated with an increased risk of mortality in older adults in the United States, independent of demographic characteristics and cardiovascular risk factors. Future research should be done with stronger research designs that can elucidate the pathways responsible for these associations.

Psychosocial Impact

Communication Barriers. Three phenomenological studies were found that examined the health care experiences of individuals who have hearing loss and identify as culturally Deaf. **Funk et al. (2018)** examined eight older adults who were inpatients on a medical unit in an American hospital. Both **Steinberg et al. (2006)** and **Bennion and Forshaw (2011)** recruited their sample population from community-based hearing loss groups and local support services. An American study, Steinberg et al. (2006) examined 91 Deaf adults ranging in age from 24 to 83 years. Bennion and Forshaw (2011) examined nine British older adults aged 61- 93 years. Researchers used semi structured focus group meetings (Steinberg et al., 2006), semi structured interviews (Bennion & Forshaw, 2011), and opened ended interviews (Funk et al., 2018) to bring forth themes that described experiences and feelings of participants surrounding their hearing and health care experiences. All three studies were deemed to be credible.

Communication was a common theme found by all three studies as participants reported communication challenges in the health care settings or when dealing with clinicians. Feeling embarrassed, isolated, and ashamed of their hearing loss was a frequent reaction to miscommunication and individuals would often avoid social interactions with others (Bennion & Forshaw, 2011; Funk et al., 2018; Steinberg et al., 2006). Participants in the study by Funk et al. (2018) highlighted misunderstandings surrounding receiving medical information, suggesting poor communication between medical staff and the individual. ASL was the primary language of

78% of participants who reported having a poor understanding of instruction from their health care providers in the study by Steinberg et al. (2006). They noted that many participants who utilized speechreading found this method of communication inadequate, even without the use of physical barriers such as surgical masks. Health care providers would often resort to written communication. Differences between syntax of English language and Sign language, coupled with poor handwriting left many feeling misinformed. Some participants reported positive experiences when they could communicate directly with their clinicians in sign language or could avail of medically certified interpreting services (Steinberg et al., 2006).

Funk et al. (2018) described experiences of feeling shame, embarrassment, and unwillingness to disclose their hearing loss for fear of inconveniencing nursing staff. Steinberg et al. (2006) reported that the participants in their sample described fear as a response to the consequences from miscommunication and participants were afraid to speak up. Participants evaluated tone of voice and facial expression cues of health care staff when deciding whether to disclose their hearing loss. Both Funk et al. (2018) and Steinberg et al. (2006) reported that the fast paced, noisy environment of acute care compounded with unfamiliar accents left many feeling vulnerable.

The results from the three phenomenological studies may be difficult to generalize to a larger population of individuals with hearing loss or who are culturally Deafened; none the less, it does not take away from the value of the experiences, and feelings, that participants have lived through. It would be beneficial to improve nurses' understanding of the hospital experience of hearing-impaired adults to accommodate the needs of this population, understand the knowledge level of nursing staff, and mitigate any adverse patient outcomes related to hearing loss.

Stigma. A British study by **Ubido et al. (2002)** used a mixed methods study design to host group discussions with 13 women who were hard of hearing and 14 women who were Deaf Sign Language users. A Canadian cross-sectional analysis by **Woodcock and Pole (2007)** used survey questionnaires from the Canada wide Community Health Survey to collect data from 131,535 respondents. Woodcock and Pole (2007) used questionnaires delivered via phone interviews. The weak design of the cross-sectional analysis by Woodcock and Pole may appear to be strengthened by a large sample size, yet only 4% of respondents identified as having hearing problems. Furthermore, there was potential for a significant bias as those with significant hearing loss or deafness who have difficulty communicating via phone could not adequately be sampled (Woodcock & Pole, 2007). Ubido et al. (2002) used data collected by means of group discussion, backed up with evidence from a questionnaire that researchers developed from their literature review. In the study by Ubido et al., a project leader communicated with the groups with a Sign Language interpreter. The interpreter also translated what was said by the participants to obtain rich descriptions of their experiences and in which of all participants were included, contributing to the credibility of this study (Ubido et al., 2002).

The women in the study by Ubido et al. (2002) reported living in fear of being thought of "dumb" and stigmatized because those who used Sign Language to communicate faced problems understanding simple medical terms. These findings contraindicate the results found by Woodcock and Pole (2007) who noted that those reporting hearing loss did not report less social or emotional support or sense of belonging. These findings should be considered in context of the methods in which researchers collected data, as the participants in the study by Woodcock and Pole (2007) were able to use a phone to communicate. Therefore, their hearing loss may be

less disabling, which could result in participants experiencing feeling less stigmatization and discrimination.

Hearing Loss Issues in Health Care

Assistive Hearing Technology

In the literature, there were five studies that gave varying reports on whether hearing assistive technology such as hearing aids have had any impact on the care received for individuals with hearing loss. There were five studies found; two were cross-sectional analyses (Chen et al., 2014; Genther et al., 2015), two were phenomenological in design (Funk et al., 2018; Steinberg et al., 2006) that reported on the use of assistive hearing devices (AHDs) and one mixed methods study that used qualitative and quantitative data to examine the feasibility of using AHDs in hospital (Kimball et al., 2018). **Kimball et al. (2018)** examined 25 patients in two inpatient neurosurgery and acute care for the elderly units in a hospital and 15 nurses. **Funk et al. (2018)** used a phenomenological design to examine inpatients in a hospital ward experiences with hearing aids and Steinberg et al. (2006) used phenomenology to understand the lived experience of Deaf people who communicate in ASL. **Chen et al. (2014)** and **Genther et al. (2015)** reported on hearing aid use of community dwelling adults.

In the study conducted by Kimball et al. (2018), the Hearing Handicap Inventory for the Elderly Screening Version (HHIE-S) instrument was used to screen patients' perception of hearing handicap. The HHIE-S is an easy to administer, 10 item questionnaire, tested for internal consistency and reliability (Kimball et al., 2018). They also used patient and nurse surveys to evaluate participants' satisfaction with the AHD, participant interest in using it again in future hospitalizations, nurse satisfaction of the AHD, and their appraisal of its effect on productivity when providing care to a patient using the device. In the studies by Chen et al. and Genther et al.

hearing aid use was self-reported as researchers examined the impact of hearing aid use on physical decline and risk of hospitalization. The two phenomenological and one mixed methods study found examined whether the lived experiences of individuals who self-reported hearing loss was impacted by hearing aid use (Funk et al., 2018; Kimball et al., 2018; Steinberg et al., 2006).

The study by Kimball et al. (2018) was the only study that specifically examined the use of AHDs in acute care setting for patients with hearing loss. However, due to the mixed methods study design the strength of the cross-sectional analysis within the study was weak. The study by Kimball et al. (2018) is a low-quality study because hearing loss was self-reported, high turnover of patients made it difficult to obtain patients that could use the device for more than one day, and high turnover of nursing staff made it difficult for nurses to be aware of the study and implement the AHDs among patients. Instruments used to evaluate patient and nursing appraisals were specifically designed for this study and did not undergo any testing for external validity.

Kimball et al. (2018) found that 24 out of the 25 participants in their study reported that AHDs helped them to hear the conversation directed towards them by health care providers. These same participants expressed interest in reusing this device in future hospitalizations. The AHD proved to be safe to use and easy to implement. Participants also expressed the desire to purchase an AHD for home use prior to being discharged. One individual expressed dissatisfaction with the AHD, however this participant reported wearing hearing aids prior to enrollment in the study and ranked their hearing handicap to be significant with the HHIE-S. The 15 nurses in the study reported the AHD was beneficial and that they spent less time communicating with patients. The nurses also felt use of the AHDs resulted in some time savings and would recommend it in future care (Kimball et al., 2018). Kimball et al. (2018) reported that

a prevalent concern among patients who received an AHD during their hospital stay was the cost of using the AHD. Consistent reassurance was needed to ensure patients understood that the AHD was free to use.

All the other studies found except for Kimball et al. (2018) did not specifically examine hearing aid/AHD as an outcome measure in their research rather they examined whether use of these devices was influential on their findings. Concerns over hearing aid use in acute care were also expressed in the phenomenological study by Funk et al. (2018). Participants discussed how they opted to leave their hearing aid at home if they were admitted to hospital out of concern over loss and replacement costs. The Deaf adults in the study sample by Steinberg et al. (2006) felt differently towards hearing aid use. They favored knowledge on communication techniques, provision of interpreting services for the Deaf, and practitioners who tried to improve communication over assistive technology use. These findings are not surprising as culturally Deaf individuals historically prefer to use sign language and using hearing assistive technologies is not aligned with their cultural values or beliefs.

Furthermore, the use of AHDs did not impact physical outcomes for individuals with hearing loss in two studies. The use of AHDs did not improve outcomes related to effects of hearing loss on mortality (Genther et al., 2015) or function (Chen et al., 2014). The findings from these studies make it difficult to conclude whether the use of AHDs in a hospitalized setting would have any impact on the quality of nursing care and patient experiences. The results of the one study (Kimball et al., 2018) that examined the feasibility of AHDs in an acute care setting need to be considered in the context of a small group of individuals in which the AHDs were beneficial for that group in that setting. Individuals with cochlear implants cannot utilize the AHD, and high volumes of background noise would render the AHD ineffective. Additionally,

the AHD requires a patient to be able to self-regulate the device decibel level, and to turn it on and off, so only patients who are completely alert and orientated will be able to utilize the device safely (Kimball et al., 2018). AHDs are not feasible for all patients, nor is it always economically feasible to be able to provide every inpatient with hearing loss an AHD. It is important to acknowledge that AHDs are only appropriate for a specific cohort of patients with hearing loss (Kimball et al., 2018).

Health Care Costs

With the increased prevalence of comorbidities, mortality rates, and hospitalizations amongst the hearing loss population, the financial impact of hearing loss both personally and economically, if unaddressed, could be burdensome. A cross-sectional study by **Foley et al. (2014)** was found that used self-reported hearing loss to measure hearing related quality of life to determine whether hearing loss was associated with higher medical care expenditures. Monetary outcomes were measured as total health care expenditures and components of care were adjusted to reflect inflation in the year 2012, as data was collected from a community-based survey from 2000-2010. While the research design was weak due to the cross-sectional study design, the study by Foley et al. was a medium quality study due to their large sample size of 34,981 adults aged 65 years and older.

Foley et al. (2014) found that 23.7% of individuals who self-reported a hearing loss was independently associated with higher total medical expenditures. These results were applied to the population of individuals with self-reported hearing loss in the United States aged 65 and older in 2010 (7.91 million). Furthermore, Foley et al. (2014) estimated that hearing loss was associated with approximately $3.10 billion in excess total medical expenditures in the United States by the year 2012. These results are important to consider with the earlier findings of this

literature review that reported that individuals with hearing loss have increased likelihood of comorbidities, hospitalizations, and readmissions to hospitals (Foley et al., 2014). Nurses are expected to be fiscally responsible and accountable for the provision of health care services. Nursing strategies aimed at addressing the health care needs of individuals with hearing loss can prevent the economic burden associated with increased hospitalizations among this population.

Quality of Care

Miscommunication. Two cross-sectional studies (Barnett et al., 2013; Smith et al., 2020) and a phenomenological inquiry (Sheppard, 2014) examined how miscommunication impacted the quality of health care for individuals with hearing loss. The cross-sectional studies examined 2,096 Medicare beneficiaries with hearing loss in communities and institutions (Barnett et al., 2013) as well as 272 hospital-based primary (physicians) and secondary (nurses, speech and language therapists, occupational therapists, physiotherapists) care providers working in the areas of geriatric and palliative medicine (Smith et al., 2020) respectively. **Barnett et al. (2013)** drew on raw data from the 2004 Medicare Current Beneficiaries Survey (MCBS) to assess individuals ranging in age from 22-103 years satisfaction with care. **Smith et al. (2020**) examined communication strategies with patients with age related hearing loss, the quality of patient care, and medical errors through a survey questionnaire. **Sheppard (2014)** used phenomenological inquiry to examine the lived experience of nine culturally Deaf adults living in the community. Sheppard used a series of three hermeneutic interviews with the aid of a Sign Language interpreter to elicit common stories and experiences with quality of care shared by Deaf individuals aged 21- 62 years.

Both cross-sectional studies used a weak study design. Barnett et al. (2013) was a low-quality study due to the use of self-report scales to obtain data from the MCBS. While this is a

convenient and cost-effective means of acquiring information from larger sample populations, the reliability of self-report scales can be questionable. The concern implies that respondents may either under-or over-estimate their health status, and degree of hearing loss and disability, thereby providing misleading responses. The low-quality study by Smith et al. (2020) experienced a similar limitation to their study. Medical errors speculated to have been made by health care providers were measured by self-report leaving the possibility for bias, and there was a lack of clarity around the precise nature of medication errors reported. The study by Sheppard (2014) was credible as researchers underwent self-reflection prior to participant interviews to eliminate any prejudice or preunderstanding that could bias the study results. Furthermore, researchers conducted analyses throughout the interview process to derive themes and rigor was established.

The participants in the study by Sheppard (2014) reported that differences in communication, culture, and linguistics between health care providers and themselves often lead to misinterpretation, misdiagnosis, and stereotyping. They described feeling confused and not understanding medications they were prescribed. They also described lack of understanding when undergoing examinations and procedures. One participant in the study shared a personal story in which she underwent a pelvic examination. Without understanding the context of the story that she described for researchers, her descriptions are not unlike a description of a woman recounting an experience of sexual assault. Miscommunication created confusion, misunderstanding, resentment, and frustration. Often, Deaf adult women were reluctant to seek health care because of miscommunication leading to poor health outcomes and substandard care to those with normal hearing (Sheppard, 2014).

Similar findings were found in the study by Barnett et al. (2013) where Medicare beneficiaries with hearing loss, because of communication breakdown, were less satisfied with the information provided to them about what was wrong, and the follow-up care received after initial treatment. Physicians may not obtain sufficient information allowing for an accurate diagnosis, which could lead to unnecessary testing and ineffective treatment. Conversely, patients often misunderstand medical information presented by the physician resulting in poor adherence to treatment recommendations and undesirable clinical outcomes (Barnett et al., 2013).

Not only was miscommunication found to cause lack of understanding in patients, but they have also led to medical errors with negative consequences. In the study by Smith et al. (2020), 29% of health care providers stated that hearing loss in older patients resulted in errors without negative consequences to patients at least "a couple of times a year". Approximately 15% of participants indicated age related hearing loss led to clinicians making mistakes with negative consequences to patients, and over 10% of respondents with prescribing authority confirmed that hearing loss resulted in medication errors at least "a couple of times" during the previous year. There were no differences between primary and secondary care providers with respect to patient safety ($p > 0.05$) (Smith et al., 2020).

These results are concerning as miscommunication secondary to hearing loss weakens overall quality of care and may initiate errors leading to patient harm. Quality of health care relating to poor communication is highlighted within these studies results and both individuals with hearing loss and health care providers recognize there is a problem. Miscommunication has a negative impact on the quality of care provided to individuals with hearing loss and these

findings highlight the importance of modification of communication strategies to address this deficit in patient care.

Satisfaction with Care. One cohort study (Mick et al., 2014) and three cross-sectional studies (Barnett et al., 2013; Pandhi et al., 2011; Reed et al., 2019) were found that examined the level of satisfaction of care that individuals with hearing loss experienced. The cohort study conducted by **Mick et al. (2014)** comprised 122,556 American adults aged 18 or older. Participants were organized into analytical cohorts based whether they had a presence (n= 9747) or absence (n=112,809) of hearing loss. **Reed et al. (2019)** conducted a cross-sectional analysis on 248 Medicare beneficiaries with hearing loss aged 67-89 years. An earlier discussed study by **Pandhi et al. (2011)** followed up with 1,203 individuals who completed a survey while they were high school students in 1957. **Barnett et al. (2013)** examined 2,096 Medicare beneficiaries with hearing loss. Audiometric testing to measure hearing loss was conducted in the study by Reed et al. whereas in the three other studies hearing loss was self-reported (Barnett et al., 2013; Mick et al., 2014; Reed et al., 2019).

Mick et al. (2014) measured the perception of patient-physician communication with the Consumer Assessment of Health care Providers and Systems, a numeral rating from 1-10 of worst overall care (1) to best overall care (10). The outcome measures for two of the cross-sectional studies examined participant satisfaction with quality of care through in person interviews (Barnett et al., 2013; Reed et al., 2019). Pandhi et al. (2011) measured patients' overall satisfaction with access to care by interviewing individuals over the phone.

The cohort study (Mick et al., 2014) was a moderate design while the cross-sectional studies were weak designs. All four studies were medium quality. The control for confounders such as depression, contributed to the medium quality of the study conducted by Pandhi et al.

(2011) as depression is known to have an important impact on satisfaction with access to care. Pandhi et al. used a sample that was selected from a group of high school students from over 60 years ago. This limits the generalizability of results as individuals with hearing loss within other ethnic/cultural backgrounds than that of a predominantly Caucasian sample are not represented. Interestingly, when conducting their telephone interviews, Pandhi et al. excluded people who reported regular hearing aid use and who have no problems hearing conversations (Pandhi et al., 2011). This limitation is like that found in the study by Reed et al. (2019), who used standardized hearing testing in their small sample (n=248). Their results were limited due to demographic homogeneity, which limited the generalizability of the study results.

All the measured variables in the study by Barnett et al. (2013), Pandhi et al. (2011) and Mick et al. (2014) were based on self-report of hearing loss, which limits the reliability of the study results, exposure misclassification, and the possibility of residual confounding. Reed et al. (2019) used standardized hearing testing. This is concerning as individuals could potentially over- or under-estimate their hearing abilities through a biased self-report.

Hearing loss was independently associated with lower ratings of patient physician communication and overall satisfaction in quality of care (Barnett et al., 2013; Mick et al., 2014; Pandhi et al., 2011; Reed et al., 2019). Two studies reported on levels of satisfaction with care and had similar results. From the analytical cohort in the study by Mick et al. (2014), 9,747 individuals with hearing loss had approximately 6% lower odds of having favorable ratings of their health care experiences (OR = 0.94, 95% CI = 0.89-0.99; p = .02) than individuals with normal hearing. Reed et al. (2019) found that 72% of participants reported being very satisfied, 22% reported being somewhat dissatisfied, 3 % somewhat satisfied, and 3% very dissatisfied with their medical care over the past 12 months. Reed et al. also examined the impact of age on

satisfaction with care and found that there was a significant interaction ($p = 0.033$) between hearing loss and age as those with hearing loss had a greater odd of being less than optimally satisfied among the older adult age group. However, hearing loss did not affect satisfaction with care among younger participants. Researchers speculated that younger adults are better able to cope with hearing loss's impact on their cognitive load (Reed et al., 2018). Individuals with hearing loss may have greater difficulty understanding or engaging in discussions with their physicians, especially in context of noisy environments or unfamiliar medical concepts and terminology. These factors potentially affect the quality of the patient provider communication and overall rating of health care (Mick et al., 2014).

Two studies examined satisfaction with access to care in addition to satisfaction with care. Barnett et al. (2013) found that individuals with hearing impairments were less likely to be satisfied with their access to and satisfaction with care in the study. As expected, those reporting greater levels of hearing impairments and communication challenges expressed more difficulty in having questions answered about their treatment or prescription (Barnett et al., 2013). Pandhi et al. (2011) found similar results in their study sample where 13% of individuals with hearing loss reported difficulties and delays in health care access as compared to 8% who were not hard of hearing ($p<0.01$). Additionally, their satisfaction with access to care was significantly lower than those with normal hearing ($p<0.01$). Predictors of reporting difficulties and delays in accessing care were increased number of chronic conditions and having significant depressive symptoms (Pandhi et al., 2011).

The findings of these studies are indicative that individuals with hearing loss have lower quality health care experiences and have greater difficult accessing care. These results could severely underestimate actual disparities in access to care and quality of care due to self-reported

data, limited generalizability, and lack of demographic heterogeneity within the samples found in the studies. The results also indicate that these challenges are not just limited to the elderly population but rather people of all ages with varying degrees of hearing loss accessing health care services. It should be a consideration of future research to evaluate objective measures of health care quality. In addition to this, strategies for managing different degrees of hearing loss among different age groups with respect to multiculturalism and ethnic minorities should be explored.

Educational Needs

Nurses in acute care are in a unique position to provide hearing screening services to a large segment of the population and to participate in assessment of their hearing health risks and functional hearing status (McCullagh & Frank, 2012). However, the literature review has highlighted knowledge gaps in areas of assessing and screening for hearing loss, communication strategies and assistive hearing devices. Furthermore, there is a need for education and training beginning at a student level as well as training for nurses in practice caring for patients with hearing loss.

Knowledge Gaps

Hearing Loss Assessment. For hearing loss to be addressed, and for the provision of focused care for individuals with hearing loss, it needs to be detected so that it can be managed. Two cross-sectional studies (Heron & Wharrad, 2000; McCullagh & Frank, 2012) and a phenomenological study (McShea, 2015) were found that examined nurses' competence in assessing and caring for patients with hearing loss. A British cross-sectional study by **Heron and Wharrad (2000)** examined 20 nurses, nurses' assistants, and 21 patients. **McCullagh and Frank (2012)** utilized a cross-sectional retrospective audit of selected patient records at two

nurse managed primary care clinics in Midwest, United States of America. A review of 30 cases was completed; women accounted for 77% of cases and 23% of cases were men ranging from 18-68 years of age. A phenomenological study conducted by **McShea (2015)** used semi-structured interviews to collect data from 13 primary care practitioners, eight of which were practice nurses. Heron and Wharrad (2000) tested patients' hearing using audiometric hearing examinations and self-completion questionnaires to investigate nursing knowledge of assessment and care of hearing-impaired patients. McCullagh and Frank (2012) used a patient record audit tool and a systematic manual review of written (non-electronic) patient records to retrospectively capture the extent to which primary care providers screen adults for hearing loss. McShea (2015) used interviewed nurses to obtain rich descriptions of nursing experiences, knowledge of hearing loss and referral procedures.

Both cross-sectional analyses were of weak design and are low-quality studies. Heron and Wharrad (2000) used audiometric assessment to determine the level of hearing loss within their patient sample but had poor response rates on nursing and patient questionnaires, and high exclusion rates for their study limiting the conclusions that can be drawn from their results. Furthermore, the researchers stated their questionnaires were piloted before use in the study but did not indicate whether their data collection tool was testing for reliability or validity. It is possible the methods utilized by the nurses in the study by Heron and Wharrad (2000) to assess for hearing loss are not sensitive enough to detect a mild or moderate loss. The patient record audit tool used by McCullagh and Frank (2012) was reviewed for content validity. A small sample size and retrospective analysis of patient records is dependent on excellent record keeping which is subject to variability among individual healthcare providers contributed to this lower quality study. The credible qualitative research conducted by McShea (2015) used

thematic analysis to interpret interviews into themes that were further coded and cross-checked with the original data set to ensure authenticity.

Heron and Wharrad (2000) found that 86.7% of the nursing staff stated that an assessment of hearing ability was included as part of a routine patient assessment. All nurses considered both nursing and medical staff to be responsible for conducting an assessment on hearing ability. Some common methods used to assess the patients were through conversation, observing whether an individual wore a hearing aid, asking the patient directly, asking relatives, checking medical history/notes, checking medication, and checking ears for accumulation of wax. Compared to the audiometric results of the patients in the study, the nursing staff were largely unaware of their patients' hearing ability as 61.2% of the assessments conducted were incorrect. Nursing staff reportedly found that rating the degree of hearing impairment was more difficult. However, despite 38.5% of nurses who were not sure of the degree of impairment there were 53.8% correct assessments and only 7.7% of incorrect assessments (Heron and Wharrad, 2000).

McCullagh and Frank (2012) found in all 30 patient cases, an assessment of the structure of the auditory system had been completed. However, the nurses had not reviewed or recorded the functional hearing status. Subsequentially, there was no documented data to determine which functional assessment tool was used by nurses to assess hearing loss. The audit showed that in some instances, nurses obtained a visual of the inner ear with an otoscope and completed a patient review of medications that were potentially ototoxic. The documentation for the patient encounters varied. In all instances a health history was obtained. Alcohol use and smoking status was assessed in most cases along with employment history. There were no patient records that indicated use of hearing protective devices, or determination of work history beyond current

employment. Additionally, there was no assessment of environmental noise exposure. These findings are problematic as most nurses are reporting they are completing hearing assessments, the nursing staff in these studies were largely unaware of their patients' hearing ability or degree of hearing impairment. This is indicative of a lack of consistency in nursing assessments of hearing loss and nurses need an improved understanding of how to conduct hearing assessment, testing, and documentation.

McShea (2015) found that aside from asking if a person could hear well, nurses did not know how to approach the issue of hearing difficulty. Many interviewees admitted they do not actively look for hearing loss. Reported assessment strategies to determine if an individual had hearing loss would be monitoring whether the person asked for frequent repetition during the nursing consultation or turned their head when questions were asked. However, all practitioners admitted they had limited knowledge of hearing loss. Nurses felt they did not have knowledge of completing a hearing assessment or knowledge on how to approach the issue of hearing difficulty (McShea, 2015). Researchers postulated this lack of knowledge could lead to a lack of confidence in assessing and detecting hearing loss.

Despite the low quality of these studies, the findings suggest that nurses do not understand how to appropriately screen for hearing loss, and do not understand the consequences if hearing loss goes undetected. This was influenced by lack of knowledge, poor attitudes, and prior assumptions (McShea, 2015). Educational opportunities and training can give nurses a better understanding of the prevalence of hearing loss in the general population and how to assess their patients appropriately for hearing loss.

Screening Methods. There were two studies found that explored whether primary care providers ever asked about or screened for hearing loss among patients. **Wallhagen and**

Pettengill (2008) conducted a longitudinal mixed method American study where 91 participants aged 60 or older were recruited from primary care clinics/centres that performed hearing evaluations. **Smith et al. (2016)** examined 510 hospice and palliative care providers in a cross-sectional analysis of which 50 participants were nurses and 48 were nurse practitioners. Wallhagen and Pettengill (2008) interviewed primary care providers to determine if they had ever inquired about or initiated screening for hearing loss. Subjective hearing among patients was measured using the 10-item (Short Form) version of the Hearing Handicap Inventory for the Elderly (HHIE-S). Participants rated the emotional and social impact of hearing loss and higher scores suggested individuals experienced their level of hearing loss as a handicap. Objective hearing loss was measured using audiograms. Smith et al. (2016) utilized a national survey to measure the perceived impact of hearing loss on quality of care, screening and audiology referral practices, and comfort with and training in caring for patients with hearing loss.

The cross-sectional analysis by Smith et al. (2016) had a weak design as was the cross-sectional analysis of the mixed methods study by Wallhagen and Pettengill (2008) who used cross-sectional analysis and participant interviews in their study. Wallhagen and Pettengill utilized standardized and validated subjective and objective measures of patient hearing and utilized which gave the cross-sectional analysis in their study a medium quality. Interviewers used a constant comparative qualitative method to find themes in the credible qualitative analysis of this study. However, rates of primary care provider hearing inquiry and screening for patients was based on participants' recall and self-report which could not be verified by any other means (Wallhagen and Pettengill, 2008). The study by Smith et al. (2016) was a low-quality study as their data was collected using a questionnaire which was not a validated survey tool. Additionally, a convenience sample was used and only those involved in hospice and palliative

care were contacted. It is possible that health care providers outside of this area of nursing would respond differently or that those who replied were more likely to believe hearing loss was an issue.

Quantitative findings of the study by Wallhagen and Pettengill (2008) were that 85% of participants could clearly recall that their health care provider never proactively inquired or screened them related to objective or subjective levels of hearing loss. Whether the primary care provider did or did not inquire about or screen for hearing loss was unrelated to either the subjective level of reported hearing loss or the objective level of hearing loss that was determined by audiometric testing (Wallhagen & Pettengill, 2008). Qualitative findings of the study determined that most participants were often the ones to initiate the discussion regarding their hearing loss as they wished to have further evaluation.

There were similar findings in the study by Smith et al. (2016) where low rates of hearing loss screening were found to be reported among health care professionals. Of their sample, 87% of the primary care providers reported not screening for hearing loss. Among the 13% of care providers who did screen, the most common method of screening was asking the patient if they have hearing problems (89%), followed by asking friends or family if the patient has hearing problems (78%), the whisper test (59%), the finger rub test (35%), and using a handheld audiometer (9%). The most common reasons for not screening were feelings of not knowing how to screen, screening was low on the priority list, participants felt confident they could detect hearing loss when talking to people, participants felt people would self-disclose if they could not understand what the provider was saying, and screening was too time consuming. In both studies, data were not available to eliminate the possibility the health care providers had already

received an earlier hearing evaluation or report indicating the presence of hearing loss and thought it ineffective to perform additional screens.

These findings suggest that the low rate of provider inquiry did not appear to be associated with the level of hearing loss or patient age but rather an assessment gap that can have significant negative consequences. Considering the limitations of these studies, the results provide important information for nurses working with individuals with hearing loss and raise questions for clinical practice and future research. The nursing profession is uniquely positioned within the health care system to take a leading role in overcoming assessment disparities by initiating screening and providing information that will facilitate effective and timely treatment in primary care settings (Wallhagen & Pettengill, 2008).

Communication Strategies. It is therefore important nurses are quickly able to determine the presence of a hearing loss to ensure that measures are being taken to maximize a person's ability to communicate (Heron & Wharrad, 2000). Two cross-sectional British studies (Heron & Wharrad, 2000; Middleton et al., 2010) and one cross-sectional American study by **Smith et al. (2016)** were found that highlighted some inconsistencies between perspectives on communication between nursing staff and patients. **Heron and Wharrad (2000)** examined 21 patients and 20 nursing staff on an inpatient elderly adult ward, and **Middleton et al. (2010)** reached out to 5250 potential participants of varying ages, audiological levels, perceptions, and experiences of deafness. The sample population in the earlier discussed low-quality study by Smith et al. (2016) consisted of 510 health care providers of which there were 98 nurse/nurse practitioners. Heron and Wharrad (2000) and Smith et al. (2016) used survey questionnaires to investigate nurse knowledge of assessment and care of patients with hearing loss. Middleton et

al. (2010) developed a nonstandard questionnaire to determine deaf individuals' preferred mode of communication.

All three cross-sectional analyses found were a weak design (Heron & Wharrad, 2000; Middleton et al., 2010; Smith, 2016). Both Smith et al. (2016) and Middleton et al., (2010) were low quality studies given that the tools used only had face validity; they were not standardized or reliable tools of measurement. Heron and Wharrad (2000) experienced similar limitations. which contributed to the low quality of their study. The researchers did use objective audiometric testing within their patient sample, yet their survey measuring nurse knowledge of assessment and care of patients with hearing loss was a self-report. Furthermore, testing of audiometric data of patients was to determine patients' actual measure of hearing loss and the nurse's ability to assess the level of loss accurately.

One study reported on the communication preferences of individuals with hearing loss when communicating with health care providers. In the study by Middleton et al. (2010), there were 999 questionnaires returned that represented individuals with hearing loss who use speech and sign language as their main preference of communication in a hospital setting. A total of 11% of respondents preferred to use sign language within everyday life, 70% used speech and 17% used a mixture of speech and sign. In the clinical setting, 50% of the sign language users preferred to have a consultation via a sign language interpreter, and 43% indicated they would prefer to only have a consultation directly with a signing health professional. Only 7% of respondents would accept a consultation in speech if there was good deaf awareness from the health professional. Good deaf awareness was indicated by a knowledge of lip-reading/speechreading. Of the deaf speech users, 98% preferred to have a consultation in speech

and of this group 71% indicated they would only accept this if the health professional had good deaf awareness (Middleton et al., 2010).

Results from two studies are indicative of inconsistencies of some degree in communication between nursing staff and patients (Heron & Wharrad, 2000; Smith, 2016). Three studies reported on communication challenges between nurses and patients. In the study by Heron and Wharrad (2000), a total of 75% of nursing staff correctly reported patients had problems communicating. Of the 21.4% incorrect assessments, 11 out of 20 nurses felt there were no communication problems although a problem was identified by the patients. Additionally, five nurses stated there was a problem where the patients felt none existed. Smith et al. (2016) reported that 61% of palliative care health care professionals felt either comfortable or very comfortable with their communication skills for older patients with hearing loss. From the study sample, 62% of health care professionals felt comfortable communicating despite 78% of them having no formal training. Participants reported that 49% were unfamiliar with resources and 57% were unaware of assistive hearing devices such as a pocket talker. Many nurses reported speaking in a person's ear or talking to a caregiver instead, which are both non recommended methods of communication thus it is questionable to find such high levels of self-reported proficiency in communication skills. It may seem appropriate to speak into an individual's ear when they have difficulty hearing, but such strategies prevent the individual from speechreading and obtaining visual cues from facial expressions. Additionally, directing conversation towards the caregiver further isolates the individuals and limits their autonomy in participating fulling in their health care decisions (Smith et al., 2016).

Researchers of these studies found that communication between health professionals and patients with hearing loss/deafness is often exchanged without knowledge and understanding of

the deaf person's communication needs or preferences (Heron & Wharrad, 2000; Middleton et al., 2010). It might be assumed that a deaf speech user is content with their hospital consultations in speech, and a deaf Sign Language user would prefer to use a Sign Language interpreter. Lack of knowledge on effective communication for individuals with hearing loss may not be seen as a strategy when developing a specific care plan for patients with hearing loss (Heron & Wharrad, 2000). These findings highlight the lack of knowledge and understanding of fundamental communication strategies, despite the high levels of proficiency in caring for individuals with hearing loss reported by nurses. Furthermore, the findings indicate that patient focused communication strategies for individuals with hearing loss is unaddressed in educational and training programs.

Hearing Devices. There was one cross-sectional study found that examined nursing competence in caring for hearing devices (Heron and Wharrad, 2000). The low-quality study by **Heron and Wharrad (2000)** examined audiometric data for 21 patients and interviewed 20 nursing staff to find that there was limited equipment available on the wards to assist hearing impaired patients. Of the 20 nurses who participated in the study, 66.7% were confident in their ability to correctly put in a hearing aid, and 33.3% reported feeling very confident. Some respondents were unsure of their ability to clean a hearing aid, but the majority felt confident they could do so. Respondents also reported high confidence levels in changing a hearing aid battery (Heron & Wharrad, 2000). The findings of this study suggest that nursing staff are confident in the abilities of managing hearing aids in patients. These results are concerning because a large part of hearing aid management is cleaning and adjusting the correct settings for use in the ward environment. Yet, 40% of nurses reported feeling unsure of their abilities to clean a hearing aid (Heron & Wharrad, 2000). The generalizability of this study is limited by the

small sample of nursing staff and patients recruited. Furthermore, out of the 20 nurses who participated in the study, only 11 questionnaires were returned and there was only a 50% response rate of patient questionnaires. Therefore, the results cannot speak to nursing proficiency with hearing devices.

Student Education

The literature review suggests that caring for the specific needs of patients with hearing loss is unaddressed in most educational programs for nurses. Nurses learn to utilize effective therapeutic communication techniques and skills as students. The academic and clinical preparation of nurses is critical to equip them with the knowledge, attitudes, and skills necessary for providing high quality care for those with hearing loss. **Adib-Hajbaghery and Rezaei-Shahsavarloo (2014)** conducted a cross-sectional study of 71 senior nursing students in a nursing school in Iran. The researchers investigated nursing students' knowledge of and performance communicating with patients with hearing impairment using a demographic and knowledge questionnaire and a performance assessment checklist. In this two-stage study, students conducted an interview with a simulated patient with hearing impairment who experienced chest pain. The students' performance was evaluated by one of the researchers during the simulation. In the second stage, students answered a knowledge questionnaire about communicating with patients with hearing impairment.

Due to the cross-sectional analysis of the study, the study was a weak design. The small sample and limitations to one nursing school affected the generalizability of this medium quality study. The results are like the other studies examined in this review in which nurses have a lack of knowledge and skills required for effective communication in clinical practice. Students had little to no previous experience in communication training for patients with hearing loss, and

only 11.3% of them had a history of caring for a patient with hearing loss in the clinical setting. Most students (75%) felt they had a moderate ability to diagnose and meet the needs of these patients, and 25% believed they had a low to very low level of ability in this regard (Adib-Hajbaghery & Rezaei-Shahsavarloo, 2014). Adib-Hajbaghery and Rezaei-Shahsavarloo (2014) found that none of the students had a very good level of knowledge and performance in communicating with a patient with hearing loss. Only 14.1% of the students expressed that asking the patient is the best way of receiving feedback from a patient with hearing loss, whereas 63.4% preferred to ask the patient's relatives. Furthermore, 74.6% selected the wrong choice on the knowledge questionnaire on the first step in dealing with patients with hearing loss. There was a significant correlation observed between the mean scores of knowledge and performance of the students in communicating with patients with hearing loss ($p = 0.004$, $r = 0.34$). Additionally, students did not introduce themselves, did not assess the severity of hearing loss in the patient, and did not ask the patient about the best way of communication. It was noted that some students tried to use lip movements and writing methods to communicate, yet only a small portion of students attempted to be faced to face with the patient throughout the simulation.

The performance of the students in this area may not be only attributed to deficiencies in nursing curricula but also to the lack of adequate practical and clinical training with patients with hearing loss (Adib-Hajbaghery & Rezaei-Shahsavarloo, 2014). Hearing loss education and training could be initiated in nursing school where the foundation for focused communication strategies for patients can be learned and practiced as a student. Future research should focus on larger scale studies which could be comprised of different and larger nursing schools to examine the effectiveness of hearing loss education and training in early nursing education.

Nursing Education and Training

There were two studies found that were conducted to examine the effectiveness of communication training for nurses (Nørgaard et al., 2013; Ruesch, 2018). In an uncontrolled before and after study conducted in Denmark, **Nørgaard et al. (2013)** conducted a three-day communication skills training course for 181 staff members. Nurses from an orthopedic surgery department comprised 102 of the sample. **Ruesch (2018)** conducted a cross-sectional analysis on a larger sample of 339 Registered Nurses working in a community hospital in the United States.

In the uncontrolled before and after study (Nørgaard et al., 2013), the effect of the training was evaluated by means of a questionnaire in which nurses measured their self-efficacy with a focus on communication. The questionnaire was filled out before, immediately after, and a six month follow up after the course. The goal of the training course was to enhance the participants' communication skills to improve accuracy, efficiency, and supportiveness. Ruesch (2018) used a knowledge assessment tool, developed, and validated by the researchers, to measure the nurses' knowledge across four areas: hearing impairment, hearing aids, communication strategies, and accessibility to care for a person with hearing loss (Ruesch, 2018).

Both studies had weak designs (Nørgaard et al., 2013; Ruesch, 2018). The study by Nørgaard et al. (2013) was a low-quality study as the sample was small and their outcome measure of self-efficacy was measured by a self-rated questionnaire leading to a potential bias of results. In their medium quality study, Ruesch (2018) used a larger sample size and the use of a validated measurement tool to collect data on the knowledge level of nurses. The participants were not prompted by the knowledge assessment tool to indicate what type of educational intervention was completed, when the course was taken, and the type of course content covered

if they completed one. This could have provided valuable insight and knowledge on nursing education for the care of individuals with hearing loss (Ruesch, 2018).

Two studies examined how nursing education and training in hearing loss can impact nursing care. Nørgaard et al. (2013) designed a training course to ensure that the skills learnt were immediately applicable in the health care professionals' clinical practice. During the first two days of the course, the structure and principles for patient-centered communication was presented, elements of an effective interview were covered, and role playing was used to provide practice applying the learned principles. The training focused on role-plays addressing psychological reactions from patients, passing on bad news, problematic discussions with colleagues and communication with relatives (Nørgaard et al., 2013). Nørgaard et al. found that nurses had identical baseline self-efficacy scores on communication with patients or colleagues compared to physicians or other healthcare professionals. Nurses had a significant improvement from baseline assessment of communication efficacy skills with patients and with colleagues right after the training course ($p = 0.001$) and again in six months ($p = 0.001$). A downfall to the study is that it is unknown whether perceptions in self-efficacy improved communication technique in practice. The study demonstrates that communication skills training can produce significant and durable increases in self-efficacy of nurses in relation to communication with both patients and colleagues.

The study by Ruesch (2018) found knowledge deficits in all four areas of knowledge testing. The only characteristic associated with a higher total score in any of the areas of knowledge testing was whether the participant indicated they had received education on hearing impairment and/or communication strategies. Nurses who attended a course scored higher in the overall knowledge assessment test and in each individual test category than those who did not.

There were no significant differences in test scores for demographic factors, years of nursing experience, knowing a hearing-impaired person, or association with a specific nursing unit. The mean score on the knowledge assessment tool was the highest for hearing aids and assistive listening devices and which was speculated to be due to nurses reporting having familiarity with these devices through their nursing experience or their own family member with a hearing aid.

Communication strategies had the second highest score of the four categories. Yet, the level of the nurses' knowledge was well below the 75th percentile cut off for adequate knowledge (Ruesch, 2018). These findings are concerning because it highlights the lack of consistency among nursing training and education. Knowledge of the technology that patients use to treat hearing loss is imperative and should not be reliant on whether nurses have had personal experience in using these devices. Furthermore, while the knowledge assessment tool did not indicate the type of education or training received, it is is not sufficient to deem nurses knowledgeable enough to implement focused communication strategies for patients with hearing loss.

A benefit to the study conducted by Nørgaard et al. (2013) not found in other research is that communication training was compulsory for all staff. Therefore, it was possible to obtain increases in self-efficacy, an effect that was still present six months after the course. However, it is unknown whether the increase in self-efficacy scores led to changes in communication behaviour (Nørgaard et al., 2013). Results from these studies provides evidence that healthcare organizations can introduce well- designed training courses addressing comprehensive communication and healthcare needs of patients with hearing loss with good results.

The literature search found one toolkit that was developed for nurses to manage hearing loss in acute care (Holmes, 2014). There was no follow up research found during this literature

review to determine whether this toolkit was effective in practice or used in other institutions. The toolkit was the result of a pilot study that examined the existing policy and procedures at an elderly care assessment unit in a British hospital. This pilot study used questionnaires for patients and staff as well as utilized focus groups to determine issues relating to hearing loss and communication. As a result of the findings, a toolkit containing eight best practice recommendations was developed. The eight practice recommendations developed were to implement a hearing loss pathway to guide staff, ensure training, provide access to a hearing loss support kit that includes hearing assistive technology, information on screening patients, improve communication, ensure hearing difficulties are recorded, provide hearing aid storage boxes, and appoint hearing loss champions (Holmes, 2014).

The toolkit was designed to improve identification of hearing loss in acute care, improve the use of hearing assistive technology and access to hearing aid support while in hospital. It also aimed to increase staff knowledge and expertise on how to communicate effectively with people with hearing loss, how to use communication equipment, reduce the misplacement and misuse of hearing aids and increase the identification and recognition of hearing loss in patients. Some limitations that were identified with the toolkit were workload pressures on staff, conflicting priorities and the level of support needed from senior staff to maintain changes on the wards. Individual views about the value of hearing loss championed also differed (Holmes, 2014). Upon further investigation of the toolkit, the website from which to retrieve the toolkit and its subsequent information is now defunct so it is unknown whether this resource is being used in practice or has since been evaluated.

Nursing Interventions

Nurses are in an optimal position, both at the bedside and in leadership roles, to improve the hospital experience of individuals living with hearing loss. Recommendations have been made by researchers to address the inadequacies surrounding nursing education on hearing loss. These nursing strategies can be narrowed down to five themes found throughout the literature; assess, accommodate, educate, empower, and advocate **(Funk et al., 2018)**.

Assess

Although the prevalence of hearing loss is high, the frequency and techniques of screening for hearing loss among nurses are unknown. Hearing screening promotes early detection, adequate treatment, and improved quality of life (**McCullagh & Frank, 2012**). Nurses should note any non-verbal signs of a hearing deficit, such as patients cupping their ear, turning the head to one side when asked questions, and misunderstanding or needing the questions repeated (Funk et al., 2018). In several studies, nurses reported asking the patient whether they have a hearing loss. It is recommended that because many people are unaware of or deny having such an impairment, hearing loss screening should be a short discussion rather than yes or no questions. If hearing problems are disclosed, follow up questions should be asked. These questions should focus on potential barriers to hearing and communication such as background noise, unfamiliar accents, and call system speakers. Additionally, the nurse should ask the patient what their preferred method is for addressing communication challenges, such as using hearing assistive technology, communicating with pen and paper, or the need for medical sign language interpreters (**Wallhagen & Pettengill, 2008**). Additionally, nurses should include health history questions that explore current and past occupational noise exposures, leisure exposures, and a thorough review of medications during their assessment (McCullagh & Frank, 2012). There are

subjective screening tools for hearing loss recommended and utilized by researchers, and health care professionals in the literature review. Tools such as the whispered voice test, the Hearing Handicap Inventory for the Elderly-Screening (HHIE-S), the Rinne test, the Weber test (McCullagh & Frank, 2012), and the finger rub test (Funke et al., 2018) are inconsistently used. There is lack of national screening guidelines and best practice policies for nurses to assess adults for hearing loss at the bedside (McCullagh & Frank, 2012).

Accommodate

Nurses should provide ample time for establishing trust and rapport in patients with hearing loss and their families. This can help patients and their loved ones feel more willing to disclose hearing challenges (Funke et al., 2018). Understanding and accommodating the need for making changes to the acute care environment such as, turning down televisions or alarms, ensuring speech reading of the lips remain unobstructed by removing masks and facing the individual, providing safe environments such as repositioning and relocating furniture, and speaking clearly and slowly can all prevent or relieve frustration. Nurses should also be aware if their patient utilizes any hearing assistive technologies and make the patient aware of whether any devices are available on the nursing unit. It is imperative that nurses accommodate individual communication needs and ensure communication is clear to facilitate uptake of information. It is important the nurse is seeking feedback from the patient to ensure understanding (**Middleton et al., 2010**). Patient specific strategies used should be documented and shared during handoffs, and other members of the health care team made aware of communication deficiencies to foster more consistent behavior and care by staff (Funk et al., 2018).

Empower

Passivity can be common among individuals with hearing loss who choose to accept their situation and feel that it is something they are not able to change. Individuals can withdraw or choose not to take part in conversation or activities in which they feel their hearing loss would be a burden (**Bennion & Forshaw, 2012**). Empowerment can be crucial for these patients, who may feel powerless and become passive. Patients have the right to be informed about their plan of care. It is the responsibility of the nurse to encourage their active participation in understanding and involvement in decision making. It is also likely to improve patient outcomes during hospitalization and discharge, and may help prevent rehospitalization (Funk et al., 2018).

Educate

Bedside nurses can educate patients, families, and other staff members on the use of key communication strategies for individuals with hearing loss. Many hospitalized patients leave their hearing aids at home (**Kimball et al., 2018**). It is important for nurses to explain the benefits of using these hearing-assistive devices during a hospital stay, and to ensure that patients and families know such devices are readily available if possible.

Advocate

The literature review conducted found that there was a scarce amount of training among nurses and health care professionals in the management of hearing loss. Nurses can advocate for system-wide education on hearing loss for individuals in acute care. Nurses are implementing communication and assessment skills despite little to no formal training (**Smith et al., 2016**). Staff education should promote awareness of failing to address hearing and communication deficits can have potentially serious consequences. Nurses could lead initiatives in evaluating and improving system-wide processes for identifying and accommodating the needs of patients

with hearing impairments. Nurses need to advocate for patients by promoting their physical, psychological, and psychosocial safety through ensuring that hearing needs are being accommodated while periodically reassessing the plan of care and its outcomes (Funk et al., 2018).

Theoretical Framework

Knowles' Adult Learning Theory

Adults have a diverse range of life experiences, interests, and preferred styles of learning. It is important to take this background into consideration to provide effective education (Bryan et al., 2009). Adults are self-directed learners who do best when asked to use their previous life experiences and apply new knowledge to solve real-life problems (Candela, 2016). The five principles of adult learning as reported by Candela (2016) are: a) adults need to know what they are learning, b) adults are motivated to learn by the need to solve problems, c) adults' previous experience must be respected and built upon, d) learning approaches should match adults' background, and e) adults need to be actively involved in the learning process. In summary, adults dedicate more time and energy when they have a purpose and/or a specific problem to solve. Furthermore, they need and want to learn useful information that can be readily adapted (Bryan et al., 2009). Some prefer to learn using a hands-on approach, while others are more visual or auditory learners.

Nurses have identified time constraints as a barrier to education. Utilizing lecture-based learning as a medium to disseminate nursing knowledge is cost effective, efficient, and easy to control. However, this presents a challenge for bedside nurses to find time for lecture-based learning and it can be difficult to assess whether learning has occurred (Cant & Cooper, 2017). The development of online learning modules could be used as a learning tool that is beneficial

for most types of learners. Compulsory education could be done at home at their convenience as the online learning resource could be uploaded to a computer for staff to utilize as a self-learning resource. The information could be supported by a physical resource manual for nurses on the nursing unit as well as a brochure to give to patients with hearing loss.

Simulation based learning and role playing were utilized by some researchers to assess nursing knowledge on the communication and management of the care of an individual with hearing loss. Simulation based learning could be utilized as a case study for nurses to practice effective communication skills and technique when caring for this population while receiving interactive feedback from both the standardized patient and the assessor. Simulation enables nurses to develop, synthesize and apply their knowledge in a replica of real experience (Cant & Cooper, 2017). However, the feasibility of simulation-based learning with large groups, costs, and effectiveness of this educational tool would need to be evaluated. The development of an educational intervention that is supported by the principles of the adult learning theory that builds upon nursing experience can address the challenges nurses face in caring for individuals with hearing loss. Furthermore, improving nurses' ability to assess, accommodate, advocate, and educate patients with hearing loss and other members of the healthcare team through the provision of a self-directed educational module can have positive outcomes for managing patients with hearing loss (Bryan et al., 2009).

Summary of the Literature

In summary, the literature search and review reflect a lack of knowledge and awareness about hearing loss and Deafness, as well as effective communication strategies in the care of the patient living with hearing loss. There was also a lack of studies that specifically investigated the effectiveness of an educational program or resource to improve nurses' competencies while

caring for this population. While there was one assessment tool found that measured nurses' knowledge of hearing loss and effective communication strategies, there were no other assessment tools found for comparison. Many of the research articles consisted of small sample sizes limiting the generalizability of these studies to a larger scale. Data collection methods varied as numerous recent studies utilized data from retrospective national surveys completed over 30 years ago, which are no longer reflective of today's hearing loss treatment options, prevalence of hearing loss, and the advancement and availability of assistive hearing technologies.

The development of hearing rehabilitative technology has changed the landscape of how people with hearing loss have adapted in society and has impacted their ability to communicate. This could have implications for current research and development of educational resources for nurses. There are major knowledge gaps surrounding nursing care for individuals with hearing loss that need to be addressed to continue to provide effective and safe nursing care within this patient population as the prevalence of hearing loss rises. Much of the literature focused on hearing loss among older adults, however future research should consider the nursing care and management of adults of all ages, specifically within acute care as noise induced hearing loss becomes a growing concern among the youth of today.

Conclusion

Individuals living with hearing loss face unique challenges when navigating health care services such as lack of appropriate identification, support, and management. Nurses' attitudes towards hearing loss, knowledge of managing the care of inpatients with hearing loss, and deficits in knowledge have the potential to limit nurses in providing sensitive and appropriate care. Nurses lack the resources needed for quick and effective identification, and management of

patients with hearing loss in acute care. This review highlighted the key elements needed for effective screening and management including assessing, accommodating, educating, empowering, and advocating for patients with hearing loss. Through evidence-based practice, nurses can incorporate the findings from this review to enhance their knowledge, and ability to care for patients with hearing loss. Although more research is needed, this review identified the need to address the knowledge gaps nurses have when caring for patients with hearing loss and identified what needs to be covered in nursing education and training. One way these knowledge gaps can be addressed is with the development of a comprehensive nursing tool kit to educate nurses on caring for patients with hearing loss in acute care. It is the expectation that the development of this tool kit will improve not only patient outcomes, but also the quality of care and environment of safety for nurses and patients with hearing loss.

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Appendix A: Literature Summary Table

Legend

ADA: Americans with Disabilities Act; ADL: activities of daily living; AHD: assistive hearing device; ARHL: age related hearing loss; ASL: American sign language; CES-D: Center for Epidemiological Studies depression scale; CHD: coronary heart disease; DSS: digit symbol substitution; EHLS-2: Epidemiology of Hearing Loss study; EPESE SPPB: Established populations for Epidemiologic Studies of the Elderly Short Physical Performance Battery; HA: hearing aid; Health ABC: Health, Aging, and Body Composition; HCP: health care provider/professional; HHIE-S: Hearing Handicap Inventory for the Elderly-Screening version; HL: hearing loss; HRQOL: health-related quality of life; IADL: instrumental activities of daily living; LBL: lecture based learning; MCBS: Medicare Current Beneficiary Survey; MDS-AC: Minimum Data Set for Acute Care; MEPS-HC- Medical Expenditure Panel Survey Household Component; MMSE/3 MS: Modified Mini-Mental State Examination; NHANES: National Health and Nutritional Examination Survey; NIHL: noise-induced hearing loss; PADL: personal activities of daily living; SBL: simulation based learning; SF-36: Short Form 36 Health Survey

Study/Design	Methods	Key Results	Comments
Adib-Hajbaghery and Rezaei-Shahsavarloo, (2015) Design: Cross-Sectional Purpose: To investigate nursing students' knowledge of and performance in communicating with patients with HL.	N: 71 senior nursing students • Sampling done through convenience method. Country/setting: Iran/ Nursing school Data Collection: • consisted of three parts: a demographic and knowledge questionnaire and performance assessment checklist • Demographic: age, sex, semester, having a history of working as a nurse, history of training in communicating with/caring for people with HL, education, and ability to use Persian sign language.	• No students had ability to use Persian sign language. • 2.9% trained in communicating with patients with HL (through self-learning). • 11.3% of them had a history of caring for patient with HL in clinical settings. • 75% evaluated their ability to diagnose and meet needs of patients with HL at moderate level. • Significant difference observed between mean	Strength of Design: Weak Quality: Medium Limitations: • potential for inconsistencies between student's self-assessment and observer's assessment • observer bias • study conducted in one nursing school,

Study/Design	Methods	Key Results	Comments
	• Knowledge: about communicating with patients with HL (content validity confirmed/reliability tested) • Performance assessment checklist: communicating with patients with HL, participants observed and scored (content validity confirmed, reliability tested, and internal consistency tested) • designed through a published work review Methods: 1st stage: students conducted an interview with a simulated patient with HL who experienced chest pain. Students were evaluated on their performance. 2nd stage: students answered the knowledge questionnaire.	score of knowledge in men and women (p=0.05): males had higher knowledge • Significant correlation observed between knowledge scores and performance in communicating with patients with HL (p=0.004, r= 0.34) • 97.2% did not ask about best way of communication • 98.6% did not assess severity of HL • 69% tried lip movements, 47.9% used writing methods, only 16.9% face to face completely.	thusly participants limited -not generalizable. • use of simulated patients may influence the response of the students • cultural differences for nursing education and knowledge.
Bainbridge et al. (2008) Design: Cross-sectional	N: 5140 noninstitutionalized adults • Had audiometric testing • Aged 20-69 years Country/setting: USA Data Collection: Data obtained for National Health and Nutrition Examination Survey	• People with hearing impairment were older than those without (p<0.001) • People with HL more likely to report having served in the military (p = <0.001),	Strength of Design: Weak Quality: Medium Limitations:

Study/Design	Methods	Key Results	Comments
Purpose: To determine if HL is more prevalent among U.S. adults with diabetes.	• Collected between 1999-2004 Methods: Half of study participants (n=11405) were randomly assigned to audiometric testing • Of the 5742 assigned, 5140 persons who completed the audiometric examination and diabetes questionnaire were included in the analysis. • Of the 5140 participants, 2259 received a random assignment to fasting protocol and subsequent blood draw. 146 reported a diagnosis of diabetes. • Occupational noise exposure was defined as reporting a history of loud noise at work that required speaking in a loud voice to be heard.	experienced occupational noise exposure (p= 0.033), and used ototoxic medications (p = 0.001). • In preliminary analysis people with a HL were more likely to report diabetes, an effect not explained by age (p <0.001) • Prevalence of HL among people with diagnosed diabetes exceeded the prevalence among those without diabetes in all groups.	• Recall based assessments of leisure time and occupational noise exposure. • Diabetes was assessed on self-report. • Only US noninstitutionalized population.
Barnett et al. (2014) Design: Cross-sectional Purpose: Investigate the determinants of access to and satisfaction with	N: 15559 participants • 1652 participants had HAs or deafness, 444 had uncorrected HL Country/setting: United States Data Collection: Raw data for the study obtained from the 2004 MCBS.	• Participants who are married (OR=0.791) and report use of HAs (OR=0.172) are more likely to be dissatisfied with the ease of getting to the doctor from where they live then	<u>Strength of Design:</u> Weak <u>Quality:</u> Medium Limitations:

Study/Design	Methods	Key Results	Comments
health care from Medicare participants with HL.	• Satisfaction with care assessed using 10 of the MCBS questions probing satisfaction in areas related to health care. • Interviews conducted in person by a trained interviewer. Methods: • Data analyzed using logistic regression. Analysis conducted in 3 steps: • Identifying potentially important predisposing and enabling variables that influences satisfaction with care using univariate analysis. • Fitting the variables retained from first step into a multiple logistic regression equation to determine a preliminary main effects model • Determining an odds ratio for each independent variable retained from earlier analysis.	those who don't report those variables. • Those who experienced trouble getting needed health care (OR=0.193) had difficulty using the telephone (OR=0.793) and who had trouble hearing (OR=0.967) were more likely to be dissatisfied with availability of care • Participants that reported trouble getting health care needs met (OR=0.089) and difficulty using a telephone (0.311) indicated dissatisfaction with quality of care • Medicare beneficiaries with HL are less likely ($p<0.05$) to be satisfied with care and access to it	• use of self-report scales in data collection for the MCBS. Limited reliability.
Bennion & Forshaw (2012) Design: Phenomenological	N: 9 participants • 3 men and 6 women • Aged between 61-93 years • Self-reported HL	**Themes:** **<u>The loss itself</u>** • HL gradual/progressive. • Families noticed first.	<u>Quality:</u> Credible Limitations: • Small sample size

Study/Design	Methods	Key Results	Comments
Purpose: Explore and develop a greater understanding of the experience of living with ARHL.	• Avg. length of time living with HL was approx. 12 years. • Hearing aids users • Recruited via use of notice boards and announcements at local HL groups and local support service. Country/setting: United Kingdom/Community Based Data Collection: Semi-structured interviews • Open ended questioning • Interviewer used active listening techniques to encourage more detailed explanations and confirmation of information. • Audio recorded and transcribed. Methods: • Transcripts were analyzed using descriptive thematic analysis. • Important themes and ideas were underlined and annotated in margins as codes	• Unaware of loss until given hearing aids. • accepted as normal aging **<u>Communication</u>** • Difficulty communicating • Miscommunication =embarrassment, frustration, barriers, and irritation. • HL prevented engagement. **<u>Hearing aids</u>** • reliant on hearing aids • needs proper maintenance and care • Affects self-image **<u>Isolating Factors</u>** • stayed home • Outside of home experiences difficult which decreased **<u>Coping Strategies</u>** • Passive= acceptance • withdrawal/doing nothing • Active**:** doing something	• All participants were volunteers who responded to requests for participants. These people may have had different experiences than others less likely to respond to the request.

Study/Design	Methods	Key Results	Comments
	• Codes tabulated to structure the analysis by themes.	• lipreading • positioning	
Chang (2018) Design: Cross-Sectional Purpose: Examine whether patients who have trouble communicating are at higher risk of hospital readmission.	N: 4,426 individuals with one index admission. • 8,005 index admission in total and 1,130 were followed by a 30-day readmission (14.1%) readmission • Participants in the MCBS • 65 years of age and older Country/setting: United States Data Collection: Responses to survey questions examined • Trouble communicating assessed based on survey questions • Subjects classified as having no trouble or trouble communicating Methods: • Multivariate models used to analyze data	• 513 (11.6%) had trouble communicating because of HL (p<.001). • associated with older age, sociodemographic disadvantage, comorbidities, and worse self-rated health. • Those who reported trouble communicating had, on average 32% greater odds of hospital readmission.	<u>Strength of Design:</u> Weak <u>Quality:</u> Medium Limitations: • No objective measure of HL. • relied on self-report of hearing handicap. • No control of confounders • underreporting due to stigma.
Chen et al. (2014) Design: Cross-Sectional	N: 2,190 • Community dwelling adults aged 70-79. • Enrolled in Health ABC study.	• Declines in SPPB scores that accelerated over time	<u>Strength of Design:</u> Weak <u>Quality:</u> Medium

Study/Design	Methods	Key Results	Comments
Purpose: Examined whether hearing impairment is independently associated with objectively measured declines in physical functioning in older adults.	• Random sample • Black and White Medicare Beneficiaries Country/setting: United States Data Collection: Conducted over an 11-year period. • EPESE SPPB given to participants at Visit 1, 4, 6, 10, and 11. • measures physical performance in gait speed, standing balance and chair stands. • Interview administered questionnaires every 6 months: gathered self-reports on incident physical disability and need for nursing care • Audiometric assessments conducted at Visit 5, using standardized audiological testing. • HL grouped: mild, moderate or greater. Methods: Objective performance data measured: • SPBB Physical disability measured: • Time from baseline (Visit 1) to any self-reported disability.	for all hearing groups over the 11-year study period. • Mean baseline (Visit 1): SPPB scores in normal hearing individuals were significantly lower in those with mild (10.4 [95% CI 10.04-10.25], p<.01) and moderate or greater HL (10.04[95% CI 9.90-10.19], p< .01). • Visit 5: No sig. difference in SPPB scores among three groups. • Visit 11: Scores were lower in those with mild (7.35 [95% CI 7.12-7.58]. p<.05) and moderate or greater hearing loss (7.00 [95% CI 6.69-7.32], p<.01) compared to normal hearing individuals. • Moderate or greater hearing impairment had significantly slower gait speeds than those with normal hearing at Visit 1	Limitations: • Audiometric Testing only performed at Visit 5. • No data available to show changes in hearing before and after that time. • Informative censoring of mortality in gerontological studies bias results

Study/Design	Methods	Key Results	Comments
	Nursing care needs measured: • time from baseline to a self-reported overnight admission to a nursing home or requirement for nursing home care.	(p<.05), Visit 5 (p<.05), and Visit 11 (p<.01). • Moderate or greater HL had a 25% (p<.01) increased risk of incident disability. • Moderate or greater HL had 18% increased risk of requiring nursing care (p=.03) • No statistically. significant. changes in SPPB scores and gait speeds for those with HA then without. • No statistically significant change in the risk of disability or need for nursing care associated with HA use.	
Dalton et al. (2003) Design: Cross-Sectional Purpose:	N: 2,688 • 53-97 years old (mean 69 years) • 28% had a mild HL, 24% had a moderate to severe HL. Country/setting: United Sates.	• Participants with a moderate to severe HL were 34 times as likely as participants without HL to have impaired HHIE-S scores and individuals with	<u>Strength of Design:</u> Weak <u>Quality:</u> Medium Limitations:

Study/Design	Methods	Key Results	Comments
Impact of HL on quality of life in older adults	Data Collection: Audiometric, medical history and quality of life were retrieved from the 5-year follow-up of the EHLS-2 • Collected from 1998-2000 Methods: • Audiometric data: standardized instrument used. • HHE-S used to determine perceived hearing handicap and communication specific problems. • Participants were asked 6 additional questions pertaining to hearing-related communication difficulties in specific situations. • Information on global functioning obtained by interviewing regarding ADL and IADL • SF-36 was used to assess health-related quality of life. • Medical history interview.	mild losses 6 times as likely. • 52% of the study participants reported having problems with communication. • Severity of HL associated. with ADL and IADL impairments in most age groups. • Individuals with a moderate to severe HL were sig. more likely than individuals without HL to have impaired ADL and IADL after controls. • Severity of HL, HHIE-S scores > 8 and self-report of communication difficulties were associated with reduced quality of life.	• Numerous data collection methods self-reported. • Did not include family member reports. • Unable to determine if the hearing loss preceded the perceived reduction in quality of life. • Unable to control for all cofounders such as comorbid conditions.
Foley et al. (2014) Design: Cross-Sectional Purpose: To determine whether HL is	N: 34,981 • 23.7% self-reported hearing loss • More likely to be older male and of lower socioeconomic status and to have cardiovascular conditions and diabetes • Adults aged 65 years and older.	• More likely to self-report poor overall health status with 79% of those without HL reporting excellent or good health compared with	<u>Strength of Design:</u> Weak <u>Quality:</u> Medium

Study/Design	Methods	Key Results	Comments
associated with higher medical care expenditures.	Country/setting: United States Data Collection: Pooled data from the Medical Expenditure Panel Survey Household Component. • Collected 2000-2010. Methods: HRQOL was measured using the Medical Outcomes Study. • 12 item short form survey • HL measures based on self-report. • Monetary outcomes measured as total health care expenditures and components of care adjusted to 2012 U.S dollars. • Non-monetary outcomes included total informal care days provided by caregivers and HRQOL scores. • Used logistic regression used to analyze positive expenditures. • Excess expenditures were estimated from a generalized linear model with log link and gamma family.	71% of those with some hearing loss (p<.001). • Individuals with HL had significant. greater odds of having nonzero total medical expenditures and on average had $392 in excess medical expenditures. • Significant greater odds of nonzero expenditures on office based, outpatient and emergency department visits, • Physical and mental health summary y scores averaged 1.7 points lower and 0.9 points lower than score of individuals with no HL. • HL associated with $3.10 billion in excess total medical expenditures in the US.	Limitations: • Use of self-reported HL rather than objective measurements of hearing status. • no mechanistic basis for the observed association or whether public health strategies focused on hearing rehabilitative treatment could improve these outcomes.
Funk et al. (2018)	N: 8 participants (5 men, 3 women)	• **Themes:**	Quality: Credible

Study/Design	Methods	Key Results	Comments
Design: Phenomenological Purpose: Assess the hospital experience of older adults with HL	• Nurse managers educated on study and asked to share with bedside nurses who identified potential patient participants • Inpatients • 70-95 years of age or older • All white. • Self-reported HL • Sample size deemed to be adequate for themes to emerge. Country/setting: USA/ 600 bed hospital Data Collection: Purposive Sampling • Open ended interviews conducted between July 1 and December 31, 2014. • Field notes • Data collected until saturation. Methods: • Data was coded for themes • Paragraphs were paraphrased into summary sentences that was further broken down into summary keywords or phrases. • Common themes compiled together to represent patient's hospital experience.	**<u>Communication</u>** • communication barriers within the hospital setting. • avoid sharing with staff about their HL due to frustration and embarrassment. • evaluated verbal (tone of voice) and nonverbal (facial expression) cues of staff on whether to disclose HL • barriers to understanding accents, speaking too loud, hearing conversations, phone, call speaker system. • not wearing hearing aids **<u>Passivity and vulnerability</u>** • vulnerable=irritation/anger • often give up if they don't understand what is happening or having to ask repeatedly. **<u>Frustration with family</u>** • family members participate in care conversations	Limitations: • Small sample size and researchers were unable to reach saturation • All participants were white. • Only subjective measures of HL and cognitive function used.

Study/Design	Methods	Key Results	Comments
		• communication issues with family caused significant tension and stress.	
Gan et al. (2015) Design: Cross-Sectional Purpose: Examine the association between bilateral high frequency HL and the presence of CHD	N: 5223 participants • Aged 20-69 years • Bilateral frequency hearing loss defined as average high-frequency hearing threshold greater 25dB in both ears Country/setting: U.S/ Mobile examination Centre Data Collection: From the National Health and Nutrition Examination Survey (1999-2004). • Response rate 77% for household interview • 73% for medical examination • Participated in audiometry examination - reliable and validated. Methods: • Household Interview- health related questionnaires, incl. information about noise exposure in the workplace and leisure time, behavioral risk factors of CVD, and medical conditions.	• Participants with high frequency HL were older, less educated, and physically inactive, more likely to be male, Caucasian, current or former smokers, and have diabetes, angina pectoris, myocardial infraction, or CHD. • Compared to normal hearing, participants with bilateral high frequency HL were 1.91 times more likely to have CHD. • Those still employed, (currently or previously exposed to loud noise), no significant association of CHD with unilateral high frequency loss and uni and bilateral low frequency loss.	<u>Strength of Design:</u> Weak <u>Quality:</u> High Limitations: • Relationships between noise exposure, bilat. High freq. HL and CHD outcomes are not clear. • Those who died from noise related CHD not included in study therefore an underestimation of true adverse CHD effects. • No baseline of healthy participants without hearing loss and heart disease to compare.

Study/Design	Methods	Key Results	Comments
	• CHD was defined as a self-report of diagnosis by a doctor or other health professional. • Medical Examination-biochemistry measurements collected (bloodwork)	• Age a potentially confounding risk factor for both CHD and bilateral high freq. hearing loss (typically age-related hearing loss).	• Exposure to loud noises in the workplace and CHD self-reported.
Genther et al. (2013) Design: Cross-Sectional Purpose: Determine whether audiometric HL is associated with mortality in older adults.	N: 1,146 with HL, 812 with normal hearing =1,958 • Aged 70-79 • Community Dwelling Country/setting: United States Data Collection: Obtained from the NHANES • Participants followed for 8 years after audiometric examination. Methods: Data combined from the 2005-2006 and 2009-2010 cycles. • Audiometric assessments completed • Mortality measurements obtained from family members, obituaries, and Social Security Death Index. • Hearing aid use (self-report), hospitalizations and burden of disease based on interviewer administered questionnaires	• 492 (42.9%) with HL died compared with 255 with normal hearing. • HL independently associated with hospitalization and poorer self-reported health for adults 70 years or older. • 34% increased risk of mortality compared to normal hearing-after adjustment of covariates. (Age, race hypertension) • HL associated with a 20% increased risk of mortality. • HL independently associated with increased health care used and burden of disease among older adults.	<u>Strength of Design:</u> Weak <u>Quality:</u> High Limitations: • Mechanistic basis for the observed association between HL and mortality cannot be determined. • HL only measured at one point in time. No information available on the duration and trajectory of HL before or after assessment.

Study/Design	Methods	Key Results	Comments
	• 3MS – completed at Year 5 • Baseline physical functioning assessed with gait speed. • Depressive symptoms assessed using the CES-D scale. • Data analyzed using multivariable logistic and ordinal logistic regression models.	• Gait speed and cognition slightly attenuated mortality rate. • Not significantly associated with reduced mortality risk when using hearing aid (p = 0.85)	
Genther et al. (2015) Design: Cross-Sectional Purpose: To determine the association between HL and risk and duration of hospitalization in older adults	N: 2,148 • Community dwelling • White and Black Medicare beneficiaries aged 70-79 at study enrollment • recruited by random sample Country/setting: United States Data Collection: Data obtained from the Health ABC study. • Participants followed for 12 years. • Audiometric testing administered at Year 5 and MMSE to determine cognitive function. • Every 6 months, participants reported any hospitalizations since their last visit. Methods: • Incidence, annual rate, and duration of hospitalization.	• older adults independently associated with higher incidence and annual rate of hospitalization. • individuals with mild, moderate, and greater hearing loss had a 16%-21% greater incidence and a 17%-19% higher annual rate of hospitalization than those with normal hearing (p <.001) • self-reported hearing aid use independently associated with shorter mean hospitalization but not risk of. • Incident hospitalization increased 11% for every	<u>Strength of Design:</u> Weak <u>Quality:</u> Medium Limitations: • inability to determine the mechanistic basis for the observed associations between HL and risk of hospitalization • HL loss only measured at one point in time (visit 5).

Study/Design	Methods	Key Results	Comments
	• The association between HL and duration of hospitalization was analyzed using parametric lognormal survival models, using robust standard errors.	10-dB increase in hearing threshold up to 40 dB HL and plateaued with no increased risk after 40dB HL.	
Genther et al. (2015) Design: Cross-Sectional Purpose: To determine whether audiometric HL is associated with mortality in older adults.	N: 1146 had hearing impairment and 812 had normal hearing. • Random sample of White and Black Medicare beneficiaries. • Aged 70-79 Country/setting: United States Data Collection: Data was taken from the Health ABC Study • 1997-1998 • Participants were followed for 8 years after audiometric examination. Methods: • Audiometric testing completed in Year 5 • Medical history and self-report were completed to obtain demographic variables • Hearing aid use (self-report) based on interviewer administered questionnaires	• 42.9% of the 1,146 with HL died compared with 31.4% of the 812 with normal hearing. • No differences in education, history of hypertension or diabetes, gait speed, or CES-D score. • HL was associated with 34% increased risk of mortality compared with normal hearing. • Further adjustment for other demographic characteristics and cardiovascular risk factors HL was associated with a 20% increased risk of mortality compared with normal hearing.	<u>Strength of Design:</u> Weak <u>Quality:</u> Medium Limitations: • Unable to determine the mechanistic basis for the observed association between HL and mortality. • HL only measured at one time point. • Limited generalizability: only White and Black individuals recruited.

Study/Design	Methods	Key Results	Comments
	• 3MS examination: global test of cognitive functioning administered at baseline (Year 5). • Baseline physical functioning assessed with gait speed. • Depressive symptoms assessed using the CES-D scale.	• Risk of increased mortality only became evident for the average threshold level at which HL begins to impede everyday communication. • Self-reported hearing aid use was not associated. with a significant reduction in the risk of mortality.	
Girard et al. (2013) <u>Design:</u> Case Control <u>Purpose:</u> Determine whether the severity of NIHL, as a result of long exposure to occupational noise increases the risks of falls leading to admission to hospitals among newly retired workers	N: 8,728 male workers • Exposed to occupational noise during their working life. • At least 55 at time of examination and reached aged of 65 during study period. • Reference population: 5382 workers) → 75 victims experienced at least one fall with hospitalization with 72 (cases) that could be matched to 216 controls. Country/setting: Canada Data Collection: 3 sources: Quebec Public Health Records, hospital records and death registry. • Case control analysis conducted on audiometric data, hospitalization and death matched. Each case of hospitalization for a fall was matched with	• Progressive increase in the risk of hospitalization due to a fall with increasing degrees of NIHL (OR= 1.97 – CI 95%; 1.001-3.876, p=.0495). • Sensitivity analyzes conducted to control for aging and associated hearing loss. • Male workers occupationally exposed to noise and newly retired with severe bilateral NIHL in an audiometric test administered after age of 55 have an increased risk	• <u>Strength of Design:</u> Weak • <u>Quality:</u> High • Limitations: • Length of time between period where hearing was measured-when workers were between 55-64 years of age and study's actual observation period (> 65 years).

Study/Design	Methods	Key Results	Comments
	three controls based on duration of follow-up and industrial sector. Methods: <u>Group 1:</u> • Separated into three categories (no loss/mild, moderate, and severe loss) • 72 cases: Mean bilateral NIHL 45.6 dB., with 28.5 years of exposure to a noisy environment and 9.2 years of follow-up. <u>Group 2:</u> • Workers in other industrial sectors to control for covariables and to increase comparability of workers. • 216 cases: Mean bilateral NIHL 41.8dB, 30.1 years of noise exposure, and 9 years of follow-up.	of falls requiring hospitalization after the age of 65. • 8 (10.7%) of retired workers had admission to hospital for a second fall. • 52 cases of fractures, 15 cases of internal trauma to head or trunk. • 6 of 75 cases (8%) admitted to hospital died during hospital stay related to fall (unsure if fall was cause of death).	• Hearing status at time of fall and at end of monitoring period is unknown. • Circumstances surrounding falls, location and risk factors are unknown. • No information on whether hearing assistive technology
Grue et al. (2009) Design: Cross-Sectional Purpose: Find the prevalence of hearing and vision impairment and their associations with loss	N: 770 patients • 75 years of age or older. • Admitted to a medical ward in an acute hospital • 48% of patients had a hearing impairment, 32.3% had vision impairment and 20.1% had both. • Randomly selected Country/setting: Medical wards in acute care hospitals in 5 Nordic countries	• HL found in 48.4% of patients. • 40.8% had mild loss, 7.7% moderate loss and none suffered from severe loss. • 14 (1.8%) had both moderate HL and moderate to severe vision impairment.	<u>Strength of Design:</u> Weak <u>Quality:</u> Medium Limitations: • sensory impairments could be underreported as method was based

Study/Design	Methods	Key Results	Comments
of IADLs and risk of falling in patients.	Data Collection: MDS-AC • Validated and tested for reliability • 14 domains with 56 standardized assessment items Methods: Premorbid data, admission data and history of falls over 3 months were obtained on admission by interview and observation. Data collected on falls, fear of falling, daily functioning (PADLs and IADLs), hearing, vision, cognitive function.	• HL and combination of hearing/vision loss increased sharply with age. • Falling not r/t vision impairment alone. • Mild HL increased probability of having one fall (OR 1.5, 95% CI= 1.0, 2.2, p=0.047), moderate loss had greater risk (OR= 2.6, 95% CI= 1.2, 5.5, p=0.009). -Combined hearing/vision loss associated with having two or more falls (OR=1.5, 95% CI=1.0-2.2, p=0.06) • IADL loss elevated for moderate HL (OR 7.8, 95% CI=2.8, 22.0, p<0.001) compared with mild HL. • Recommended sensory function screened and help offered for impairments.	on observations and interviews and not actual hearing or vision measures. • variability of patient population among hospitals such as age, living arrangement, cognitive impairments, and dependency in daily living. • unable to pinpoint mechanism behind falling and HL
Heron & Wharrad (2000)	N: 21 patients residing on wards & 20 nursing staff	• 30.6% were correct in the assessment of patient's hearing ability, 61.2% were	Strength of Design: Weak Quality: Medium

Study/Design	Methods	Key Results	Comments
Design: Cross-Sectional Purpose: To determine nursing competence in assessing and caring for hearing impaired older patients.	Country/setting: United Kingdom/ 3 Health Care of the Elderly wards. Data Collection: Two surveys • clinical examination of patients by audiometric testing and self-completion questionnaire: investigate nurse knowledge of assessment and care of patients with HL. Methods: • Nursing staff invited to complete questionnaire. • Patients underwent hearing testing, which before testing patients were asked for brief self-assessment of HL, communication problems and use of HAs.	wrong and 8.2% were not sure. (Not statistically significant $p>0.05$) • Degree of HL: 53.8% correct, 7.7% incorrect, 38.5% not sure. • assessing patient's HA use (81% correct) was highly significant ($p<0.001$) • assessing communication problems (75% correct) also highly significant ($p<0.001$) • 86.7% of nursing staff included hearing assessment as part of routine patient assessment. • 86.7 had difficulty communicating with patients with HL. Only 13.3% received any training and this was through post-registration education. • 66.7% confident in their ability to correctly put in	Limitations: • poor response rates on nursing questionnaires (of 20, 11 returned) and of patient questionnaires (30 distributed and 50% returned fully completed. • Proportion of patients excluded from study was high (55.3%)-limited generalizability • self-report of data

Study/Design	Methods	Key Results	Comments
		HA.13.3% confident they could clean a HA.	
Kimball et al. (2018) Design: Mixed Methods Purpose: To assess the feasibility of using amplified hearing devices in acute care settings for patients with HL.	N: 25 adult hard of hearing patients and 15 nurses • patient recruitment done by nurses when initial assessment of patients for possible HL. • 68-95 years of age. Country/setting: United States/2 inpatient neurosurgery and acute care for the elderly units. Data Collection: HHIE-S:10 item questionnaire • used to screen patients' perception of hearing handicap • reliable & consistent. Patient and nurse surveys: developed by physician, nurse, and an individual with HL • consisted of closed and open-ended questions • Patient survey: evaluated participant's satisfaction with the AHD and interest in using it again in future hospitalizations. Nurse survey: aimed to assess the nurses\ satisfaction with the AHD, effect on productivity when interaction with patients using the device.	• 16 participants reported using a HA at least some of the time. 10-16 regular users. • participants used the AHD for 2.4 days during their stay. • 24 reported devices helped them to hear conversations directed towards them by HCP and wanted to reuse in future hospitalizations. • 15 nurses reported AHD beneficial and would recommend it to future patients. Time spent communicating with patients using AHD was reduced. • All nurses reported patient utilization of AHD resulted in time savings. • safe, easy to use/implement.	<u>Strength of Design:</u> Weak <u>Quality:</u> Moderate (Feasibility study) Limitations: • high turnover or patients made it difficult to obtain participants that could use the device for more than one day. • high nursing staff turnover made it difficult for nurses to be aware of the study. • the HHIE-S is subjective • HL was self-reported • sample size small, not generalizable.

Study/Design	Methods	Key Results	Comments
	Methods: • Reizon Loud Ear Personal Amplifier used. • 3 training meetings to education day and night shift nurses regarding AHD with study patients. • Patient then screened with HHIE-S by study team if nurses suspected hearing loss. • Study patients then trained on how to use the AHD.	• training a patient and nurse took less than 5 minutes.	• instruments used: patient and nurse surveys did not undergo any testing for external validity.
Lin & Ferrucci (2012) Design: Cross-Sectional Purpose: Examine the association of audiometric HL with self-reported falls in individuals 40-69 years old.	N: 2017 • 40-69 years old • Individuals who participated in the NHANES Country/setting: United States Data Collection: • Audiometric assessment completed and fall history obtained through interviewer administered questionnaire. Methods: • Logistic regression used to analyze association between HL and self-reported falling	• HL was prevalent in 14.3% of these participants, and 4.9% of the participants reported falling over the preceding 12 months. • For every 10-dB increase in HL, there was a 1.4-fold (95% CI, 1.3-1.5) increased odds of an individual reporting a fall over the preceding 12 months. • Adjusted for demographic factors (age, sex, race, education) and medical histories (cardiovascular/vestibular	<u>Strength of Design:</u> Weak <u>Quality:</u> Medium Limitations: • Reliability and validity of measurement tools utilized not disclosed. • Results based on cross-sectional data rather than longitudinal trajectories.

Study/Design	Methods	Key Results	Comments
	• Sample weights used to account for complex sampling design. • Adjustment made	balance function) did not change significance of results. • Excluding participants with HL of 40 dB or less (moderate/severe hearing loss) did not affect magnitude of results.	• No demographic data given on sample.
Lin et al. (2013) Design: Cross-Sectional Purpose: To determine whether HL is associated with cognitive decline in older adults.	N: 2206 underwent hearing testing • 1984 older adults had no evidence of cognitive impairment (baseline) cohort • Mean age 77.4 years • Mild hearing loss (762 participants), moderate HL (386 participants), severe HL (14). • Aged 70-79 years • Random Sampling Country/setting: USA Data Collection: Individuals enrolled in the Health ABC Study • Aged 70-79 years • Random Sampling Methods: • Audiometric testing administered in Year 5 of the study.	• In mixed effects models HL associated with lower baseline 3MS scores. • The rates of 3MS scores decline were significantly greater in individuals with mild HL (p = .03), and in individuals with moderate or greater HL (p = .005) • DSS scores decline were greater in individuals with moderate or greater HL (p = .01) • Every 10 dB of HL at baseline was associated with an incremental additional rate of decline for the 3MS and DSS	<u>Strength of Design:</u> Weak <u>Quality:</u> Poor Limitations: • Variability in how HL was measured and how audiometric data was analyzed. • Study results may not be generalizable (Black and White race/ethnicity of participants) • Speculate that other pathways (comorbidities) have

Study/Design	Methods	Key Results	Comments
	• Participants followed up for 6 years. • 3MS and DDS administered in year 5 (2001-2007) year 8 (2005-2005), year 10 (2006-2007) and year 11 (2007-2008). - tests orientation, concentration, language, praxis, and memory. • DSS is a nonverbal test of psychomotor speed and executive function. • Centre for Epidemiological Studies Depression Scale- depressive symptoms at baseline were assessed with this tool.	respectively (p = .003 & p = .04).	a contribution to accelerated cognitive decline. • HL only measured at baseline.
McShea (2015) Design: Phenomenology Purpose: To improve access to, and aftercare from, audiology services for people with learning disabilities	N: Nine practitioners (5 GPs, 8 practice nurses) Country/setting: United Kingdom/ Data Collection: Semi-structured interviews Addressed experiences, knowledge, of HL and referral procedures Methods: • primary care professionals interviewed to ascertain their knowledge and experience of assessing people with HL • interviews were interpreted using thematic analysis.	**Awareness of Audiology** • practice nurses unable to refer directly. Had limited knowledge of audiology. No training in this area. • GPs aware on how to refer to audiology, completed examination, history taking and referral process. **Roles and responsibilities** • all practice nurses involved in annual health checks for people with learning disabilities.	<u>Quality:</u> Credible Limitations: • small sample size and qualitative methods limit generalizability. • potential bias- providers overestimating the level of care being provided.

Study/Design	Methods	Key Results	Comments
	• Codes generated that were condensed into 4 central themes that were cross-checked with the original data set to ensure authenticity.	• staff would rely on family members to tell them if they're having problems. **Assumptions and barriers** • interviewers did not know how to approach the issue of hearing difficulty. • strategies used were monitoring if the person asked for repetition or turned their head when questions asked. **Enablers** • education on referral routes, information sharing for staff and carers, publicizing available audiology services and more teamwork.	
McCullagh & Frank (2012) Design: Cross-Sectional	N: 30 cases. • Participants obtained retrospectively through a random sample of cases. • 18-68 years of age	• an assessment of the structure of the auditory system was completed for all 30 records. Functional status was not recorded in any case. No data to	<u>Strength of Design:</u> Weak <u>Quality:</u> Low Limitations:

Study/Design	Methods	Key Results	Comments
Purpose: Determine the extent to which primary care providers screen adults for HL and determine what technique are used to screen in adult primary care patient.	Country/setting: United States/ Two nurse managed primary care clinics in a Midwestern city Data Collection: • patient record audit tool developed to capture possible cues to the selection of clients with potential hearing impairment and methods of determining hearing acuity. • tool was reviewed for validity by a panel of nurses with expertise in primary care and promotion of hearing health. Methods: • Descriptive statistics used to identify input errors. Non-parametric descriptive statistics were used to summarize the characteristics of selected cases.	determine which functional assessment tool used. • All but two: evidence of one or more potentially ototoxic drugs prescribed. • no way to determine risk of HL associated with previous employment. • no documentation of use of hearing protection, or environmental noise exposure.	• Small sample size-generalization of conclusions inappropriate. • possible that function was assessed by the ability of the patient to converse, but not recorded as such. • retrospective analysis of patient records was dependent on excellent record keeping.
Mick et al. (2014) Design: Cohort Purpose: To investigate the associations between HL and patient perceptions of quality of health care.	N: 122,556 participants • 9747 with HL;112,809 with normal hearing • 18 or older • Visited a physician at least once in the previous year. Country/setting: United States	• Individuals with HL were more likely to be older, of lower socioeconomic status, and in poorer health. • Individuals with HL had significantly lower odds that those with normal hearing of having rations of	<u>Strength of Design:</u> Moderate <u>Quality:</u> Medium Limitations: • HL based on self-report resulting in exposure

Study/Design	Methods	Key Results	Comments
	Data Collection: Pooled data derived from MEPS-HC • HL self-reported as no HL vs any HL (excluding deafness) • Perception of patient-physician communication was assessed using the Consumer Assessment of Healthcare Providers and Systems Methods: • Associations between HL and rating of patient physician communication and health care were analyzed using logistic regression.	patient-physician communication ($p<.001$) and overall health care ($p=.02$) • Sex, age, HA use, and self-reported visual impairment did not modify these associations significantly.	misclassification, and the possibility of residual confounding.
Middleton et al. (2010) Design: Cross-Sectional Purpose: To explore the preferences of deaf people for communication in a hospital consultation	N: 999 questionnaires returned for analysis • Use speech or sign language as their main form of communication • Recruitment via two UK-based magazines. Country/setting: United Kingdom Data Collection: • Nonstandard questionnaire used-generated via discussions with deaf people and experts in deaf studies as well as after a review of the medical, social sciences, and deaf studies literature.	• Of 609 participants whose comfortable language was spoken, 98%: spoken consultation would suffice. 71% would only accept a consultation with an awareness of lip-reading/speechreading. • 123 comfortable using a mixture of sign language and speech- 90% required some level of deaf awareness in speech only consultation	<u>Strength of Design:</u> Weak <u>Quality:</u> Low Limitations: • not a representative sample. • exploratory study; utilized data from a larger study.

Study/Design	Methods	Key Results	Comments
	• checked for ease of translation into signed language and checked for cultural sensitivity readability/face-validity checked. • contained 32 questions Methods: • All copies of one issue of each magazine had a questionnaire included together with invitation to participate in study.	• 49% preferred signing consultation, 14% only through a direct health care professional who could sign.	• unable to determine generalizability of results.
Nørgaard et al. (2012) Design: Uncontrolled Before and After Purpose: To investigate the impact of a training course on participants' self-efficacy with a focus on communication	N: 181 participants • 177 answered questionnaires before, 165 immediately after, and 150 six months. • Doctors, nurses, nursing assistants, secretaries, other staff members (managers/service) Country/setting: Denmark/Department of Orthopedic Surgery at Kolding Hospital Data Collection: • Self-efficacy measured by a questionnaire (validated) Methods: • Staff members attended a 3-day training course in patient/colleague centered communication. Last day of training was	• Self-efficacy in communication with patients was higher for doctors than other HCPs at baseline. • nurses had identical baselines in communication with patients and colleagues. • Nurses (n=96) had significant increase of self-efficacy when communicating with patients (p=0.001) • Increases in self-efficacy was still present 6 months after course.	<u>Strength of Design:</u> Weak <u>Quality:</u> Medium Limitations: • self-rating questionnaire of self-efficacy • no test-retest of the internal reliability of the questionnaire • unknown whether the increased self-efficacy scores led to changes in communication behavior.

Study/Design	Methods	Key Results	Comments
	6 weeks after start and gave opportunity to practice skills. • Training: to enhance communication skills (accuracy, efficiency, and supportiveness) through communication principles		
Pandhi et al. (2011) Design: Cross-Sectional Purpose: Investigate whether older adults who are hard of hearing are more likely than other adults to report experiencing difficulties and delays in accessing care and decreased satisfaction with access to care.	N: 6524 • Men and Women who graduated from Wisconsin high schools in the spring of 1957 and 8,778 of randomly selected siblings • 1,203 individuals who were hard of hearing • 5,321 not hard of hearing • Those hard of hearing were older, more likely to be male, separated/divorced, and to have Medicare insurance as compared to private or other public insurance. Country/setting: USA/Wisconsin Data Collection: Data obtained for the Wisconsin Longitudinal Study survey (long term cohort study) • 2003-2006 round of Data collection. Methods:	• Hard of hearing individuals had a higher average number of chronic conditions ($p < 0.001$) • Proportionally more likely to have diabetes ($p < 0.01$), atherosclerotic vascular disease ($p =< 0.001$), clinical depression ($p < 0.001$), lower self-rated health ($p<0.001$). • 13% with HL reported experiencing difficulties and delays in health care access in the past 12 mos. As compared to 8% who were not hard of hearing ($p<0.01$)	<u>Strength of Design:</u> Weak <u>Quality:</u> Medium Limitations: • Telephone survey eliminates accessibility of population. • Population not generalizable (geographical/ethic and racial diversity) – white, well-educated. • HL based on self-report subject to

Study/Design	Methods	Key Results	Comments
	• Participants contacted via telephone and interviewed. • Followed up with 54-page mailout, mail back surveys (x3) and then a final telephone contact. • 88% response rate	• Satisfaction with access to care was sig. lower for hard of hearing, compared to those without ($p<0.01$). • Sig. predictors of reporting difficulties and delays in accessing care were increased number of chronic conditions and having sig. depressive symptoms.	misclassification bias.
Reed et al. (2019) Design: Cross-Sectional Purpose: Explore the relationship between HL and satisfaction with health care.	N: 248 patients • Medicare beneficiaries • Aged 67-89 years. Country/setting: United States/ Maryland Data Collection: • Hearing pilot study in the Atherosclerosis Risk in Communities Study. Methods: • Patients completed audiometric hearing measurements. • Patients were asked about their overall satisfaction with the quality of care they received from their health care providers over the past 12 months.	• 72% reported being very satisfied, 22% somewhat satisfied, 3% somewhat dissatisfied, 3% very dissatisfied with their medical care. • significant ($p=0.033$) interaction between HL and age. HL had a greater impact on odds of being less than optimally satisfied among older adults. • did not affect satisfaction with care among younger participants.	<u>Strength of Design:</u> Weak <u>Quality:</u> Medium Limitations: • non-white, Medicaid participants excluded (demographic homogeneity) • modest sample size.

Study/Design	Methods	Key Results	Comments
	• Association between HL and satisfaction with care used logistic regression. Interactions between HL and demographic variables explored. Sensitivity analysis done to adjust for self-reported perceived health compared to peers of the same age.		
Ruesch (2018) Design: Cross-Sectional Purpose: To develop, validate, and test a knowledge assessment tool to measure nurse's knowledge of HL, HAs, effective communication, and laws and policies regarding caring for an individual with HL.	N: 339 Registered Nurses Country/setting: United States/Community hospital in Pennsylvania Data Collection: • Knowledge assessment tool (developed/validated by researcher): used to identify knowledge deficits to be addressed in a communication skills training program. Measured knowledge across 4 areas: • Hearing impairment, HAs, communication strategies and regulations regarding hearing accessibility for people with HL. • Tested for internal consistency and reliability Methods:	• Only 8% of respondents attended a course on hearing impairment. • No statistically significant differences in test scores for age, years of experience, academic degree, knowing a hearing-impaired person, or association with a specific nursing unit. • higher total score for participants who attended a course or workshop on hearing impairment and/or communication strategies when interacting with a hearing-impaired patient (p=0.0084)	<u>Strength of Design:</u> Weak <u>Quality:</u> Medium Limitations: • participants were not prompted to indicate what type of educational intervention, when the course was taken, and the type of course content if they completed one. • convenience sampling limited generalizability to larger population of nurses.

Study/Design	Methods	Key Results	Comments
	• Researcher 1st developed the assessment tool to obtain data: reviewed and validated be an expert panel • Then knowledge assessment test was distributed to nurses.	• communication strategies had the second highest score but still below the 75th percentile cut off for adequate knowledge. • Highest for HA/ALD: attributed to familiarity with HAs through their own personal lives and family.	• limitations with test tool: no questions on race and gender to allow further description of the sample population
Sheppard (2014) Design: Phenomenology Purpose: To give voice to nine Deaf adults who describe their experience with health care	N: 9 culturally Deaf adults. • Purposive sampling and saturation reached • From 21-62 years of age. Country/setting: United States/Large university in the western portion. Data Collection: • Hermeneutic interviews: First interview was an introduction and getting to know participant though open-ended question. Second interview was used to pursue areas that held significance for the participant. The third interview, central concerns reviewed and emerging themes	• each participant voluntarily brought up the topic of health care. • stories of health care were often related with angry facial expressions, and some were recounted tearfully. • Four themes: Theme 4: Reaching out, spoke to their health care experiences. • difficulty accessing health care and encounters meaningless.	<u>Quality:</u> Credible Limitations: • not generalizable: small sample size and Deaf community small in that geographical location. Cannot be generalized to all culturally Deaf adults. • possible participants could be biased as interviewer a nurse and they had a desire to talk to a nurse

Study/Design	Methods	Key Results	Comments
	from early analysis shared to verify mutual understanding. Methods: • Each participant interviewed three times, aided by a certified ASL interpreter. • Self-reflection done prior to each interview to identify the researcher's preunderstanding and prejudices. • Analysis done through the interview process and themes derived. Rigor established.	• frustration, lack of resources available to Deaf patients, lack of accessibility, scary and intimidating. • Nurses, doctors, and office staff were described as frequently impatient. • Feeling confused, not understanding of medications prescribed, undergoing examinations and procedures without understanding. • Communication barriers- not able to lip read, masks covering mouths, confidentiality challenges with ASL interpreters.	who wanted to hear their stories. • numerous people described anger; therefore study may have attracted more participants who wished to air their concerns.
Smith et al. (2016) Design: Cross-Sectional Purpose:	N: 510 • 315 physicians, 50 nurses, 48 nurse practitioners, 58 social workers, and 39 chaplains. Country/setting: USA	• 91% felt HL had some or great impact on the quality of care of older patients in palliative care.	<u>Strength of Design:</u> Weak <u>Quality:</u> Moderate Limitations:

Study/Design	Methods	Key Results	Comments
To determine whether hospice/palliative care providers screen for or received training about HL, its impacts on care and use of communication strategies.	Data Collection: Likert scales/or dichotomous scales used. • Data collected using SurveyMonkey Methods: • Survey large convenience sample of hospice and palliative care providers from multiple disciplines. • Participants recruited via email • Survey questions addressed: perceived impact of HL on quality of care, screening and audiology referral practices, comfort with and training in caring for patients with HL, treatment strategies, perceived prevalence, and demographic data of respondents.	• 88%: a situation where HL created a communication problem. • 61% reported feeling very comfortable with communication skills. • 21% received formal training. • 31% unfamiliar with resources, 38% never heard of assistive technology. • 87% do not formally screen. • Most common method of screening was asking patient, asking family, whisper test, the finger rub test, and using audiometer. Nurses expressed least familiarity with resources for patients with HL (p=0.024) • Nurses least likely familiar with pocket talker (p.=.007) • -Nurses least likely to refer to audiologist (p<0.0001)	• Convenience sample used. • Only those with social media/email could respond or participate. • No validated survey tools used.

Study/Design	Methods	Key Results	Comments
Smith et al. (2020) Design: Cross-Sectional Purpose: To examine health professionals' strategies and level of formal training completed for communication with older adults with HL.	N: 172 primary care physicians + 100 hospital-based health care providers • Comprised of nurses, speech and language therapists, occupational therapists, physiotherapists, and health care assistants. Country/setting: Ireland/Inpatient palliative care and geriatric services Data Collection: • 17 item questionnaires: Covered 3 areas, sociodemographic and occupational items, communication strategies with patients with ARHL and quality of patient care and medical error. • Approaches to communication with ARHL patients were assessed using items adapted from another studied that examined ARHL in a palliative care setting • Likert scale used to assess medical error/quality of patient care. Methods: • 250 primary care physicians contacted via email or post.	• 97% of reported ARHL had impacted quality of care. • 13% of reported feeling 'very/uncomfortable' with their communication skills. • 73% reported feeling 'very/comfortable' • 13% reported having received formal training in how to care for patients with HL (p=0.004). • 30% reported familiarity with resources available to ARHL patients. • Were significantly more likely to use strategies: speaking in patient's ear (p<0.001), reducing extraneous noises (p<0.001) and facing the patient (p=0.006) • 29% stated HL in older patients resulted in errors without negative consequence.	<u>Strength of Design:</u> Weak <u>Quality:</u> Moderate Limitations: • Subjective, self-report measure of medical error. • Lack of clarity on the precise nature of medication errors reported.

Study/Design	Methods	Key Results	Comments
	• Questionnaires distributed in person to secondary health care providers in 3 teaching hospitals. • Surveys also distributed via post or email to 50 health care providers in geriatric medicine or palliative care units across public hospitals.	• 15% ARHL led to mistakes with negative consequences. • ->10% with prescribing authority ARHL resulted in medication errors.	
Steinberg et al. (2006) Design: Phenomenological Purpose: To better understand the health care experiences of Deaf people who communicate in ASL	N: 91 Deaf adults • Communicate primarily in ASL • Recruited from local Deaf communities through face-to-face interactions at Deaf community events, organizations, printed flyers. • Age 24-83 years old. Country/setting: USA Data Collection: Four semi-structured focus group meetings, 2hrs each. Methods: • Researchers at focus group reviewed transcripts for accuracy. • Transcripts reviewed for key concepts, ideas, and incidents. These were discussed during face-to-face meetings and email to refine themes.	• **Themes:** **Communication** • poor understanding of clinician instructions • medically certified interpreters infrequently available. • Note writing/speech reading inadequate • Lack of familiarity with TTY and telephone relay services. • family members inadequate **ASL Practitioners** • communicating directly with clinicians with sign language skills was a positive experience	Quality: Credible Limitations: • Not representative of the entire U.S Deaf population as majority of deaf people lost their hearing later in life and often do not learn ASL. • Those that elected to participate in the study may have had different experiences than those who do not participate. • Lack of information amongst 3 cities study took place

Study/Design	Methods	Key Results	Comments
	• Text based qualitative research software package Folio VIEWS to manage data.	• when visual aids used with interpreting services many had successful health care experiences. **<u>Emotions</u>** • fear, afraid of consequences from miscommunication and afraid to speak up • mistrust, frustration, and burnout from self advocation. **<u>Knowledge of the ADA</u>** • unsure of their human rights	with regards to recruiting participants to reflect the sociodemographic characteristics of the local Deaf community.
Ubido et al. (2002) Design: Mixed Method Purpose: To examine access to health care experiences of Deaf women	N: • 1st group discussion: women over the age of 65 wore hearing aids, on a loop system, a lip-reading class. • 2nd group discussion: 14 women Deaf Sign Language users aged 20-50 years, deaf from birth or early childhood • 3rd: interview with a woman who became late deafened, who undertook to interview	**Making appointments** • must go in person or get someone else to phone for them **Problems in the waiting room** • anxiety/concern over missing their appointment **Communication** • never fully understanding doctor, written notes not	<u>Strength of Design:</u> Weak <u>Quality:</u> Weak Limitations: • small sample size • lack of validated measurement tools

Study/Design	Methods	Key Results	Comments
	two other women who recently experienced profound deafness Country/setting: UK Data Collection: • Group discussions with 27 women. • Questionnaires sent to random sample of 103 women from social services register – 38 returned. • 129 questionnaires distributed to leaders of various clubs and organizations of the Deaf-100 returned. Methods: • Group discussions and questionnaires utilized. • Group discussions were supported by the literature review and revealed important topic issues that were incorporated into a questionnaire. Questionnaire addressed: sociodemographic details, types of deafness, use of health services, how they make appointments, experiences in waiting room, their understanding of medical staff, their perceptions of medical staff, problems with hearing tests and aids, views on accessibility of health information and suggestions for improvement.	easy to understand and poor/no understanding of medical procedures. **Lack of awareness** • different doctors each visit and having to explain communication needs • poor communication skills such as looking down when talking. • poor attitude and insensitivity **Language** • medical jargon difficult to understand **Hearing aids/test** • many find it difficult to get to hearing aid clinic **Health information** • lack of information on sex, contraception/childbirth	• questionnaires could limit the responses of Deaf women as language barrier present.

Study/Design	Methods	Key Results	Comments
Wallhagen & Pettengill (2008) Design: Longitudinal Mixed Methods Purpose: Explore whether primary care providers ever asked about or screened for HL among older adults.	N: 91 adults • Participants recruited while seeking information about HL testing or treatments from clinics/centers that performed hearing evaluations. • Age 60 or older. • Untreated HL and either had no prior experience with HAs or had not worn HAs within the past year Country/setting: United States/ Primary health care clinics Data Collection: • Interviews: questionnaires that asked about history of HL symptoms prior to hearing evaluations and prior to use of HAs. • Subjective hearing impairment measures using the HHIE-S. • Standardized audiological audiograms utilize to determine frequencies of HL. Methods: • Baseline interviews conducted by interviews trained in qualitative data collation. Interviews transcribed, and	• 90% had clear recollection about whether primary care provider ever inquired about their hearing. • 85% of clear recall: provider never proactively asked or screened for HL. • whether the primary care provider asked or not: unrelated to HHIE-S or audiogram scores. • participants always initiated discussion as they wanted further evaluation. • communication partners would validate and advocate for participants.	<u>Strength of Design:</u> Weak <u>Quality:</u> Medium Limitations: • rates of primary care provider hearing inquiry and screening based on participants' recall and self-report. Could not be verified by other means. • data not available to eliminate possibility provider had received an earlier hearing evaluation indicating HL and thought it ineffective to perform additional screens.

Study/Design	Methods	Key Results	Comments
	constant comparative qualitative method used to find themes. • First interviews took place before or close to the time of initial hearing evaluation. • Audiograms performed during initial evaluation obtained.		
Woodcock & Pole (2007) Design: Cross-Sectional Purpose: To profile the health of deaf and hard of hearing Canadians in relation to the population as a whole	N: 131 422 respondents • 4% of respondents were considered to have hearing problems. Country/setting: Canada Data Collection: Data obtained from the Canada Community Health Survey 1.1 • Conducted by Statistics Canada • Respondents contact for interview between September 2000-November 2001. • 12 or older, living in private occupied dwellings in all provinces and territories. Methods • Study examined health care utilization, several commonly accepted health outcomes, engagement in health promotion activities, and perceptions of overall health.	• higher prevalence of depression seen in the deaf/hard of hearing group. • deaf and hard of hearing people reported comparable access to health care, but it was noted that procedures reflecting comparable access were not communication intensive clinical encounters. • Respondents with hearing problems were significantly more likely to report heart disease, the presence of chronic conditions, being injured in the past 12 months, and to experience depression compared with respondents no reporting hearing problems.	<u>Strength of Design:</u> Weak <u>Quality</u>: Strong Limitations: • interviews done by telephone for individuals who are deaf or have HL is biased. • Causality cannot be determined due to cross sectional design.

Study/Design	Methods	Key Results	Comments
	• Hearing status assessed by questioning • Logistic regression models.	• no difference than hearing counterparts in reporting life stress, sense of belonging, and emotional and social support.	

Appendix II: Environmental Scan Report

Hearing Loss Management in Acute Care: Environmental Scan Report

Leanna Rowe

Memorial University of Newfoundland and Labrador

Hearing loss can have a vast impact on a variety of life factors including physical, mental, and social health that can lead to a decreased quality of life. Hearing loss has been associated with increased risk for physical injury (Girard et al., 2013; Grue et al., 2009; Lin & Ferrucci, 2012), increased hospitalizations (Chang et al., 2018; Genther et al., 2015), comorbidities (Genther et al., 2014; Pandhi et al., 2011), communication challenges (Bennion & Forshaw, 2011; Funk et al., 2018; Steinberg et al., 2006) and stigmatization (Ubido et al., 2002; Woodcock & Pole, 2007). Addressing the needs of hearing-impaired patients in the hospital setting can be challenging and nurses should be aware of the complex health care and communication needs of this patient population. With the prevalence of hearing loss on the rise, nurses in acute care need to be equipped to address the complex and unmet health care needs of individuals living with hearing loss. Education and resources for nurses caring for individuals with hearing loss in acute care is lacking, therefore the purpose of this practicum project was to develop a toolkit for nurses to address the lack of knowledge and training surrounding this patient population. Prior to the development of the toolkit, an environmental scan was necessary to determine if any resources, such as existing toolkits, are utilized in other acute care settings locally, nationally, and internationally. Additionally, the purpose of conducting the environmental scan was to potentially identify any recurring themes or essential components that should be included in the development of a hearing loss toolkit for nurses.

Objectives

The objectives of the environmental scan were:

1. Identify existing policies and procedures for caring for patients with hearing loss, including identifying and managing hearing loss.
2. Identify any nursing educational materials that exist that could inform the development of a

toolkit for surgical nurses and their patients with hearing loss.

Methods

The environmental scan was completed in three parts. Surgical nurse managers and community stakeholders were contacted in addition to an international online search for existing nursing resources in managing hearing loss and patient care. The following report describes the purpose of contacting these individuals and the methods that were used to connect with surgical nurse mangers locally, provincially, and nationally. The rationale behind reaching out to community stake holders that work with individuals living with hearing loss in our community and the search methods utilized to conduct an online scan for international resources are discussed. Furthermore, the results from the environmental scan, and any information received from the scan, were assessed for common and recurring themes that could contribute to the development of an educational toolkit for nurses caring for patients with hearing loss.

Surgical Nurse Managers

The purpose of reaching out to surgical nurse managers was to identify whether there are resources in existence for surgical nurses to care for patients with hearing loss in nursing units locally, provincially, and nationally. Additionally, if no such resource exists, it was beneficial to investigate whether nurse managers had any information available on the provision of nursing care for individuals with hearing loss that would provide content to the development of a nursing toolkit on this topic.

Methods. The first step in the environmental scan was to determine if nurses in Newfoundland and Labrador have an existing policy or resource in place to identify and manage individuals with hearing loss admitted to an acute care facility. A Google search was conducted to find websites of the four existing Regional Health Authorities (RHAs) in Newfoundland and

Labrador. Eastern Health, Central Health, Western Health, and Labrador Grenfell Health websites were reviewed to find the major hospital within each RHA and for the contact information for surgical nurse managers of surgical nursing units in those hospitals.

Another Google search was completed to compose a list of major hospitals within each of the 10 provinces and three territories in Canada. The largest (most inpatient beds) urban hospital with inpatient surgical services from each province and territory was chosen. The results from the Google search were retrieved from individual hospital websites and compiled into a contact list that identified a contact person for every location for a total of 13 contacts. If a surgical nursing manager could not be identified directly from the website, the contact information of a nursing representative from the hospital was utilized. The contact person was contacted via email to identify the existence of any educational materials, toolkits, hearing loss policies or resources they have available for their surgical nurses caring for individuals with hearing loss. A script of this email can be found in Appendix A.

Results. Emails were sent to four contact people from each of the four major hospitals within the RHAs in Newfoundland and Labrador as well as the 13 contact persons from major Canadian hospitals. A follow up email was sent a week later to those individuals who had not yet responded. From the RHAs in Newfoundland and Labrador, one response was received. A surgical nursing manager of an acute care inpatient unit at the Health Sciences in St. John's, shared that they were not familiar with any policies or protocols in place for individuals in acute care with hearing loss. However, they have directed their patient care coordinators and staff to utilize the only resource they are familiar with which is the *Hear Here* resource toolkit located on the unit provided by the Canadian Hard of Hearing Association. This resource will be discussed later in this report.

Of the 13 emails sent nationally, only one response was obtained from the contact person of the Horizon Health Network in New Brunswick. Horizon Health Network is the largest regional health authority in New Brunswick and delivers quality and safe care to residents of New Brunswick, northern Nova Scotia, and Prince Edward Island (Horizon Health Network, 2020). Horizon Health is leading a regional project to revamp an existing program within the network called *Access to Communication: Serving Patients who are Deaf or Hard of Hearing*. This project was developed approximately eight years ago after there was a demand for improved health care services for individuals who were Deaf and Hard of Hearing. The *Access to Communication: Serving Patients who are Deaf or Hard of Hearing* resource includes information on hearing loss, a policy for deaf and hard of hearing patients, strategies for the identification of people with hearing loss, communication strategies, as well as strategies for accessing resources, such as sign language interpreting services, assistive listening devices (ALDs) and hearing aids.

The primary goal of the policy that was developed was to support Deaf/deaf and hard of hearing patients within Horizon Healthcare in New Brunswick. The policy comprised of making sign language interpreting services and/or assistive listening devices available upon request. It also specified mandatory "e-learning" education on techniques, services, and assistive equipment for communicating with people who are Deaf/deaf or hard of hearing for frontline staff and management. The policy outlines procedures that should be taken concerning Deaf/deaf and hard of hearing patients. This includes ensuring online training is completed at least once as part of employment orientation and consulting with patients who identify as hard of hearing or Deaf/deaf (or their family/support person) to determine their requirements such as the use of assistive listening devices (ALDs) and/ or sign language interpreting services. The procedures

also include ensuring information that patients who are Deaf/deaf or hard of hearing that require these services is included in any referrals or consultations within Horizon Health facilities or services. Lastly, the procedures guide staff and patients who are Deaf/deaf or hard of hearing on where to find further information on the *Access to Communication for Deaf and Hard of Hearing* program as well as local area contact numbers for audiologists.

The contact also informed me that the policy relied largely on individuals who are Deaf/deaf or hard of hearing to self-report their hearing loss and let staff know of their needs. They shared that Horizon Health uses the universal blue ear symbol for hearing loss to identify places where assisted communication is available for people with hearing difficulties, informing patients that employees are trained in communicating with the hard of hearing population, or a blue ear sticker can be attached to a patient's chart for easy identification of a hearing loss. The contact also shared pocket talker purchasing information for hospital units, unit brochures that encourage patients to inform staff members if they have a hearing loss and posters that make patients aware of accessibility services. Unfortunately, content from the staff e-learning module could not be shared as that is electronic based and located on the employee intranet. However, the contact shared that it is based on tips for communicating with patients with hearing loss and where to get further information if they should need it. Additionally, it was shared that the program is currently being revamped to reflect the diversity of the Deaf and hearing loss community and to update the policy along with the available resources.

Community Stakeholders

Two local non-profit groups, the Canadian Hard of Hearing Association-Newfoundland and Labrador (CHHA-NL), and the Newfoundland and Labrador Association of the Deaf (NLAD), were contacted. The purpose of reaching out to these community groups was to

identify whether they have developed their own educational resources for nurses or have a library of resources or information that could contribute to the development of a toolkit for nurses caring for individuals with hearing loss.

Methods. An employee of the local CHHA-NL branch in St. John's was contacted through email. A representative from the NLAD was also contacted via email to request their assistance with this practicum project. A second follow-up email was sent the to the NLAD a week later and to date there has been no response. A script of the email sent to community stakeholders can be found in Appendix B.

Results. The contact person from CHHA-NL shared information regarding the *Hear Here* project launched in 2014 to improve healthcare services for individuals who are hard of hearing in acute care. The project consisted of the development of a physical toolkit, which was a box full of resources that was delivered to all nursing units within the Health Sciences Centre in St. John's. Included in this kit was a pocket talker along with its operating manual and a small amount of replacement parts. An *Improving Communications* brochure which highlighted strategies for healthcare staff on how to communicate with individuals with hearing loss and *Hear Here* posters to encourage patients to self-identify their hearing loss and communication strategies for patients were included. Stickers were provided in the toolkit to place around the unit to indicate the availability of such a toolkit if a patient should require a pocket talker or further information. The CHHA-NL toolkit contains a three-minute video in which there is an example of a patient care scenario and strategies on to improve communication between people with hearing loss and health care providers.

The contact person at CHHA-NL shared that this project was implemented some time ago and follow-up from the project remains inadequate due to poor responsiveness from nursing

managers after the program was implemented and lack of financial and staffing resources from CHHA-NL. Since the kits have been disseminated, CHHA-NL staff remain unsure as to whether the kits have been appropriately implemented on nursing units and whether these kits or any components within them were effective in improving patient care for individuals with hearing loss. CHHA-NL has not received any evaluations on the toolkits and whether nursing staff or patients are aware of the existence of such a resource. Therefore, the association has not invested in any further development of the program nor in its follow-up. The contact also informed me that the pocket talkers used within the kits are now obsolete, so if they should break, a new pocket talker will need to be purchased and that will have to be at the expense of the nursing unit. The CHHA-NL can still provide guidance and support for purchasing ADLs such as pocket talkers as well as be a resource for both patients and staff needing further information on hearing loss supports.

International Search

An international search was also conducted to identify if there are any hearing loss toolkits utilized by nurses on a global level to inform the development of a toolkit for nurses on 4NB-General Surgery at the Health Sciences Centre.

Methods. The search engine utilized to conduct a broad internet search for hearing loss toolkits utilized by nurses globally was Google. The parameters for the search were set to include any toolkits or resources developed with the intent to aid health professionals managing hearing loss in acute care. Key terms such as “hearing loss”, “toolkit”, “nurses” and “resources” were used to guide the search to identify whether nursing toolkits exists internationally for the care of individuals with hearing loss. After further exploration of the 3,900,000 results retrieved from the search, the search was narrowed down to include resources written in the English language

and developed within the last 10 years. This resulted in 2,210,000 articles and websites that included the key terms “hearing loss”, “toolkit”, “nurses” and “resources”.

Results. It was determined that three toolkits that were found could be utilized for information purposes to help inform the content of the toolkit developed from this practicum project. The first toolkit that was found was one utilized by the Royal Victoria Regional Health (RVH) Centre located in Barrie, Ontario. Developed by the RVH Accessibility Committee, the Hearing Loss Communication Tool Kit (Royal Victoria Regional Health Centre, 2018) is comprised of communication strategies for patients with hearing loss to communicate effectively with healthcare staff. This toolkit assists an individual in identifying whether they are Deaf or have a hearing loss and allows them to tick off what communication strategies they need staff to employ to communicate with them. Additionally, it allows for patients with hearing devices to identify what and how many devices they use, and what if any, further communication needs or assistance they require.

Another toolkit was developed by the Southlake Regional Health Centre of Newmarket, Ontario, in partnership with the Canadian Hearing Society to provide Southlake patients and staff with processes to improve communication access and enhance patient safety and satisfaction for people who are culturally Deaf, oral deaf, deafened, or hard of hearing (Southlake Regional Health Centre, 2015). Included in this toolkit is a patient assistance card that indicate the presence of a hearing loss and that the patient requires assistance. The toolkit also included stickers that have the Universal Symbol of Access indicating a hearing loss, which is a blue ear that can be placed on a patient’s identification bracelet, the chart, the nursing Kardex, and the call bell system to indicate that calls for assistance must be answered in person. The toolkit contains signs to post at the patient’s bedside, pictograms for communication, hearing devices

information, care and storage, information about sign language interpreting as well as sheets of paper and pen for written communication. The toolkit also has a copy of an article from the hospital magazine as well as patient testimonials on the value of the toolkit and a survey questionnaire to determine the satisfaction of individuals using the toolkit.

A British toolkit that was launched by Heart of England National Health Service Foundation Trust and Action on Hearing Loss was found that was developed as part of a pilot project to act on hearing loss in acute care. The toolkit was designed to improve hospital recognition of hearing loss, use of hearing aids, and access to hearing aid support to improve treatment outcomes for patients with hearing loss. Additionally, the toolkit was created to increase staff knowledge and expertise on how to communicate effectively with people with hearing loss, improve the care of hearing aids and increase the identification and recognition of hearing loss in patients (Holmes, 2014).

The Action on Hearing loss toolkit is a document that shows healthcare professionals what steps they can take to improve the experience of older people with hearing loss while they are in hospital. It follows a hearing loss pathway to help steer staff along the best course of action and ensures training in recognizing and understanding hearing loss, communication tips and basic hearing aid maintenance are provided. The steps of the pathway ensure patients are screened for hearing loss and referred appropriately, ensure hearing difficulties are documented and this documentation is included in the patient plan of care, ensure hearing aid storage boxes are available on nursing units for patients and ensure the use of hearing loss "champions" who act as the liaison between clinical staff, hearing service provider or local non-profit organizations (Holmes, 2014) to address patient care needs. The toolkit also provides access to a hearing loss support kit, which includes a hearing aid maintenance kit and ALDs such as personal

amplification systems. While there was sufficient information regarding development and general content of the toolkit, an actual physical copy of the toolkit was unable to be located in the internet search. All links to download the toolkit have been rendered non-functional so it is unclear whether this resource is still being utilized in practice.

Ethical Considerations

The Health Research Ethics Authority Screening Tool was completed prior to the environmental scan to determine whether ethical approval was required for the project and subsequently the environmental scan. The results indicated that the project did not require ethical approval. A copy of this tool can be found in Appendix C. A variety of methods were utilized to ensure the rights of the individual nursing managers of the facilities, the hospitals, and the health authorities they work for. In the contact emails, participants were made aware that their involvement in the project was voluntary. The email also apprised surgical nursing managers that any information or copyrighted material provided to be during the environmental scan will only be included in the toolkit with their written permission.

Contact information collected from websites are for the public to obtain and did not infringe any confidentiality standards. Any material collected from websites are for the public to obtain and does not infringe any confidentiality standards. If there is any copyrighted information on the websites, any material or information used from websites will be appropriately referenced to the original source. Any copyrighted material will not be used without the express permission of the individual or copyright holder to use the material in the toolkit.

Analysis

Strategies from every resource collected from the environmental scan were compiled into a table to assess for those that were common and recurring. This was done to organize the data to

help determine what may be useful for inclusion in an educational toolkit. As shown in Table 1, there are a variety of different strategies that are used in nursing toolkits and patient resources to aid in the care of individuals with hearing loss that are utilized across Canada and internationally. Despite poor follow-up from email contacts, the environmental scan yielded rich valuable data that can all be taken into consideration in the later development of a hearing loss toolkit for the practicum project.

Table 1

Strategies Utilized within Toolkits for Managing Hearing Loss in Acute Care

Strategies	1	2	3	4	5
General Information on Hearing Loss/Deafness					
Brochures for Patients	✓				
Brochures for Nursing Staff/Healthcare workers		✓			
Posters		✓			
Patient Self-Identification Strategies					
Stickers	✓	✓		✓	
Posters		✓		✓	
Cards				✓	
Communication Strategies for Patients					
Hearing Loss Identification and Specific Needs Form			✓		
Communication Pictograms		✓		✓	
Communication Strategies for Nurses					
Communication Education	✓	✓			
Hearing Loss Screening/Documentation					✓
Staff Education					
E-learning modules	✓				
Videos		✓			
Resources					

Strategies	1	2	3	4	5
Information to access resources (ASL services, Audiology, obtaining ALDs)	✓		✓	✓	✓
Provision of ASL interpreting services	✓				
Provision of ALDs/supplies	✓	✓			✓
Miscellaneous					
Hearing Loss Procedure for Patients					✓
Hearing Loss Policy for Patients	✓				
Hearing Loss Advocates					✓
Survey Questionnaires/Evaluation of Resource				✓	

Note. Legend: 1= Access to Communication: Serving Patients who are Deaf of Hard of Hearing, 2 = Hear Here, 3= Hearing Loss Communication Tool Kit, 4= Southlake Tool Kit, 5 = Action on Hearing Loss Tool Kit

As the results in the table indicate, four of the five toolkits included information on how patients with hearing loss and nurses can access resources. Information on available resources contained in the toolkits was comprised of how to access hearing loss services such as sign language interpreters, audiologists, and non-profit organizations that specialize in the field of hearing loss and/or Deafness. Information on procuring ALDs should patients or nurses require them was also included in the resource information within the toolkits. These results highlight the importance of providing patients with hearing loss knowledge of services they can avail of to improve their ability to communicate and advocate for themselves. Comprehensive information on the availability of various resources that exist within hospitals, health agencies, and community groups is beneficial to nurses to address individual patient needs.

Strategies involving patient self-identification and disclosure of hearing loss appeared to be a focus for several of the toolkits. Three of the toolkits indicated that patient self-identification

of their hearing loss was a strategy in managing the care of these individuals. Patients were encouraged to self-identify a hearing loss using posters and stickers placed around the unit. In one of the toolkits, patients were given a card indicating the presence of a hearing loss/Deafness that they were able to provide to members of the healthcare team if they should need to. Three of the toolkits implemented universally utilized and recognized blue ear symbols that signifies a hearing loss which were made into stickers. These stickers were placed on patient charts, in patient rooms, and in places where assisted communication is available for people with hearing difficulties.

While some strategies were popular amongst the different toolkits, there are strategies that were not well represented throughout all the toolkits. Overall, there was a lack of general information on hearing loss/Deafness to educate patients and nursing staff. One toolkit contained posters and brochures that provided nurses information on the etiology of hearing loss. There was only one toolkit that included a brochure for patients concerning hearing loss. This is concerning because if nurses do not truly understand the etiology behind hearing loss/Deafness, what the signs and symptoms of hearing loss are, or ways in which hearing loss can be treated, providing comprehensive holistic nursing care to this patient population would be challenging.

Futhermore, only three of the five toolkits included communication between patients and nurses as a strategy in managing hearing loss in acute care. The ability to communicate effectively with patients is a nursing skill that impacts patient safety, patient comfort, and patient care. It would be prudent when dealing with any vulnerable population in nursing to include communication as a priority strategy in all available nursing resources, yet communication as a strategy remains undervalued. Communication strategies utilized in one toolkit have patients self-disclose their hearing loss on an admissions form when entering the hospital. Patients can

indicate on this form their communication needs and whether they use or wish to request an ALD. Two toolkits have a communication pictogram available for patients to use while they are inpatients to communicate with staff. These strategies rely largely on the assumptions that patients feel comfortable enough to disclose their hearing loss and can use communication pictograms. Two toolkits included communication education strategies within staff education and training programs. These programs are delivered via employer mandated "e-learning" modules and videos developed by non-profit community groups respectively. Hearing loss communication training is mandatory in only one toolkit. The mandatory "e-learning" training module is built into a hearing loss policy in which all staff must be trained to manage the care of individuals with hearing loss as part of their employee orientation.

There were also some notable strategies that were found throughout several toolkits that could be valuable in the future development of a hearing loss toolkit in the practicum project. Two toolkits implemented policies and procedures that nursing staff could refer to to guide their practice should they be caring for an individual who had hearing loss/Deafness. One toolkit implemented a procedure for when patients get admitted to hospital and have self-disclosed their hearing loss. The procedure involves the patient filling out documentation surrounding their communication needs, use of ALDs, and how many devices the patient uses. Additionally, the procedures ensure that blue ear stickers are placed on the patient's chart, on their call bell system, and around the patient's room to alert nursing staff. One toolkit developed and implemented a policy to support Deaf/deaf and hard of hearing patients. The policy includes mandatory training for staff, referring patients appropriately to health care team members such as audiology, the provision of ALDs and interpreting services, appropriate identification of patients with hearing loss using blue ear stickers, and general information on hearing loss.

One toolkit implemented the use of a hearing loss pathway. This pathway provides a step-by-step process for frontline nursing staff when working with patients with hearing loss. From screening on admission for the presence of hearing loss, to the correct documentation of the loss, nurses have a pathway to follow the best course of action for patient care. The pathway also ensures training in recognizing and understanding hearing loss, communication tips, and basic hearing aid maintenance are provided. Only one toolkit included a survey questionnaire to evaluate the effectiveness of the toolkit in improving patient care for hearing loss. This is unfortunate considering the small number of toolkits available in nursing practice. It would be beneficial to understand the considerations of patients with hearing loss and nursing staff in the future development of toolkits and whether these strategies are effective in improving patient care.

Implications

The results of the environmental scan have many implications for the development of this practicum project which is to develop a toolkit for nurses caring for individuals with hearing loss. Through reaching out to surgical nurse managers throughout Canada and conducting an international search, I was able to collect valuable information that will be useful to consider in the development of my practicum project. The environmental scan identified five toolkits that were comprised of different strategies; however, no two toolkits were the same. The lack of consistency in strategies among toolkits is concerning as it highlights variance in nursing care worldwide. This suggests that nursing does not know which the best strategies are to use and there may be a lack of standardized nursing care plans for patients with hearing loss.

The results of the scan indicate that best practices in patient safety, communication, education, policies, and procedures that can guide nursing staff is unknown. Furthermore, poor

evaluation of already existing toolkits makes it difficult to understand what strategies have the biggest impact on patient safety and holistic nursing care. There is too much emphasis placed on the presumption that patients will be comfortable self-disclosing their hearing loss, assuming they are aware of the presence of the loss. Strategies that focus on the nursing assessment and screening for hearing loss as well as the improvement of generalized communication skills place the onus on nursing to support these patients. Thus, nurses need to be appropriately educated and trained in these skills and have a good understand of hearing loss and the impact it can have on peoples lives. The individual strategies utilized by existing toolkits will be taken into consideration when developing the toolkit for the practicum project as they are all useful in the provision of nursing care for individuals with hearing loss.

Conclusion

The results of the environmental scan have provided a wealth of information that has many implications for the development of a toolkit for nurses caring for individuals with hearing loss. The results of the environmental scan, along with the results of the literature review and consultations, will all be synthesized to contribute to the development of this resource. The request for information went unanswered for many of the contacts identified for the environmental scan however, the information provided for the purpose of this practicum project was beneficial and will be invaluable to the development of the tool.

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Appendix A: Email to Surgical Nurse Managers

To [Name of Surgical Nursing Manager],

My name is Leanna Rowe and I work as a Registered Nurse at the Health Sciences Centre in St. John's, Newfoundland and Labrador. I am also a Master of Nursing student at Memorial University in Newfoundland. **I am reaching out to you today because I was wondering if you could please share with me any policies or procedures your facility has on the identification and management of hearing loss in surgical patients, as well as any educational materials or resources on this topic you have for surgical nurses and/or their patients.** For my master's practicum project, I am focusing on improving the nursing care for surgical inpatients with hearing loss through improved identification and management of this patient population. As part of this project, I would like to determine what resources exist within other healthcare facilities.

Through my experience in nursing and through consultations with my colleagues, my manager, and community stakeholders, it has become apparent that education and resources regarding the identification and management of hearing loss in acute care is needed. Furthermore, specific resources and educational materials pertaining to patients with hearing loss for nursing staff are needed. I am developing a toolkit that focuses on educating surgical nurses on identifying hearing loss in their patients and managing the complex care needs of these patients.

The material you send me will be reviewed by me and shared with my practicum supervisor, to identify common topics and any teaching/learning strategies addressed by other hospitals across Canada in caring for surgical patients with hearing loss. Additionally, any information you provide me will not be used without your permission and referenced as applicable with your permission. Any copyrighted material will not be used without the express permission of the individual or copyright holder to use the material in the toolkit.

Your assistance will help inform the development of the toolkit I am creating for surgical nurses at the Health Sciences Centre. I appreciate your time in reading this email and responding to my request. If you could please get back to me by the **end of the day on August 28th** regarding whether you are able to assist me in this endeavour, I would greatly appreciate it. Additionally, please feel free to contact me at any time to discuss this further.

Thank you,

Leanna Rowe, BN RN
Registered Nurse, Health Sciences Centre
St. John's, NL
709-728-7248
leanna.rowe@mun.ca

Appendix B: Email to Representatives of Community Groups

To [Community Group Representative],

My name is Leanna Rowe and I work as a Registered Nurse at the Health Sciences Centre in St. John's, Newfoundland and Labrador. I am also a Master of Nursing student at Memorial University in Newfoundland. For my master's practicum project, **I would like to determine what resources exist within your organization that provide services to individuals with hearing loss/Deaf. I am reaching out to you today because I was wondering if you could please share with me any resources, or educational materials your organization has on the identification and management of hearing loss in for hospitalized individuals, particularly surgical patients.** I am focusing on improving the nursing care for surgical inpatients with hearing loss through improved identification and management of this patient population.

Through my experience in nursing and through consultations with my colleagues, my manager, and community stakeholders, it has become apparent that education and resources regarding the identification and management of hearing loss in acute care is needed. Furthermore, specific resources and educational materials pertaining to patients with hearing loss for nursing staff are needed. I am developing a toolkit that focuses on educating surgical nurses on identifying hearing loss in their patients and managing the complex care needs of these patients.

The material you send me will be reviewed by me to identify any common topics and/or teaching/learning strategies that have been found that highlight the need for nursing education in caring for this population. Additionally, any information you provide me will not be included in the toolkit unless you have given your permission and all information will be referenced as applicable. Any copyrighted material will not be used without the express permission of the individual or copyright holder to use the material in the toolkit.

Your assistance will help inform the development of the toolkit I am creating for surgical nurses at the Health Sciences Centre. I appreciate your time in reading this email and responding to my request. If you could please get back to me by the **end of the day on August 28th** regarding whether you are able to assist me in this endeavour, I would greatly appreciate it. Additionally, please feel free to contact me at any time to discuss this further.

Thank you,

Leanna Rowe, BN RN
Registered Nurse, Health Sciences Centre
St. John's, NL
709-728-7248
leanna.rowe@mun.ca

Appendix C: Health Research Ethics Authority (HREA) Screening Tool

Student Name: Leanna Rowe

Title of Practicum Project: The Development of a Toolkit for Nurses Caring for Patients Living With Hearing Loss

Date Checklist Completed: July 15, 2020

This project is exempt from Health Research Ethics Board approval because it matches item number _____3_____ from the list below.

1. Research that relies exclusively on publicly available information when the information is legally accessible to the public and appropriately protected by law; or the information is publicly accessible and there is no reasonable expectation of privacy.
2. Research involving naturalistic observation in public places (where it does not involve any intervention staged by the researcher, or direct interaction with the individual or groups; individuals or groups targeted for observation have no reasonable expectation of privacy; and any dissemination of research results does not allow identification of specific individuals).
3. Quality assurance and quality improvement studies, program evaluation activities, performance reviews, and testing within normal educational requirements if there is no research question involved (used exclusively for assessment, management, or improvement purposes).
4. Research based on review of published/publicly reported literature.
5. Research exclusively involving secondary use of anonymous information or anonymous human biological materials, so long as the process of data linkage or recording or dissemination of results does not generate identifiable information.
6. Research based solely on the researcher's personal reflections and self-observation (e.g., auto-ethnography).
7. Case reports.
8. Creative practice activities (where an artist makes or interprets a work or works of art).

For more information, please visit the Health Research Ethics Authority (HREA) at https://rpresources.mun.ca/triage/is-your-project-exempt-from-review/

Appendix III: Consultation Report

Hearing Loss Management in Acute Care: Consultation Report

Leanna Rowe

Memorial University of Newfoundland and Labrador

Hearing loss is on the rise, and as it becomes more present in those receiving inpatient hospital care, it is imperative that nurses are aware of and know how to manage the care of individuals with hearing loss. Hearing loss has been found to be associated with negative physical and psychosocial implications that can have a direct impact on patients with hearing loss quality and satisfaction with care (Bennion & Forshaw, 2012). On top of that, communication challenges between patients with hearing loss and nurses caring for them can pose serious safety issues, feelings of isolation and vulnerability, loss of autonomy in directing their care, and an increased risk of hospitalization in those living in the community (Genther et al., 2013).

Educating nurses on the issues concerning those with hearing loss is of utmost importance. Knowledgeable nurses can minimize the negative consequences of hearing loss for patients in acute care by providing comprehensive patient centered care (Ruesch, 2018). However, there is a paucity of literature concerning educational resources or training for nurses who provide bedside care for these patients. Research has shown that communicating effectively with patients with hearing loss entails much more than speaking louder. Nurses should instead focus on screening for hearing loss as part of a comprehensive health assessment, take accommodative measures to maximize a person's ability to communicate (Heron & Wharrad, 2000), empower patients to reduce passivity and be involved in their plan of care, educate patients and the health care team on communication strategies and care management for individuals with hearing loss, and advocate for their patients and educational opportunities and training in caring for those with hearing loss (Funk et al., 2018).

The lack of adequate educational resources and training for nurses highlights the need for the development of a toolkit that supports nurses caring for individuals with hearing loss. In

order to best address the knowledge gap between nurses and patients with hearing loss, the goal of the consultation process was to glean information on the barriers that exist in developing an adequate resource for nurses, provide direction on the educational content within the toolkit, and determine the best medium in which to disseminate the toolkit to nursing staff. This report summarizes the objectives for the consultations process and the roles of key stakeholders. An overview of the consultation process will be described and how the findings were processed and analyzed. Lastly, the results from the consultations and relevance of the findings in relation to the practicum project will be discussed.

Objectives for Consultation

The overall goal of the consultations was to determine the educational content and method of delivery of a toolkit for nurses caring for patients living with hearing loss on a general surgery inpatient unit at a major St. John's hospital in Newfoundland. Consulting with these stakeholders was imperative to ensure that developing an educational toolkit for nurses caring for individuals with hearing loss is warranted, and to explore what content the resource should include. The objectives for this consultation were the following:

1. To identify specific learning needs of surgical nurses working with individuals living with hearing loss;
2. To identify specific surgical nursing challenges in caring for individuals with hearing loss;
3. To determine what content surgical nurses need from a nursing toolkit to manage the care of individuals with hearing loss; and
4. To determine how to effectively deliver a nursing toolkit for practical and educational purposes.

Sources

There were three sources that were consulted for this project: the staff nurses on a surgical nursing unit, a surgical nurse manager, and a community stakeholder who is an expert in

the needs of individuals with hearing loss. Each source was chosen with respect to their relevance to the practicum project and in the next sections, how the data was collected from each source, managed and analyzed for the consultation process will be described. Prior to the consultations, questionnaires and interview guides were reviewed and approved by the project supervisor to ensure data collection integrity was met.

Surgery Staff Nurses

The nurses on a surgical nursing unit were consulted for this project. These nurses range from novice to senior Registered Nurses who provide care for those who are inpatients in a hospital postoperatively. They were chosen for consultations as part of this project because their perspectives on their own experiences in caring for individuals with hearing loss was valuable and they could speak to their educational needs for working with this patient population. Additionally, these nurses provided insight into how best to learn about individuals with hearing loss and how they would like to see an educational resource such as a toolkit on hearing loss distributed.

Surgical Nurse Manager

A surgical nurse manager was also consulted. Their wealth of knowledge and experience in patient care and staff management provided invaluable information to the project. They gave insight into improving care for those with hearing loss and identified features that could contribute to an effective learning resource for the nurses on the unit.

Community Stakeholder

The community stakeholder is a part of a non-profit resource group that specializes in the provision of programs and services based on awareness, accessibility, and advocacy for individuals with hearing loss in Newfoundland and Labrador. The community stakeholder was

consulted for their expertise in working with individuals with hearing loss. In 2014, there was a project launched by a community organization to improve accessibility in health care for people with hearing loss. This project consisted of kits that included hearing accessibility audits, information about hearing loss and communicating with patients with hearing loss, and the provision of hearing technology where applicable (CHHA-NL, 2020). These kits were distributed to all inpatient nursing units at a teaching hospital in St. John's, Newfoundland. The community stakeholder was consulted on their knowledge of the project to discuss the effectiveness of the project in improving inpatient nursing care for those with hearing loss. Additionally, they provided information on the development of education toolkits and resources for nurses surrounding hearing loss.

Data Collection

Consultation data was collected from these consultants through survey questionnaires of surgery nurses and individual semi-structured interviews with the remaining two consultation participants. A short questionnaire was disseminated to the surgical nurses regarding caring for an individual with hearing loss. The questionnaire consisted of 18 questions that took approximately 15 minutes to complete and was completed online. It was decided that online distribution of the questionnaire would be the best method to ensure all nurses on the surgery unit had an opportunity to participate in the questionnaire. The questionnaire was anonymous and voluntary. It was created using Qualtrics, an approved survey tool used by Memorial University of Newfoundland. A weblink to the online questionnaire was provided to participants along with a brief, informal explanation of the project. It was posted to a confidential online group discussion utilized by surgical nursing staff and management. Prior to commencing the questionnaire, the invitation to participate was reviewed. The invitation consisted of information

about the practicum project, the purpose of the questionnaire, and discussed privacy and confidentiality. Agreement to participate in the consultation process by completing the questionnaire served as implied consent. See Appendix A1 for the invitation to participate and explanation of the project. Appendix A2 contains the questionnaire for staff nurses.

Information was collected from the surgical nurse manager and the community stakeholder in the form of semi-structured interviews. Semi-structured interviews often consist of a number of important questions that the interviewer wants addressed but are structured so that the interviewee can expand on their answers and give more details in their responses (Gill et al., 2008). Prior to commencing the interview, an invitation to participate in the interview was e-mailed to both consultants. The email consisted of information about the practicum project, the purpose of the interview, and discussed privacy and confidentiality. Agreement to participate in the interview served as implied consent to be a part of the consultation process. A copy of the email sent to both participants can be found in Appendix B1. The interview for the surgical nurse manager took place in person and the interview for the community stakeholder was conducted through an online based video conference. The interview took approximately 30 minutes for each interview and notes were taken during the interview. The interview was not recorded. The interviews consisted of a discussion of the challenges nursing staff might experience in caring for those with hearing loss and how best to address those challenges. Additionally, questions explored what would be important for nursing staff to be aware of when caring for individuals with hearing loss. Interviewees were also questioned on what medium they felt would be best to deliver an educational resource such as a toolkit to nurses, in order for it to be most effective.

Furthermore, in the interview with the community stakeholder, their experiences, their knowledge of the pre-existing hearing loss toolkit and their feelings on why this resource was

necessary were discussed. I also investigated whether any formal follow up had been completed on this toolkit, and what changes if any could be made to change or improve the existing toolkit. Additionally, the community stakeholders' experiences in working with individuals with hearing loss were explored and whether these individuals have shared any information in which nursing care could be improved upon regarding their hearing loss. Both interviewees were asked whether they had any educational materials they could share that could support the development and content of the toolkit. Interview questions for the surgical nurse manager and the community stakeholder can be found in Appendix B2 and B3 respectively.

Ethical Considerations

The Health Research Ethics Authority Screening (HREAS) tool was completed. A copy of the HREAS tool and my responses can be found in Appendix C. After completing the screening tool, health research ethics approval was deemed unnecessary. Prior to approaching participants, the purpose of this practicum project and its applicability to nursing practice was described. All participants were made aware that questionnaires and interviews were voluntary, and participants were asked for their agreement to participate in the consultation process. Participants were made aware their privacy and confidentiality were of upmost importance. There is no identifying information from the questionnaire responses in this consultation report. Additionally, there were no names attached to any stakeholder specific information obtained from the interviews in this consultation report. Data from the questionnaires and notes obtained from the interview were kept on a password-protected computer, which is solely for personal use and the collected information will remain confidential. Participants were informed that all information collected was for the sole purpose of this practicum project and was not shared with anyone outside of those involved in its development. Once the practicum project is complete, all

data pertaining to the project will be deleted permanently.

Analysis

The results from the questionnaires were transferred to tables in a Microsoft Word document for content analysis and to outline themes. Themes and information provided from staff nurses were utilized to develop the content of a nursing toolkit for caring for individuals with hearing loss. Written notes from the interviews were transcribed to a computer using a Word document. Data obtained from the interviews were reviewed and analyzed by using content analysis, clustering similar data, and creating themes. The transcribed notes were shared with the supervisor of the practicum project to ensure rigor of analysis. Themes are based on data collected from the interviews along with the questionnaire responses obtained from staff nurses to support the development of a nursing toolkit to manage the care of individuals with hearing loss.

There are a total of 54 nurses who are employed in the general surgery unit that was selected for the survey questionnaire. Nurses in this unit range from newly graduated baccalaureate nurses to nurses who have been employed to the unit for over 20 years. An invitation to participate in the survey questionnaire was sent to an online group forum in which all staff had the opportunity to complete the survey. A total of 31 general surgery nurses completed the online survey questionnaire for an overall response rate of 57%. The survey questionnaire responses along with the results from the interview consultations were compiled into themes for analysis.

Patient Care

Of the 31 nurses surveyed, 80% felt they could not provide comprehensive nursing care specific to the needs of patients who have hearing loss or who identify as Deaf. The nurses were

asked to comment on why they felt they could not provide safe care. Two nurses reported concerns for patient safety as they feared they could not fully communicate their care or educate patients on surgical procedures. Furthermore, some reported feeling worried about the ability of their patients with hearing loss to fully consent to medical procedures because it was clear the patients struggled to understand the information provided to them.

Knowledge

Many nurses reported that the specific reasons they could not provide comprehensive care were difficulties communicating with this patient population due to a lack of knowledge on communication strategies, training, and supportive nursing resources. The surgery nurse manager was also questioned on whether they felt their staff nurses can provide comprehensive nursing care specific to the needs of patients with hearing loss and Deafness. The manager felt that surgery nurses in general are trained in basic communication skills, thus general comprehensive nursing care is provided to *all* patients. However, the manager felt that there needed to be an improvement on specific care strategies for individuals who have hearing loss in order for these individuals to have an improved inpatient experience. They felt nurses lacked knowledge particularly in the areas of communication and of resources within and outside of the health authority for patients with hearing loss.

The community consultant from a non-profit organization working with individuals with hearing loss reported a different perspective on nursing care for individuals with hearing loss. As a community stakeholder, the consultant often receives stories about individual health care experiences and reported that it is the knowledge level of the nurse caring for the patient with hearing loss that has the biggest impact. While the consultant could not speak to acute care experiences specifically, they reported that individuals with hearing loss have shared with them

that they struggle to connect with health care staff when they feel they have no method of communicating with them, health care providers often turn their backs while speaking to them, there are no visuals, and people with hearing loss were tired of having to self-advocate and self-disclose their loss to everyone they met.

With respect to patient care, both interviewees felt that comprehensive nursing care specific to individuals with hearing loss or Deafness is influenced by the knowledge level nurses have surrounding hearing loss and Deafness. Surgery nurses were asked to rate their knowledge level on various hearing loss topics which can be found in Table 1.

Table 1

Surgery Nurses' Knowledge Level Surrounding Hearing Loss/Deafness

	Not Very Knowledgeable	Somewhat Knowledgeable	Very Knowledgeable
American Sign Language (ASL)	93.6%	6.5%	0%
Cultural Deafness	83.9%	16.1%	0%
Hearing Loss/Deaf Acute Care Resources	83.9%	12.9%	3.2%
Hearing Loss/Deaf Community Resources	77.4%	19.4%	3.2%
Types of Hearing Loss	54.8%	45.2%	0%
Ototoxic Medications	45.2%	45.2%	9.7%
Assistive Listening Devices/Hearing Assistive Technology	45.2%	54.8%	0%
Diagnosing a Hearing Loss	45.2%	54.8%	0%
Prevalence of Hearing Loss/Deafness	38.7%	61.3%	0%
Physical/Psychosocial Impact of Hearing Loss/Deafness	35.5%	61.3%	3.2%
Causes of Hearing Loss	25.8%	80%	3.2%

The results indicated that a large percentage of the nurses who completed the survey are not very to only somewhat knowledgeable of hearing loss topics. Concerningly, almost all of the nurses

(93.4%) have very little knowledge of American Sign Language (ASL) or Cultural Deafness (82.87%). This is a cultural group in which individuals who identify as culturally Deaf typically communicate primarily with ASL; in addition, this language has its own unique linguistics (Lieu et al., 2007; Sheppard, 2014). A lack of knowledge in this area presents a huge barrier to accessing equal health care services for individuals who are culturally Deaf. Present methods of communication that nurses may use with individuals with hearing loss may not necessarily be effective due to a language barrier.

Moreover, there is a lack of knowledge of hearing loss/Deaf acute care (83.9%) and community (77.4%) resources. The surgical nurse manager reported that they felt nursing staff are not aware of resources outside of the health care organization; additionally, they would not know how to educate patients with hearing loss or Deafness on how to access community services or resources specifically to their needs. The manager felt that in recognition of the limited knowledge nurses have on general hearing loss topics, at the very least, staff nurses should be aware of what acute care and community resources are available to them so that they may seek out further education, nursing support, and general information.

Approximately half of the nurses felt they were not very knowledgeable on the different types of hearing loss (54.8%) and were only somewhat knowledgeable on how to diagnose a hearing loss (54.8%) and use an assistive listening technology (54.9%). These findings are important in the context of understanding the communication needs of individuals with hearing loss. The communication needs of a patient with hearing loss can vary depending on the type of loss and thus the type and severity of hearing loss often indicates the method of communication the patient prefers, and assistive listening devices remain one of the primary forms of treatment of hearing loss (Hearing Loss Association of America, n.d). A patient with a mild noise induced

hearing loss who utilizes hearing aids and communicates orally could have communication needs and specific nursing care that differ from an individual with age related hearing loss with newly acquired cochlear implants.

Over half of the nurses (61.3%) who completed the survey reported being somewhat knowledgeable of the prevalence of hearing loss which gives hope that nurses may understand that hearing loss is becoming more common among their patient population. With further education and awareness of hearing loss/Deafness, nurses can be more knowledgeable about the specific patient care needs of this patient population. Nurses reported feeling somewhat knowledgeable in their knowledge level surrounding the physical/psychosocial impacts of hearing loss (61.3%) and the causes of hearing loss (80%).

Comfort

In addition to rating their knowledge levels on hearing loss topics, the nurses were also asked what their comfort levels were for caring for patients who identify as having a hearing loss or as Deaf. Their responses can be found in Table 2.

Table 2

Surgery Nurses' Comfort Level Surrounding Hearing Loss/Deafness

	Not Very Comfortable	Somewhat Comfortable	Very Comfortable
Accessing Hearing Loss Resources and Services	70%	23.3%	6.7%
Documenting Hearing Loss/Deafness	43.3%	53.3%	3.3%
Maintenance/Storage and Care for Assistive Listening Devices (e.g., Hearing Aids)	43.3%	46.7%	10%
Assessing/Identifying Hearing Loss/Deafness	43.3%	56.7%	0%
Communicating with Patients with Hearing Loss	23.3%	73.3%	3.3%

Of the nurses who completed the survey, 70 % felt not very comfortable in accessing hearing loss resources and services. Nurses appeared to be split between not very comfortable to somewhat comfortable when documenting hearing loss, caring for assistive listening devices and assessing for hearing loss. Most of the nurses (73.3%) felt somewhat comfortable when communicating with patients with hearing loss. No nurses reported feeling very comfortable when assessing/identifying hearing loss or Deafness. Only 10% of nurses felt very comfortable in the maintenance/storage and care for assistive listening devices such as hearing aids. Additionally, only 3.3% of nurses were very comfortable with communicating with patients with hearing loss and documenting the presence of a hearing loss.

Screening

During the discussion with the community stakeholder who is a hearing loss expert, they were asked whether they felt hearing screening should be a part of a comprehensive physical assessment, and what would the best method for nurses to complete a baseline screening. The community consultant felt that "some kind of screening" would be beneficial because individuals with hearing loss typically do not self-disclose their disability for fear of stigma or denial/unawareness of the loss. Furthermore, they reported that a vast majority of individuals and their family members are unaware they have a hearing loss or are often in denial. Individuals with hearing loss are typically unaware of the loss until they are told by a health care professional after the insistence of family members to go and be formally tested. The consultant made some recommendations for nurses to use to screen individuals for hearing loss such as simple phone applications that can be used to test and screen for hearing loss in patients very efficiently. They also recommended that asking individuals specific questions such as "Do you have difficulty hearing in a noisy environment?" is more beneficial than broad statements asking

individuals whether they have hearing loss because it empowers people to think about times when they have had difficulty hearing or communicating. The nursing manager was also asked the same question and they discussed how the nursing history form that nurses complete on patient admission has limitations related to hearing loss screening. The form only asks whether an individual has hearing loss and if they use any assistive listening devices. The form does not elaborate on the degree or severity of the loss or give patients an opportunity to identify any specific communication needs.

When surgical nurses were asked if they could detect the signs of a hearing loss if a patient did not self-disclose it, 67.7 % of nurses felt they could. Almost all of the surgery nurses (93.3%) felt that conducting a baseline screening assessment was very to somewhat important. Only two nurses (6.7%) felt that baseline screening was not very important. If nurses felt they could detect a hearing loss, they were asked how they would detect it. The nurses described detecting hearing loss through cues from their patients such as patients not responding to questions appropriately, not following commands, looking at their lips and leaning towards the direction of sound, not waking up when there are loud noises in the room, and smiling and nodding vacantly at inappropriate times during conversation. They also reported having to repeat themselves frequently to patients as another indication of the presence of a hearing loss.

Nurses were asked what methods, if any, they use to screen patients for hearing loss/Deafness, and the most popular methods were asking patients and family members directly to determine whether a hearing loss is present. Some nurses chose other methods of screening such as the Rinne test, the Weber test, and the use of audiometers to detect hearing loss in their patients. These results are questionable in their validity as the nursing unit where the nurses who completed the survey are employed does not have the equipment in order to complete these tests.

There were 14.1% of nurses who do not screen patients for hearing loss/Deafness. The staff nurses along with the surgical manager reported lack of time and lack of knowledge as a barrier to hearing loss assessment and screening. The community consultant commented several times during their interview that because hearing loss training is not mandatory, this is the biggest barrier to completing hearing loss screening and assessment. They felt that nurses will not complete the training if they do not have to as they already have a high workload.

Communication

All of the nurses who responded to the survey questionnaire reported utilizing a communication strategy when caring for patients with hearing loss/Deafness. The majority of the nurses implement some form of communication strategy by ensuring they face the patient when speaking to them (13%), answering call bells in person (12%), ensuring glasses and hearing aids are being worn and functional (11.5%), using pen and paper (11.1%), turning on room lights (10.1%), and enunciating their words when speaking (9.6%). Nurses also reported speaking louder (8.2%) and directly into the patient's ear (4.3%), avoiding the use of slang (3.9%), and removing their masks (6.4%) when necessary. One nurse commented that they speak more slowly when communicating with a patient with hearing loss. Only 4.8% of nurses reported speaking to a family member or friend, 3.4% of nurses reported use of a communication pictogram to communicate with patients, and only 1.4% of nurses consult with a sign language interpreter for communication. With respect to the low number of nurses obtaining sign language interpreters it is important to recognize that the Deaf community who use sign language as a primary form of communication is small in Newfoundland and Labrador. Therefore, these results could potentially indicate that nurses have not had experience in caring for individuals who are Deaf.

The community consultant was asked for their opinion on what important communication strategies nurses should be implementing when caring for patients with hearing loss/Deafness. The consultant recommended using light as a strategy; nurses need to ensure that the lights are turned on and shining on the health care providers face, not behind it. They also discussed the benefits of a communication pictogram which can be used with individuals with various degrees of hearing loss as a communication tool. The consultant felt that modern technology is not used enough by health care providers for persons with disabilities. When providing patient care for individuals with hearing loss, assistive listening devices such as pocket talkers and speech to text phone applications can be cost effective and easy to use, however nurses need knowledge and training to use these tools.

Documentation

Nurses communicate with each other and with other members of the health care team in order to provide continuous patient care. Nurses reported utilizing communication strategies for patients with hearing loss; they were asked how they ensure other health care providers are aware their patient has a hearing loss or is Deaf. The nurses reported documenting the presence of hearing loss in the nursing Kardex (28.9%) and in the patients' nursing history (23.7%). Nurses typically use some form of verbal report and handover reports to keep members of the team updated on patient care and 22.7% of nurses reported using verbal handover as a method of letting other team members know that a patient has a hearing loss. Only a few nurses reported documenting the hearing loss on a patient's chart (13%), placing a sign at the bedside (4%), writing a focus note (6.2%). Only one nurse reported they usually do not document a hearing loss (1%).

The nurse manager was also asked how they felt staff nurses should ensure other nurses and health care providers are aware that a patient has a hearing loss/Deafness. They felt that hearing loss should be documented in the patient's medical history and communicated on the nursing Kardex. The nursing manager raised concern over whether this was enough as the nursing Kardex is typically used exclusively by nurses, excluding other members of the health care team. The manager felt that individuals who are also involved in patient care, such as physiotherapists, dietary aides, and phlebotomists for example, need to be made aware of the presence of a hearing loss in order for care to be consistent among health care staff. The manager felt a visual at the bedside, such as a sticker or a sign, would help ensure that everyone is aware of the needs of the patient. Nurses often use signs for other reasons, such as when bloodwork in a certain arm is contraindicated for example, so the manager felt a bedside visual indicating the presence of a hearing loss should not be treated any differently.

The community consultant felt that stickers placed on charts and individual disabilities such as hearing loss should be a part of a patient's electronic chart permanently, similar to the way an allergy is documented as a permanent part of a patient's health care record. Suggestions that were made by the community consultant to improve communication directly with patients included using communication confirmation techniques, getting patients to "speak back", communicating directly with patients' instead of family members, verify and clarify the patients understanding of information.

Assistive Listening Devices

The nursing manager was asked to explore the learning needs of their staff nurses to care for patients with hearing loss. They felt that staff nurses would struggle to identify the different types of assistive listening devices (ALDs) and complete technological care of ALDs.

Additionally, the manager had some concerns about proper storage and maintenance of the devices as hearing aids are commonly stored in denture cups that can be found on the unit if the patient did not have a storage container. These cups could easily be misplaced, are fragile, and typically are filled with water which is contraindicated for ALDs. Nurses were asked what their comfort level for providing basic care such as proper handling, storage, battery changes/charging, and basic troubleshooting for these devices were. Comfort level was rated from not very comfortable, to somewhat or very comfortable, and the results can be found in Table 3.

Table 3

Nurses Comfort Level for Basic Care of ALDs (Proper Handling, Storage, Battery Changes/Charging, Troubleshooting)

ALDs	Not Very Comfortable	Somewhat Comfortable	Very Comfortable
Loop Systems	89.7%	10.3%	0%
FM Systems	86.7%	13.3%	0%
Cochlear Implants	76.7%	20%	3.3%
Hearing Aids	41.4%	48.3%	10.3%
Pocket Talkers	40%	53.3%	6.7%

Nurses reported feeling the most uncomfortable with loop systems (89.7%), FM systems (86.7%), and cochlear implants (76.7%). Nurses seem to be split between feeling not very comfortable (41.4%) to somewhat comfortable. (48.3%) with hearing aids and overall were somewhat comfortable (53.3%) with pocket talkers. Nurses reported feeling the most comfortable with hearing aids (10.3%) and pocket talkers (6.7%).

These findings are concerning, because as hearing loss becomes more prevalent in society, so does the development of modern technological advancements that restore hearing and quality of life for people with hearing loss. Nurses should be more proficient in understanding

how these devices work. Many children with hearing loss and deafness are implanted with cochlear implants at an early age and people with cochlear implants often communicate orally. However, nurses should be aware that without these cochlear implants, people are profoundly deaf so if these devices are removed while patients are asleep, for surgical procedures, for illness, or for other reasons, the patient may require more specific nursing support and care. Furthermore, these devices are often expensive so proper care and storage is imperative to ensure the longevity of these products as replacements products may not be fiscally possible. Additionally, nursing staff and the health care organization could potentially be held liable for any improper care. FM systems are popular with individuals with hearing loss as modern technology has enabled these systems to be utilized with Bluetooth technology allowing users to connect these systems with multiple devices. Despite the popularity of FM systems among users with hearing loss, 86.7% of nurses were not comfortable with using these products.

Interestingly, nurses appeared to be more comfortable in using pocket talkers. The surgical unit where the nurses who responded to the survey are employed has one pocket talker. It is possible that these surgical nurses have had some experience utilizing this pocket talker during patient care and they are more familiar with this product. The community consultant felt that pocket talkers are the most effective, easy to use tools, to overcome communication barriers between patients and nursing staff. They reported that these devices are often small, portable, and have simple functional components that make it quick for nursing staff to implement these devices if necessary. The consultant stressed that without the proper knowledge, training, and awareness of the existence of these devices for both the patient and nursing staff, they are not regularly utilized. Furthermore, they reported that someone has to be accountable for ensuring these devices do not go missing, replenishing the parts, cleaning the device between uses and

ensuring the devices are properly maintained. The nursing manager is aware of the presence of the pocket talker on the nursing unit however, they felt that one was not enough. They recounted one experience where a nurse was looking for the pocket talker but could not find it, as "things are not always put back properly and then go missing".

Hearing Loss Resources

The staff nurses were provided with a list of resources pertaining to hearing loss/Deafness and were asked which of the resources they knew how to access. Concerningly, only 7.4% of nurses reported knowing how to access community organizations specifically for those with hearing loss/Deafness. Nurses reported being more proficient in accessing speech language pathology (29.4%), general information on hearing loss (17.7%), and interpreting services (19.1%). There were 7.4% of nurses who reported they do not know how to access any resources, and 7.4% of nurses do not know how to access information on hearing aids. When nurses were asked if they knew of any unit resources such as a hearing loss toolkit, over half of the nurses (55.2%) who completed the questionnaire were not aware of any hearing loss toolkits or resources that are available on their nursing unit. Of the 44.8% that were familiar with a unit resource, the majority of these nurses commented they use the pocket talker that can be found within the unit hearing loss toolkit. Comments surrounding the use of the unit pocket talker indicate that it is used infrequently, it often goes missing, and cannot be located when it is needed. There was only one mention of the communication pictogram that is in this toolkit and no nurses reported using any of the information brochures, posters, stickers, or the educational video that is inside this unit toolkit. The unit toolkit in which nurses are utilizing the pocket talker from is a toolkit developed by a non-profit community organization. The community consultant shared that the toolkit program had difficulties becoming established as the toolkits

were dropped off to one unit at the hospital and that unit only was responsible for dispersing the kits to other nursing units. There was no nursing staff or patient follow up completed. There was also no evaluation on the effectiveness of the toolkits which made it difficult to discern whether the toolkits had any impact on nursing care for individuals with hearing loss.

Barriers

Unit nurses reported the largest barrier to using a hearing loss toolkit was that there was not enough time (29.3%) and not enough awareness of the existence of the toolkit (22%). Some other barriers included: nurses found the toolkit needed to be updated/replenished (19.5%), it was difficult to access (17.1%), and there was no certification or continuing education recognition (9.8%). The nursing manager was asked what they felt were barriers for their staff nurses to using a unit toolkit for hearing loss. They reported that with the high turnover of nursing staff, they felt that most nurses are not aware of the pre-existing toolkit. Additionally, the toolkit and its contents including the pocket talker need to be kept updated and items replenished, and the manager felt that no one has been assigned the responsibility of ensuring that.

Developing a Toolkit

In order to create a toolkit for nurses, it was prudent to ask nurses what they would like to see included in a physical toolkit on their nursing unit to care for patients with hearing loss or who are Deaf. The nurses were provided with a list of items that could potentially be included in a physical toolkit and asked to choose all those that applied. This list can be found in Table 4.

Table 4

Items Nurses Would Like Included in a Physical Toolkit

Toolkit Items	% of Nurses
Information on Communication Strategies for Nurses	12.3%
Information to Access Resources (ASL services, Audiology, obtaining ALDs)	9.6%

Toolkit Items	% of Nurses
Information on Hearing Loss Screening/Assessment	8.7%
Hearing Aid Storage Boxes	8.2%
Hearing Loss Identification and Specific Needs Form (Patient can identify their communication needs/devices they use)	8.2%
Communication Strategies Brochures for Patients	7.8%
Identification stickers for charts of patients with hearing loss (Blue Ear Stickers)	7.8%
Identification posters for patient's bedside	7.8%
An ALD (e.g., Pocket Talker)	7.8%
Hearing Loss Pathway (Step by step guide in caring for patients with hearing loss)	7.3%
Communication Pictogram	6.4%
Unit posters encouraging patients to self-disclose hearing loss	5%
Blue Ear stickers to place around nursing unit	3.2%

According to the responses, every item on the list was selected at least once. The top five choices were information on communication strategies (12.3%), information on accessing hearing loss/Deaf resources (9.6%), information on hearing loss screening/assessment (8.7%), hearing aid storage boxes (8.2%), and a hearing loss identification specific needs form where patients can identify specific communication needs/devices they use (8.2%) on a form. Blue Ear stickers to place around nursing unit appeared to be the least popular with only 3.2% of nurses who wish to see this item included in a physical toolkit.

The community consultant felt that the best item within the toolkit would be information on communication strategies. The consultant felt that nurses who are not aware of the communication needs of their patients could be potential liable for patient safety as the patient has a right to understand their plan of care. A similar sentiment was shared by the nursing manager who felt creating awareness of resources within the health care organization and the community could help support nurses caring for patients with hearing loss. The nursing manager also felt that having stickers in the toolkit can be used to place on charts, overbed lights, and on nursing Kardexes to cue health care professionals to be aware that a patient has a hearing loss.

Education

Both the consultants made it clear during their interviews that without awareness of the existence of toolkits, hearing loss toolkits would not be able to reach their full potential. The nurse manager shared that the high turnover in nursing staff makes it difficult to ensure all staff are aware of any unit or organizational resources that can help in the provision of nursing care. Between newly graduated nurses and nurses who come from other units, it is a challenge to make sure education and training is continuously tracked and updated. Historically, it appears that just having a physical toolkit may not be enough to address the knowledge gaps nurses have. The community consultant felt in hindsight that the pre-existing toolkit should have been supported with an educational component to bring attention to the presence of a hearing loss toolkit on the nursing unit in addition to training nurses on caring for patients with hearing loss.

The staff nurses who completed the survey and the consultants were asked what they would like to see included in an educational resource as part of a toolkit for nurses caring for patients with hearing loss or who are Deaf. These findings can be found in Table 5.

Table 5

Items Nurses Would Like Included in an Educational Resource

Toolkit Items	% of Nurses
Communication Strategies for Nurses	17.9%
Information on Assistive Hearing Devices	15.9%
Information on Screening/Assessment	15.2%
General Hearing Loss/Deaf Information	14.5%
Information on Accessing Resources (ASL services, Audiology, obtaining ALDs)	13.1%
Hearing Loss Pathway (Step by step guide in caring for patients with hearing loss)	11.7%
Printable materials from physical toolkit (e.g., forms, brochures, posters, information)	11.7%

The popular choices of staff nurses were communication strategies for nurses (17.9%) followed by information on assistive hearing devices (15.9%). Other popular components nurses would like to see included in an educational resource were information on screening/assessment (15.2%), general information on hearing loss/Deafness (14.5%), information on accessing resources (13.1%), a hearing loss pathway (11.7%), and printable materials that are included in the physical toolkit (11.3%).

The list of components that could be included in an educational resource was shared with the surgical nursing manager and the community consultant. The surgical nurse manager felt that a hearing loss pathway would be a great addition to the toolkit as it would eliminate confusion for nurses by providing them with a step-by-step guide in caring for patients with hearing loss. They also felt that communication strategies should be highlighted, especially given the current pandemic, because communication has become more challenging with the use of mandatory masks. The community consultant felt the educational component should focus on assessment for hearing loss rather than screening. They felt screening could be time consuming and not within the scope of practice of Registered Nurses in acute care to screen or diagnose hearing loss. A hearing loss assessment could help the nurse be more aware of the needs of the patient and improve overall patient care and hospital experience.

Physical and Educational Delivery of Toolkit

The method of delivery for the hearing loss toolkit is important in order to engage all staff nurses in the educational and physical components of a hearing loss toolkit on the nursing unit. Staff nurses were questioned on what form they would like to have the educational resource in, and the nurses listed their top three choices. The preference of the surgical nurses was to have a “lunch and learn” (50%) as their number one choice, a webinar (42.1%) as their second choice,

and an online self-learning module available at home/work (44.4%) as their third choice. The nurse manager felt staff nurses are more inclined to complete self-education and training online on their own time as the busy workday does not often allow them the opportunity to have learning experiences while working. The community consultant recommended having mandatory online training sessions as most of community programs that are delivered are now done virtually. They felt that between the different nursing shifts and newly hired staff, nurses would prefer education that can be done at their convenience, and the education will have more participants if there are no limitations such as scheduling conflicts. They went on to say that until hearing loss education and training is made mandatory, it will not be a priority of nurses to complete hearing loss education.

Nursing Practice

Completing hearing loss education and training online would eliminate some potential barriers to using the hearing loss toolkit that nurses have reported such lack of awareness and difficulty accessing the toolkit. Furthermore, the educational component would serve to create more awareness of the physical toolkit itself so that it could be utilized appropriately in identifying and managing a patient with hearing loss/Deafness. If education is considered to be mandatory, it must have some consequential impacts on nursing practice as it suggests that the topic is serious enough that without education and training, quality of care could lapse. Nurses were asked whether they felt hearing loss education was influential to their nursing practice and those findings can be found in Table 6.

Table 6

Nurses' Feelings of the Influence of Hearing Loss Education on their Nursing Practice

Nursing Practice	Very Influential	Somewhat Influential	Not Very Influential
Self-Regulation	51.7%	37.9%	10.3%
Professional Responsibility and Accountability	48.3%	44.8%	6.9%
Ethical Practice	70%	23.3%	6.7%
Knowledge Based Practice	62.1%	37.9%	0%
Service to the Public	70%	30%	0%

All nurses felt that hearing loss education would be very influential to their nursing practice particularly in the areas of ethical practice (70%), service to the public (70%), and knowledge-based practice (62.1%). In addition to this, 92.1% of the staff nurses surveyed felt that hearing loss education should be mandatory for all nurses in practice. The nursing manager expressed great confidence that their nursing staff is well equipped to provide excellent nursing care for all patients, but they felt nursing education on hearing loss is the difference between great nursing care and comprehensive nursing care for patients with hearing loss/Deafness. By completing hearing loss education, and utilizing a toolkit designed to support nurses in caring for patients with hearing loss, it could create an improved overall health experience for patients, reduce liability, and help nurses provide ethical and culturally competent nursing care for people at their most vulnerable.

Implications for Hearing Loss Toolkit

It has become clearer through the consultations process that prioritizing education and training for nurses pertaining to the care of individuals with hearing loss or who are Deaf is a must. Nurses are feeling ambivalent about numerous aspects of hearing loss including

assessment, communication, technology, and available resources. Nurses should not have to feel this way, especially when there could be a wealth of information at their disposal but there is a lack of awareness of what is available and barriers to accessing this information. It is concerning that the majority of surgical nurses who completed the survey felt they cannot provide comprehensive nursing care to individuals living with hearing loss or Deafness. There is a need for a supportive toolkit along with hearing loss education to assist nurses in their practice of managing individuals with hearing loss.

This consultation process identified the lack of knowledge that nurses have on communication strategies, assistive listening technologies, and hearing loss resources within the health care organization and within the community. The majority of nurses are unaware of what currently exists on the nursing unit to assist them in caring for patients with hearing loss and most nurses only identified one component (a pocket talker) of the existing unit toolkit that they utilize. Furthermore, there is a lack of consistency in screening individuals for hearing loss and overall varied nursing care with respect to documenting a hearing loss, caring for assistive listening devices, and implementation of communication strategies. Yet, the nurses feel that hearing loss education is important and influential to their practice. There was an overwhelming amount of support from both the interview consultants and the nurses who felt that hearing loss education should be mandatory for nursing practice.

It is important for this toolkit to not only address these knowledge gaps, but to be delivered in a way that makes access to information and support seamless so that nurses can continue to deliver efficient and comprehensive patient care. The need for a physical on unit toolkit is warranted but it needs to be supported with an educational component to make nurses aware of its existence in addition to providing hearing loss education for nurses. Nurses need to

have a thorough understanding of the contents of the physical toolkit, where to access the kit, and how to implement the kt in practice if needed. The educational component will be comprised of information on hearing loss, resources, communication strategies, and assistive listening devices and will be delivered in such a way that nurses can efficiently access information and training at home or work at their convenience.

In a world where inclusion is a priority, inclusion needs to extend to health care and nurses should continue to set the bar high by ensuring individuals with hearing loss/Deafness have equal access to information, the right to make informed decisions, and to partake in their health care experiences. Furthermore, the nursing profession has a responsibility to uphold the tenets of nursing practice and this can be done through continued education, training, and nursing supports. A hearing loss toolkit and hearing loss education would address the learning needs of nurses and ensure quality care for patients who live with hearing loss or who identify as Deaf.

Conclusion

The overall goal of the consultations was to determine the educational content and method of delivery of a toolkit for nurses caring for patients living with hearing loss. Consulting with these stakeholders was imperative to ensure that developing an educational toolkit for nurses caring for individuals with hearing loss is warranted, and to explore what content the resource should include. It is evident that there is a knowledge gap for nurses in caring for patients with hearing loss and this gap can be addressed through the provision of a comprehensive toolkit that combines physical and educational support, training, and resources to support surgical nurses in their practice caring for patients with hearing loss/Deafness. The consultations identified what the learning needs are and the best way to implement a toolkit successfully that eliminates barriers to comprehensive patient care and hearing loss education

and training. Moreover, if nurses feel more comfortable and prepared to care for individuals with hearing loss in all aspects, patient care and hospital experiences with respect to their hearing loss can be positive.

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Appendix A1: Invitation to Participate Post for Surgical Staff Nurses

Hello all,

I am reaching out to you today to invite you to take part in a **questionnaire** that would assist me in the completion of my master's practicum project. For my practicum project, I am focusing on improving the identification and management of care of surgical inpatients with hearing loss. I am developing a toolkit that focuses on educating surgical nurses on identifying patients with hearing loss, effective communication and appropriate management of hearing loss in surgical patients. Through my own personal experiences in nursing and with hearing loss it has become apparent that nurses may benefit from education and resources surrounding caring for individuals with hearing loss. Having such educational resources available to nurses has the potential to improve patient care for inpatients with hearing loss and give nurses more confidence and knowledge in caring for this population.

In order to create a toolkit for nurses, I need to hear from nurses about what kind of information you would like to see included in such a resource, areas you feel you need more information on and what is the best method of delivery of a toolkit so that it is readily available and accessible for you. As part of this project, I am inviting you, surgical nurses, to **complete a short questionnaire** as part of the consultation process in developing this toolkit. The questionnaire will be completed online and will take approximately 15 minutes to complete.

Completing the questionnaire is completely voluntary and questionnaire results will remain confidential. There will be no identifying information attached to any of the data. Results from the questionnaire will be collated and organized into themes by myself for analysis and will kept on my password protected personal computer. Data will be reviewed by my practicum supervisor only. At the end of the practicum project, the questionnaire and all data will be deleted permanently.

You will have four days, from November 17th to end of the day November 20th, to complete the questionnaire. Completion of the questionnaire will indicate your agreement to participate in the project. A reminder to complete the questionnaire will be sent after the second day. You will find the link for the questionnaire below.

If you have any questions or concerns, please do not hesitate to message me privately or contact me at (709) 728-7248. Thank you so much for taking the time to help me in the completion of my practicum project and for your continued support throughout the program. Additionally, thank you for your contribution in the development of a toolkit for nurses caring for individuals with hearing loss.

Sincerely,
Leanna Rowe

https://mun.az1.qualtrics.com/jfe/form/SV_0HuQ9DJsAIg3iKx

Appendix A2: Questionnaire for Surgical Nurses

Caring for Individuals with Hearing Loss

I am inviting you to **complete a short questionnaire** as part of the consultation process to develop a toolkit for surgical nurses to manage the care of patients with hearing loss. The questionnaire is comprised of 18 questions and will take approximately 15 minutes to complete. Please answer all of the questions.

Completing the questionnaire is completely voluntary and questionnaire results will remain confidential. There will be no identifying information attached to any of the data. Results from the questionnaire will be collated and organized into themes by myself for analysis and will be kept on my password protected personal computer. Data will be reviewed by my practicum supervisor only. At the end of the practicum project, the questionnaire and all data will be deleted permanently.

The questionnaire will be open for four days, from November 17th to end of the day November 20th. Completion of the questionnaire will indicate agreement to participate in the project. A reminder to complete the questionnaire will be sent after the second day.

If you have any questions or concerns, please do not hesitate to message me privately or contact me at (709) 728-7248. Thank you so much for taking the time to help me in the completion of my practicum project and for your continued support throughout the program. Additionally, thank you for your contribution in the development of a toolkit for nurses caring for individuals with hearing loss.

Please answer <u>all</u> of the following questions:

1. Do you feel you can provide comprehensive nursing care specific to the needs of patients who have hearing loss or who identify as Deaf?
   - ☐ Yes
   - ☐ No

   If no, why not? _____

2. How would you rate your knowledge level surrounding hearing loss/Deafness? (Please provide a checkmark indicating your response)

	Not Very Knowledgeable	**Somewhat Knowledgeable**	**Very Knowledgeable**
Prevalence of Hearing Loss/Deafness			
Diagnosing a Hearing Loss			
Causes of Hearing Loss			
Physical/Psychosocial Impact of Hearing Loss/Deafness			

Types of Hearing Loss			
Ototoxic Medications			
American Sign Language (ASL)			
Cultural Deafness			
Assistive Listening Devices/Hearing Assistive Technology			
Hearing Loss/Deaf Individuals Community Resources			
Hearing Loss/Deaf Patients Acute Care Resources			

3. What is your comfort level caring for patients who identify as having a hearing loss or as Deaf? (Please provide a checkmark indicating your response)

	Not Very Comfortable	**Somewhat Comfortable**	**Very Comfortable**
Communicating with Patients with Hearing Loss			
Assessing/Identifying Hearing Loss/Deafness			
Maintenance/Storage and Care for Assistive Listening Devices (e.g., Hearing Aids)			
Documenting Hearing Loss/Deafness			
Accessing Hearing Loss Resources and Services			

4. If a patient did not disclose their hearing loss, do you feel that you would be able to detect the signs of a hearing loss?

   □ Yes
   If you chose yes, how would you detect it? _____
   □ No

5. Do you use any of the following to screen patients for hearing loss/Deafness? (Select all that apply)
   □ I do not screen patients for hearing loss/Deafness

- Hearing Handicap Inventory for the Elderly-Screening (HHIE-S)
- Rinne Test
- Weber Test
- Whispered Voice Test
- Finger Rub Test
- Ask patients
- Ask Family members
- Audiometers
- Other: _____

6. How important is conducting a baseline screening assessment?
   - Not very important
   - Somewhat important
   - Very important

7. What are some barriers to assessing/screening patients for hearing loss/Deafness? (Select all that apply)
   - Lack of time
   - It is not important to me/I do not care
   - I do not know how to assess/screen for hearing loss
   - It is not a nursing priority
   - It does not influence my nursing care
   - Other _____

8. Do you implement any of the following communication strategies when caring for patients with hearing loss/Deafness? (Select all that apply)
   - I do not implement any communication strategies
   - Use pen and paper to communicate
   - Speaking loudly
   - Speaking directly into their ear
   - Turning on lights
   - Remove masks
   - Enunciate words
   - Avoid slang
   - Face the patient
   - Use of communication pictograms
   - Obtain a sign language interpreter
   - Answer call bells in person
   - Speak to family members/friends instead
   - Ensure glasses and hearing aids are being worn and functional
   - Other _____

9. What is your comfort level for providing basic care such as proper handling, storage, battery changes/charging, and basic troubleshooting for these devices? (Please provide a checkmark indicating your response)

	Not Very Comfortable	Somewhat Comfortable	Very Comfortable
Hearing Aids			
Cochlear Implants			
FM Systems			
Pocket Talkers			
Loop Systems			

10. Which of the following resources pertaining to hearing loss/Deafness do you know how to access? (Select all that apply)
    - ☐ I do not know how to access any resources
    - ☐ Information on Hearing Aids
    - ☐ General information on Hearing Loss
    - ☐ Audiology/Audiologists
    - ☐ Interpreting Services
    - ☐ Speech Language Pathology
    - ☐ Community Organizations specifically for those with hearing loss/Deafness.
    - ☐ Other _____

11. Are you aware of any hearing loss toolkits or resources available on your unit?
    - ☐ Yes

    If yes, what is it and how often do you use it (e.g., never, a few times etc.)? ___
    - ☐ No

12. What would you like to see included in a *physical* toolkit for nurses on your nursing unit caring for patients with hearing loss or who are Deaf? (Select all that apply)
    - ☐ Communication Strategies brochures for patients
    - ☐ Information on Communication Strategies for Nurses
    - ☐ Information on Hearing Loss Screening/Assessment
    - ☐ Hearing Loss Pathway (Step by step guide in caring for patients with hearing loss)
    - ☐ Identification stickers for charts of patients with hearing loss (Blue Ear Stickers)
    - ☐ Information to access resources (ASL services, Audiology, obtaining Assistive Listening Devices)
    - ☐ Information on the care of Assistive Hearing Devices
    - ☐ Hearing Aid Storage boxes
    - ☐ Identification posters for patient's bedside
    - ☐ Hearing Loss Identification and Specific Needs Form (Patients can identify their communication needs/ devices they use)
    - ☐ An Assistive Listening Device (e.g. Pocket talker)
    - ☐ Communication Pictogram
    - ☐ Unit posters encouraging patients to self-disclose hearing loss
    - ☐ Blue Ear stickers to place around nursing unit
    - ☐ Other _____

13. In addition to a physical resource on your nursing unit, what would you like to see included within an *educational* resource as part of a toolkit for nurses caring for patients with hearing loss or who are Deaf? (Select all that apply)
    - ☐ Communication strategies for nurses

- ☐ General Hearing Loss/Deaf information
- ☐ Information on Screening/Assessment
- ☐ Information to access resources (ASL services, Audiology, obtaining Assistive Listening Devices)
- ☐ Information on Assistive Hearing Devices
- ☐ Hearing Loss Pathway (Step by step guide in caring for patients with hearing loss)
- ☐ Printable materials from physical toolkit (e.g. forms, brochures, posters, information)
- ☐ Other _____

14. In what form would you like to have the *educational* resource in? (Of the following list below, please indicate your top 3 choices with number 1 being your most preferred)
    - ☐ In person PowerPoint presentation on hearing loss education and nursing toolkit
    - ☐ Lunch and Learn
    - ☐ Pamphlet
    - ☐ Webinar
    - ☐ An online self-learning module available at home/work (LEAP module)
    - ☐ Online resource available at home/work
    - ☐ Simulation Based Learning with an information session
    - ☐ Other _____

15. What could be some potential barriers in using a nursing toolkit for patients with hearing loss? (Select all that apply)
    - ☐ Not enough time
    - ☐ Not important enough
    - ☐ Difficult to access toolkit
    - ☐ No certification/continuing education recognition
    - ☐ Needs to be kept updated/replenished
    - ☐ Not enough awareness
    - ☐ Other _____

16. How do you ensure other health care providers are aware that your patient has a hearing loss or is Deaf? (Select all that apply)
    - ☐ I usually do not document a hearing loss/Deafness
    - ☐ Document in patients' nursing history
    - ☐ Document in nursing Kardex
    - ☐ Document in patients' chart
    - ☐ Write a focus note
    - ☐ Place a sign at the bedside
    - ☐ Verbal report/Handover
    - ☐ Other _____

17. How influential do you think hearing loss education would be to the following aspects of your nursing practice? Please provide a checkmark indicating your response.

	Not Very Influential	**Somewhat Influential**	**Very Influential**
Professional Responsibility and Accountability			

Knowledge Based Practice			
Ethical Practice			
Service to the Public			
Self-Regulation			

18. Do you feel that hearing loss education should be mandatory for all nurses in practice?
    - Yes
    - No

    If no, why not? _____

Further comments/suggestions/feedback:

Thank you for your participation ☺

Appendix B1: Email for Interview Consultations

Dear [Name of Consultant],

I am reaching out to you today to invite you to take part in an informal interview that would assist me in the completion of my master's practicum project. For my project, I am focusing on improving the nursing care for surgical inpatients with hearing loss through improved identification and management of this patient population. Hearing loss is on the rise in Newfoundland and Labrador, and education for nurses on caring for individuals with hearing loss in acute care is lacking. Nurses are unaware of any formal training or resources available to them in managing the care of this patient population, which has complex physical, psychosocial, and communication needs. Furthermore, specific resources and educational materials pertaining to patients with hearing loss for nursing staff are needed. I am developing a tool kit that focuses on educating surgical nurses on identifying hearing loss in their patients and managing the complex care needs of these patients.

The purpose of this interview is to explore your experiences and your professional opinions, as well as to brainstorm future educational initiatives surrounding hearing loss management in acute care. Should you wish to participate in the interview, you will be asked a number of interview questions through telephone or online video conference. The interview will take approximately 30 minutes. If necessary, I may contact you again to clarify any of your statements to ensure your true thoughts, feelings, and emotions on the subject matter.

Privacy and confidentiality is of the upmost priority during this interview process. Therefore, every effort to protect your privacy will be made. This interview will not be recorded, and I will be taking notes during the discussion. Your responses will be kept on a computer protected by a password, that can only be accessed by me. There will be no identifying information from the interview included in the final report, and interview responses will only be utilized by myself and shared with my practicum supervisor. The interview information will be destroyed at the end of this practicum project.

Your assistance will help inform the development of the toolkit I am creating for surgical nurses at the Health Sciences Centre. I appreciate your time in reading this email and I look forward to having a discussion with you.

Please let me know **within the next four days** regarding whether you are able to assist me in this endeavour. If you agree, then we can schedule a time that works to schedule the interview. Additionally, please feel free to contact me at any time to discuss this further.

Thank you,

Leanna Rowe, BN RN
Registered Nurse, Health Sciences Centre
St. John's, NL
709-728-7248/leanna.rowe@mun.ca

Appendix B2: Interview Questions for Surgical Nurse Manager

1. Do you feel your staff nurses can provide comprehensive nursing care specific to the needs of patients who have hearing loss or who identify as Deaf?

2. Without identifying any patient information, has your staff experienced any challenges related to patients with hearing loss or who are Deaf?

Some challenges such as:

- Miscommunication between nurses and patients
- Lack of accessibility
- Missing items such as hearing aids, assistive technologies
- Safety issues
- Other:

3. What do you feel are the learning needs for your staff nurses to care for patients with hearing loss/Deafness?

    - Communication Strategies
    - Screening/Assessment
    - Care for ALDs
    - Documentation
    - Accessing Resources
    - Other:

4. Do you think hearing screening should be a part of a comprehensive physical assessment? If yes, how do you think nurses should complete a baseline screening?

Examples of hearing screening are:

- Hearing Handicap Inventory for the Elderly-Screening (HHIE-S)
- Rinne Test
- Weber Test
- Whispered Voice Test
- Finger Rub Test
- Ask patients
- Ask Family members
- Audiometers
- Other:

5. What do you think are some barriers for nurses on your unit in assessing/screening patients for hearing loss/Deafness?
    - Lack of time
    - It is not important to them
    - They do not know how to assess/screen for hearing loss
    - It is not a nursing priority
    - It does not influence their nursing care
    - Other:

6. What would you like to see included in a *physical* toolkit for nurses caring for patients with hearing loss or who are Deaf?

Items such as:

- Communication Strategies brochures for patients
- Information on Communication Strategies for Nurses
- Information on Hearing Loss Screening/Assessment
- Hearing Loss Pathway (Step by step guide in caring for patients with hearing loss)
- Identification stickers for charts of patients with hearing loss (Blue Ear Stickers)
- Information to access resources (ASL services, Audiology, obtaining Assistive Listening Devices)
- Information on the care of Assistive Hearing Devices
- Hearing Aid Storage boxes
- Identification posters for patient's bedside
- Hearing Loss Identification and Specific Needs Form (Patients can identify their communication needs/ devices they use)
- An Assistive Listening Device (e.g. Pocket talker)
- Communication Pictogram
- Unit posters encouraging patients to self-disclose hearing loss
- Blue Ear stickers to place around nursing unit
- Other:

7. In addition to a physical resource, what would you like to see included within an *educational* resource as part of a toolkit for nurses caring for patients with hearing loss or who are Deaf?

Items such as:

- Communication strategies for nurses
- General Hearing Loss/Deaf information
- Information on Screening/Assessment
- Information to access resources (ASL services, Audiology, obtaining Assistive Listening Devices)
- Information on Assistive Hearing Devices
- Hearing Loss Pathway (Step by step guide in caring for patients with hearing loss)
- Printable materials from physical toolkit (e.g. forms, brochures, posters, information)
- Other:

8. In what form do you think is the best method of delivering the *educational* resource? (Of the following list below, please indicate your top 3 choices with number 1 being your most preferred)
    - In person PowerPoint presentation on hearing loss education and nursing toolkit
    - Lunch and Learn
    - Pamphlet
    - Webinar
    - An online self-learning module available at home/work (LEAP module)
    - Online resource available at home/work
    - Simulation Based Learning with an information session
    - Other:

9. What do you think could be some potential barriers to using a nursing toolkit for patients with hearing loss? (Select all that apply)
    - Not enough time
    - Not important enough

- Difficult to access toolkit
- No certification/continuing education recognition
- Needs to be kept updated/replenished
- Not enough awareness
- Other:

10. How do you feel your staff nurses should ensure other nurses/health care providers are aware that a patient has a hearing loss or is Deaf?

Examples such as:

- Document in patients' nursing history
- Document in nursing Kardex
- Document in patients' chart
- Write a focus note
- Place a sign at the bedside
- Verbal report/Handover
- Other:

11. Do you think hearing loss education is important in nursing practice? How about in the areas of?
    - Professional Responsibility and Accountability
    - Knowledge based Practice
    - Ethical Practice
    - Service to the Public
    - Self-Regulation

12 Do you feel that hearing loss education should be mandatory for all the nurses working on your unit? Would you consider it to be included as part of your orientation package for your unit?

13 Any further comments/suggestions/feedback:

Appendix B3: Interview Questions for Community Stakeholder

1. In your experience working with individuals with hearing loss, without identifying any personal client information, have you heard of any health care experiences of individuals with hearing loss?

2. Do you feel patients with hearing loss in acute care have enough support from nurses? If no, why do you feel that this is? Do you feel that acute care nurses can provide comprehensive nursing care specific to the needs of patients who have hearing loss or who identify as Deaf?

3. What do you feel are the learning needs for nurses to care for patients with hearing loss/Deafness?
    - Communication Strategies
    - Screening/Assessment
    - Care for ALDs
    - Documentation
    - Accessing Resources
    - Other:

4. Do you think hearing screening should be a part of a comprehensive physical assessment? If yes, how do you think nurses should complete a baseline screening?

Examples of hearing screening are:

- Hearing Handicap Inventory for the Elderly-Screening (HHIE-S)
- Rinne Test
- Weber Test
- Whispered Voice Test
- Finger Rub Test
- Ask patients
- Ask Family members
- Audiometers
- Other:

5. In your opinion, what are some important communication strategies nurses should be implementing when caring for patients with hearing loss/Deafness?

Examples such as:

- Using pen and paper to communicate
- Speaking loudly
- Speaking directly into their ear
- Turning on lights
- Removing masks
- Enunciating words
- Avoiding slang
- Face the patient
- Use of communication pictograms
- Obtain a sign language interpreter
- Answering call bells in person
- Speaking to family members/friends instead
- Ensure glasses and hearing aids are being worn and functional
- Other:

6. What do you think are some barriers for nurses in assessing/screening patients for hearing loss/Deafness?
    - Lack of time
    - It is not important to them
    - They do not know how to assess/screen for hearing loss
    - It is not a nursing priority
    - It does not influence their nursing care
    - Other _____

7. How do you feel staff nurses should ensure other nurses/health care providers are aware that a patient has a hearing loss or is Deaf?

Examples such as:

- Document in patients' nursing history
- Document in nursing Kardex
- Document in patients' chart
- Write a focus note
- Place a sign at the bedside
- Verbal report/Handover
- Other:

8. With respect to the Hear Here toolkit, what parts of the toolkit worked? Which parts did not work? In retrospect, is there anything you would change about the toolkit?

9. What would you like to see included in a *physical* toolkit for nurses caring for patients with hearing loss or who are Deaf?

Items such as:

- Communication Strategies brochures for patients
- Information on Communication Strategies for Nurses
- Information on Hearing Loss Screening/Assessment
- Hearing Loss Pathway (Step by step guide in caring for patients with hearing loss)
- Identification stickers for charts of patients with hearing loss (Blue Ear Stickers)
- Information to access resources (ASL services, Audiology, obtaining Assistive Listening Devices)
- Information on the care of Assistive Hearing Devices
- Hearing Aid Storage boxes
- Identification posters for patient's bedside
- Hearing Loss Identification and Specific Needs Form (Patients can identify their communication needs/ devices they use)
- An Assistive Listening Device (e.g. Pocket talker)
- Communication Pictogram
- Unit posters encouraging patients to self-disclose hearing loss
- Blue Ear stickers to place around nursing unit
- Other:

10. In addition to a physical resource, what would you like to see included within an *educational* resource as part of a toolkit for nurses caring for patients with hearing loss or who are Deaf?

Items such as:

- Communication strategies for nurses

- General Hearing Loss/Deaf information
- Information on Screening/Assessment
- Information to access resources (ASL services, Audiology, obtaining Assistive Listening Devices)
- Information on Assistive Hearing Devices
- Hearing Loss Pathway (Step by step guide in caring for patients with hearing loss)
- Printable materials from physical toolkit (e.g. forms, brochures, posters, information)
- Other:

11. What could be some potential barriers in using a nursing toolkit for patients with hearing loss?
    - Not enough time
    - Not important enough
    - Difficult to access toolkit
    - No certification/continuing education recognition
    - Needs to be kept updated/replenished
    - Not enough awareness
    - Other:

12. In what form do you think is the best method of delivering the *educational* resource? (Of the following list below, please indicate your top 3 choices with number 1 being your most preferred)
    - In person PowerPoint presentation on hearing loss education and nursing toolkit
    - Lunch and Learn
    - Pamphlet
    - Webinar
    - An online self-learning module available at home/work (LEAP module)
    - Online resource available at home/work
    - Simulation Based Learning with an information session
    - Other:

13. Do you feel that hearing loss education should be mandatory for all nurses in acute care?
14. Any further comments/suggestions/feedback:

Appendix B4: Health Research Ethics Authority (HREA) Screening Tool

Student Name: Leanna Rowe

Title of Practicum Project: The Development of a Toolkit for Nurses Caring for Patients Living with Hearing Loss

Date Checklist Completed: July 5th, 2020

This project is exempt from Health Research Ethics Board approval because it matches item number _____3_____ from the list below.

9. Research that relies exclusively on publicly available information when the information is legally accessible to the public and appropriately protected by law; or the information is publicly accessible and there is no reasonable expectation of privacy.
10. Research involving naturalistic observation in public places (where it does not involve any intervention staged by the researcher, or direct interaction with the individual or groups; individuals or groups targeted for observation have no reasonable expectation of privacy; and any dissemination of research results does not allow identification of specific individuals).
11. Quality assurance and quality improvement studies, program evaluation activities, performance reviews, and testing within normal educational requirements if there is no research question involved (used exclusively for assessment, management or improvement purposes).
12. Research based on review of published/publicly reported literature.
13. Research exclusively involving secondary use of anonymous information or anonymous human biological materials, so long as the process of data linkage or recording or dissemination of results does not generate identifiable information.
14. Research based solely on the researcher's personal reflections and self-observation (e.g. auto-ethnography).
15. Case reports.
16. Creative practice activities (where an artist makes or interprets a work or works of art).

For more information, please visit the Health Research Ethics Authority (HREA) at https://rpresources.mun.ca/triage/is-your-project-exempt-from-review/

Appendix IV: Hearing Loss Toolkit

Hearing Loss Management in Acute Care: Hearing Loss Toolkit

Leanna Rowe

Memorial University of Newfoundland and Labrador

Managing Hearing Loss in Acute Care

A series of E-Learning Modules for Acute Care Nurses

Who is this learning resource for?
Nurses in acute care caring for patients living with hearing loss and Deafness.

How will it support acute care nurses?
By providing comprehensive information on hearing loss/Deafness, focused nursing strategies, and awareness of resources.

What does this learning resource consist of?
It consists of five modules plus a physical on-unit resource. Each interactive module has learning objectives, key content on hearing loss/Deafness and a self-assessment to test your knowledge.

What is the overall goal?
To provide information and resources to support acute care nurses managing the care of patients living with hearing loss or Deafness.

What do these modules cover?
The following five modules consist of general information about hearing loss and Deafness, nursing strategies for the care of this patient population, communication strategies, resources for nurses and knowledge assessments.

Learning Modules

- Module 1: What is Hearing Loss?
- Module 2: Hearing Loss Technology
- Module 3: Nursing Care for Individuals with Hearing Loss/Deafness
- Module 4: Communication Strategies
- Module 5: Hearing Loss Resources

Module 1

What is Hearing Loss?

5

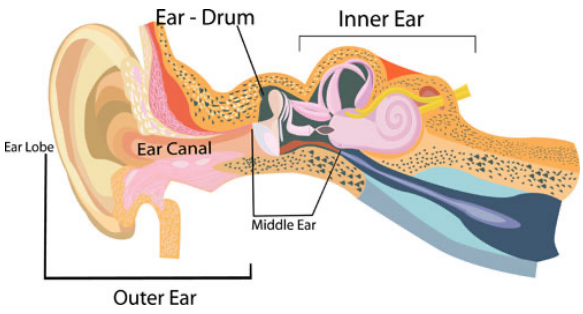
Learning Objectives

By the end of this module, you should be able to:

- Understand how normal hearing works and the definition of hearing loss;
- Recognize the prevalence of hearing loss both nationally and provincially;
- Identify the different causes and types of hearing loss;
- Identify the cultural differences between Deaf individuals and individuals with hearing loss; and
- Identify reasons why hearing loss is an important health care concern.

6

How Do We Hear?



"Source: Centers for Disease Control and Prevention" -*Diagram of the main parts of the peripheral hearing system* - https://www.cdc.gov/ncbddd/hearingloss/types.html; "Materials developed by CDC. Reference to this image does not constitute its endorsement or recommendation by the U.S Government, Department of Health and Human Services, or Centers for Disease Control and Prevention".

- **Outer Ear**

Sound travels through the pinna and down the ear canal, striking the ear drum and causing it to vibrate.

- **Middle Ear**

Vibrations from the ear drum cause the ossicles to vibrate (the three smallest bones in the human body) which, in turn, creates movement of the tiny hair cells in the inner ear.

- **Inner Ear**

The movement of the hair cells sends electrical impulses through the auditory nerve to the hearing centre of the brain. The brain then translates this stimulus to sounds the brain can recognize.

What Is Hearing Loss?

Normal Hearing

Normal hearing is measured as thresholds of 25 decibels or better in both ears.

Hearing Loss

Hearing loss is the reduced ability to hear sound.

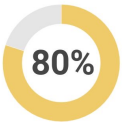
Disabled Hearing

Disabling hearing loss is a loss greater than 40 decibels in the better hearing ear in adults.

<u>One in five</u> Canadians has some hearing loss.

of Canadian adults over the age of 19 have some degree of hearing loss.

of Canadian adults between the ages of 40-59 have some hearing loss.

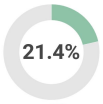


of Canadian seniors aged 60-79 have some hearing loss, which typically gets worse over time.

Click here for hearing loss statistics in Newfoundland and Labrador!

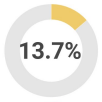
(Statistics Canada, 2016)

% the population in Newfoundland and Labrador with a hearing disability (defined as persons whose daily activities were limited because of difficulties with their ability to hear, even with assistive technologies):

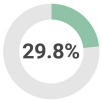


15 years and younger

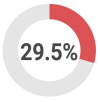
15-24 years of age



25-44 years of age



45-64 years of age



65 years and older

In 2017, Workplace NL reported hearing loss injuries climbed hitting 10.6 people per 10,000 workers.

Those who work in fish plants are up to five times more likely to suffer from hearing loss. The rate of hearing loss injury in fish processing alone is 46.9 per 100 workers compared to a provincial injury rate of 9.9.

(Statistics Canada, 2017)

Hearing Loss

- is not reversible.
- can be progressive or sudden.
- affects people of all ages.
- can be disabling.
- is treatable.

So, what is the cause of hearing loss?

Hearing loss can be caused by aging and prolonged noise exposure, which are the most common causes. However, hearing loss can result from several other things such as an accident, illness, exposure to certain drugs/ chemicals or genetics at birth.

Click each picture below to find out more about what causes hearing loss.

Noise Induced Hearing Loss

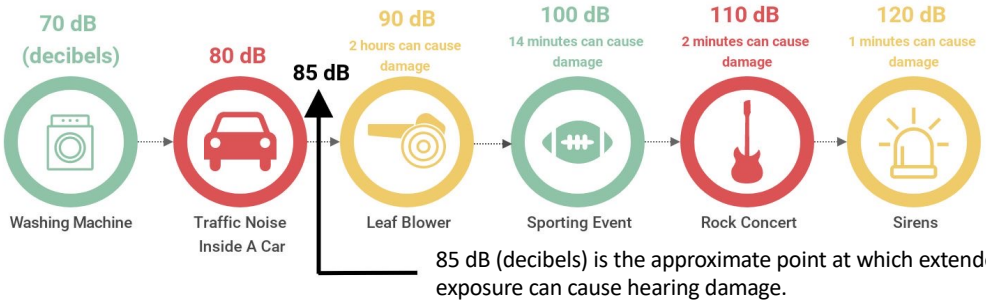
Age Related Hearing Loss

Other Causes of Hearing Loss

Noise Induced Hearing Loss

Noise induced hearing loss is caused by overexposure to loud sounds. In some cases, the damage is only temporary, however repetitive exposure to excessive noise for long periods of time can cause permanent damage.

Rise of noise induced hearing loss is linked to excessive noise in the workplace and recreational noise such as listening to music or mowing lawns.



85 dB (decibels) is the approximate point at which extended exposure can cause hearing damage.

Age Related Hearing Loss

- Age related hearing loss is also known as presbycusis.
- Presbycusis is the loss of hearing that gradually occurs in most of us as we grow older.
- It often occurs in both ears equally and gradually.
- It arises from changes in the inner ear as we age, but can result from changes in the middle ear, or from complex changes along the nerve pathways from the ear to the brain.

For Canadians in the age group 65 years or older, hearing loss is projected to double from 5 million in 2011 to 10.4 million by 2036 (Feder et al., 2017).

Adults aged 60-79 were significantly more likely to have hearing loss (78%) compared with younger adults aged 39-59 (40%) (Statistics Canada, 2016).

Other Causes of Hearing Loss

Hearing loss can result from several other things such as an accident, illness, exposure to certain drugs/ chemicals or genetics at birth.

Occupational hazards such as harmful chemicals can cause hearing loss.

Some illnesses or diseases that result in high fever can potentially cause hearing damage and subsequent hearing loss.

Medications such as antibiotics can be damaging to the fine hair cells in the ear (ototoxic).

Your genetic makeup can make you more susceptible to hearing loss.

In addition to having different causes, hearing loss also comes in different types.

Click on one of the ears below to learn more.

Conductive Hearing Loss

Sensorineural Hearing Loss

Mixed Hearing Loss

Conductive Hearing Loss

- With conductive hearing loss, sound signals are prevented from reaching the inner ear due to problems with the outer and/or middle ear.
- This type of hearing loss can be caused by
  - fluid in the middle ear (ear infection);
  - a perforated ear drum;
  - wax (cerumen) buildup; or
  - damage to the tiny bones in the middle ear (ossicles).

Sensorineural Hearing Loss

- Sensorineural hearing loss is caused by damage to the hair cells that line the inner ear, or the fibers of the auditory nerve. This damage can cause ineffective transmission of sounds through the inner ear to the brain.
- This is the most common type of hearing loss and can be caused primarily by age and noise exposure which over time can cause ”wear and tear” on the hair cells in the cochlea.

Mixed Hearing Loss

- Mixed hearing loss occurs when a person has both a conductive and sensorineural hearing loss.
- A person can develop a hearing loss from prolonged noise exposure (sensorineural) in addition to having an ear infection (conductive).
- Often, the conductive component of hearing loss can be medically treated and resolved, while sensorineural hearing loss can be treated with hearing aids or cochlear implants.

Other Conditions Associated with Hearing Loss:

Tinnitus

- Described as a ringing, buzzing or pulsing noise in one or both ears.
- Thought to be caused by nerve damage in the inner ear or damage higher up in the brain.
- Can be extremely aggravating, leading to stress, anxiety, depression, poor concentration, irritability and more.
- Can be improved upon when the hearing loss is treated with hearing aids.

Hyperacusis

- An increased sensitivity to everyday sounds.
- The response to these sounds can range from simple sensitivity to extreme pain to noises such as alarms, dishes clanging, or children crying.

Auditory Processing Disorders (APD)

- More commonly found in children but can also affect the adult population.
- APD is when the brain interprets what it hears as if there were some delay or distortion in the sounds.
- Can make listening, learning, and memorization very difficult.

So, if hearing loss has many different causes and types what do people with hearing loss identify themselves as?

Some common terms people with hearing loss use to identify themselves are:

- hearing Impaired;
- living with a hearing loss;
- profoundly deaf (meaning being deaf from birth); or
- hearing challenged.

However, some individuals who are born profoundly deaf may identify as being culturally Deaf. Click here to learn about the differences between individuals who identify as having a hearing loss or as being Deaf.

Individuals who identify as being Deaf.

- Individuals who identify as Deaf are a part of a cultural group where most adults consider themselves a member of a non-disabled culture.
- Culturally Deaf adults are typically born with profound hearing loss, or hearing loss that occurred at an early age, often before the onset of speech development.
- The use of sign language is regarded as the foundation for Deaf culture, and for individuals who identify as Deaf it can be their primary and only form of communication.

- Sign languages are natural languages with their own grammar and lexicon.
- English is typically learned as a second language within this cultural group and not always aurally reinforced as members of the Deaf community view their deafness as a natural characteristic and choose not to modify this with hearing assistive technology.

Why is hearing loss an important health care concern?

- Hearing loss is linked to other disabling comorbidities.
- Hearing loss has impacts beyond physical loss such as reduced quality of life, stigma and isolation.
- Individuals with hearing loss have been found to report a decreased satisfaction with quality of nursing care.

Nurses should be aware of these physical and psychosocial implications that individuals living with hearing loss or Deafness face, in order to adequately assess and manage the care of these individuals.

Nurses are in a unique position as frontline health care workers to identify and manage hearing loss in acute care including:

- assessing;
- accommodating;
- educating;
- empowering; and
- advocating for patients with hearing loss/Deafness.

The remaining four modules encompass information, resources and nursing strategies needed to assist acute care nurses to provide comprehensive nursing care and a safe supportive environment for inpatients with hearing loss or Deafness.

Test your Knowledge

True or False?

Hearing loss is only caused by overexposure to loud sounds.

Test your Knowledge

True or False?

Hearing loss is only caused by overexposure to loud sounds.

False! Hearing loss can be caused by overexposure to loud sounds in addition to other factors such as age, accident, illness, exposure to certain drugs/chemicals or genetics at birth.

Test Your Knowledge

Choose one of the following:

Damage to the hair cells found within the cochlea in the inner ear is an example of which type of hearing loss?

A) Sensorineural Hearing Loss
B) Conductive Hearing Loss
C) Age Related Hearing Loss

Test Your Knowledge

Choose one of the following:

Damage to the hair cells found within the cochlea in the inner ear is an example of which type of hearing loss?

A) Sensorineural Hearing Loss
B) Conductive Hearing Loss
C) Age Related Hearing Loss

A) Sensorineural Hearing Loss. There are hair cells that line the cochlea and damage to these hair cells or to the fibres of the auditory nerve can cause sensorineural hearing loss.

Test Your Knowledge

Which one of the following statements is not true regarding hearing loss?

A) Hearing loss is a decreased sensitivity to sounds that one normally hears.
B) Hearing loss can be progressive or sudden.
C) Hearing loss is reversible.
D) Hearing loss can be disabling.

Test Your Knowledge

Which one of the following statements is not true regarding hearing loss?

A) Hearing loss is a decreased sensitivity to sounds that one normally hears.
B) Hearing loss can be progressive or sudden.
C) Hearing loss is reversible.
D) Hearing loss can be disabling.

C) Hearing loss is reversible. Once hearing loss occurs, it is not reversible.

Test your Knowledge

One in ___ Canadians has some hearing loss?

a) 10
b) 25
c) 100
d) 5

Test your Knowledge

One in ___ Canadians has some hearing loss?

A) 10
B) 25
C) 100
D) 5

D) One in five Canadians has some hearing loss.

Test your Knowledge

Why is hearing loss an important health care concern?

A) It has been found to be linked to other disabling comorbidities.
B) People with hearing loss/Deafness can have a reduced quality of life.
C) People with hearing loss/Deafness report decreased satisfaction in nursing care.
D) All of the above.

Test your Knowledge

Why is hearing loss an important health care concern?

A) It has been found to be linked to other disabling comorbidities.
B) People with hearing loss/Deafness can have a reduced quality of life.
C) People with hearing loss/Deafness report decreased satisfaction in nursing care.
D) All of the above.

D) All of the above.

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Module 2

Hearing Loss Technology

1

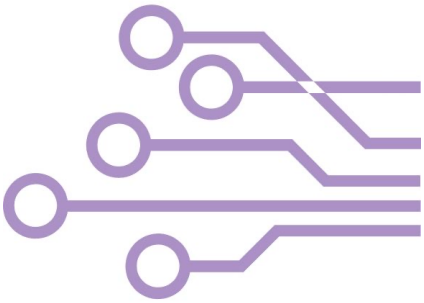
Learning Objectives

By the end of this module, you should be able to:

- Understand the importance of hearing loss technology for individuals who have hearing loss;
- Identify the different types of hearing aids and explain how they work;
- Recognize cochlear implants and explain their function;
- Distinguish between various types of assistive listening devices and assistive listening systems; and
- Understand how to provide basic general care and maintenance to all assistive listening technologies.

2

Hearing Loss Technology



There is a variety of technology that can be used to treat and help people overcome hearing loss.

Depending on the type and severity of hearing loss, hearing loss can be treated with hearing aids or cochlear implants.

With the help of a health care provider, the best treatment can be determined.

There are different types of technologies that can be used as a treatment to restore hearing.

Click on one of the ears below to learn more.

Hearing Aids

Cochlear Implants

Other Treatments

Hearing Aids

Click on one of the ears below to learn more about hearing aids.

- What are they?
- How do they work?
- Types of Hearing Aids
- Hearing Aid General Care and Maintenance

Hearing Aids: What Are They?

- A hearing aid is a small electronic device that you wear in or behind the ear.
- Modern day hearing aids that incorporate the latest technology are similar to powerful computers that can be adapted to individual hearing needs.
- Hearing aids amplify sounds that are important for communication and can work to reduce disruptive sounds.
- Hearing aids enable individuals with hearing loss to listen, communicate, and participate more fully in daily activities.

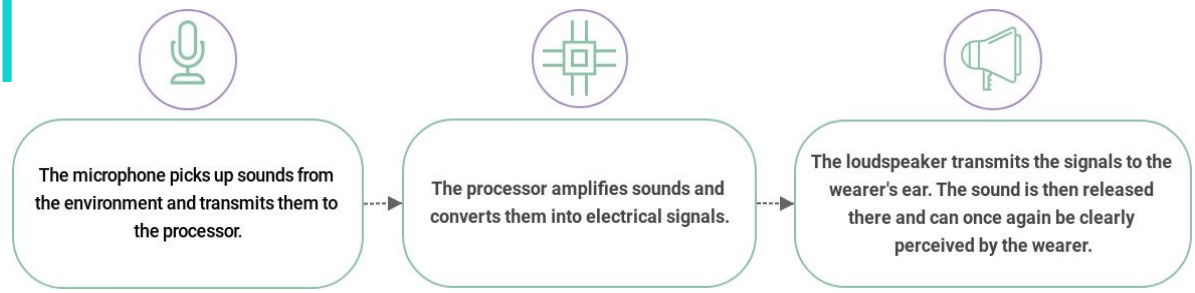
Hearing aids are typically made of three main components:

Microphone

Processor

Loudspeaker

Hearing Aids: How Do They Work?



A hearing aid magnifies sound vibrations entering the ear. The surviving hair cells can detect the larger sound vibrations and convert them into neural signals that are transmitted through the auditory nerve to the brain.

The greater the damage to a person's hair cells, the more severe the hearing loss thus a greater hearing amplification is needed.

Click here to watch a video on how hearing aids work!

How Do They Work?: Video

https://www.youtube.com/watch?time_continue=1&v=AxzVyMcmRcs&feature=emb_logo

Hearing Aids: The Different Types

The type of electronics used within a hearing aid affect how they work. The two main types of electronics are analog hearing aids and digital hearing aids.

Click here to learn about the differences between the two.

In addition to using different technologies, hearing aids come in many different brands and styles.

Click here to learn about the different styles of hearing aids.

Analog Hearing Aids

Analog Hearing Aids		Digital Hearing Aids
Converts sounds to electrical signals that are amplified and passed to the earphone on the hearing aid.		Converts sound to digital signals (data) that are processed by a tiny computer to sound.
Provide too much amplification for loud sounds and too little amplification for soft sounds.		Provide just enough amplification so that soft, normal and loud sounds are clear and comfortable.
Cannot discriminate between speech and unwanted noise. Hence they amplify everything.		Can suppress background noise so that speech in noisy environments is easier to listen to and understand.
Consume a lot of power, requiring frequent battery replacements.		Power efficient and batteries last longer.
Cheaper to purchase for the wearer.		More expensive.
Made up of several different electronic components, hence is prone to frequent repairs.		Less prone to wear and tear.
Mobile phones are not compatible and can produce a disturbing buzzing sound.		Conversing on mobile phones is easier and clear and some can directly pair with mobile devices.

Digital Hearing Aids

Hearing Aids: The Different Styles

A behind-the-ear (BTE) hearing aid consists of a hard plastic case worn behind the ear and connect to a plastic earmold that fits inside the outer ear.

The electronic components are held inside the case behind the ear and sound travels from the hearing aid through the earmold and into the ear.

There are also BTE hearing aids that do not use the earmold but have an “open fit” model in which a narrow tube is inserted into the ear canal, enabling the canal to remain open.

For the in-the-ear (ITE) hearing aids, the electronic components of the hearing aids are completely encased in hard plastic that fit completely inside the outer ear, partially in the ear canal or completely in the ear canal.

These hearing aids are made to fit the size and shape of a person’s ear canal. Canal aids can have additional features such as a telecoil, which is a small magnetic coil that allows users to receive sound through the circuitry of the hearing aid, rather than through its microphone.

Hearing Aids: General Care and Maintenance

Click on one of the ears below to learn how to provide general care and maintenance for hearing aids.

Insertion & Removal

Cleaning

Troubleshooting

Hearing Aids: Insertion & Removal

Click the ear above to watch a video on insertion and removal of hearing aids.

- Before removing the hearing aid, ensure that it has been turned off and then lower the volume. If the hearing aid is not turned off the batteries will continue to run.
- Remove the battery if the hearing aid will not be used for several days. This prevents corrosion of the hearing aid from battery leakage.
- Store the hearing aid in a safe place, away from heat and moisture. Safe storage prevents loss or damage.
- Before insertion check that the battery placement is correct, the hearing aid is turned off and the volume is turned down.
- Ensure the ear is dry and free of debris before inserting the hearing aid. Check that the earmold fits snugly by asking the patient if it feels secure and comfortable.
- Turn on the hearing aid and adjust the volume according to the individual's needs.

Insertion & Removal: Video

https://www.youtube.com/watch?v=szDDYHa8zGk

Hearing Aids: Cleaning

Click the ear above to watch a video on cleaning hearing aids.

- If the hearing aid has an earmold, disconnect the earmold from the device where the tube meets the body of the hearing aid. Do not remove if it is glued or secured.
- If the earmold is detachable, soak it in a mild soapy solution. Clean the earmold, rinse and dry with a soft cloth. If it is not detachable, clean the earmold with a damp cloth.
- Check that the earmold opening is patent. Remove any excess moisture or debris with a soft cloth or cotton ball and then reattach to the rest of the hearing aid.

Cleaning: Video

https://www.youtube.com/watch?v=fWyNUHK2Wg8

Hearing Aids: Troubleshooting

If the sound is weak or absent:

1. Ensure the volume is turned up.

2. Check the battery by turning the hearing aid on, turning up the volume, cupping your hand over the earmold and listening. A constant whistling sounds indicates the battery is functioning. A weak sound may indicate the battery is losing power. Replace the battery, as necessary.

3. Ensure the negative and positive signs on the battery match those indicated on the hearing aid. Make sure the new battery fits snugly but comfortably into its compartment. If there is resistance, either the battery is the wrong size or has been inserted in the wrong way.

Hearing Aids: Troubleshooting

4. Ensure the earmold opening is not clogged. If it is an in-the-ear hearing aid, the receiver opening is lined with a piece of tubing that can easily be mistaken for cerumen (ear wax). The patient may have a tool called a wax loop, which can be used to remove the cerumen.

5. Ensure the ear canal is not blocked with cerumen. If the patient reports a whistling sound or squeal after insertion, turn the volume down, ensure the receiver is properly attached to the earmold, and try reinserting the earmold.

Refer the patient to their audiologist if any problems persist or if difficulties cannot be corrected by the above steps. Document any pertinent data, including any problems the patient may have with their hearing aid. In addition, daily care and maintenance should also be documented.

Cochlear Implants

Click on one of the ears below to learn more about cochlear implants.

- What are they?
- How do they work?
- Types of Cochlear Implants
- Cochlear Implant General Care and Maintenance

Cochlear Implants: What Are They?

There are limitations to the amount of amplification a hearing aid can provide. A cochlear implant can be another consideration for individuals with hearing loss.

- A cochlear implant is a small, complex electronic device.
- A cochlear implant bypasses the injured or damaged portion of the auditory system and directly stimulates the auditory nerve.
- It consists of an external portion that sits behind the ear and a second portion that is surgically placed under the skin.
- Cochlear implants enable individuals with hearing loss to listen, communicate, and participate more fully in daily activities.

Cochlear implants are typically made of four main components:

Microphone

Speech Processor

Transmitter/Receiver/Stimulator

Electrode Array

Cochlear Implants: How Do They Work?

The microphone picks up sounds from the environment and transmits them to the processor.

The processor selects and arranges sounds picked up by the microphone.

The transmitter and receiver/stimulator receive signals from the speech processor and convert them to electrical impulses.

A group of electrodes receives the signals from the stimulator and sends them to different regions of the auditory nerve.

A cochlear implant bypasses damaged portions of the ear and directly stimulates the auditory nerve to the brain, which recognizes signals as sound.

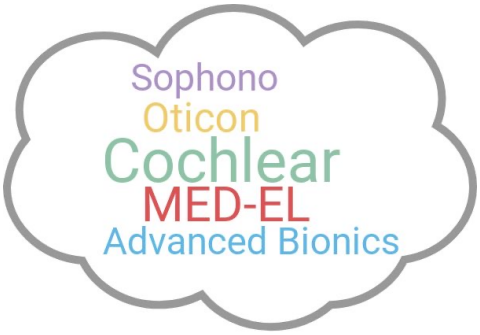
Click here to watch a video on how cochlear implants work!

How Do They Work?: Video

https://www.youtube.com/watch?v=YdYjdYD--nk

Cochlear Implants: Types of Cochlear Implants

There are several different makes and models of cochlear implants, but they all work in a similar way. There are several different cochlear implant manufacturers who offer different variations of cochlear implants. Choosing a manufacturer is done through personal research, preferences and the advice of a hearing health care professional.



Cochlear Implants: General Care and Maintenance

1. The outside of the processor (the body) and its accessories should be cleaned regularly using a dry or lightly moistened microfibre cloth to remove any dust and perspiration residue.

2. The sound processor should be stored in a protective case when not in use.

3. Some cochlear implants use rechargeable batteries and some use one time use batteries. For rechargeable batteries, just open the battery door and insert the battery correctly. Close the battery compartment and turn on the sound processor. For rechargeable batteries, ensure the batteries slide out from the sound processor and are placed on the charger when the processor is not in use.

4. Ensure the microphone openings are clear from dirt and debris by cleaning with a soft bristled brush.

5. If your patient requires magnetic resonance imaging (MRI), ensure the cochlear implant is compatible as many individuals with cochlear implants are unable to undergo MRIs.

Other Treatments

There are other forms of hearing loss treatments that work to provide individuals with hearing loss with a sense of sound.

- Bone anchored hearing aids (BAHA) use bone conduction to deliver hearing to those with profound hearing loss.
- They treat hearing loss through sound vibrations transmitted by bone conduction to the inner ear.
- The external sound processor of the bone anchored hearing aid receives sounds from the environment and coverts them into vibrations which get transmitted to the embedded implant.
- The internal implant that is surgically placed under the skin vibrates the surrounding bone, transmitting sound waves in the inner ear which then stimulates the hair cells and activates the auditory nerve.

Click on the ear below to watch a video about how BAHA works!

How Do They Work? : Video

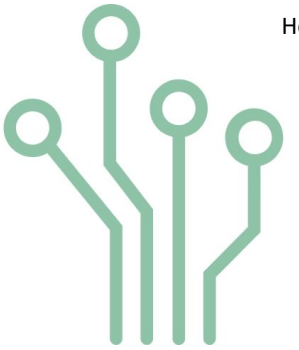
https://www.youtube.com/watch?v=EZ-M9AxesVc

Despite significant advances in hearing aids and cochlear implants, sometimes these devices are not enough.

Users may struggle to hear and understand what is being communicated in different settings.

For many people with hearing loss, turning up the volume isn't enough. In addition to noise, distance and environment affect hearing ability.

Hearing aids and cochlear implants can amplify almost all sound (even unwanted ones), and usually can't separate the background noise from the voices and sounds you want to hear.



Hearing Assistive Technology (HAT) can make environments more hearing friendly.

Click here to learn more about these devices available to individuals with hearing loss.

Assistive Listening Devices (ALDs)

What are they?

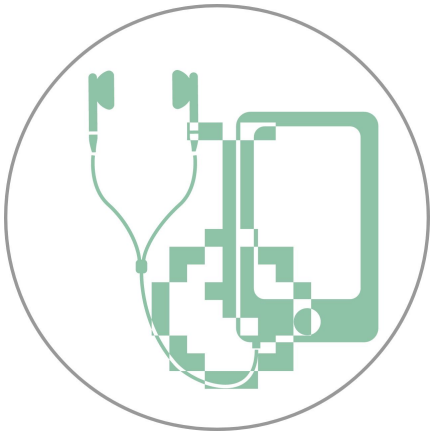
Assistive listening devices are personal technologies that can help you communicate in one-to-one conversations.

How do they work?

They are amplifiers that are hand-held with microphones that bring the sounds you wish to hear closer to your ears.

Why use them?

These small devices capture the sound you want to hear and may filter some background noise making it easier for a person with hearing loss to understand sound in a variety of different environments and settings.

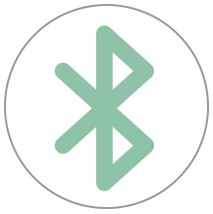


Click here to learn more about the different types of ALDs.

Assistive Listening Devices (ALDs)

A pocket talker amplifies sounds and reduces background noise. It is ideal for one-on-one conversations and can be used with or without hearing aids.

Hearing aid and cochlear implant users can use Roger pens or Roger microphones as a handy and portable solution to use to hear better in noisy environments.



Bluetooth is a relatively short-range wireless technology that can be used as an assistive listening device by connecting hearing aids and cochlear implants to other technological devices such as cell phones, music players and televisions.

Strategies For The Effective Use Of Handheld ALDs

- Determine that the amplifier and batteries are working properly. Put the earphones on and listen to your own speech before putting the headphones on patients.
- Ensure you adjust the headband and earphones for comfort and fit.
- Stand or sit approximately 3 feet (or less) from the patient. Ensure you are facing the main source of light (e.g., the window).
- Hold the amplifier in your hand under your chin. Talk across (not into) the microphone and keep the microphone approximately 2 inches from your mouth.
- Be sure the patient can see your mouth easily. Speak in a normal (tone and volume) voice. Do not shout.
- Be sure to switch off the amplifier when you are finished.
- Ensure the batteries are replenished or recharged when required.

Not only are there personal listening systems but there are listening systems that can also be used publicly in which individuals with hearing loss can access sound being transmitted through a public address system or sound system.

If a person wants to conveniently connect to one of these systems, their hearing device must have a telecoil.

Telecoils, also known as t-coils, are built into many hearing aids and all cochlear implants.

The telecoil feature needs to be programmed or activated by an audiologist or hearing health care provider in order to work.

Telecoils are an essential component for anyone wishing to easily and directly access an assistive listening system.

If a public address or sound system can be accessed through telecoil, a poster with the telecoil symbol like the one in the center of the slide can alert individuals to connect to the system with their hearing aids or cochlear implants.

There are three types of assistive listening systems that are accessible for people with or without hearing aids and cochlear implants.

Click on the circles below to learn more about each system.

Hearing Loops

Infrared Systems

FM Systems

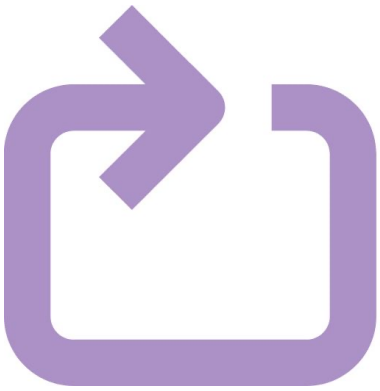
Hearing Loops

Hearing loops consist of a copper wire placed within a room which is connected via a special loop to a public sound system.

They are user friendly, simple, discreet and effective.

Users simply switch their devices to the telecoil program and automatically receive clear, customized sound directly to their ears.

People who do not have hearing aids, or access to telecoil in their devices can use headphones to connect to the system.



Click the loop above to watch a video to learn more about how hearing loops work!

Hearing Loops: Video

https://www.youtube.com/watch?v=hlnx3ZImTw0

Infrared Systems

A transmitter sends speech from a public sound system to an infrared system receiver using invisible infrared light waves.

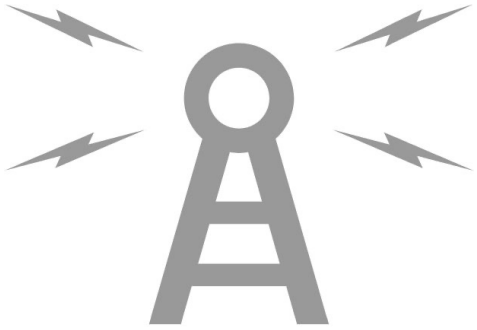
Signals are sent and received in a straight line, so these systems work best when users are located as centrally as possible in front of the device.

Everyone using an infrared system needs a receiver and either a headphone or neck loop.

FM Systems

FM systems use low power FM frequency radio transmission from a sound system to FM receivers.

This system also needs a receiver and either a headphone or neck loop to be used.



Click on the diagram above to watch a video to learn more about FM systems!

FM Systems: Video

https://www.youtube.com/watch?v=KnfVmq8tm_o

Assistive Listening Devices: General Care and Maintenance

- Complete a daily check of the device by visually inspecting the device followed by listening to the sound quality.
- Determine that the amplifier and batteries are working properly. Put the earphones on and listen to your own speech before putting the headphones on patients.
- Ensure that extra parts are available for the device such as microphones and batteries in the event of equipment malfunction.
- Be sure to switch off the device when you are finished.
- Ensure the batteries are replenished or recharged when required or the device has been returned to its docking station.

Hearing Loss Technology: Summary

Hearing aids	Can be analog or digital Can be behind-the-ear or in-the-ear	Amplify sounds via a microphone, processor, and loudspeaker	Greater amplification is needed with more severe hearing loss Hearing aids come at a wide range of costs
Bone Anchored Hearing Aids (BAHA)	Utilizes bone conduction to deliver hearing	Sounds are converted to vibrations The vibrations stimulate the surrounding bone and hair cells in the inner ear and auditory nerve	Can be used with a more profound hearing loss. Requires surgical insertion
Cochlear Implants	Directly stimulates the auditory nerve	Sounds are converted to electrical impulses that are sent to different regions of the auditory nerve	Used with severe to profound hearing loss Requires surgical insertion Expensive

Assistive Listening Devices (ALDs): Summary

Assistive Listening Devices (ALDs)	Personal technologies for communication	Amplify sounds via a microphone	Help in one-to-one conversations Small devices that are easily transportable for use in multiple environments Can help filter background noise
Hearing Loops	Special type of sound system for individuals with hearing loss	Consist of copper wire connected via a special loop to a public sound system	Most used in public places – churches, banks, theatres etc. Can be used with telecoil or without using headphones (can be used by people without hearing loss!) User friendly, simple, discreet, and effective

Assistive Listening Devices (ALDs): Summary

Infrared Systems	Special type of sound system for individuals with hearing loss	A transmitter sends speech from public sound system to infrared system receiver using infrared light waves	Need to be used with a receiver and either a headphone or neck loop Signals are sent and received in a straight line so users need to be located as centrally as possible in front of the device which can be challenging
FM Systems	A personal listening system for use in public environments	Use low power FM frequency radio transmission	Need a receiver and either a headphone or neck loop to be used Popular in classrooms for school aged children

Test your Knowledge

Match the word with its definition.

A. Cochlear Implant

B. Hearing Aid

C. Telecoil

D. Assistive Listening Devices

E. Bone Anchored Hearing Aid

F. Hearing Loop

___ A small electronic device that magnifies sound vibrations entering the ear.

___ A small complex device that directly stimulates the auditory nerve.

___ This device uses bone conduction to deliver sound vibrations to the inner ear.

___ Personal technologies that help individuals with hearing loss communicate one on one.

___ A built-in feature of hearing aids and cochlear implants that allows individuals to connect to public address systems or sound systems.

___ A loop of copper wire placed within a room which is connected to a public sound system.

Test your Knowledge

Match the word with its definition.

A. Cochlear Implant

B. Hearing Aid

C. Telecoil

D. Assistive Listening Devices

E. Bone Anchored Hearing Aid

F. Hearing Loop

__B__ A small electronic device that magnifies sound vibrations entering the ear.

__A__ A small complex device that directly stimulates the auditory nerve.

__E__ This device uses bone conduction to deliver sound vibrations to the inner ear.

__D__ Personal technologies that help individuals with hearing loss communicate one on one.

__C__ A built-in feature of hearing aids and cochlear implants that allows individuals to connect to public address systems or sound systems.

__F__ A loop of copper wire placed within a room which is connected to a public sound system.

Test your Knowledge

When caring for hearing loss technology, what should the nurse ensure?

A) Hearing aids and cochlear implants are stored in a cool dry container.
B) Batteries are replaced or recharged as necessary.
C) The microphone openings are clear of any dirt or debris.
D) The device is powered off when not in use.
E) All of the above.

Test your Knowledge

When caring for hearing loss technology, what should the nurse ensure?

A) Hearing aids and cochlear implants are stored in a cool dry container.
B) Batteries are replaced or recharged as necessary.
C) The microphone openings are clear of any dirt or debris.
D) The device is powered off when not in use.
E) All of the above.

E) All of the above.

Test your Knowledge

True or False?

A pocket talker amplifies sounds and reduces background noise and can be used with or without hearing aids.

Test your Knowledge

True or False?

A pocket talker amplifies sounds and reduces background noise and can be used with or without hearing aids.

True! A pocket talker is ideal in one-on-one conversations, amplifies sounds, reduces background noise and can be used with or without hearing aids.

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Module 3

Nursing Strategies

1

Learning Objectives

By the end of this module, you should be able to:

- Recognize how implementing specific nursing strategies can impact the healthcare experience of individuals with hearing loss/Deafness;
- List the individual nursing strategies along the hearing loss pathway;
- Identify an individual with hearing loss through a completion of a hearing loss assessment; and
- Implement strategies for accommodating, educating, empowering, and advocating for patients with hearing loss and their loved ones.

2

Nursing Strategies

Nurses are in an optimal position, both at the bedside and in leadership roles, to improve the hospital experience of individuals living with hearing loss or Deafness.

Hearing Loss Pathway

From admission to discharge, nurses can follow a hearing loss pathway to ensure hearing loss and Deafness gets appropriately identified and the needs of these individuals are addressed and communicated with the health care team

Click on each ear to learn more about the hearing loss pathway!

(Funk et al., 2018)

Assess

The nursing curriculum often includes various hearing loss screening tests such as the Weber and Rinne tests which use tuning forks, and the Whispered Voice Test to detect hearing loss as part of a nursing physical health assessment.

However, formalized tests for hearing loss assessment are challenging in the acute care environment because:

- screening can be time consuming;
- hearing loss screening tools are too subjective;
- the available screening tools are inconsistently used;
- nurses do not receive enough education or training to use these tools;
- there is lack of national screening guidelines and best practice policies for nurses; and
- screening and diagnosing hearing loss is not within the scope of practice of Registered Nurses in acute care.

Assess

Instead, nurses should focus on hearing loss assessment which can be easily integrated into nursing practice to address individual communication needs during hospitalization.

Hearing loss assessment:

- can be completed during the nursing physical health assessment;
- uses verbal and non-verbal cues to assess for hearing loss;
- promotes early detection, adequate treatment and improved quality of life;
- can be incorporated into nursing practice at any time and is an ongoing process during patient care;
- helps nurses to be more aware of patient needs and improves overall patient and hospital experience; and
- is within the scope of practice of a Registered Nurse in acute care.

Click on the clipboard above to learn how to conduct a hearing loss assessment!

Hearing Loss Assessment

Did You Know?

More than half of Canadians between the ages of 40 and 79 have at least a mild hearing loss, but 77% of them do not know it!

(StatsCan, xx)

Hearing Loss Assessment: Non-Verbal Cues

Nurses should note any non-verbal signs of a hearing deficit because many patients can be unaware of or deny having such an impairment. Non-verbal cues indicating a hearing loss can include:

- Cupping of the ear or turning the head to one side when asked questions;
- Misunderstanding conversation or needing questions repeated frequently;
- Depending on a family member or spouse to clarify information for them;
- Not replying or responding when you call them;
- Appearing confused or not responding to questions appropriately
- Acting withdrawn, quiet and or isolated;
- Turning up the volume of the television, radio or phone very high;
- Watching the speaker's lips instead of making eye contact;
- Speaking too loudly or softly; and
- Mumbled or slurred sounding speech.

Hearing Loss Assessment: Verbal Cues

In addition to being able to assess for non-verbal cues of hearing loss when conducting a physical assessment, nurses should also:

- have a short discussion about hearing loss with patients rather than ask yes or nor questions;
- ask questions that focus on potential barriers to hearing and communication (e.g., background noise, unfamiliar accents) and on assistive technology requirements;
- ask specific questions such as "Do you have difficulty hearing in a noisy environment?". This is more beneficial than broad statements asking individuals "Do you have a hearing loss?" because it encourages people to think about times when they have had difficulty hearing or communicating;
- include health history questions that explore current and past occupational noise exposures, leisure exposures, and a thorough review of medications during their assessment;
- ask what the individual's preferred method is for addressing communication challenges, such as using hearing assistive technology, communicating with pen and paper, or the need for medical sign language interpreters; and
- ask follow up questions if hearing problems are disclosed.

Accommodate

In the health care setting, where the environment can be unfamiliar and constantly changing, the nurse must pay close attention and take care to accommodate individual needs.

Accommodating individual needs promotes a safe, caring, and nurturing environment where individuals with hearing loss feel respected and valued.

Regardless of an individual's age or level of impairment, accommodating individuals with hearing loss ensures that basic needs are being met, compensations for losses are being made, and achievement of a meaningful and satisfying health care experience.

Accommodate

Nursing care must be adapted to accommodate the needs of individuals with hearing loss. Some ways in which nurses can provide accommodation are:

- providing ample time for establishing trust and rapport with patients with hearing loss and their families to help patients and loved ones feel more comfortable disclosing hearing challenges;
- accommodating individual communication needs and ensuring communication is clear to facilitate uptake of information;
- ensuring speech reading of the lips remains unobstructed by removing masks, facing the individual and speaking clearly and slowly;
- making changes to the acute care environment such as turning down televisions or alarms and providing better listening environments (e.g., positioning and relocating furniture so that the speaker can be closer to the patient and the patients view of the speaker is unobstructed);
- seeking feedback from the patient and their loved ones to ensure understanding and their needs are being met; and
- documenting patient specific strategies that are used and sharing with the other members of the health care team to foster more consistent behaviour and care by staff.

Educate

Nurses have a responsibility to educate individuals with hearing loss and their loved ones to empower them to improve their health status. The nurse's role in educating patients with hearing loss is to:

- educate patients, families and other staff members on the use of key communication strategies for individuals with hearing loss;
- explain to patients and their loved ones the benefits of using hearing assistive technology during a hospital stay;
- ensure that patients and families are aware of resources and accessibility supports available to them both in the hospital and community setting; and
- ensure that they themselves are knowledgeable about current best practice policies and continuing education in caring for individuals with hearing loss and Deafness.

Empower

Passivity can be common among individuals with hearing loss who choose to accept their situation and feel that it is something they are not able to change. Individuals can withdraw or choose not to take part in conversation or activities in which they feel their hearing loss would be a burden.

Empowerment can be crucial for these patients, who may feel powerless and become passive. It is the nurse's responsibility to empower patients by:

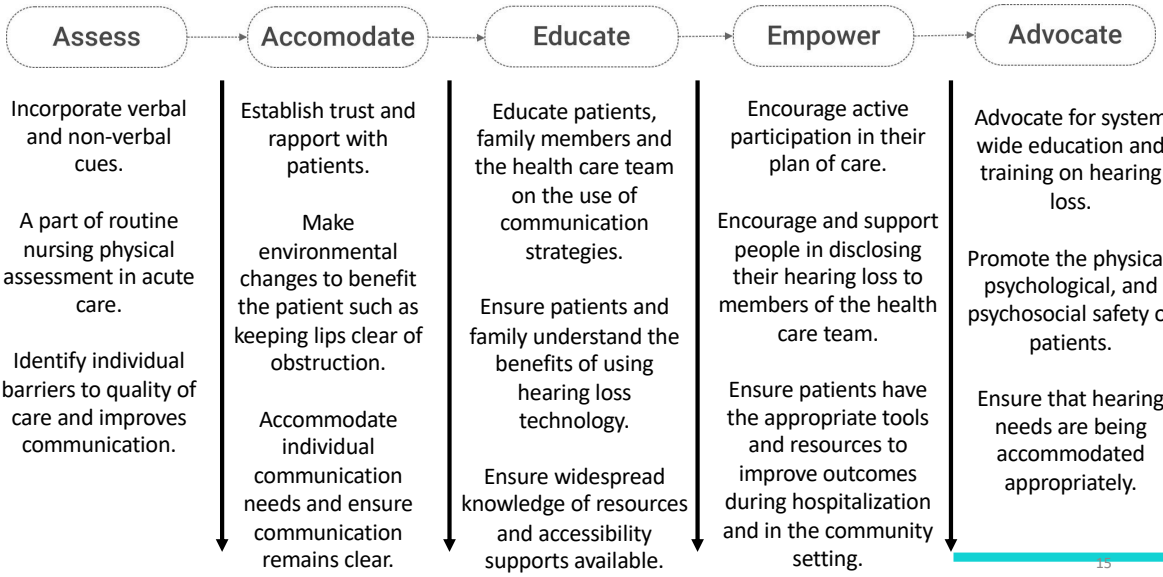
- advocating for system wide education on hearing loss for individuals in acute care;
- encouraging active participation in their plan of care and providing the necessary information for informed decision making;
- encouraging patients to inform their health care providers and all members of the health care team that they have hearing difficulties; and
- ensuring that patients have the appropriate tools and resources to improve outcomes during hospitalization and discharge.

Advocate

Nurses can advocate for patients with hearing loss and their loved ones by:

- advocating for system wide education on hearing loss for individuals in acute care;
- leading initiatives in evaluating and improving system-wide processes for identifying and accommodating the needs of patients with hearing impairments;
- advocating for patients by promoting their physical, psychological, and psychosocial safety; and
- ensuring that hearing needs are being accommodated while periodically reassessing the plan of care and its outcomes.

Summary



Test your Knowledge

Which is not an example of a non-verbal cue when assessing for hearing loss?

A) Cupping of the ear.
B) Turning up the volume of the television.
C) Not replying when you call out to them.
D) Asking the patient directly if they have hearing loss.

Test your Knowledge

Which is not an example of a non-verbal cue when assessing for hearing loss?

A) Cupping of the ear.
B) Turning up the volume of the television.
C) Not replying when you call out to them.
D) Asking the patient directly if they have hearing loss.

D) Answers A-C are all examples of non-verbal cues. Nurses can detect potential hearing loss from observed behaviour. Asking the patient directly if they have hearing loss is a verbal cue.

Test your Knowledge

True or False?

A hearing loss assessment helps nurses to be more aware of patient needs and improves overall patient and hospital experiences.

Test your Knowledge

True or False?

A hearing loss assessment helps nurses to be more aware of patient needs and improves overall patient and hospital experiences.

True! **A hearing loss assessment can be completed during routine physical assessments and can help the nurse to provide comprehensive and inclusive nursing care by accommodating communication needs.**

Test your Knowledge

Drag and drop the nursing strategy to its description.

A. Assessment

B. Accommodate

C. Educate

D. Empower

E. Advocate

_____ explaining to patients and their loved ones the benefits of using hearing assistive technology during a hospital stay.

_____ encouraging patients to inform their health care providers and all members of the healthcare team that they have hearing difficulty.

_____ can promote early detection, adequate treatment and improved quality of life.

_____ ensuring speech reading of the lips remains unobstructed by removing masks for example.

_____ leading initiatives in evaluating and improving system wide processes for the care of inidividuals with hearing loss.

Test your Knowledge

Drag and drop the nursing strategy to its description.

C. Educate	explaining to patients and their loved ones the benefits of using hearing assistive technology during a hospital stay.
D. Empower	encouraging patients to inform their health care providers and all members of the healthcare team that they have hearing difficulty.
A. Assessment	can promote early detection, adequate treatment and improved quality of life.
B. Accomodate	ensuring speech reading of the lips remains unobstructed by removing masks for example.
E. Advocate	leading initiatives in evaluating and improving system wide processes for the care of individuals with hearing loss.

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Module 4

Communication Strategies

1

Learning Objectives

By the end of this module, you should be able to:

- Define communication and explain how it is vital to nursing patients living with hearing loss and Deafness;
- Recognize the communication difficulties patients with hearing loss can face;
- List the three factors of the communication triangle and identify key communication strategies within each factor;
- Describe common communication apps utilized by individuals with hearing loss and understand how to access these tools;
- Implement nursing care for Deaf patients who use sign language and facilitate collaboration with a sign language interpreter; and
- Identify methods for the documentation of hearing loss and collaboration with the interdisciplinary team.

2

Communication: What is it?

Communication encompasses all means by which people exchange messages with each other.

Communication is vital to a person's everyday existence.

It is the means to make an individual's wants and needs known to others.

Communication can be verbal, non-verbal or symbolic.

Communication in Nursing

- Effective communication is regarded as an integral and essential part of nursing.
- Nurses are expected to effectively and appropriately communicate with patients and their families.
- Nurses are expected to competently voice the concerns of patients and families to other members of the health care team.
- Effective communication is a prerequisite to sensitive and individualized care.
- Nurses are in a unique position to be able to determine if a patient has a hearing loss through the use of hearing assessments during direct care or conversation.
- Therefore, it is important that nurses are quickly able to determine the presence of a hearing loss and ensure that measures are being taken to maximize a person's ability to communicate.

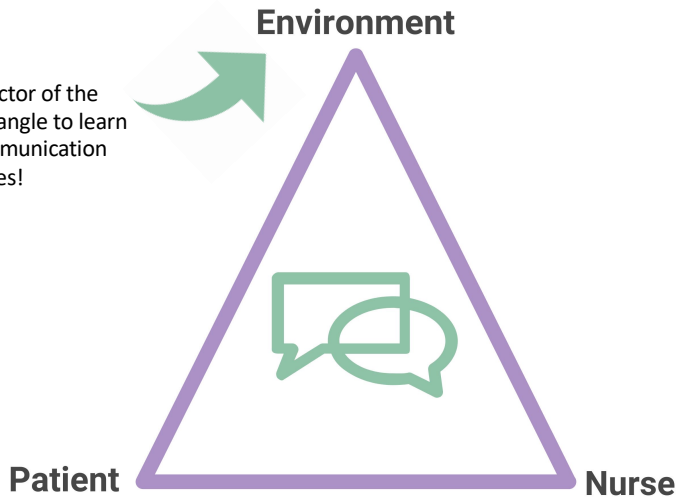
Understanding Hearing Loss

Click the link below to visit a Hearing Loss Simulator and to find out the communication experiences of individuals with hearing loss.

Hearing Loss Simulator

Nurses can utilize the communication triangle that highlights three important factors to be considered when trying to improve communication. They are: characteristics of the environment, the patient and the nurse.

Click on each factor of the communication triangle to learn more about communication strategies!



Adapted from (Canadian Hard of Hearing Association – Newfoundland and Labrador, n.d)

Communication Strategies: Environment

- Ensure patients are seated with their back to the light source; ideally the light should fall on the nurses's face.
- Place individualized notice boards or information sheets in patients' rooms to inform the health care team of a hearing loss.
- If required, keep a picture chart or reading board at the bedside to assist with communication.

- Ensure the room is well lit, curtains are drawn, and door closed if possible to reduce background noise and improve acoustics.
- Position yourself 1-2 metres away from the patient to enable comfortable lip reading.
- Try to minimize background noise by turning the television or radio volume down or off, turning off call bells or moving to a quieter area.

Communication Strategies: Nurse

- Speak clearly, not loudly, in short and simple sentences. The rate of speech needs to be slow but words should not be exaggerated.
- Offer the opportunity for patients to ask questions and ensure correct understanding of the information.
- Attract the attention of patients before speaking to them such as waving or a gentle touch to their arm or leg.
- Face patient, make eye contact, and repeat your speech if patient does not understand what is being said.
- Avoid assuming what patients may require and ask them directly about their communication needs and preferences.
- Be patient and use non-verbal communication such as gestures/body language, facial expressions or visual aids.
- Support and encourage patients to take advantage of hearing amplification if available.
- Ask patients to repeat or "speak back" instructions or conversation to confirm understanding. Additionally, nurses should determine if patients have any questions about the presented information.

Communication Strategies: Patient

Patients who have hearing loss or who are Deaf are at high risk of breakdowns in health care communication. Some ways in which nurses can support patients are:

- being empathetic to communication challenges and try to understand communication for the individual's perspective;
- encouraging patients to self identify hearing loss and let others know they have hearing difficulty and what they need in order to understand communication;
- encouraging plenty of rest and listening breaks to minimize listening fatigue and misunderstanding;
- encouraging the use of hearing devices and hearing assistive technology; and
- promoting a safe, inclusive, and accessible communication environment for all.

Communication Tools

Click on the icon above to learn more about the different apps available!

There are multiple communication tools used by people who are Deaf or who have hearing loss.

The advancement of technology has opened further options for communication for individuals living with hearing loss.

There are many types of apps which aim to help those with hearing loss.

Some app cans transcribe or caption anything from conversations to phone calls.

The apps can range from free to low cost, can be used for varying degrees of hearing loss and can be used with Apple or Android products.

Communication Tools: Apps for Hearing Loss

Click the icons below to learn more about each!

Captioning Apps

Sound Amplification Apps

Communication Tools: Captioning Apps

App	Type	Key Feature	Devices
Ava	Speech to text	Transcribes communication using artificial intelligence. Available for free.	Android/Apple
Live Transcribe	Speech to text	Can transcribe over 70 languages using speech recognition technology.	Android
Hearing Helper	Speech to text	Provides real-time captioning.	Apple
eyeHear	Caption	Uses voice recognition to provide free of charge captioning service.	Apple
Live Caption	Caption	Subscription based. Can caption conversations in multiple languages.	Apple

Communication Tools: Captioning Apps

Click the link below to watch a video demonstrating how speech to text apps work!

https://www.youtube.com/watch?v=PNoSWNUz1Z0

Communication Tools: Sound Amplification Apps

App	Type	Key Feature	Devices
Hear-Advanced Listening	Sound filtration	Filters environmental sounds to drown out background noise and harsh sounds.	Apple
Mobile Ears	Speech amplification	Uses free speech amplification technology.	Apple/Android
USound	Speech amplification	Adopts sounds through in-app hearing test which estimates the values that compose your hearing.	Apple/Android
Sound Amplifier	Speech amplification	Can boost and reduce sounds around you and can personalize listening experiences for free.	Android

Communication Tools: Sound Amplification Apps

Click the link below to watch a video demonstrating how sound amplification apps work!

https://www.youtube.com/watch?v=YnKt6w34l40

- **What is sign language?**

It is a complete, natural language that has the same linguistic properties as spoken language but has grammar that differs from English.

- **How does it work?**

Sign language is expressed by movements of the hands and face.

- **Who uses it?**

It is the primary language of many North Americans who are Deaf or have hearing loss, and sign language is used by many hearing people as well.

- **Did you know?**

There is no universal sign language. Different sign languages are used in different countries or regions. In Canada, there are two legitimate sign languages: American Sign Language (ASL) and la Langue des Signes Quebecoise (LSQ).

Sign Language

Sign language is based on visual cues through the hands, eyes, face, mouth or through the body.

The gestures or symbols in sign language are organized in a linguistic manner.

It also uses timing, touch, and anything that communicates thoughts or ideas without the use of words.

Sign language has its own sentence structure, syntax, and vocabulary.

A big misconception about sign language is that it is a nonverbal form of a spoken language.

It cannot be assumed that Deaf individuals can automatically understand and read written language such as English because it is a different language.

Sign Language: A Few Things to Know About American Sign Language

Click the link below to watch a video where Deaf people share what they feel are some important things to know about sign language and the Deaf culture.

https://www.youtube.com/watch?v=wa0nxppMJ-Q

Nursing Care for Deaf Patients

- Ask the patient how best to communicate with them. Accommodate the patient's communication request as best you can.
- Make sure the setting is evenly lit. If there is a bright light source, have the patient sit so that they are not looking into a brightly lit background.
- Establish eye contact with the patient. Keep your hands away from your face, and especially your mouth. Use gestures to show the patient where to sit or what to do.
- Face the patient directly for the greeting and conversation. Speak normally and clearly, but do not exaggerate lip movements.
- Use graphics, pictures, and hand gestures to enrich the patient's understanding of the conversation such as a chart of commonly used ASL words/phrases and using yes or no questions.
- Intermittently check to make sure you and the patient understand each other. Ask the patient to repeat the information to be sure it has been transmitted correctly.
- To acquire the attention of a Deaf patient, gently wave your hand, tap on a table or hard surface where the patient is sitting to create vibrations, lightly place hand on patient's shoulder or arm, or turn lights on and off in a room.

Sign Language Interpreters

For patients who are Deaf, a sign language interpreter may be required. Deaf patients have a right to accessible sign language interpreting services because:

- using family members or friends as interpreters can violate patient confidentiality and privacy;
- if a patient does not fully understand what their health care plan is they cannot give informed consent;
- the patient has the right to make health care decisions and be autonomous; and
- requiring a Deaf person who may not understand or be literate in the English language to communicate in writing or to lip read English is ineffective and may cause the patient distress.

What exactly is a sign language interpreter?

Click on the icon above to learn more!

What is a sign language interpreter?

A professional whose job is to convey the messages of individuals who live with hearing loss or who are Deaf and who do not share the same language, culture , or mode of communication. Interpreters allow equal access to information and interactions for people who use sign language to communicate.

Can anyone who signs be an interpreter?

No. A sign language interpreter is a trained, credited professional and has developed the skills and expertise needed to mediate meanings across languages and cultures. A certified interpreter has passed a standardized test, received certification, is bound by a strict code of professional conduct, and is typically registered.

What is the role of the interpreter?

It is not the interpreter's role to advise, edit, advocate, teach, or participate while in the interpreting situation. The interpreter must transmit the spirit and content of any speaker or signer within any communication interaction.

When collaborating with sign language interpreters, the following tips can help the nurse to ensure there are no communication barriers for patients requiring interpreting services.

- Do not use family members or friends to translate.
- Ask the patient ahead of time what type of language they prefer the interpreter to use and if they prefer a male or female interpreter.
- If required, contact a reputable interpreting agency within your healthcare organization and inquire whether they have a nationally certified interpreter who is trained to interpret in the medical field.
- Ensure that an interpreter is available to the patient whenever required and in advance of any important meetings or conversation.
- When in conversation with the patient, talk directly to the patient, not the interpreter, and maintain eye contact.
- Position the interpreter to the side and slightly behind the speaker for the best eye contact between the patient and the interpreter. Respect the patient's privacy by having the interpreter stand a discreet distance if the patient is having an intimate examination or procedure.
- Avoid direct comments to the interpreter. Speak at your normal pace. Interpreters will ask you to slow down or repeat if necessary.
- Interpreters cannot give clinical opinions, but they can tell the nurse or medical professional if the patient's signing is intelligible.
- Ask the patient whether the interpreter was satisfactory and whether the patient would like the same one in the future.

Communication: Interdisciplinary Team

The patient's health care record is a communication tool for documenting progress, treatments, interventions, and patient responses to care.

The health care record is an important source of information and a major means of communication between members of the team.

It is important to ensure that all individuals involved in a patient's circle of care is aware if a patient has hearing loss or Deafness to ensure the patient remains safe, respected, and valued.

Communication about a patient's hearing loss between members of the interdisciplinary team ensures congruent and consistent care.

Communication: Documentation

There are numerous different ways in which nurses should document the presence of hearing loss in order to increase nursing awareness and notify other health care providers. Some ways in which hearing loss can be documented are:

- the nursing Kardex;
- the patient's nursing history;
- handover report;
- the electronic health record;
- the patient's chart;
- writing a focus note; and
- placing a sign at the bedside or room door.

Test your Knowledge

True or False?

Effective communication is regarded as an integral and essential part of nursing.

Test your Knowledge

True or False?

Effective communication is regarded as an integral and essential part of nursing.

True!

Test your Knowledge

Which factor is not a part of the communication triangle?

A) Patient
B) Family and Friends
C) Nurse
D) Environment

Test your Knowledge

Which factor is not a part of the communication triangle?

A) Patient
B) Family and Friends
C) Nurse
D) Environment

B) Family and friends are not a part of the communication triangle but they play an important role in understanding a patient's communication needs.

Test your Knowledge

Which of the following is not an effective commmunication strategy?

A. Ensure the room is well lit and any bright lights are behind the patient.

B. Face patient, make eye contact, and repeat your speech if necessary.

C. Assume all patients with any form of hearing loss need instructions written down and speak very loudly.

D. Encourage the use of hearing devices and hearing assistive technology.

E. Ask patients to "speak back" instructions or conversation to confirm understanding.

Test your Knowledge

Which of the following is not an effective commmunication strategy?

A. Ensure the room is well lit and any bright lights are behind the patient.

B. Face patient, make eye contact, and repeat your speech if necessary.

C. Assume all patients with any form of hearing loss need instructions written down and speak very loudly.

D. Encourage the use of hearing devices and hearing assistive technology.

E. Ask patients to "speak back" instructions or conversation to confirm understanding.

C) Assuming all patients with hearing loss need written instructions is not an effective communication strategy because patients with hearing loss use multiple modes of communication such as verbal, non-verbal, written speech, sign language, and lip reading for example. When speaking to patients with hearing loss your speech should be slow, clear, and concise.

Test your Knowledge

Fill in the blank.

A _____ app is a communication tool that aims to make everyday life more accessible for individuals living with hearing loss by transcribing live communication.

Test your Knowledge

Fill in the blank.

A _____ app is a communication tool that aims to make everyday life more accessible for individuals living with hearing loss by transcribing live communication.

Speech to text

Test your Knowledge

Which of the following statements is false?

A) When using an interpreter, face the interpreter and speak directly to the interpreter.

B) Using family members or friends as interpreters can violate patient confidentiality and privacy.

C) Sign language is expressed by movements of the hands and face.

D) Ensure that an interpreter is accessible to the patient whenever required.

Test your Knowledge

Which of the following statements is false?

A) When using an interpreter, face the interpreter and speak directly to the interpreter.

B) Using family members or friends as interpreters can violate patient confidentiality and privacy.

C) Sign language is expressed by movements of the hands and face.

D) Ensure that an interpreter is accessible to the patient whenever required.

A) When working with a sign language interpreter the nurse or health care professional should always maintain eye contact with the patient and speak with the patient directly.

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Module 5

Hearing Loss Resources

1

This module provides a comprehensive list of the available resources acute care nurses can avail of to care for individuals living with hearing loss/Deafness.

2

Hearing Loss Resources

Click on the following icons below to connect with available resources for nurses!

Unit Resource

Eastern Health

Community

Unit Resource

In addition to the online educational modules, there is a physical unit educational resource available to assist nurses in caring for individuals living with hearing loss/Deafness.

Here's what you can find in this resource:

- Pocket talker with operating manual and replacement parts
- Communication triangle infographic including strategies for improved communication
- Hearing loss screening information sheet
- Communication pictogram
- Sign language pictogram
- Sign language interpretation resources and contact information
- Communication apps list
- Hearing Aid/Cochlear Implant storage containers
- Unit resource evaluation sheet

Eastern Health Resources

The Newfoundland Association of the Deaf provides Eastern Health with visual language interpretation, including 24-hour hospital emergency services.

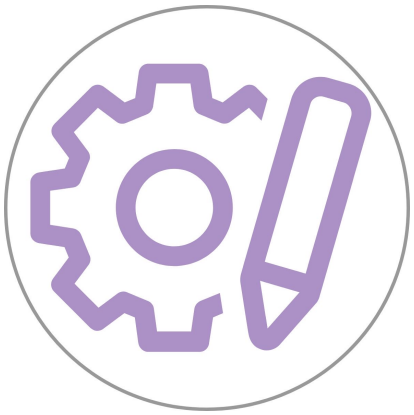
TTY/Voice: (709) 726-6523
Text: (709) 325-5008
Email: interpreting@nlad.org

Audiology Department – Health Sciences

Voice: (709) 777-7943
TTY: (709) 777-7945
Fax: (709) 777-7942

Speech Language Pathology– Health Sciences

Voice: (709) 777-6560



Community Resources

Canadian Hard of Hearing Association – Newfoundland and Labrador

1081 Topsail Road
Mount Pearl, NL
A1N 5G1

Phone: (709) 753-3224
Toll Free: 1-888-753-3224
Text: (709) 725-3224
Fax: (709) 753-5640
Email: info@chha-nl.ca
Website: https://chha-nl.ca

Newfoundland Association of the Deaf

33 Pippy Place, Suite 201
St. John's, NL
A1B 3X2

Phone: (709) 726-6672
Text: (709) 325-5008
Fax: (709) 726-6650
Email: nlad@nlad.org
Website: http://www.nlad.org

Community Resources – Private Clinics

The following are private hearing health clinics within Eastern Health.

NewLife Hearing Health Centre
(709) 800-7343
https://newlifehearing.ca

Maico Hearing Service
(709) 726-4327
https://maicohearingservice.ca/

Sound Island Hearing
(709) 466-5114
https://hearatsoundislandhearing.com/

Red Door Hearing and Speech
(709) 754-4327
https://www.reddoorhearing.com

Newfoundland Hearing Health Centre
(709) 745-5133
https://www.nfldhearing.ca

Beltone Hearing Service
(709) 726-8083
https://www.beltone.com/en-ca

Parrott's Hearing Clinic
(709) 754-4884
https://www.parrottshearing.com/

Quality Care Hearing
(709) 739-0999
https://www.qualitycarehearing.ca

In Conclusion..

- Nurses play a key role in providing comprehensive, patient centered care to individuals with hearing loss/Deafness.

- Through the use of appropriate strategies and resources, nurses can be better equipped to address patient specific needs and improve the health care experiences of this patient population.