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UNIVERSITY OF NORTHERN COLORADO

Greeley, CO

The Graduate School

EXPLORING COMMUNICATION STRATEGIES USED BY SPEECH-LANGUAGE PATHOLOGISTS AND NURSING PROFESSIONALS PRIOR TO AND DURING THE CORONAVIRUS DISEASE 2019 PANDEMIC

A Thesis Submitted in Partial Fulfillment of the
Requirements for the Degree of
Master of Arts

Madeline Baretta

College of Health and Natural Sciences
Speech-Language and Audiology Sciences
Speech-Language Pathology

August 2021

This Thesis by: Madeline Baretta

Entitled: *Exploring Communication Strategies Used by Speech-Language Pathologists and Nursing Professionals Prior to and During the Coronavirus Disease 2019 Pandemic*

has been approved as meeting the requirement for the Degree of Master of Arts in College of Natural and Health Sciences, Department of Speech-Language Pathology and Audiology Sciences, Program of Speech-Language Pathology

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ABSTRACT

Baretta, Madeline. *Exploring Communication Strategies Used by Speech-Language Pathologists and Nursing Professionals Prior to and During the Coronavirus Disease 2019 Pandemic.* Unpublished Master of arts thesis. University of Northern Colorado, 2021.

In 2019, a novel virus was discovered and spread resulting in a global pandemic. Individuals with severe cases of coronavirus disease 2019 (COVID-19) experienced critical illnesses such as pneumonia, hypoxemic respiratory failure/acute respiratory distress syndrome (ARDS), and complications from prolonged hospitalization (Centers for Disease Control and Prevention [CDC], 2020e). Some individuals with severe cases required mechanical ventilation in the acute care setting (Bernstein, 2020).

Due to the rapidly evolving nature of the pandemic, this study was developed to better understand the practices of speech-language pathologists (SLPs), nursing professionals, and healthcare organizations prior to and during the COVID-19 pandemic with particular focus surrounding interprofessional collaboration and communication studies for mechanically ventilated, recently extubated, and/or patients with tracheostomies (MVRET). A 38-question SLP survey and a 40-question nursing professional survey were created. There were 15 nursing professionals and 30 SLPs that indicated that they were practicing in a setting that was seeing COVID-19 positive patients and these individuals were asked to continue with the survey.

The findings from these surveys suggest that there have been minimal changes in the types of communication strategies used and in the frequency of collaboration. However, both SLPs and nursing professionals indicate that they want better access to communication strategies

and/or better access to training and education on communication strategies to support individuals who are MVRET. Further research is warranted to facilitate advocacy at the personal and educational level so that a hospital-wide/organizational shift may occur for healthcare workers to best serve their patients.

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Lastly, I would like to dedicate this work to our healthcare heroes that persevered throughout the COVID-19 pandemic; your endless, hard work does not go unnoticed. Thank you

to the nursing professionals and speech-language pathologist healthcare workers that participated in my survey. Without you, this research project would not be possible.

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INTRODUCTION

Introduction

The novel coronavirus was discovered in 2019 and impacted everyday life in tremendous ways (Centers for Disease Control and Prevention [CDC], n.d.). The first confirmed case of coronavirus disease 2019 (COVID-19) in the United States was reported on January 22, 2020 (Johns Hopkins University, 2020a). It was also around this time that it was confirmed that the virus could be spread via human transmission (American Journal of Managed Care [AJMC], 2020). The World Health Organization (WHO, 2020a) declared a public health emergency on January 31, 2020, with a global death toll of over 200 and more than 9800 confirmed cases. The President of the United States declared a public health emergency on February 3, 2020. On February 10, 2020, the death toll in China surpassed the death toll of the severe acute respiratory syndrome (SARS) outbreak that occurred in around 2002-2003 (CDC, n.d.; WHO, 2020a). On March 11, 2020, the WHO declared COVID-19 a pandemic and just two days later, the President of the United States declared COVID-19 a national emergency (WHO, 2020a). At that time, 2,200 cases had been reported in the United States and a travel ban on non-United States citizens traveling from Europe was implemented (Johns Hopkins University, 2020a; WHO, 2020a). Approximately one week later, on March 19, 2020, 13,700 cases in the United States had been reported and at that time, California became the first state to issue a statewide mandated stay-at-home order (AJMC, 2020; Johns Hopkins University, 2020a). Then a couple weeks later, on

April 2, 2020, the WHO reported that COVID-19 may be transmitted from symptomatic, pre-symptomatic, and asymptomatic individuals infected with COVID-19. Two days after, on April 4, 2020, it was reported that over 1 million cases of COVID-19 had been confirmed worldwide, which was more than a tenfold increase in under a month and 313,300 of those cases were confirmed in the United States (Johns Hopkins University, 2020a; WHO, 2020a); it was estimated that there were approximately 29,700 hospitalizations due to COVID-19 (CDC, 2020f; Johns Hopkins University, 2020a). By May 28, 2020, the United State's death toll surpassed 100,000 deaths (AJMC, 2020). From May 2020 to October 2020, cases and deaths continued to rise in the United States. On October 1, 2020, 7,300,000 confirmed cases and 203,200 deaths were reported (Johns Hopkins University, 2020a, 2020b).

Communication with critically ill patients was drastically impacted during the COVID-19 pandemic. This is partially due to no-visitor policies that may have been implemented in a hospital setting. The CDC (2020b) recommended utilizing telehealth when appropriate to allow for communication between COVID-19 positive patients and their providers while in separate rooms. However, the communication difficulties encountered extended beyond patient-provider relationships as it also had an effect on COVID-19 positive patients and their family and/or friends. In a CNN interview, Maura Lewinger described saying goodbye to her dying husband who was hospitalized with COVID-19. She did this over the telephone (Burnett, 2020). During these unprecedented times, communication strategies had to diverge from typical practices.

Need for Study

At the time of the literature review, the precautions recommended by the CDC posed a challenge for health care workers and communication with patients. Personal protective equipment (PPE) such as masks, goggles, and face shields impeded the typical visual and/or

acoustic signal of nonverbal and verbal messages during communication with others (Beukelman & Mirenda, 2013; Mheidly et al., 2020). The disinfectant recommendations the CDC proposed may have also interfered with the number or amount of augmentative and alternative communication (AAC) devices and strategies available for each individual patient. Further, the rotational scheduling to minimize the amount of contact with COVID-19 positive patients may have challenged the team and/or collaborative approaches previously implemented in a health care setting. This may have impacted the assessment and/or evaluation of most appropriate forms of AAC and training of nursing professionals to utilize different communication strategies. As of June 2021, there were three authorized and recommended vaccines for COVID-19, however, at the time of the literature review (October 2020-November 2020 timeframe), there was not an approved vaccine for the coronavirus (CDC, 2021). Furthermore, a second wave of confirmed cases was surging in the United States and other countries. Due to the accelerated course the coronavirus took over just a few short months, it was necessary to better identify the challenges that speech-language pathologists (SLPs) and nursing professionals experienced during the pandemic, particularly as it related to communication with mechanically ventilated, recently extubated, and tracheostomized patients (MVRET).

Overview of the Study

Due to the rapidly evolving nature of the pandemic, previous research on practices for communication strategies for COVID-19 positive patients in the acute care setting had not been examined. This study investigated that as well as how the practices changed from pre- to during-COVID-19. Furthermore this research investigated the role that interprofessional practice (IPP) had had on the strategies utilized. The purpose was to help guide and inform practicing clinicians

and nursing professionals during the remainder of the COVID-19 pandemic and possibly during future pandemics.

Research Questions

The recommendations from the CDC and WHO fundamentally changed the day-to-day work of SLPs and nursing professionals in acute care settings. It was unclear how these changes impacted what communication strategies were utilized for MVRET patients who were COVID-19-positive during the pandemic. To this end, the following research questions were posed:

Q1 What speech-language pathology and nursing professional characteristics (e.g., years experience, years experience in an acute setting, years employed with current employer) are related to the practices for patients pre- and during-COVID-19?

Q2 What workplace and practice characteristics (e.g., setting, number of SLPs employed by facility, type of unit, beds in hospital, patients on caseload, collaborative practices, counseling, types of communication strategies) are related to the practices for patients pre- and during-COVID-19?

Q3 What variables (e.g., demographics, training, collaboration practices, adverse events) are related to nursing professionals' thoughts, feelings, and beliefs about effective communication for patients?

Definition of Terms

This study contains definitions that require explanation to further understand the research. The following definitions apply to the study:

Adverse Event is described by Kohn et al. (2000) as "the failure of a planned action to be completed as intended or the use of a wrong plan to achieve an aim" (p. 1).

Aerosol Generating Procedure is a procedure that may produce small, physically-light particles that can remain in the air for prolonged periods of times and may be infectious (CDC, n.d.; Zaga et al., 2020).

Artificial Airway is a device that assists in ventilation and secretion management and may be utilized to access mechanical ventilation (American Speech-Language-Hearing Association [ASHA], n.d.-d).

Complex Communication Needs describes individuals with significant and complex communication disorders characterized by impairments in speech-language production and/or comprehension of speech-language that may involve spoken and/or written modes of communication (ASHA, n.d.-d).

Endotracheal tube (ET) is a tube inserted in the trachea via the oral cavity to establish and/or maintain the airway and ventilation. This is also referred to as intubation (ASHA, n.d.-d)

Interprofessional Education involves two or more health professionals learning about, from, and with each other to facilitate successful collaboration and enhance the outcomes and quality of care (Johnson, 2016).

Interprofessional Practice occurs when two or more professionals successfully collaborate to enhance outcomes and the quality of care for their clients and/or patients (Johnson, 2016).

Mechanical Ventilation involves the use of a machine to assist or replace the spontaneous breathing process (ASHA, n.d.-d).

Multidisciplinary Teamwork involves multiple disciplines typically working individually in parallel or sequentially to address the needs of a client or patient (Johnson, 2016)

Tracheostomy Tube is the tube that may placed in the tracheostoma to help maintain an airway (ASHA, n.d.-d).

Tracheotomy is a surgically created stoma in the trachea and placement of a tube that acts as an alternative route for respiration (ASHA, n.d.-d).

Summary

The COVID-19 pandemic quickly progressed and while research existed regarding the practices of nursing professionals and SLPs prior to the COVID-19 pandemic, this study investigated the communication strategies utilized for MVRET patients who were COVID-19-positive during the pandemic and sought to better understand if and how IPP was utilized during the pandemic.

CHAPTER II

LITERATURE REVIEW

Background of Coronavirus Disease-19

In December 2019, a new virus was discovered in Wuhan, China (Centers for Disease Control and Prevention [CDC], 2020d). On February 11, 2020, the World Health Organization (WHO; n.d.) announced the name of the virus, COVID-19. There are many coronaviruses found in humans, however, this was a novel disease (CDC, 2020d).

Spread and Symptomology of Coronavirus Disease-19

It was reported that coronavirus disease 2019 (COVID-19) may be transmitted between individuals through respiratory droplets (CDC, 2020c). Reported symptoms include: fever or chills, cough, shortness of breath, difficulty breathing, fatigue, headache, nasal congestion or running nose, muscle or body aches, sore throat, new loss of smell or taste, nausea or vomiting, and diarrhea (WHO, n.d.). The estimated incubation period of the virus is 2-14 days, however, some individuals may be infected but not present symptoms (CDC, 2020e).

Most individuals infected with COVID-19 experience mild symptoms and spontaneously recover, however, some individuals develop more significant consequences. More significant consequences can include, but are not limited to: pneumonia, respiratory failure, septic shock, multiple organ dysfunction or failure, and in the most severe cases, death (CDC, 2020c).

Risk Factors Associated with Coronavirus Disease-19

Information regarding risk factors for critical illness due to COVID-19 was limited given the novel nature of the disease, however, it was reported that risk increases as individuals age. As of the beginning of October 2020, there were a total of 198,809 COVID-19 deaths in the United States This number escalated to 586,659 deaths by the beginning of June 2021. It was reported that individuals who were 65 years of age and older accounted for 79.7% of total deaths in the United States to date (CDC, 2020a). Furthermore, individuals with underlying medical conditions such as heart disease, lung disease, cancer and/or diabetes may increase the risk of developing a more severe case of COVID-19 (CDC, 2020c; WHO, n.d.).

Severe Implications of Coronavirus Disease-19

Some individuals with severe implications of COVID-19 may require hospitalization. Some of the most common severe complications of COVID-19 included (but were not limited to): pneumonia, hypoxemic respiratory failure/acute respiratory distress syndrome (ARDS), sepsis and septic shock, cardiomyopathy and arrhythmia, acute kidney injury, and complications from prolonged hospitalization (CDC, 2020c). Complications such as acute hypoxemic respiratory failure or ARDS require oxygen and ventilation therapies, and at times intubation and ventilation (Meng et al., 2020). ARDS is a medical condition that is characterized by significant and acute lung injury leading to respiratory failure, often times within 48 hours of the insult. ARDS patients often have impaired gas exchange, may be hypoxemic, and utilize a mechanical ventilator (Johnson & Jacobson, 2017). Bernstein (2020) noted that approximately 20% of COVID-19 positive individuals required hospitalization and approximately 5% of that sample required intensive care unit treatment, such as mechanical ventilation.

Coronavirus Disease-19 Recommendations

The CDC and WHO recommended several strategies to prevent the spread of COVID-19. Healthcare facilities may designate specific healthcare workers to care for COVID-19 patients to limit the amount of contact among individuals (CDC, 2020c; WHO, 2020b) Namasivayam-Macdonald and Riquelme (2020) suggested that a facility organize their staff into teams that manage COVID-19 positive patients versus those who are noninfectious to minimize or prevent disease spread amongst teams. The CDC (2020c) recommended restricting the number of visitors into healthcare facilities and the use of personal protective equipment (PPE). A face covering and physical distancing of at least two meters apart from other individuals was also recommended (CDC, 2020; WHO, n.d.).

Namasivayam-Macdonald & Riquelme (2020) reported that airborne precautions should be applied when executing aerosol generating procedures (AGPs). Some AGPs that speech-language pathologists (SLPs) may be involved with include management of patients with laryngectomies, management of patients with tracheostomies, management of patients utilizing noninvasive bilevel positive airway pressure (BiPaP) and continuous positive airway pressure (CPaP) and positive pressure ventilation, management of patients using high-flow oxygen, management of patients with nasogastric tubes, and endoscopic evaluations of voice and swallowing (Namasivayam-Macdonald & Riquelme, 2020). In addition to airborne precautions being taken, SLPs should advocate for adequate PPE. However, the WHO released a statement in March 2020 noting there was a shortage of PPE due to the increased demand and misuse possibly impacting health care professionals' practices, especially for COVID-19 positive patients. Zaga et al. (2020) further explained that communication interventions that are considered AGPs with COVID-19 positive patients or suspected COVID-19 positive patients

should be minimized. These would include interventions such as one-way speaking valves in-line with a ventilator, ventilator adjusted leak speech, and above cuff vocalization with a cuff inflated. Furthermore, with the recommendations to minimize contact with COVID-19 positive patients, SLPs may not have provided patients with face-to-face care.

Roles of Speech-Language Pathologists in an Acute Care Setting

Speech-language pathologists have an overarching goal of optimizing individuals' abilities to communicate and swallow resulting in an improved quality of life (American Speech-Language-Hearing Association [ASHA], 2016). The American Speech-Language-Hearing Association (n.d.-b) stated that an SLP working in an acute care setting provides evaluation and treatment of swallowing disorders as well as speech and language impairments as a result of a stroke, head injury, respiratory issue, and/or other medical complications. In the National Outcomes Measurement System (NOMS) report with data collected from 2012-2016, ASHA found that respiratory diseases were in the top five primary medical diagnoses of acute care patients (ASHA, 2019.). Hurtig et al. (2018) noted that due to an SLP's scope of practice, they are, "Best positioned to advocate for all hospitalized patients with complex communication needs" (p. 107). In the initial days of a patient's stay in an intensive care unit, individuals may be ventilated with oral intubation utilizing an endotracheal tube. It is possible that patients may also necessitate a tracheotomy to aid in respiration (Johnson & Jacobson, 2017). Johnson and Jacobson (2017) noted that successful communication for a patient involves an in-depth understanding of the patient's condition, a background of voicing options with tracheostomy tubes and speaking valves, patience, counseling, and a team focused approach.

Interprofessional Relationships

The American Speech-Language-Hearing Association (2016) noted that speech-language pathology is a dynamic occupation and, therefore, there are overlapping scopes of practice in health care, education, and other practice settings. To distinguish SLPs' role in health care and educational settings, ASHA (n.d.-c) has adopted the WHOs definition of interprofessional practice (IPP), also referred to as interprofessional collaborative practice or interprofessionalism.

Interprofessionalism Defined

Johnson (2016) explained that IPE "occurs when two or more professions learn about, from, and with each other to enable effective collaboration and improve outcomes for individuals and families whom we serve" (p. 2). When IPE occurs, individuals are engaging in IPP. In IPP, a service provider, for example an SLP, transcends simply being aware of the contributions of other service providers by valuing and being invested in these inputs. It is important to distinguish an interprofessional collaborative practice approach from other approaches, such as cross-training and multidisciplinary approaches. Cross-training often encompasses skills or training in a context outside of the one in which it will be used or simply training to perform job functions of other professions (Johnson, 2016). Multidisciplinary teamwork occurs when professionals work independently to address a patient's needs (Johnson, 2016). However, interprofessionalism emphasizes the simultaneous care of a patient by team members, appreciates the role that each professional plays in the care of a patient while focusing on learning about, from, and with each other to facilitate collaboration. Furthermore, it involves numerous service providers with diverse qualifications providing "comprehensive healthcare or educational services by working with individuals and their families, caregivers, and

communicates to deliver the highest quality of care across settings" (ASHA, n.d.-c, Interprofessional Education/Interprofessional Practice, para. 1).

Interprofessionalism in Hospital Settings

Though SLPs utilize IPP across practice settings, for the purpose of this study, SLPs use of IPP in the hospital setting is of particular interest. SLPs may collaborate with a variety of professionals in the hospital setting. These interprofessional relationships may include physicians, nurses, other rehabilitation providers, dieticians, social workers, and case managers (ASHA, n.d.-b). Often, an SLP works in collaboration with an interprofessional team that manages patients with tracheostomies, both with and without ventilator dependence (ASHA, n.d.-d). The SLP's role on this team is to evaluate a patient's ability to utilize a speaking valve and/or provide recommendations for augmentative and alternative communication (AAC) strategies (de Mestral et al., 2011). SLPs may also educate their team on communication partner strategies to use with a patient (Zaga et al., 2019). Hurtig et al. (2019) noted that nurses are often a patient's primary communication partner, thus it is imperative that nurses and medical directors support communication strategies. The American Speech-Language-Hearing Association (2016) stated that part of an SLP's responsibility within the domain of collaboration is to educate stakeholders regarding the IPE and IPP principles and:

- partner with other professions/organizations to enhance the value of speech-language pathology services;
- share responsibilities to achieve functional outcomes;
- consult with other professionals to meet the needs of individuals with communication and swallowing disorders; and

- serve as case managers, service delivery coordinators, members of collaborative and patient care conference teams. (p. 9)

In an interprofessional relationship, all members of the patient's team are involved in the care of the patient, and therefore all professionals are responsible for developing skills for communicating with patients who have communication difficulties (Johnson, 2016).

Mechanical Ventilation, Tracheostomies, and Communication Strategies

Hurtig et al. (2018) explained that it is a basic human right to be able to express a need and/or want, to participate with friends, families, and caregivers, and to partake in decision-making processes. Furthermore, it is a critical right during a time of medical crisis and an essential component of quality of care and patient safety (Beukelman & Mirenda, 2013; Hurtig et al., 2018). Theresa Rogers, MA, CCC-SLP, the 2020 President of the American Speech-Language and Hearing Association, explained that "It is essential that everyone have the ability to communicate at all times--and be provided an alternative method of communication if they cannot use speech." She also stated that, "Not only do people deserve to have their basic needs met, such as to communicate that they are in pain or request that a loved one is called but patients may be more likely to have a serious adverse medical event if they cannot communicate with their health care providers" (ASHA, n.d.-e). More recently, Zaga et al. (2020) noted that SLPs have a crucial role in educating other health care providers who are providing face-to-face care to COVID-19 positive patients. This may involve the use of AAC.

Augmentative and Alternative Communication

There are two broad categories of augmentative and alternative communication (AAC): unaided and aided. Unaided types of AAC do not require an external apparatus. These may also

be considered a “no-tech” form of AAC. This may include gestures, manual signs, facial expressions, vocalizations, verbalizations, and/or body language. Aided forms of AAC can be further categorized into low-tech or light-tech AAC and high-tech AAC. Low or light-tech types of AAC may include pictures, objects, photographs, writing, and communication boards/books. High-tech types of AAC may be comprised of speech-generating devices (SGDs), single-message devices and recordable/digitized devices, and/or AAC software that involves dynamic symbol/language representation and is utilized with a form of technology hardware such as a tablet, computer, or smartphone (ASHA, n.d.-a)

Not only are there different types of AAC, but AAC can also be used within differing situations. For example, individuals with chronic complex communication needs (CCN) may require a way to augment their current communication abilities. In the same way, individuals with a temporary disability or a condition such as intubation may require the implementation of AAC in a critical care facility (ASHA, n.d.-a). Johnson and Jacobson (2017) noted that methods of communication in an intensive care unit (ICU) will initially focus on getting basic needs met. The American Speech-Language-Hearing Association (2016) indicated that part of an SLPs duty within the domain of treatment is to document assessment and trial results for selecting AAC interventions and technology, which may include speech-generating devices (SGD). They also explained that there are a variety of AAC technologies to support individuals who have an impaired ability to communicate regularly by utilizing verbal output. AAC devices help to ensure that an individual may “successfully communicate within their environment and community” (p. 13). Beukelman and Mirenda (2013) noted that an acute medical facility will often not have an AAC consultant due to the complex nature of the setting. Therefore, an AAC team generally involves an SLP, a nurse, and at times a physical and/or occupational therapist. The authors

indicated that a successful AAC program is accommodating of the diverse factors specific to that setting and patient and should be accepted and implemented by both the patient and medical staff. They also noted that the service delivery of AAC cannot interfere with the medical care of the patient, rather, they should be integrated into the treatment plan for the individual.

Garrett et al. (2007) acknowledged several communicative strategies that may be considered in an acute care setting. These strategies include but are not limited to natural communication signals such as gestures to indicate wants/needs. Yes/no signals may also be utilized with thumbs up or down, shake of the head, or eye blinks. Johnson and Jacobson (2017) describe a more sophisticated system of eve movements. This low-tech AAC system utilizes a clear, acrylic board with intentionally placed collections of letters on the four corners. The patient looks at a particular corner and then a communication partner is able ask the patient questions in order to decipher the intended letter.

MacAulay et al. (2002) worked on a multidisciplinary research project with nurses, SLPs, and computer scientists to create a high-tech AAC device, ICU-Talk. This device was specifically created for intubated patients in intensive care settings. ICU-Talk was developed to be user friendly and easy to learn. The interfaces allowed interaction through touch screen, the use of a mouse, or a single switch for switch scanning. The ICU-Talk contained a database of up to 250 phrases, including personalized phrases in addition to phrases specific to the ICU environment. The interfaces had eight topics and numerous phrases. The multidisciplinary team considered visual impairments of patients in the ICU, and therefore utilized a large font, color coded topics, and contrast with the background. To meet the demands of an ICU environment, ICU-Talk was developed to be moved out of the way with ease in case of emergency, waterproof and able to withstand cleaning, and accessible from a variety of positions a patient may be in.

Although the researchers developed ICU-Talk with ease and efficiency in mind, 71% of nurses surveyed found the computer based system too large and felt that it obstructed their view of the patient. In addition, 55% of nurses surveyed regarding the device found that ICU-Talk was difficult to navigate. With 250 available phrases, patients either searched for a phrase that did not exist or did not correctly identify the topic the phrase belonged to. Therefore, initial research suggests that the organizational layout of the device was one of the biggest challenges of utilization, however, the authors reported that this is an ongoing challenge within the realm of AAC.

Even with attempts to create an AAC device that pertains to the ICU patient, individuals in an ICU are acutely ill and disabled, therefore patients in this type of setting may not be able to participate in the extensive assessment procedures involved in AAC evaluation (Beukelman & Mirenda, 2013). Beukelman and Mirenda (2013) also reported several barriers to AAC service delivery. These included a lack of referral for individuals to receive AAC services, staff whom do not want to be burdened with additional work, and SLPs and/or other professionals who are not familiar with AAC in an acute care setting.

Happ et al. (2014) developed an innovative study to better understand AAC in the ICU and the effectiveness of educating nurses on strategies to use with intubated patients. They implemented a three phase clinical trial to investigate the frequency, quality, success, and ease of communication between nurses and ICU patients who were intubated. Phase one served as the control condition and involved care per usual. Low-tech AAC strategies such as a pen and paper or whiteboard and marker were available. SLPs were not consulted during this phase. During the second phase, nurses attended a basic communication skill training specific to intubated ICU patients. This involved AAC strategies and relationship centered care. Nurses also had access to

communication carts that were stocked with low-tech AAC materials, such as alphabet boards, picture boards, felt-tip pens and notebooks. During the third phase, nurses attended additional training sessions to better understand both low-tech and high-tech AAC strategies. This training also involved the creation of a communication plan to provide nurses with appropriate communication strategies specific to their patient's needs. Their research found that the intervention conditions (phases two and three) reported improvement in length of communication and successful message transmission regarding pain and other symptoms. Communication difficulty was eased by SLPs providing individualized assessment and AAC intervention. Overall, an inverse relationship was displayed as positive behaviors increased and negative behaviors decreased for both the intubated ICU patients and the nurses after the nurse training sessions. The authors reported that the percentage of successful communication attempts in regard to patient pain were greater for the two independent variable groups when compared to the control group ($p = 0.03$). They also reported that the AAC and SLP group utilized more AAC methods when compared to the other groups ($p = 0.002$) and they reported less difficulty with communication ($p < 0.01$).

Hurtig et al. (2019) also investigated the impact of AAC strategies through patient and nurse perceptions of the patient's ease of requesting help and effectively communicating their wants/needs. Hurtig et al. (2019) utilized a convenience sample of individuals admitted to a hospital's ICU and step-down units. They looked at patients utilizing Voxello AAC technology, patients who were able to effectively communicate without AAC (full access), and patients who were unable to independently and effectively communicate using the nurse call system (no access). The Voxello AAC technology developed a noddle switch and noddle-chat communication tablet for individuals who were unable to independently access the nurse call

system. It can be mounted on the intravenous pole that is often found next to the bedside in a hospital setting. The noddle utilizes gesture identification technology to control the nurse call system and a speech-generating device. They found that patients who were provided full, independent access to their nurse call system in addition to AAC reported significantly more positive experiences than the no-access group and just the AAC group ($p < 0.0001$). The above studies included patients in the ICU and/or were intubated, however, communication strategies may look different for individuals with tracheostomies.

Tracheostomies

A tracheostomy is an alternative way to transport air from a ventilator to the respiratory system through a surgical opening at the front side of the neck into the trachea. The ventilator attaches to the section on the outside of the surgical incision. As described previously, a patient with a tracheostomy who utilizes a ventilator frequently has limited verbal output due to the air needed to sustain phonation passing through the tube instead of the vocal folds and oral cavity. There are times when an individual may no longer require mechanical ventilation, however a tracheostomy tube may remain in place. This process still limits verbal output, as the air is moving in and out of the tracheostomy tube. However, individuals may utilize an external one-way speaking valve to bypass the tracheostomy tube and force air through the vocal folds and oral cavity to phonate (Beukelman & Mirenda, 2013). Individuals may also establish airflow for voicing with a deflated cuff on a tracheostomy tube (Beukelman & Mirenda, 2013). Johnson and Jacobson (2017) explained that there are several different voicing options for individuals with deflated cuffs or cuffless tracheostomy tubes. The first option involves the utilization of a fenestrated inner cannula for fenestrated tubes. One may also remove a nonfenestrated inner cannula to allow the air to consume the distal end of the outer cannula and up through the

fenestration while the outer cannula is occluded or capped. Another option involves maintaining the inner cannula in place while utilizing digital occlusion to cover the proximal opening of the tracheostomy tube. Finally, a patient may remove the inner cannula in a cuffless or cuff-deflated non-fenestrated tube and occlude or cap the outer cannula for voicing. At times, a tracheostomy may be performed on critically ill patients in the ICU. Early tracheostomy has been shown to decrease the duration of mechanical ventilation (de Mestral et al., 2011).

Mechanical Ventilation

Individuals who require respiratory support may experience interference with their typical communication process and ability to speak. This is frequently true if the individual requires endotracheal intubation or a tracheostomy (Beukelman & Mirenda, 2013). Continuous positive airway pressure (CPAP) and pressure-support ventilation (PSV) may be utilized via intubation or in a close-fitting nasal or full-face mask for a noninvasive avenue to mechanical ventilation. Both mechanical ventilations may be utilized to support a patient's respiration or aid in the weaning of a patient from mechanical ventilation by providing less work of breathing. Mechanical ventilation such as bilevel positive airway pressure (BiPAP) and CPAP may only be utilized for an individual who is capable of spontaneous breathing (Johnson & Jacobson, 2017). An endotracheal tube carries air from a ventilator to the respiratory system and is typically passed through a patient's mouth and into the trachea. Endotracheal intubation, specifically oral intubation, often interferes with the articulators necessary for verbal output and interferes with the vocal folds which are required to phonate and produce speech.

Zaga et al. (2019) conducted a systematic review of the feasibility, utility, and safety of communication interventions for individuals who were mechanically ventilated and in intensive care. While 48 studies met their inclusion criteria, 30 of those were rated as "very low" in terms

of levels of evidence. Despite this, the authors were able to summarize the state of the research in this area. Zaga et al. (2019) looked at communication strategies including: communication boards, electrolarynx, high-technology augmentative and AAC devices, tracheostomy tube with communication-enabling features, one-way valve in line with the ventilator, ventilator-adjusted leak speech, ventilator adjustments and one-way valve, and multiple communication strategies. The authors found that AAC and tracheostomy-related communication interventions such as one-way valves in line with the ventilator, ventilator-adjusted leak speech, and ventilator adjustments combined with one-way valves were deemed feasible, safe, and also demonstrated utility. The authors did not find strong evidence to support communication strategies with individuals who were mechanically ventilated. The authors did discover that low-tech communication boards and high-tech AAC devices proved to have the highest degree of utility, however, they do not always convert to clinical practice. This may be due to mechanically ventilated patients being too ill to participate in the practice or training of a high-tech device and/or may be due to SLP or other medical staff not having the resources required to implement. It is important to note that the authors did not upend any clinically significant adverse events as a result of the reported interventions. Furthermore, patient and staff satisfaction levels were shown to improve given the different communication interventions.

Communication Strategies During Coronavirus Disease-19

Namasivayam-Macdonald and Riquelme (2020) created brief guidelines for the SLP working with COVID-19 positive adults in an acute care setting. Although their initial proposal had limited information due to the novel status of the virus, some important takeaways were observed. The authors suggested single patient, low-tech AAC options that nursing staff can implement efficiently and effectively for COVID-19 positive patients. This was especially

important as Beukelman and Mirenda (2013) noted that the best AAC interventions are strategies that require minimal training, especially on behalf of the listener or patient.

Namasivayam-Macdonald and Riquelme (2020) highlighted several other AAC strategies for COVID-19 positive patients who may be on mechanical ventilation. A call bell or cell phone may be used to help get the attention of a caregiver or medical staff. Low-tech communication systems that can be utilized with pointing or eye blinks may include a white board and marker, alphabet boards, or a translated communication board for individuals whom are utilizing English as a second language. High-tech communication strategies may be utilized in conjunction with the patient's individual phone or tablet. Some options suggested include Grid Player TEXT TALKER, Grid 3 speaking software, or Speech Assistant AAC. For individuals who may be deaf or hard of hearing, a hearing amplifier may be utilized.

Namasivayam-Macdonald and Riquelme (2020) noted that SLPs may be involved in activities that are considered aerosol generating procedures (AGPs), such as management of patients with laryngectomies and/or tracheostomies, management of patients using noninvasive ventilation (i.e., BiPaP, CPaP), and management of patients using positive pressure ventilation. The authors suggested that if a speaking valve is utilized for a COVID-19 positive patient who has a tracheostomy, the tracheostomy should be covered with a surgical mask to prevent the spread of the virus. One of the most important takeaways involves SLPs advocating for proper PPE and following hospital protocols for AGPs. Most importantly, the authors recognized that these guidelines were only preliminary; as more information is learned about the virus and the impact it has on patients and health care workers, these guidelines must be expanded upon.

Implications of Communication Difficulties in an Acute Setting

In a retrospective study looking at acute care facilities in Canada, Bartlett et al. (2008) found that individuals with communication difficulties were significantly more likely to be involved in a preventable adverse event when compared to individuals without communication problems. Approximately half of the preventable adverse events resulted in disability or multiple hospital admissions or readmissions. Zubow and Hurtig (2013) discovered that approximately 14% of conscious, hospitalized individuals above age three were not able to access the nurse call system. They also noted that 33% of conscious, hospitalized individuals who were also ventilated were unable to communicate with caregivers. Rodriguez et al. (2016) found that providing AAC options to hospitalized adults improved satisfaction by decreasing their frustration. Bartlett et al. (2008) emphasized the importance of patient safety with communication strategies for those who have communication difficulties in acute care settings.

Bergbom-Engberg and Haljamäe (1993) explored how ICU nursing staff experience difficulties in communication with critically ill ventilated patients. They found that after a communication breakdown between a critically ill ventilated patient and nurse, 93% of the nurses reported the situation as frustrating. They even reported feelings such as despair, incompetency, and distress. After the communication breakdown, 78% of the nurses reported that patients would give up efforts to communicate. Furthermore 59% of the nurses reported that the communication breakdown made patients angry or irritated. 78% of the surveyed nurses reported that they received questions from patients regarding their medical condition and/or prognosis. 82% of nurses reported that being overloaded with work tasks was the most pertinent factor that would prevent the establishment and maintenance of effective communication between patients and nurses. The authors noted that in order to facilitate effective

communication with ventilated patients in the ICU, it is crucial to consider the nurses personal experiences, both positive and challenging, regarding the communication strategies they've encountered.

Similar to Bergbom-Engberg and Haljamäe's (1993) research, however, in a more recent systematic review, Finke et al. (2008) explored communication between nurses and patients with complex communication needs (CCN). They focused their research on four particular areas: the importance of communication, the barriers to effective communication, the supports that are necessary for effective communication, and recommendations to improve the effectiveness of communication between individuals with CCN and their nurses. While 23 papers were identified within the author's search, only 12 studies met inclusion criteria regarding the perspectives of stakeholders. There were three stakeholders, or participants: communication as perceived by the nurse, communication as perceived by the patient, and communication as perceived by a family member and/or unpaid caregiver of the patient with CCN. Consistent with other research, the authors found that effective patient provider communication directly impacts the quality of care a patient receives. Poor communication may result in longer recovery for a patient, a longer hospital stay, negative emotions/feelings, and possible physical discomfort. The authors found that a major barrier to communication originates from the lack of AAC knowledge and training. Finke et al. (2008) also reported that some facilities may not have the resources needed or there may be a "lack of continuity in nurses assigned to care for the patient" (p. 2110). Furthermore, the authors discovered that some nurses may perceive that it is not their job to facilitate effective communication with additional tools or they do not have the additional time that may be required. The authors found that the supports for effective communication included factors such as enough time, resources, training, level of cognition/psychological status/level of language

impairment of the patient, willingness to collaborate and share information with team members, and the presence/absences of family members or unpaid care providers. The author made several recommendations based on their findings. Their main recommendations included training in AAC, both unaided and aided, and understanding the implications of ineffective communication. Some major implications of ineffective communication may involve the length of recovery and emotional status of the patient, which may result in possible adverse events.

Hurtig et al. (2018) examined several preventable adverse events such as preventable pressure ulcers, ventilator associated pneumonias, falls, and adverse drug events. They reported that approximately $3.4 billion dollars may be saved annually if individuals with complex communication needs are supported with strategies that lead to more positive patient-provider communication and outcomes. The American Speech-Language-Hearing Association (2016) noted that in addition to direct care, SLPs have a responsibility to help "manage populations to improve overall health and education, improve the experience of the individuals served, and in some circumstances reduce the cost of care" (p. 13). Engaging in interprofessional collaboration to improve communication with individuals who have CCNs may meet this need. SLPs can help enhance the experience of care by "analyzing and improving communication environments" as well as assist in reducing "the cost of care by designing and implementing case management strategies that focus on function and by helping individuals reach their goals through a combination of direct intervention, supervision of and collaboration with other service providers, and engagement of the individual and family in self-management strategies" (p. 13).

Downey and Happ (2013) identified that improved patient-provider communication outcomes for individuals with CCNs are a necessity. Downey and Happ (2013) suggested a transdisciplinary approach to bridge the communication barrier by utilizing a SLP. Mitchell

(2005) explained that a transdisciplinary approach involves individuals integrating concepts, theories, and approaches from a variety of disciplines to create a new framework for a shared problem. Downey and Happ (2013) noted that SLPs are in a unique position to do so as they are considered communication specialists. SLPs have the ability to utilize AAC solutions and service delivery models in a similar way that is seen in the schools; first the team caring for individuals with CCNs must be provided with the appropriate tools and then they must be trained to possess the knowledge and skills to implement them. The authors noted that developing training materials should be the first step in addressing the barriers of communication strategies for patients with complex communication needs. Although a transdisciplinary approach may be a starting point to bridge the gap of improved communication strategies, Marshall and Hurtig (2019) suggested an interprofessional approach on a larger scale.

Marshall and Hurtig (2019) explained that meeting the needs of patients with CCNs involves a hospital-wide culture shift to focus on communication and will often involve a wide variety of team members or interprofessional critical collaboration. The authors utilized case studies to further investigate the obstacles that are often present in the care of individuals with CCNs. The hurdles are often those of an institutional barrier. Some factors to overcome include insufficient time, limited resources, training, scheduling, and funding. The authors encouraged those wishing to improve the communicative outcomes through institutional changes that these shifts will not occur overnight. The fundamental goal of implementing a culture of communication is so a patient may participate in their care and making decisions, which is ultimately the right of every individual. With the COVID-19 pandemic, health care professionals such as SLPs and nursing staff have encountered uncharted territories. It was important to

investigate the communication strategies and hospitals' viewpoints on collaboration approaches for individuals with CCN, particularly COVID-19 positive patients in an acute care setting.

CHAPTER III

RESEARCH METHODS

To better understand how the roles and practices of speech-language pathologists (SLPs) and nursing professionals have evolved during the coronavirus disease 2019 (COVID-19) global pandemic in addition to the thoughts, feelings, and beliefs of communication for patients, a survey was developed to investigate the communication strategies utilized by SLPs and nursing staff with COVID-19 positive patients (see Appendix A).

Procedures

Participants

A convenience sample of SLPs and nursing professionals working in the acute care setting was targeted for participation in this study. Participation in the survey was voluntary and individuals were provided informed consent before beginning the survey. Participants in the survey remained anonymous and identifying information was not collected. It was estimated that 50 SLPs and 50 nursing professionals would participate in this research.

Data Collection

A researcher-developed survey was generated in Qualtrics, an electronic survey development, distribution, and management system (see Appendix A). After consenting to participate in the study, the first question asks, “What is your profession?” and provided the choices: SLP, nursing professional, and other. If the participant selected “other,” they were directed to the end of the survey and no additional data were collected. Participants who selected,

"speech-language pathologist" were directed to the 38-question SLP survey, while nursing professionals were directed to the 40-question nursing professional survey.

Upon approval from the University of Northern Colorado's Institutional Review Board (IRB), the author distributed the survey link via email, LinkedIn, and posts in private speech-language pathology Facebook groups, and via the American Speech-Language-Hearing Association (ASHA) Special Interest Groups 12: Augmentative and Alternative Communication, 3: Voice and Upper Airway Disorders, and 2: Neurogenic Communication Disorders. The survey was also distributed to ZO Chapter of Sigma, a nursing honor society. A snowball sampling technique was also utilized, as participants were be encouraged to share the survey link with their acute care colleagues within the nursing and speech-language pathology professions. An initial email and posting with the link for the survey was generated on February 18th, 2021. A reminder email, posting, and link for the survey was generated again 15 days later. The survey remained open for 30 days and closed on March 19th, 2021.

Data Analysis

The surveys consisted of three sections each; demographic information, pre-COVID-19 practice information, during-COVID-19 practice information, and response to COVID-19 information. Data from the 38-question SLP survey and 40-question nursing professional survey were collected and analyzed using SPSS v. 27. The following approach was utilized to answer each of the study research questions provided again here:

Q1 What speech-language pathology and nursing professional characteristics (e.g., years experience, years experience in an acute setting, years employed with current employer) are related to the practices for patients pre- and during-COVID-19?

Q2 What workplace and practice characteristics (e.g., setting, number of SLPs employed by facility, type of unit, beds in hospital, patients on caseload, collaborative practices, counseling, types of communication strategies) are related to the practices for patients pre- and during-COVID-19?

Q3 What variables (e.g., demographics, training, collaboration practices, adverse events) are related to SLP and nursing professionals' thoughts, feelings, and beliefs about effective communication for patients?

Descriptive analysis was used to examine participant characteristics of the sample and provide frequency data for practice patterns pre- and during-COVID-19. To explore relationships of variables to answer Research Questions 1, 2, and 3, the researcher used a Spearman's Rank Order correlation procedure for ordinal and continuous data. A Mann Whitney U Test was also utilized to examine the relationships between two independent groups when the dependent variable was a continuous or ordinal value and the independent variable was categorical (i.e., a yes/no question).

CHAPTER IV

RESULTS

Individuals who met the inclusion criteria for the survey were participants who were either speech-language pathologists (SLPs) or nursing professionals in the United States who practiced at a facility that treated coronavirus disease 2019 (COVID-19) positive patients. A total of 79 participants, 16 nursing professionals and 63 SLPs, voluntarily completed the respective surveys. However, survey participants were not required to answer each question, therefore, the number of participants varied throughout the survey questions.

Nursing Professionals

Nursing Professional Demographics

The first portion of the nursing professional survey focused on demographic characteristics of nursing professionals; 15 of the 16 respondents (93.75%) practiced in a setting that saw COVID-19 positive patients, these participants were asked to continue with the survey. Most of the nursing professionals were employed in an Intensive Care Unit (ICU) setting (57.14%), in particular a pulmonary unit (46.15%) and/or other type of unit (46.15%) such as a "medical", "tele", or "stepdown" unit. The survey indicated that 42.86% of the nursing professional respondents were from Colorado, and 35.71% of the respondents were from North Carolina; 53.85% indicated that their employer was located in a suburban setting and 46.15% noted a city/urban setting. Most of the nursing professional participants indicated between 0-5 years (38.46%) and 6-10 years (30.77%) of experience with the majority of the respondents' experience in an acute care setting between 0-5 years (46.15%). A vast majority of the nursing

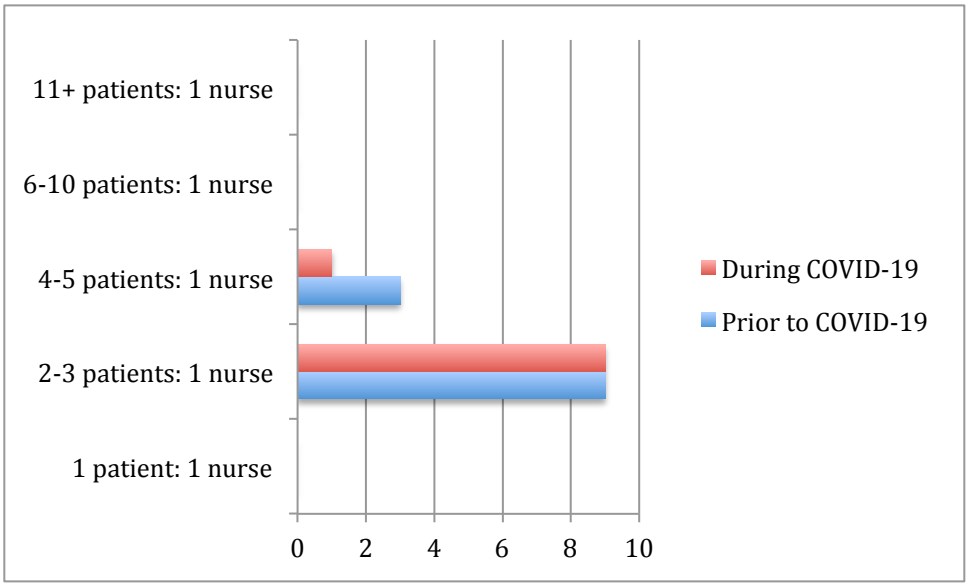
professionals noted that they have been employed with their current employers for 0-5 years (69.23%) and that there were 201 or more beds within their hospital (53.85%). See Appendix C for more detailed information of the nursing professional demographics.

Nursing Professionals Nurse to Patient Ratio

Figure 1 below compares the nurse-to-patient ratio prior to the COVID-19 pandemic to during the COVID-19 pandemic, on average, as reported by nursing professionals. Prior to the COVID-19 pandemic, the majority of nursing professionals indicated their average nurse-to-patient ratio as 2-3 patients per nurse (75%). During the COVID-19 pandemic, the majority percentage increased to 90% indicating their average nurse-to-patient ratio as 2-3 patients per nurse; however, it is important to note that there were 3 more responses for the prior to the COVID-19 pandemic question.

Figure 1

Nurse-to Patient-Ratio

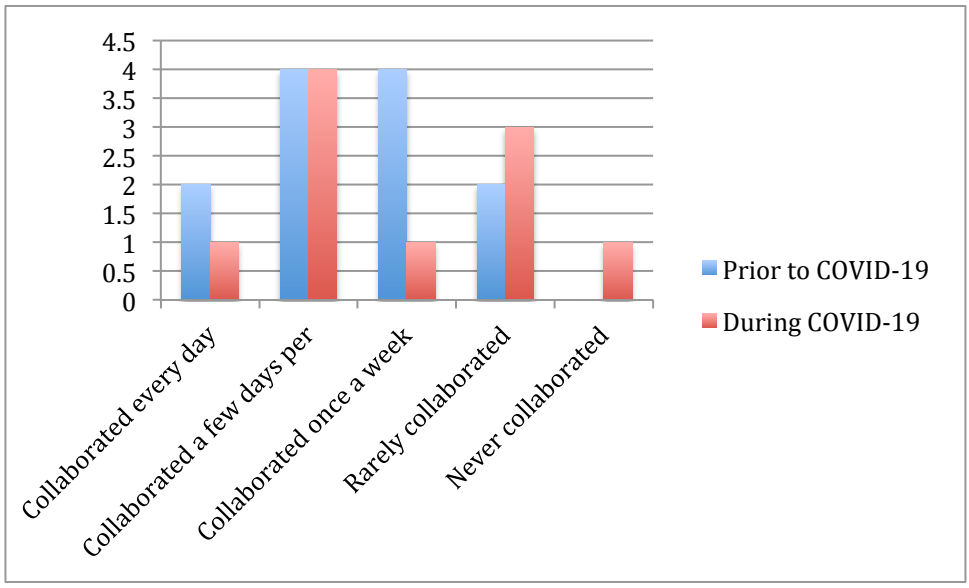


Nursing Professionals Collaboration

Figure 2 demonstrates that prior to the COVID-19 pandemic, all of the respondents indicated collaboration with speech-language pathology with the majority of the collaboration occurring a few days per week (33.33%) to once a week (33.33%).

Figure 2

Nursing Professionals' Frequency of Collaboration



The majority of the collaboration occurred as communication regarding an order (50.00%) and some individuals noted receiving education (27.78%) or training (11.11%) from speech-language pathology. Interestingly, during the COVID-19 pandemic, 10.00% of the respondents indicated that they never collaborate with speech-language pathology and 30.00% noted that they rarely collaborate with speech-language pathology. However, there was still collaboration as reported by nursing professionals that ranged from every day (10.00%), to a few days per week (40.00%), to once per week (10.00%). Furthermore, during the COVID-19 pandemic, nursing professionals reported collaboration characterized by, but not limited to,

asking questions of speech-language pathology (29.63%), conveying information (25.93%), and receiving education from speech-language pathology (22.22%). It should be noted that there was an error in the method of transferring this question to compare prior to the COVID-19 pandemic and during the COVID-19 pandemic; the nursing professionals received a set of questions that were intended for the SLPs for the during the COVID-19 pandemic portion, so there is a lack of data due to participants not receiving the accurate choices for the question set (see Appendix A, NQ12 and NQ22).

Nursing Professionals and Patients

There were no observable differences between the two time points (prior to and during the COVID-19 pandemic) in the types of patients served by nurses. Figure 3 demonstrates that prior to the COVID-19 pandemic, 90.91% of the nursing professional participants indicated that they worked with mechanically ventilated patients, recently extubated patients, and/or patients who had tracheostomies (MVRET); the majority of the respondents noted that they worked with this population every day (63.34%).

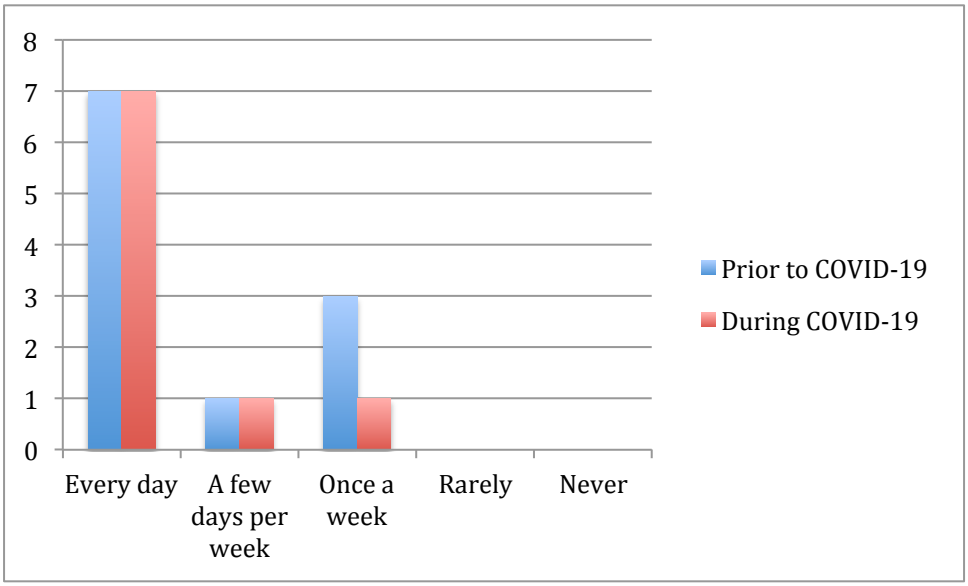
Prior to the COVID-19 pandemic, 54.54% of the nursing professional participants indicated that 61-100% of their caseload consisted of MVRET patients. Prior to the COVID-19 pandemic, the majority of the nursing professional participants did not receive training from a speech-language pathologist regarding communication strategies for MVRET patients (72.73%), however, the 27.27% of the respondents that did all indicated training was delivered in-person, one-on-one. The frequency of this training ranged from every day (33.33%), to once a week (33.33%), to a few times a year (33.33%).

As displayed in Figure 3, during the COVID-19 pandemic, 100% of the nursing professional respondents indicated that they worked with MVRET patients, and/or patients who

had tracheostomies; again, the majority of the respondents noted that they worked with this population every day (77.78%). During the COVID-19 pandemic, 77.77% of the nursing professional participants indicated that 61-100% of their caseload consisted of MVRET patients. During the COVID-19 pandemic, 55.56% of the nursing professionals indicated that they did not receive training from a speech-language pathologist regarding communication strategies for MVRET patients; yet, the 44.44% of nursing professional respondents who indicated that they did receive training, received training characterized by in-person, one-on-one (83.33%) and webinar training (16.67%). The frequency of the training during the COVID-19 pandemic varied more so than prior to the COVID-19 pandemic; during the COVID-19 pandemic, reported frequencies included every day (14.29%), once a week (14.29%), a few times a year (28.57%), to once a year (42.86%).

Figure 3

Nursing Professionals and Mechanically Ventilated, Recently Extubated, and/or Tracheostomized Patients

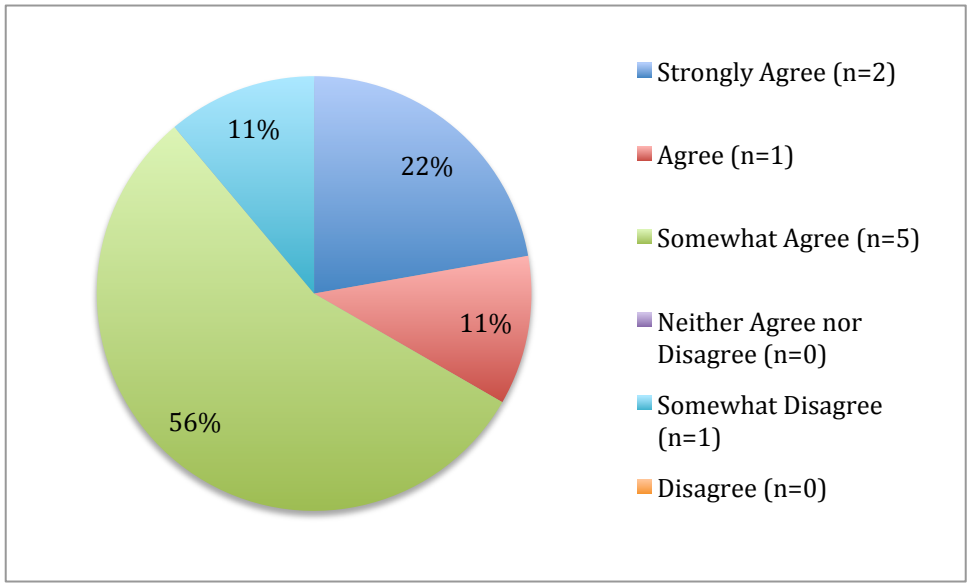


Nursing Professionals' Thoughts, Feelings, and Beliefs

Figure 4 demonstrates that most of the nursing professional participants indicated that a lack of communication access and a lack of training and/or education surrounding communication strategies have impacted the quality of care that a patient has received during the COVID-19 pandemic.

Figure 4

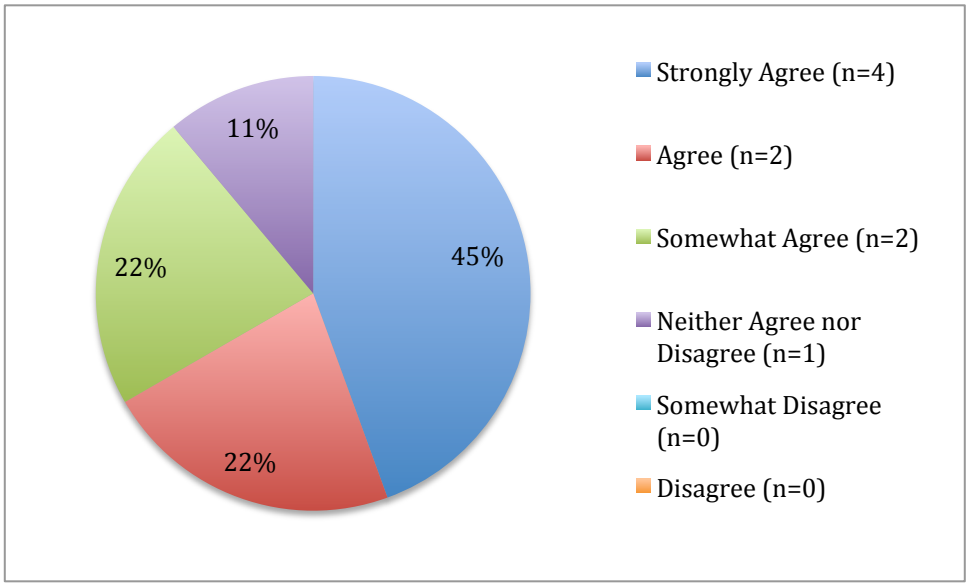
Lack of Communication Access Impacted Quality of Care



Furthermore, Figure 5 shows the majority of the respondents indicated that they wanted better access to communication strategies to treat patients who are MVRET.

Figure 5

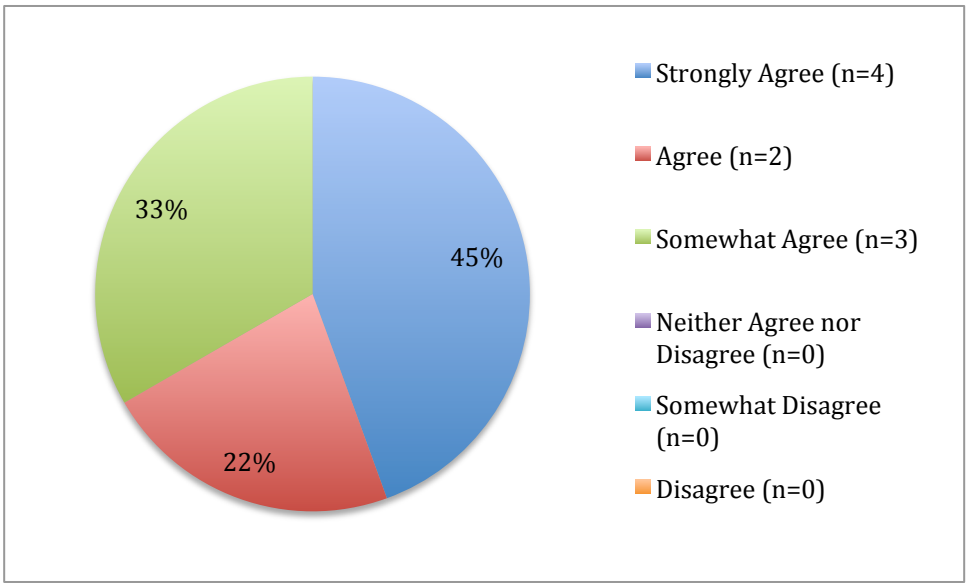
Want Better Access to Communication Strategies



In Figure 6, all of the nursing professional respondents indicated that they want better access to training and/or education surrounding communication strategies to treat patients who are MVRET.

Figure 6

Want Better Access to Trraining and/or Education on Communication Strategies



Additionally, Figure 7 displays that all of the nursing professional participants agreed or strongly agreed that it is within their job roles and responsibilities to facilitate effective communication for MVRET patients.

Figure 7

Within Job Roles and Responsibilities to Facilitate Effective Communication

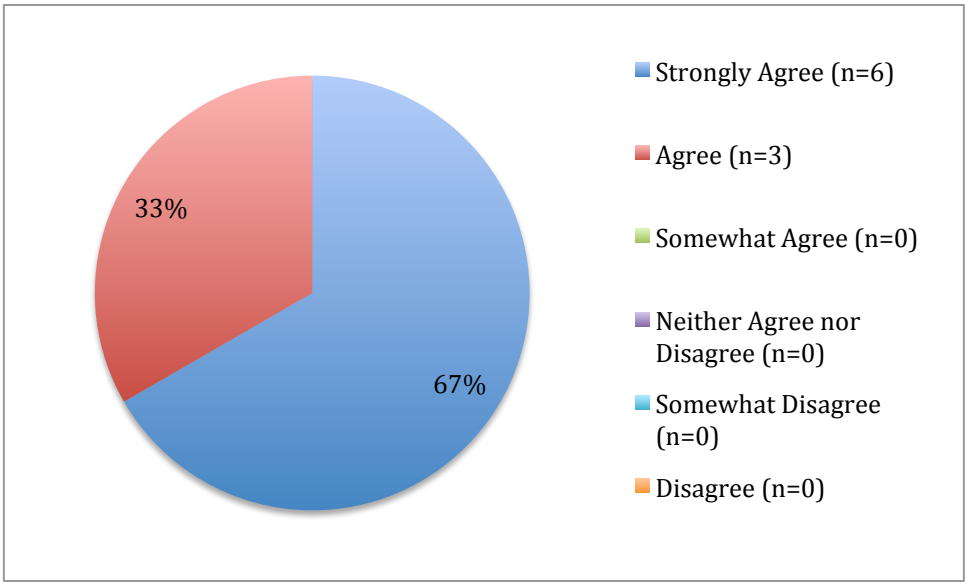
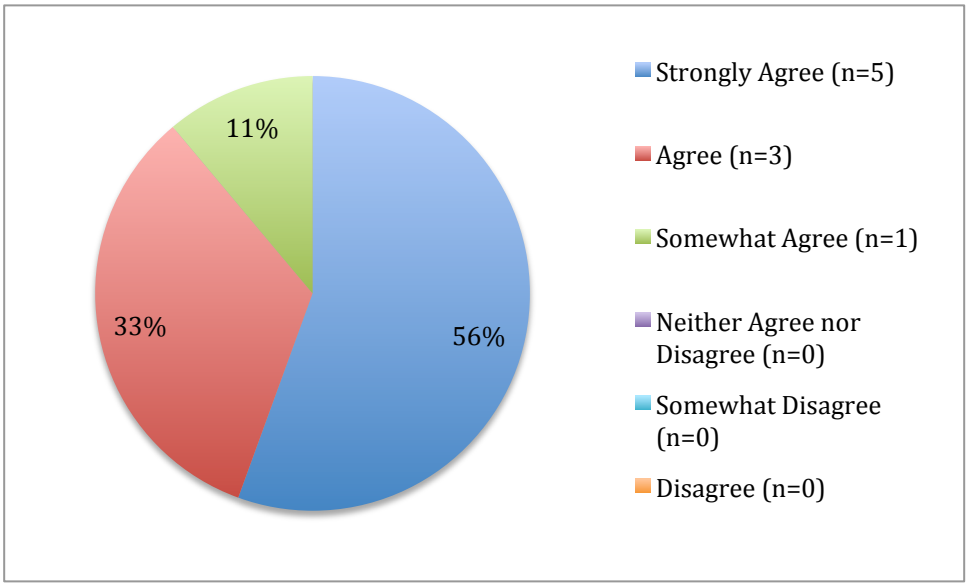


Figure 8 exhibits that all nursing professional participants agreed to an extent that it is a priority to facilitate effective communication for this population of patients.

Figure 8

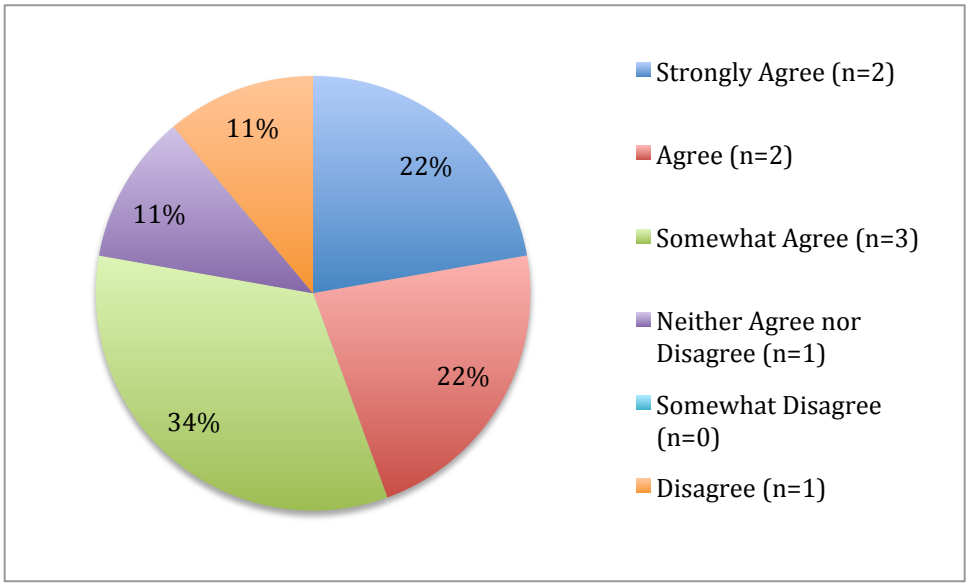
Priority to Facilitate Effective Communication



Interestingly, in Figure 9, 11.11% of the nursing professional participants neither agreed nor disagreed and 11.11% of the participants disagreed that they have time to facilitate effective communication.

Figure 9

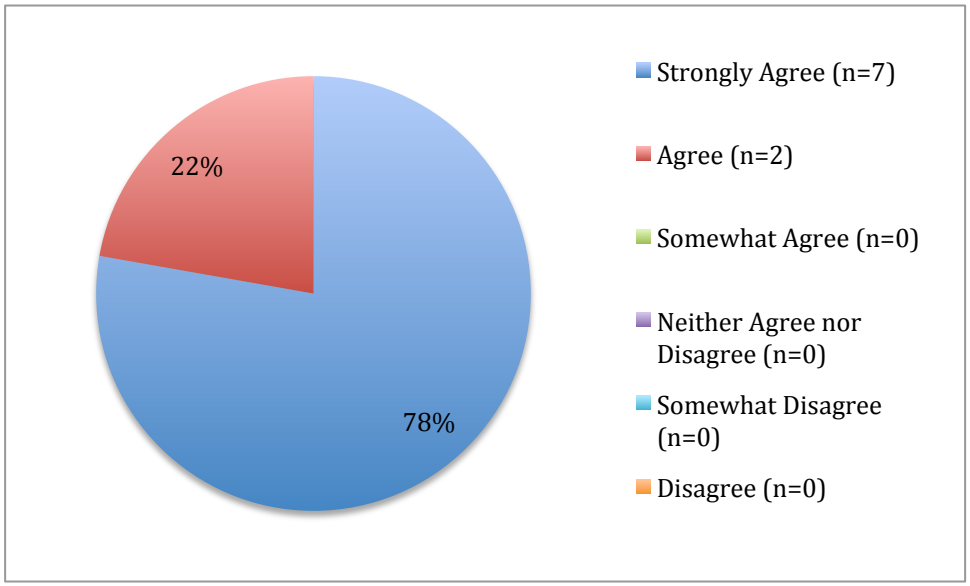
Time to Facilitate Effective Communication



However, Figure 10 demonstrates that all participants indicated that they believe that patient-provider communication directly impacts the quality of care a patient receives and may prevent adverse events and longer recovery times for patients.

Figure 10

Effective Communication Directly Impacts Quality of Care



Unsurprisingly and consistent with the literature reviewed previously, 100% of the nursing professional respondents indicated either "strongly agree" or "agree" that poor patient-provider communication may result in negative emotions/feelings for the patient (see Figure 11) and all participants agreed to an extent that poor communication may result in physical discomfort for the patient (see Figure 12).

Figure 11

Poor Communication May Result in Negative Emotions/Feelings for Patient

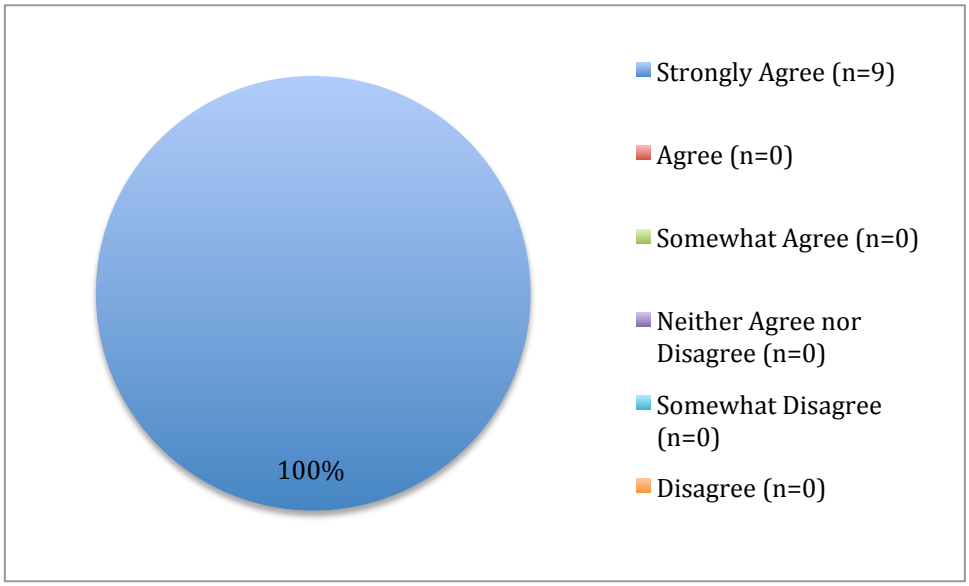
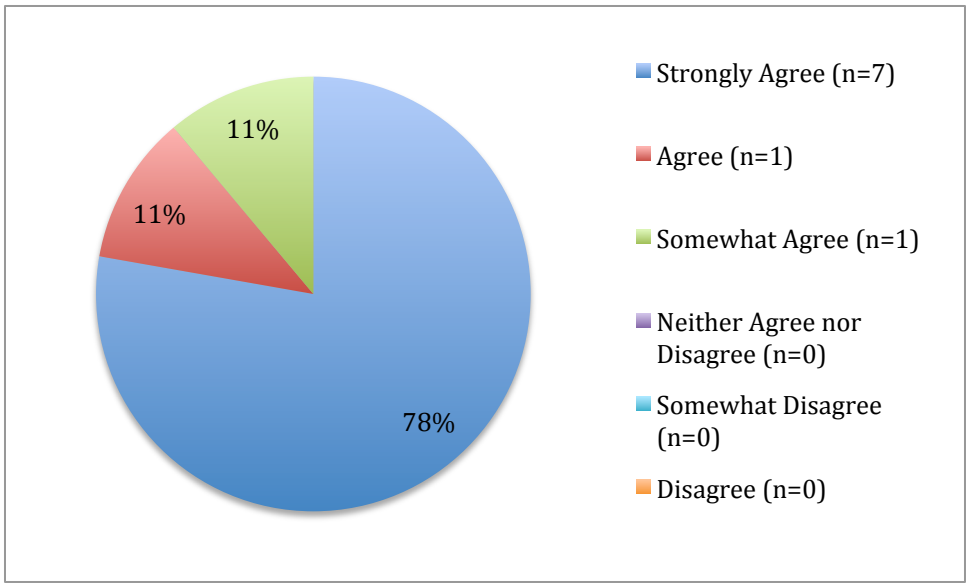


Figure 12

Poor Communication May Result in Physical Discomfort for Patient



Nursing Professionals and Communication Strategies

In regards to the communication strategies utilized by nursing professionals prior to and during the COVID-19 pandemic, it is difficult to compare the high-tech, low-tech, and no-tech AAC communication strategies due to more individuals only responding to the prior-COVID-19 pandemic question set; however, some important takeaways may still be observed. For this portion of the survey, a downloadable PDF was provided with a guide to the communication strategies (see Appendix K). Some of the respondents indicated "I don't know" as a response to the frequency of the communication strategies used; it is certainly possible that some of the communication strategies were truly utilized prior to and during the COVID-19 pandemic but more training could be done to familiarize the nursing profession with these communication strategies. There was not a significant change in communication strategies prior to and during the COVID-19 pandemic (see Appendix E-G). Additionally, the low-tech and no-tech communication (e.g., alphabet boards, white boards, pen and paper, gestures, manual signs, facial expressions, and verbalizations/vocalizations) were reported as strategies that were "often" or "always" utilized prior to and during the COVID-19 pandemic. Some of the nursing professional respondents indicated "other" as an alternative communication strategy for high-tech AAC and no-tech, however, it was not reported what these strategies entailed.

Speech-Language Pathologists

Speech-Language Pathology Demographics

The first portion of the SLP survey involved demographic characteristics of speech-language pathologists (SLPs); 52.38% of the respondents indicated that they practiced in a setting that was seeing COVID-19 positive patients. Respondents who did not indicate that they

practiced in a setting that was seeing COVID-19 positive patients (47.62%) did not continue with the remaining survey questions. All of the included speech-language pathology participants noted that they sometimes assessed and treated COVID-19 positive patients; however, none of the participants indicated that they exclusively assessed and treated COVID-19 patients. The majority of the SLPs indicated that they worked in an acute care setting (57.58%). Additionally, 12.12% of respondents indicated that they worked in an acute rehab setting and 12.12% of respondents indicated that they worked in an Intensive Care Unit (ICU). Six of the respondents (18.18%) selected their setting of employment as "other"; however, these respondents did not specify the type of setting. Most of the SLP respondents (63%) indicated that they were from Colorado, 22.22% indicated that they were from Wisconsin, and 11.11% indicated that they were from Massachusetts. The majority of the SLP survey participants indicated that they worked in a city/urban area (74.07%). Although there was a range of experience measured by years working as an SLP the majority of the respondents 37.04% have been working in the acute care setting for 0-5 years. Additionally, most of the SLP survey participants have been employed with their current employer for 0-5 years (55.56%). While the majority of the SLP participants indicated that there were 201 or more beds in their hospital (51.85%), there were varying responses in regards to how many SLPs are employed by the facility (44.44% indicated 10 or more, 33.33% indicated 4-6, 11.11% indicated 1-3, and 11.11% indicated 7-9). See Appendix D for more detailed SLP demographic information.

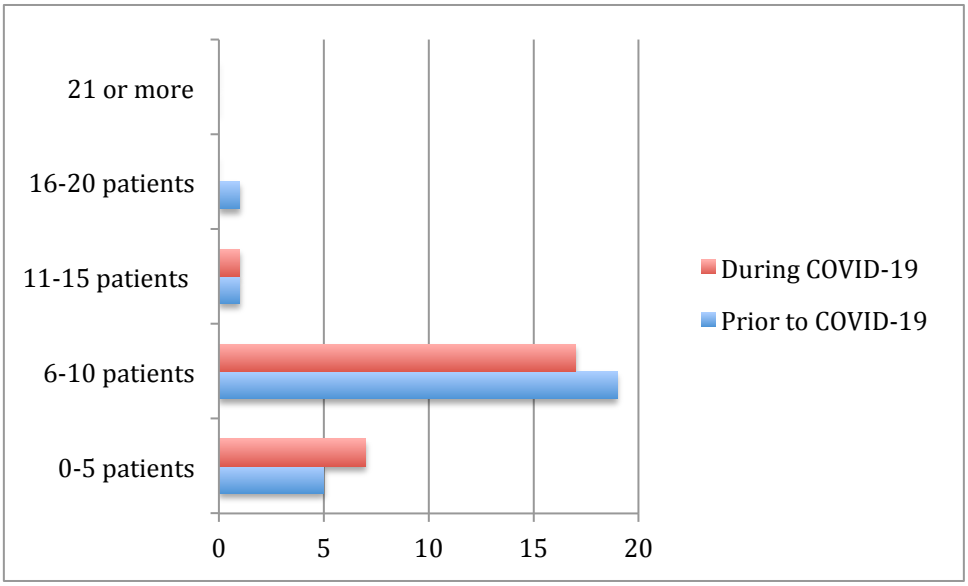
Speech-Language Pathologists' Caseload

As demonstrated in Figure 13, prior to the COVID-19 pandemic, the majority (73.08%) of the SLP participants reported that their average daily caseload was 6-10 patients. Interestingly, this percentage dropped slightly during the COVID-19 pandemic and 68.00% of SLP

participants reported that their average daily caseload was 6-10 patients. Although the majority of respondents indicated no change in their average daily caseload, based on the data, some participants did indicate that their caseload had dropped to 0-5 participants during the COVID-19 pandemic.

Figure 13

Speech-Language Pathologist's Caseload



Speech-Language Pathologist's Collaboration

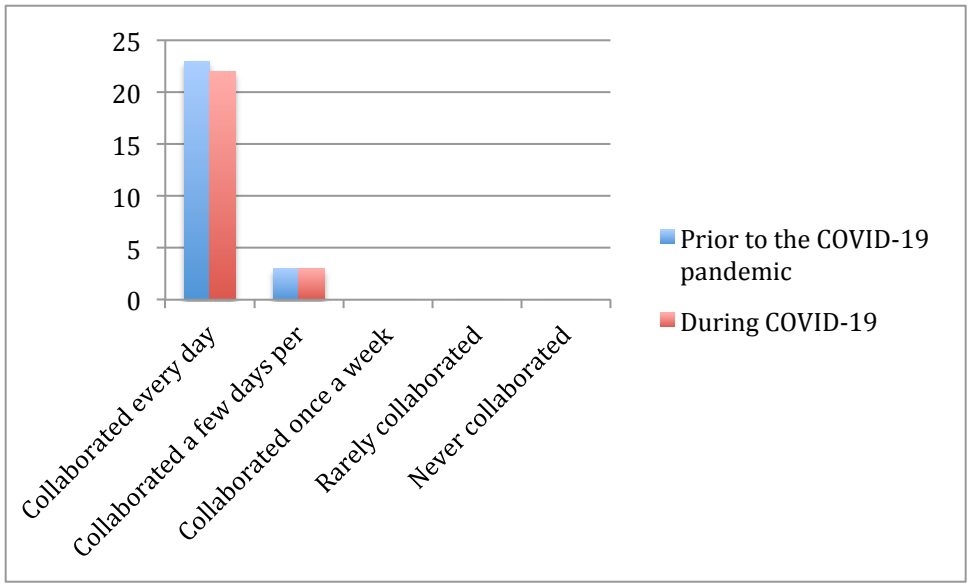
Figure 14 exhibits that prior to the COVID-19 pandemic, all of the respondents indicated collaboration with nursing professionals with the majority of the collaboration occurring every day (88.46%). The frequency of collaboration was very similar during the COVID-19 pandemic, save for one less participant that responded to the "during" portion of the question.

Prior to the COVID-19 pandemic, collaboration occurred in a variety of ways; it occurred mainly in the form of answering a question for nursing (23.33%), passing on an order (11.11%), conveying information for nursing (25.56%), providing education for nursing (21.11%), and/or

providing training for nursing (15.56%). Three respondents (3.33%) indicated another type of collaboration and reported that they "discussed patient progress", "gathered information related to patient care", and would "connect and collaborate prior to meeting or working with a patient". During the COVID-19 pandemic, the characteristics of collaboration were similar including answering questions for nursing (23.53%), passing on orders (10.59%), conveying information (27.06%), providing education (20.00%), and providing training (15.29%). Three respondents (3.53%) indicated another way of collaboration that again involved the discussion of "patient progress" or "gathering information prior to meeting or working with a patient".

Figure 14

Speech-Language Pathologist's Frequency of Collaboration



Speech-Language Pathologists' Patients

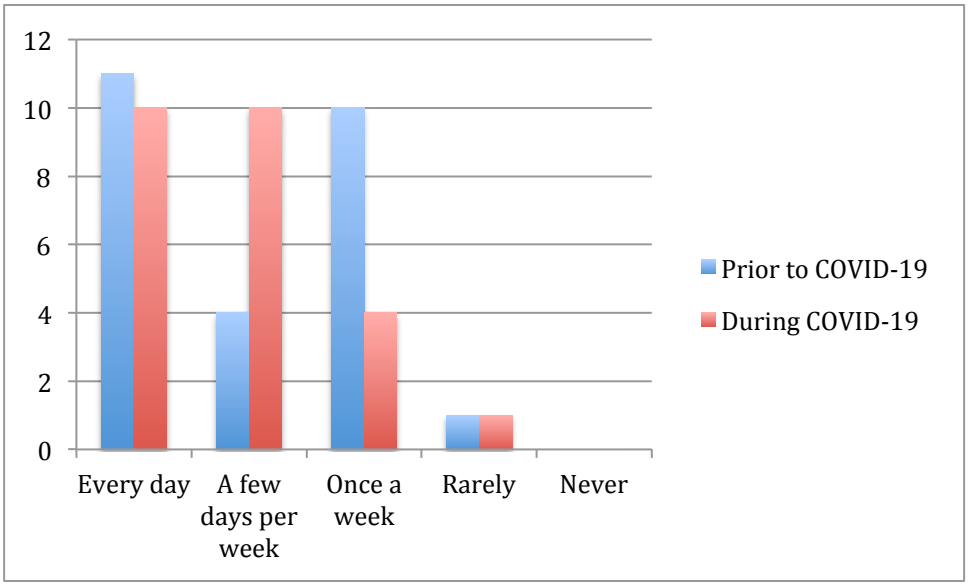
Figure 15 demonstrates that prior to the COVID-19 pandemic, 100% of the SLP participants indicated that they worked with MVRET patients; the bulk of the respondents noted that they worked with this population every day (42.31%) and once a week (38.46%). Prior to

the COVID-19 pandemic, most of the respondents (43.15%) indicated that 6-20% of their caseload consisted of MVRET patients. Prior to the COVID-19 pandemic, 100% of the SLP respondents noted that they counseled and/or educated patients, family members, and/or health care professionals on communication strategies for this population. There was a fairly even distribution of data in regards to how often the counseling and/or education was provided prior to the COVID-19 pandemic; 32.00% indicated that they counseled and/or educated every day, 20.00% indicated that they counseled and/or educated a few days per week, 20.00% indicated that they counseled and/or educated a few days per week, and 28.00% indicated that they rarely counseled and/or educated.

During the COVID-19 pandemic, 96.15% of the SLP participants indicated that they worked with MVRET patients. Participants noted that they worked with this population every day (40.00%) or a few days per week (40.00). Interestingly, the percentage of respondents whom indicated that they worked with this population a few days per week during the pandemic increased to 40.00% and the percentage of respondents whom indicated that they worked with this population once per week decreased to 16.00%. The data involving the percentage of MVRET patients on a caseload varied during the COVID-19 pandemic; 24.00% of the respondents noted that this population was less than 5% of their caseload, 36.00% indicated that this population made up 6-20% of their caseload, 12.00% indicated that this population made up 21-40% of their caseload, 16.00% indicated that this population made up 41-60% of their caseload, and 4% indicated that this population made up 61-80% of their caseload. Finally, 8.00% indicated that this population made up 81-100% of their caseload, which is a 4.15% difference when compared to prior to the COVID-19, pandemic.

Figure 15

Speech-Language Pathologists and Mechanically Ventilated, Recently Extubated, and/or Tracheostomized Patients

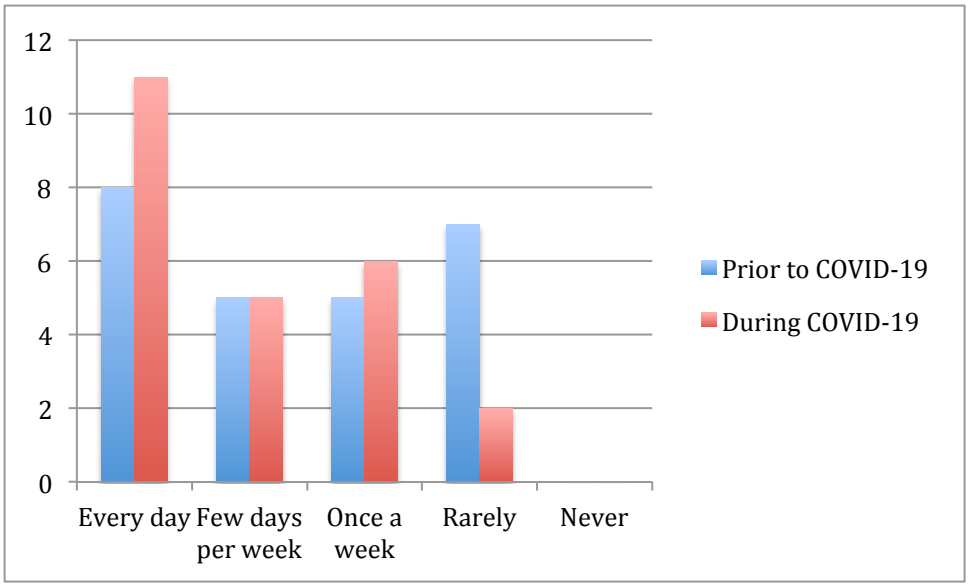


Speech-Language Pathologists' Counseling/Education

During the COVID-19 pandemic, 96% of the SLP respondents indicated that they counseled and/or educated patients, family members, and/or other health care professionals on communication strategies for MVRET patients. Interestingly, 4.00% of the respondents indicated that they did not counsel and/or educate. During the COVID-19 pandemic, the majority of the SLP participants indicated that the counseling and/or education frequency occurred every day (45.83%); this increased by 13.83% during the pandemic (see Figure 16).

Figure 16

Speech-Language Pathologist's Frequency of Counseling and/or Education



Speech-Language Pathologists' Thoughts, Feelings, and Beliefs

When compared to the nursing professionals, more SLPs indicated that they "somewhat disagreed" that a lack of communication access (29%) and a lack of training and/or education (21%) surrounding communication strategies have impacted the quality of care that a patient has received during the COVID-19 pandemic (see Figures 17 and 18).

Figure 17

Lack of Communication Access Impacted Quality of Care

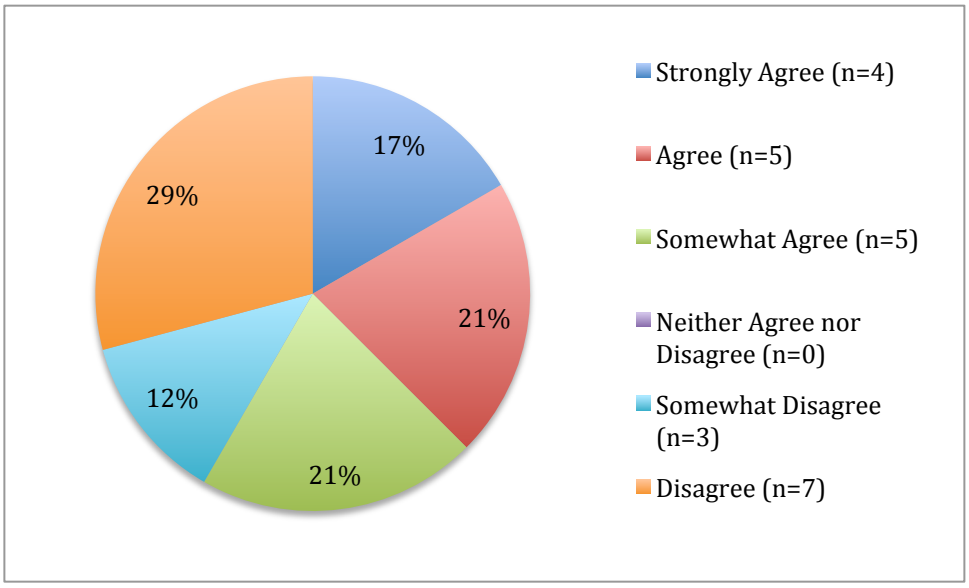
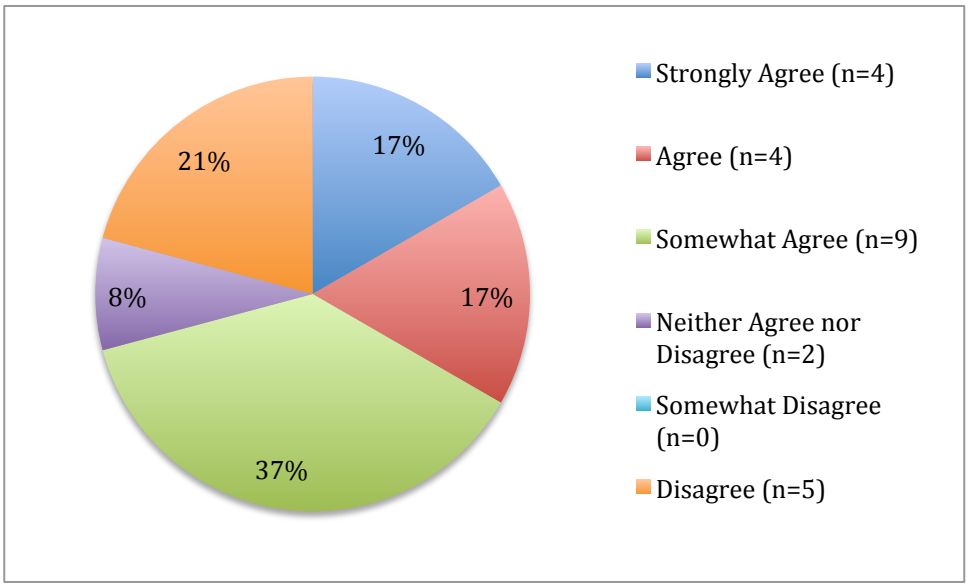


Figure 18

Lack of Training and/or Education of Communication Strategies Impacted Quality of Care



However, a number of SLPs did agree to an extent that they want better access to communication strategies (see Figure 19) and to training/education on communication strategies (see Figure 20).

Figure 19

Want Better Access to Communication Strategies

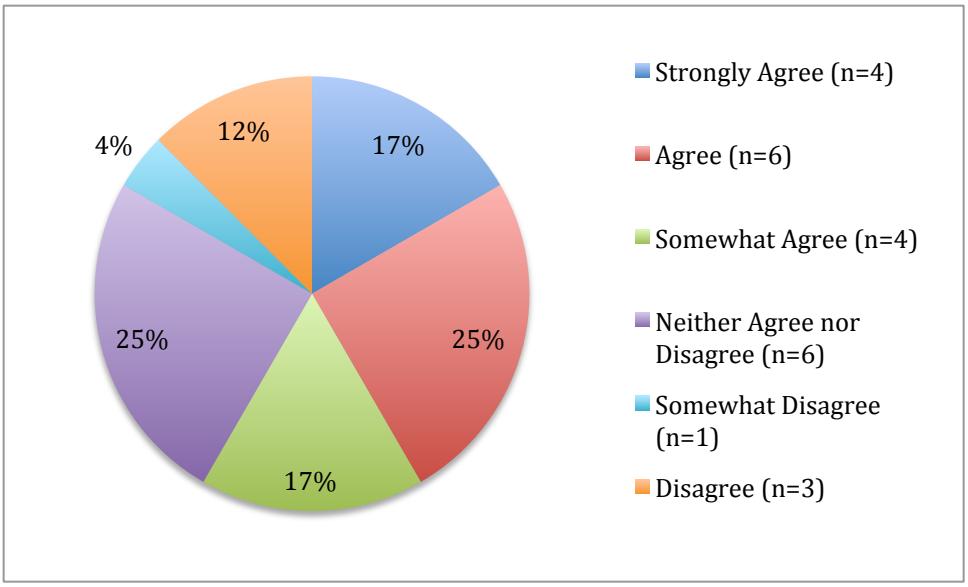


Figure 20

Want Better Access to Training and/or Education on Communication Strategies

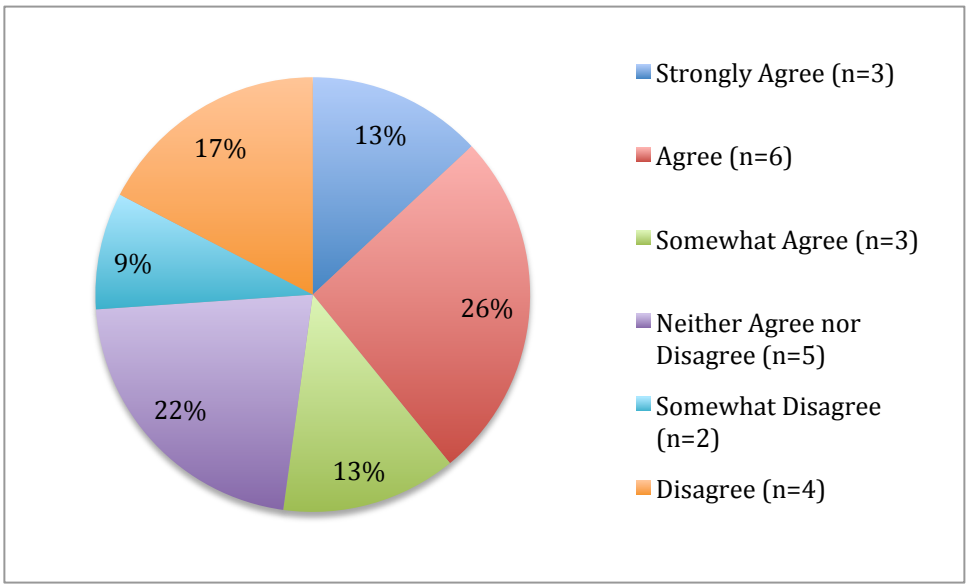
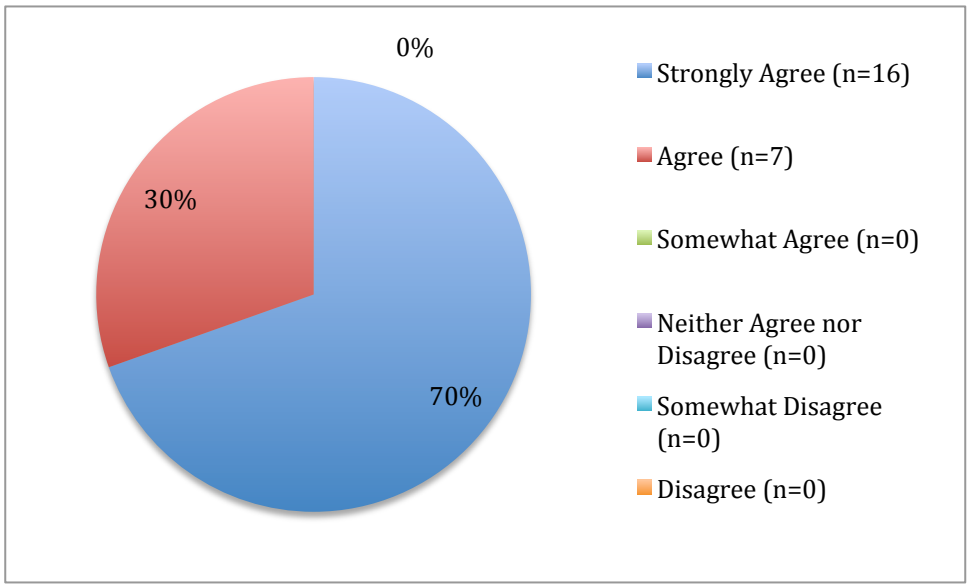


Figure 21 demonstrates that all of the SLP respondents indicated that they either "agreed" or "strongly agreed" that it is within their job roles and responsibilities to facilitate effective communication.

Figure 21

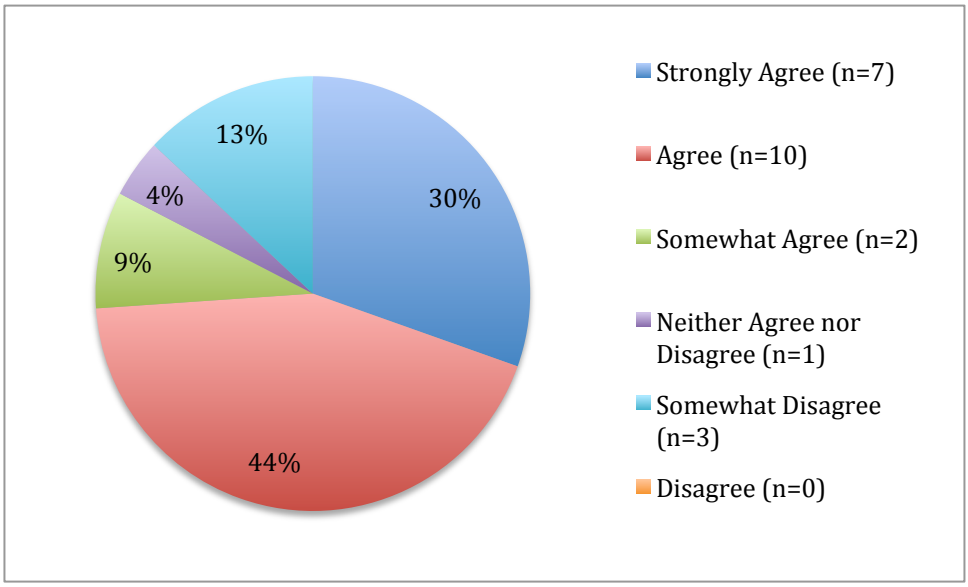
Within Job Roles and Responsibilities to Facilitate Effective Communication



However, Figure 22 displays that some SLPs reported that they "somewhat disagree" that they have the time to facilitate effective communication.

Figure 22

Time to Facilitate Effective Communication



Similar to the nursing professionals, most participants indicated that they believe that patient-provider communication directly impacts the quality of care a patient receives, may prevent longer recovery times, and may prevent adverse events for patients (see Figures 23, 24, and 25).

Figure 23

Effective Communication Directly Impacts Quality of Care

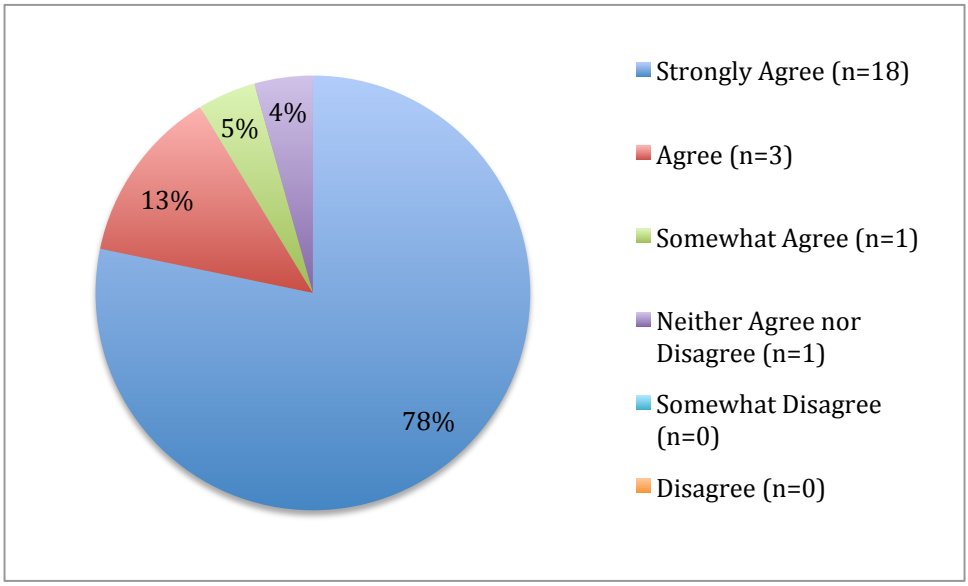


Figure 24

Poor Communication May Result in Longer Recovery Time

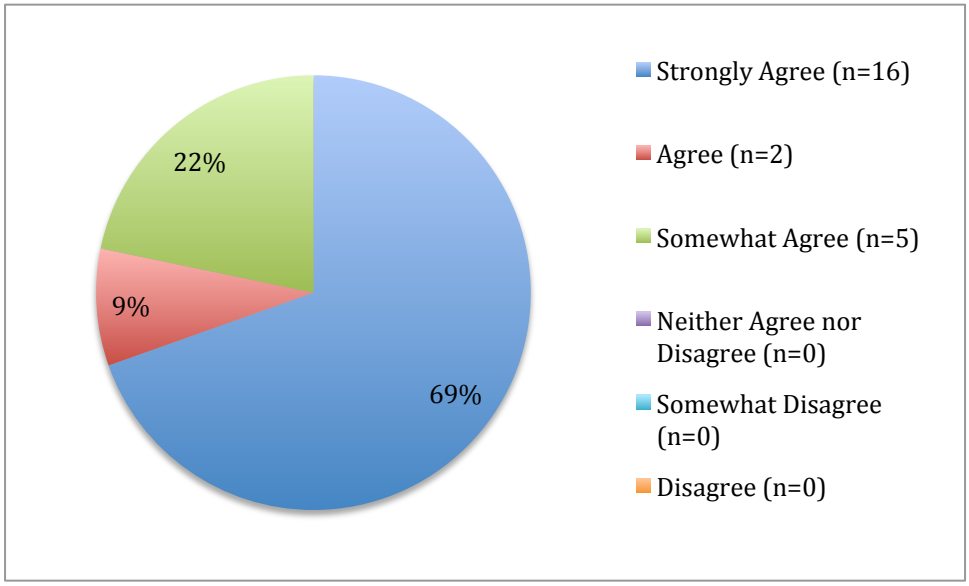
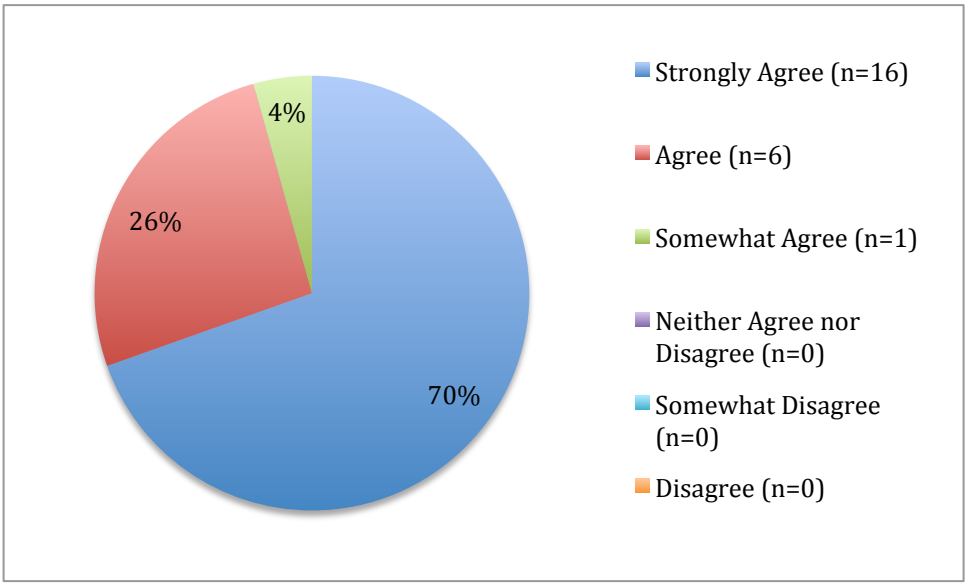


Figure 25

Effective Communication May Prevent Adverse Events



Speech-Language Pathology and Communication Strategies

Similar to the nursing professional portion of the survey, the speech-language pathology portion of the survey that addressed prior to and during the COVID-19 pandemic communication strategies (high-tech, low-tech, and no-tech AAC) is difficult to compare exactly due to more individuals completing the "prior to" portion. Nevertheless, some noteworthy observations can be made. For the most part, there was not a significant change in communication strategies utilized prior to and during the COVID-19 pandemic (see Appendix H-J). In addition, the low-tech and no-tech communication strategies such as alphabet boards, white boards, pen and paper, gestures, manual signs, facial expressions, and verbalizations/vocalizations were more reported to be "often" or "always" utilized prior to and during the COVID-19 pandemic when compared to the high-tech options. Of note, the number of individuals who reported "always" utilizing "facial expressions" as a no-tech AAC communication strategy decreased during the COVID-19

pandemic. Some of SLP respondents selected “other” as an alternative communication strategy for no-tech, low-tech, and high-tech options; however, these alternative communication strategies were not identified.

Healthcare Organizations’ Response to Coronavirus Disease 2019

The present survey also investigated practices at an organization level. Both SLP and nursing professionals were asked questions regarding personal protective equipment (PPE), aerosol generating procedures (AGPs), etcetera. Most of the nursing professionals (62.6%) and SLP (72.73%) respondents indicated that the availability of PPE did not impact the ability to see COVID-19 patients. However, one SLP did note that they “were not allowed to see COVID positive patients in the initial stages of the pandemic, and had to instead provide indirect care via collaboration (with) RNs without ever directly seeing a patient.” The majority of the nursing professional respondents (62.5%) and SLP participants (86.36) always saw AGP precautions being followed. Most nursing professionals (75.00%) indicated that their hospital implemented a schedule change or position reassignment in response to the COVID-19 pandemic; this was characterized by changes such as “12 hour shifts”, “cluster care”, and COVID-19 positive patients being “placed in rooms with windows or video monitoring.” One participant also described changes to the caseload that included PRN nurses available for every four COVID-19 positive patients. Furthermore, most speech-language pathologists (63.64%) also indicated that their hospital implemented a schedule change or position reassignment in response to the COVID-19 pandemic; this was characterized by changes such as “clustering COVID+ caseload to a specific therapist” to “minimize others [*sic*] contacts with COVID”. A majority of the nursing professional participants 62.50% indicated that they did not know if their hospital had a protocol for improving communication outcomes for individuals with complex communication

needs, but the respondents (100%) indicated that it was an effective protocol. A number of the SLP participants (47.62%) were aware that their hospital had a protocol for improving communication outcomes for individuals with complex communication needs, but 33.33% of SLP participants indicated their hospital did not have a protocol and 19.05% did not know. Most SLP participants (81.82%) noted that their hospital's protocol was effective, but 18.18% indicated that it was not effective. Some narrative provided by participants included that "we (SLPs) are not utilized to the extent we should be" and "we have no high tech options, like iPads with apps, which most patients are familiar with and capable of using."

Data Analysis

Research Question 1

A Mann Whitney U Test was used to compare differences between two independent groups and a Spearman Rank Order correlation coefficient was utilized to determine the strength and direction of the relationship between multiple variables in order to answer Research Question 1 (What speech-language pathology and nursing professional characteristics (e.g., years experience, years experience in an acute setting, years employed with current employer) are related to the practices for patients pre- and during-COVID-19?).

Nursing Professionals

Nursing professionals' characteristics (i.e., how long an individual has been working as a nursing professional, how long an individual has been working as a nursing professional in the acute care setting, and how long an individual has been employed with their current employer) were compared to the following components: the average nurse-to-patient ratio both prior to and during the COVID-19 pandemic, whether or not nursing professionals worked with MVRET patients both prior to and during the COVID-19 pandemic, how often nursing professionals

worked with MVRET patients both prior to and during the COVID-19 pandemic, what percentage of MVRET patients made up a caseload both prior to and during the COVID-19 pandemic, how frequently collaboration occurred both prior to and during the COVID-19 pandemic, whether or not nursing professionals received training from an SLP both prior to and during the pandemic, and the frequency of training nursing professionals received both prior to and during the pandemic. There were not any significant relationships revealed.

Speech-Language Pathologists

The SLP characteristics (i.e., how long an individual has been working as an SLP, how long an individual has been working as an SLP in the acute care setting, and how long an individual has been employed with their current employer) were compared to the following components: the average daily caseload both prior to and during the COVID-19 pandemic, whether or not SLPs worked with MVRET patients both prior to and during the COVID-19 pandemic, how often SLPs worked with MVRET patients both prior to and during the COVID-19 pandemic, what percentage of MVRET patients made up a caseload both prior to and during the COVID-19 pandemic, how frequently collaboration occurred both prior to and during the COVID-19 pandemic, whether or not SLPs provided education and/or training both prior to and during the pandemic, and the frequency of education and/or training both prior to and during the pandemic. Similar to the nursing professionals' data, there were many insignificant relationships for the SLPs with the exception of one relationship; when comparing length of employment with their current employer (see Appendix A, SLPQ7) to how often counseling and/or education occurs during the COVID-19 pandemic (see Appendix A, SLPQ26), a positive and significant relationship was detected ($r = 0.430$, $p < 0.05$). The longer a speech-language pathologist worked, the more counseling and/or education that was provided.

Research Question 2

A Mann Whitney U Test was used to compare differences between two independent groups and a Spearman Rank Order correlation coefficient was utilized to determine the strength and direction of the relationship between multiple variables in order to answer Research Question 2 (What workplace and practice characteristics (e.g., setting, number of SLPs employed by facility, type of unit, beds in hospital, patients on caseload, collaborative practices, counseling, types of communication strategies) are related to the practices for patients pre- and during-COVID-19?).

For both the nursing professional and SLP surveys, whether or not the participants worked with MVRET patients (both prior to and during the COVID-19 pandemic) and whether or not they assessed and/or treated COVID-19 positive patients were compared to the following components: the average nurse-to-patient ratio/daily caseload both prior to and during the COVID-19 pandemic, whether or not nursing professionals/SLPs worked with MVRET patients both prior to and during the COVID-19 pandemic, how often nursing professionals/SLPs worked with MVRET patients both prior to and during the COVID-19 pandemic, what percentage of MVRET patients made up a caseload both prior to and during the COVID-19 pandemic, how frequently collaboration occurred both prior to and during the COVID-19 pandemic, whether or not nursing professionals received/SLPs provided education and/or training both prior to and during the pandemic, and the frequency of education and/or training both prior to and during the pandemic. For both the nursing professional and SLP surveys, there were not any significant relationships revealed with a Spearman Rank Order test. Furthermore, there were not any significant relationships revealed with a Mann Whitney U Test; this can be attributed to the fact that most participants responded in the same manner resulting in only one group/variable. For

example, most respondents indicated “yes” they worked with MVRET patients both prior to and during the COVID-19 pandemic (see Appendix A, SLPQ13 and SLPQ22 for more detail on the survey question). This was similar to the nursing respondents; most respondents indicated “yes” they worked with MVRET patients both prior to and during the COVID-19 pandemic (see Appendix A, NQ13 and NQ23 for more detail on the survey question). With a lack of a comparison group (i.e., “no”), the Mann Whitney U Test could not be calculated.

Research Question 3

A Mann Whitney U Test was used to compare differences between two independent groups and a Spearman Rank Order correlation coefficient was utilized to determine the strength and direction of the relationship between multiple variables in order to answer Research Question 3 (What variables (e.g., demographics, training, collaboration practices, adverse events) are related to nursing professionals’ thoughts, feelings, and beliefs about effective communication for patients?).

Nursing Professionals

Nursing professionals’ thoughts, feelings, and beliefs were compared to components including: how long an individual has been working as a nursing professional, how long an individual has been working as a nursing professional in the acute care setting, how long an individual has been employed with their current employer, whether or not nursing professionals received training from an SLP both prior to and during the COVID-19 pandemic, the frequency of the training both prior to and during the COVID-19 pandemic, the frequency of collaboration both prior to and during the COVID-19 pandemic, whether or not the availability of PPE impacted the ability to see COVID-19 positive patients, and whether or not the individual’s employer (hospital) had a protocol for improving communication outcomes for individuals with

complex communication needs. Although there were a number of insignificant relationships, there was one significant relationships observed. When comparing length of time working as a nursing professional (see Appendix A, NQ6) with the strength to which nursing professionals agree that they are able to communicate effectively to manage basic needs of patients who are MVRET (see Appendix A, NQ29-5), a positive and significant relationship was revealed (r = 0.675, $p < 0.05$). This indicated that the longer an individual had been working as a nursing professional, the more strongly they agreed that they were able to communicate effectively to manage the basic needs of patients who are MVRET.

Speech-Language Pathologists

Speech-language pathologist's thoughts, feelings, and beliefs were compared to components including: how long an individual has been working as an SLP, how long an individual has been working as an SLP in the acute care setting, how long an individual has been employed with their current employer, whether or not SLPs provided training and/or education both prior to and during the COVID-19 pandemic, the frequency of the training and/or education both prior to and during the COVID-19 pandemic, the frequency of collaboration both prior to and during the COVID-19 pandemic, whether or not the availability of PPE impacted the ability to see COVID-19 positive patients, and whether or not the individual's employer (hospital) had a protocol for improving communication outcomes for individuals with complex communication needs. There were many important relationships observed within the SLP survey for Research Question 3. The length of employment (see Appendix A, SLPQ7) compared to the strength to which SLPs agree that it is within their job roles and responsibilities to facilitate effective communication (see Appendix A, SLPQ27-6) revealed a positive, significant relationship (r = 0.453, $p < 0.05$). This indicated that the longer an SLP has been employed, the more they agree

that effective communication is a part of their job roles and responsibilities. The frequency of collaboration with nursing professionals during the COVID-19 pandemic (see Appendix A, SLPQ20) compared to the strength to which SLPs agree that it is within their job roles and responsibilities to facilitate effective communication (see Appendix A, SLPQ27-6) revealed a positive, significant relationship ($r = 0.467$, $p < 0.05$) which suggested that the more often collaboration occurs, the more strongly SLPs agree that it is within their job roles and responsibilities to facilitate effective communication. The frequency of counseling and/or education during the COVID-19 pandemic (see Appendix A, SLPQ26) compared to the strength to which SLPs agree that it is within their job roles and responsibilities to facilitate effective communication (see Appendix A, SLPQ27-6) also revealed a positive, significant relationship ($r = 0.555$, $p < 0.01$). This showed that the more often that counseling and/or education occurred the more strongly SLPs agree that it is within their job roles and responsibilities to facilitate effective communication.

The strength to which SLPs agree that it is a priority to facilitate effective communication (see Appendix A, SLPQ27-7) revealed a significant and positive relationship when compared to the amount of time the respondent had been working as an SLP (see Appendix A, SLPQ5; $r = 0.434$, $p < 0.05$). The strength to which SLPs agree that it is a priority to facilitate effective communication (see Appendix A, SLPQ27-7) revealed a significant and positive relationship when compared to the amount of time employed by current employer (see Appendix A, SLPQ7; $r = 0.486$, $p < 0.05$). The strength to which SLPs agree that it is a priority to facilitate effective communication (see Appendix A, SLPQ27-7) also revealed positive relationships at the $p < 0.01$ significance level for frequency of collaboration with nursing professionals prior to the COVID-19 pandemic (r=0.634) and frequency of counseling and/or education prior to the COVID-19

pandemic (r= 0.601) and during the COVID-19 pandemic (r= 0.744). These findings implied that the longer the amount of time working as an SLP, the longer the amount of time employed by current employer and the more frequent collaboration occurred with nursing professionals prior to the COVID-19 pandemic, the more strongly SLPs agreed that it was a priority to facilitate effective communication.

There was also a positive and significant relationship ($r = 0.603$, $p < 0.01$) observed when comparing the frequency of education and/or counseling during the COVID-19 pandemic (see SLPQ26) with the strength to which SLPs agree that they have the time to facilitate effective communication for patients who are MVRET (see Appendix A, SLPQ27-8). This indicated that the more frequently education and/or counseling occurred during the COVID-19 pandemic, the stronger the agreement.

Next, the strength to which SLPs agree that effective patient-provider communication impacts the quality of care that a patient receives (see Appendix A, SLPQ27-9) had a positive and significant relationship when compared to the frequency of counseling and/or education provided prior to the COVID-19 pandemic (see Appendix A, SLPQ17; $r = 0.474$, $p < 0.05$) and to how frequently collaboration occurred during the COVID-19 pandemic (see Appendix A, SLPQ20; $r = 0.474$, $p < 0.05$). This implied that the more frequent counseling and/or education occurred prior to the COVID-19 pandemic and the more frequent collaboration occurred during the COVID-19 pandemic, the more strongly SLPs agreed that effective patient-provider impacts the quality of care that a patient receives.

A positive and significant relationship was observed ($r = 0.440$, $p < 0.05$) when comparing the frequency of counseling and/or education provided prior to the COVID-19 pandemic (see Appendix A, SLPQ17) with the strength to which SLPs agree that effective

patient-provider communication may prevent adverse events (see Appendix A, SLPQ27-10). This suggested that the more frequent counseling and/or education was provided prior to the COVID-19 pandemic, the more strongly SLPs agreed that effective patient-provider communication may prevent adverse events.

Finally, a positive and significant relationship was revealed ($r = 0.469$, $p < 0.05$) when comparing the frequency of education and/or counseling during the COVID-19 pandemic (see SLPQ26) with the strength to which SLPs agree that poor patient- provider communication may result in a longer recovery time for the patient (see Appendix A, SLPQ27-11).

CHAPTER V

DISCUSSION

The purpose of this study was to examine the practice patterns of nursing professionals and speech-language pathologists (SLPs) prior to and during the coronavirus disease 2019 (COVID-19) pandemic. A survey was created to better understand what demographic features and what workplace and practice characteristics were related to the practices reported prior to and during the COVID-19 pandemic. Due to the medical implications of COVID-19, particular attention was paid to the population of mechanically ventilated, recently extubated, and/or tracheostomized (MVRET) patients. Further, this study sought to better understand the variables that are related to SLPs' and nursing professionals' thoughts, feelings, and beliefs about effective communication prior to and during the COVID-19 pandemic.

About the Sample

Many components may impact an individual's motivation and/or desire to participate in a survey including, but not limited to, the efficiency of the survey, if an incentive is offered, and the respondent's interest. This present study did not offer an incentive for completion which may have negatively impacted individuals' interest. As described in the Results section, the limited sample size did not allow for some of the comparisons planned to be calculated.

Study Limitations

There were several limitations of this study related to sampling, incomplete data and survey context. The participants for the study were recruited with a snowball sample technique via email in addition to posts in private speech-language pathology Facebook groups, and via the

American Speech-Language-Hearing Association (ASHA) Special Interest Groups 12: Augmentative and Alternative Communication, 3: Voice and Upper Airway Disorders, and 2: Neurogenic Communication Disorders. The survey was also distributed to ZO Chapter of Sigma, a nursing honor society. With this method, there was no way to track the number of individuals the survey was made visible to. Other issues/factors that may have contributed to some of the limitations of this study include incomplete data; some of the respondents started the survey but did not complete it. The survey logic was designed to allow participants to skip questions and exit at any time, but still record the responses. Additionally, a number respondents completed their respective surveys on their cellular device; some of the questions were lengthy and required scrolling to view the instructions and/or responses. This format could certainly have impacted the respondent's willingness and/or ability to complete the survey. Further, there was only a small sample of participants who were seeing COVID-19 positive patients. Lastly, is important to note that the timing of this research is pertinent; the healthcare profession has been one of the most affected professions by the COVID-19 global pandemic; the survey was distributed approximately 11 months into the pandemic. The stress and fatigue that healthcare workers experienced could have certainly impacted their willingness and/or ability to complete this research.

Answers to Research Questions

Some interesting findings were observed in this study. For instance, there was not a reported significant change in communication strategy use prior to and during the COVID-19 pandemic for nursing professional respondents. This was surprising as the disinfecting recommendations released by the CDC may have interfered with the number or amount of augmentative and alternative communication (AAC) devices and strategies available for each

individual patient. It may have also facilitated the education and/or training on different strategies. However, the lack of change in communication strategies may be attributed to the chaos that the pandemic caused; respondents continued to utilize strategies that they were familiar with because there wasn't time to learn and/or train on anything new. When investigating the SLPs' reported use of communication strategies, the number of individuals who reported "always" utilizing "facial expressions" as a no-tech AAC communication strategy decreased during the COVID-19 pandemic. This may be explained by the use of the personal protective equipment (PPE), such as facemasks, that covered part of the facial area that were recommended by the CDC.

Although there were many insignificant relationships revealed through the statistical analyses of the nursing professional and speech-language pathology responses, several significant relationships were found and warrant further discussion. First, in regards to Research Question 1, for SLPs, when comparing length of employment with their current employer (see Appendix A, SLPQ7) to how often counseling and/or education occurs during the COVID-19 pandemic (see Appendix A, SLPQ26) a significant positive relationship was found. The relationship indicated that as SLPs' length of employment with their current employed increased, they more frequently counseled and/or educated patients, family members, and/or other health care professionals on communication strategies for MVRET patients. This may be due to seasoned SLPs' increased experience and comfort level within their role with their current employer.

In regard to Research Question 3, for nursing professionals, when comparing length of employment with professional (see Appendix A, NQ6) with the strength to which nursing professionals agree that they are able to communicate effectively to manage basic needs of

patients who are MVRET (see Appendix A, NQ29-5), a positive and significant relationship was revealed ($r = 0.675$, $p < 0.05$). This suggests that the longer a nursing professional has been working, the more they were to agree that they were able to effectively communicate with this specific population. In regards to Research Question 3, for SLPs, components such as length of time working as an SLP and length of time working for their current employer were related to a number of thoughts, feelings, and beliefs surrounding effective communication for patients. These relationships indicate a relationship between experience and abilities.

Future Direction for Study

Although many of the nursing professional and SLP respondents indicated that they do collaborate interprofessionally, one of the responses in regards to the effectiveness of a protocol for improving communication outcomes for patients from one SLP was particularly insightful; they noted, "we (SLPs) are not utilized to the extent we should be". This is an opportunity to advocate for the speech-language pathology profession and services that SLPs offer so that SLPs and nursing professionals may maximize patient care. There is also an opportunity to advocate for interprofessional collaboration and effective communication strategies earlier than as a seasoned SLP clinician and/or experienced nursing professional. With an end goal of a hospital-wide shift in focus to support communication for individuals with complex communication needs (CCNs; Marshall and Hurtig, 2019), access to training and materials must be provided as a first step (Downey & Happ, 2013). It could be beneficial for newer clinicians to seek out resources focused on topics such as interprofessional collaboration and/or counseling/education; this may include pursuing continuing education units (CEUs), networking and/or establishing a mentor/mentee relationship. In a brief search completed on the American Speech-Language-Hearing Association's Continuing Education page, the keyword "interprofessional" yielded few

results; these included topics such as “Ethics in Interprofessional Practice”, “Interprofessional Collaboration in Defensible Documentation”, “Interprofessional Collaboration to Maximize Documentation”, and “Working Within an Interprofessional Team”. However, these topics are not specific to the acute care setting and communication strategies that individuals with complex communication needs often require. Therefore, more specific opportunities for CEUs would be beneficial. These topics could also be further discussed at an institutional level throughout graduate programs. Speech-language pathology graduate programs and nursing programs may host guest speakers to facilitate learning about, with, *and* from other disciplines. Consulting with acute care AAC specialists may also be beneficial to familiarize the professions with the communication strategies that are available. Because acute care is often fast-paced and busy, SLPs and nursing professionals may provide brief, in-service education and/or training opportunities to their interprofessional teams.

Conclusions

At the time the literature review portion of this research was completed, there was not an approved vaccine for COVID-19. However, during the time the results and discussion portion was written, there were three authorized and recommended vaccines for COVID-19. The three vaccines (Pfizer-BioNTech, Moderna, Johnson & Johnson/Janssen) are all proven to be safe, effective, and reduce individuals’ risk of severe illness (CDC, 2021). Although these vaccines reduce the risk of severe illness that may cause mechanical ventilation and potentially result in extubation and/or a tracheostomy, there are new variants of the COVID-19 virus that have been reported (Johns Hopkins Medicine, 2021). Aside from the global pandemic, there will always be individuals with complex communication needs (CCNs). It is critical for nursing professionals and speech-language pathologists to better understand how to support communication in

individuals with CCNs, particularly those who are MVRET. Effective communication with this specialized population is proven to reduce the risk of adverse events, save hospitals money, and maintain patient comfort (Hurtig et al., 2018). Most importantly nursing professionals and speech-language pathologists must be provided with the time, resources, and support to provide access to effective communication to individuals with CCNs as it is ultimately an essential human right.

REFERENCES

American Journal of Managed Care. (2020, July 3). *A timeline of COVID-19 developments in 2020*. AJMC. https://www.ajmc.com/view/a-timeline-of-covid19-developments-in-2020

American Speech-Language-Hearing Association. (n.d.-a). *Augmentative and alternative communication.* https://www.asha.org/practice-portal/professional-issues/augmentative-and-alternative-communication/

American Speech-Language-Hearing Association. (n.d.-b). *Getting started in acute care hospitals.* https://www.asha.org/slp/healthcare/start_acute_care/

American Speech-Language-Hearing Association. (n.d.-c). *Interprofessional education/interprofessional practice*. https://www.asha.org/Practice/Interprofessional-Education-Practice/

American Speech-Language-Hearing Association. (n.d.-d). *Tracheostomy and ventilator dependence*. https://www.asha.org/Practice-Portal/Professional-Issues/Tracheostomy-and-Ventilator-Dependence/.

American Speech-Language-Hearing Association. (n.d.-e). *AAC and COVID-19: Ventilator use may necessitate alternative methods of communication for patients in acute care*. https://www.asha.org/public/aac-and-covid-19-ventilator-use-may-necessitate-alternative-methods-of-communication-for-patients-in-acute-care/

American Speech-Language-Hearing Association. (2016). *Scope of practice in speech-language pathology*. https://www.asha.org/policy/SP2016-00343/

American Speech-Language-Hearing Association. (2019). *National outcomes measurement system: Adults in healthcare-acute hospital national data report 2019*. National Center for Evidence-Based Practice in Communication Disorders.

Bartlett, G., Blais, R., Tamblyn, R., Clermont, R. J., & Macgibbon, B. (2008). Impact of patient communication problems on the risk of preventable adverse events in acute care settings. *Canadian Medical Association Journal*, *178*(12), 1555-1562. https://doi.org/10.1503/cmaj.070690

Bergbom-Engberg, I., & Haljamäe, H. (1993). The communication process with ventilator patients in the ICU as perceived by the nursing staff. *Intensive and Critical Care Nursing*, *9*(1), 40-47. https://doi.org/10.1016/0964-3397(93)90008-l

Bernstein, L. (2020, July 3). *More covid-19 patients are surviving ventilators in the ICU*. https://www.washingtonpost.com/health/more-covid-19-patients-are-surviving-ventilators-in-the-icu/2020/07/03/2e3c3534-bbca-11ea-8cf5-9c1b8d7f84c6_story.html.

Beukelman, D. R., & Mirenda, P. (2013). *Augmentative and alternative communication supporting children and adults with complex communication needs* (4th ed.). Paul H. Brookes Pub.

Burnett, E. (2020, April 3). *Widow describes emotional moment she lost her husband to Covid-19* [Interview]. US News; CNN. https://www.cnn.com/videos/us/2020/04/03/high-school-assistant-principal-coronavirus-wife-ebof-vpx.cnn/video/playlists/us-news/

Centers for Disease Control and Prevention. (n.d.). *SARS basic facts sheet*. https://www.cdc.gov/sars/about/fs-sars.html

Centers for Disease Control and Prevention. (2020a). *COVIDView summary ending October 24, 2020*. https://www.cdc.gov/coronavirus/2019-ncov/covid-data/covidview/past-reports/10302020.html

Centers for Disease Control and Prevention. (2020b, May 1). *Ten ways healthcare systems can operate effectively during the COVID-19 pandemic.* https://www.cdc.gov/coronavirus/2019-ncov/hcp/ways-operate-effectively.html

Centers for Disease Control and Prevention. (2020c, August 12). *COVID-19 overview and infection prevention and control priorities in non-US healthcare settings*. https://www.cdc.gov/coronavirus/2019-ncov/hcp/non-us-settings/overview/index.html

Centers for Disease Control and Prevention. (2020d, September 1). *About COVID-19*. https://www.cdc.gov/coronavirus/2019-ncov/cdcresponse/about-COVID-19.html

Centers for Disease Control and Prevention. (2020e, September 10). *Management of patients with confirmed 2019-nCoV*. https://www.cdc.gov/coronavirus/2019-ncov/hcp/clinical-guidance-management-patients.html

Centers for Disease Control and Prevention. (2020f, September 30). *COVID-19 Provisional counts - weekly updates by select demographic and geographic characteristics*. https://www.cdc.gov/nchs/nvss/vsrr/covid_weekly/index.htm

Centers for Disease Control and Prevention. (2021, May 13). *Different COVID-19 vaccines.* https://www.cdc.gov/coronavirus/2019-ncov/vaccines/different-vaccines.html?s_cid=10512:%2Bshould%20%2BI%20%2Bget%20%2Ba%20%2Bcovid%20%2Bvaccine:sem.b:p:RG:GM:gen:PTN:FY21

de Mestral, C., Iqbal, S., Fong, N., LeBlanc, J., Fata, P., Razek, T., & Khwaja, K. (2011). Impact of a specialized multidisciplinary tracheostomy team on tracheostomy care in critically ill patients. *Canadian Journal of Surgery, 54,* 167-172.

Downey, D., & Happ, M. B. (2013). The need for nurse training to promote improved patient-provider communication for patients with complex communication needs. *Perspectives on Augmentative and Alternative Communication*, *22*(2), 112–119. https://doi.org/10.1044/aac22.2.112

Finke, E. H., Light, J., & Kitko, L. (2008). A systematic review of the effectiveness of nurse communication with patients with complex communication needs with a focus on the use of augmentative and alternative communication. *Journal of Clinical Nursing, 17*(16), 2102-2115. https://doi.org/10.1111/j.1365-2702.2008.02373.x

Garrett, K., Happ, B., Costello, J., & Fried-Oken, M. (2007). AAC in the intensive care unit. In D. R. Beukelman, K. L. Garrett, & K. M. Yorkston (Eds.), *Augmentative communication strategies for adults with acute or chronic medical conditions* (pp. 17-157). Paul H. Brookes Publishing Co.

Happ, M. B., Garrett, K. L., Tate, J. A., Divirgilio, D., Houze, M. P., Demirci, J. R., George, E., & Sereika, S. M. (2014). Effect of a multi-level intervention on nurse–patient communication in the intensive care unit: Results of the SPEACS trial. *Heart & Lung*, *43*(2), 89-98. https://doi.org/10.1016/j.hrtlng.2013.11.010

Hurtig, R. R., Alper, R. M., & Berkowitz, B. (2018). The cost of not addressing the communication barriers faced by hospitalized patients. *Perspectives of the ASHA Special Interest Groups*, *3*(12), 99-112. https://doi.org/10.1044/persp3.sig12.99

Hurtig, R. R., Alper, R. M., Bryant, K. N. T., Davidson, K. R., & Bilskemper, C. (2019). Improving patient safety and patient-provider communication. *Perspectives of the ASHA Special Interest Groups*, 4(5), 1017-1027. https://doi.org/10.1044/2019_PERS-SIG12-2019-0021

Johns Hopkins Medicine. (2021, February 22). *New variants of coronavirus: What you should know.* https://www.hopkinsmedicine.org/health/conditions-and-diseases/coronavirus/a-new-strain-of-coronavirus-what-you-should-know

Johns Hopkins University. (2020a). *COVID-19 United States cases confirmed*. https://coronavirus.jhu.edu/us-map

Johns Hopkins University. (2020b). *COVID-19 United States cases deaths.* https://coronavirus.jhu.edu/us-map

Johnson, A. (2016). Interprofessional education and interprofessional practice in communication sciences and disorders: An introduction and case-based examples of implementation in education and health care settings. *https://www.asha.org/uploadedFiles/IPE-IPP-Reader-eBook.pdf*

Johnson, A. F., & Jacobson, B. H. (2017). *Medical speech-language pathology: a practitioner's guide* (3rd ed.). Thieme.

Kohn, L. T., Corrigan, J. M., & Donaldson, M. S. (Eds.). (2000). *To err is human: Building a safer health system, a report of the Committee on Quality of Health Care in America*. National Academic Press.

MacAulay, F., Judson, A., Etchels, M., Ashraf, S., Ricketts, I. W., Waller, A., Brodie, J. K., Alm, N., Warden, A., Shearer, A. J., & Gordon, B. (2002). Capturing phrases for ICU-Talk, a communication aid for intubated intensive care patients. *Proceedings of the Fifth International ACM Conference on Assistive Technologies - Assets '02*, 226-230. https://doi.org/10.1145/638249.638288

Marshall, S., & Hurtig, R. R. (2019). Developing a culture of successful communication in acute care settings: Part II. Solving institutional issues. *Perspectives of the ASHA Special Interest Groups*, *4*(5), 1037-1043. https://doi.org/10.1044/2019_pers-sig12-2019-0016

Meng, L., Qiu, H., Wan, L., Ai, Y., Xue, Z., Guo, Q., Deshpande, R., Zhang, L., Meng, J., Tong, C., Liu, H., & Xiong, L. (2020). Intubation and ventilation amid the COVID-19 outbreak. *Anesthesiology*, *132*(6), 1317-1332. https://doi.org/10.1097/aln.0000000000003296

Mheidly, N., Fares, M. Y., Zalzale, H., & Fares, J. (2020). Face masks on interpersonal communication during the COVID-19 pandemic. *Frontiers in Public Health, 8*(582191), 1-6. https://doi.org/10.3389/fpubh.2020.582191

Mitchell, P. H. (2005). What's in a name? Multidisciplinary, interdisciplinary, and transdisciplinary. *Journal of Professional Nursing, 21*, 332-334. https://doi.org/10.1016/j.profnurs.2005.10.009

Namasivayam-Macdonald, A. M., & Riquelme, L. F. (2020). Speech-language pathology management for adults with COVID-19 in the acute hospital setting: initial recommendations to guide clinical practice. *American Journal of Speech-Language Pathology*, 1-16.

Rodriguez, C. S., Rowe, M., Thomas, L., Shuster, J., Koeppel, B., & Cairns, P. (2016). Enhancing the communication of suddenly speechless critical care patients. *American Journal of Critical Care*, *25*(3). https://doi.org/10.4037/ajcc2016217

World Health Organization. (n.d.). *Naming the coronavirus disease (COVID-19) and the virus that causes it*. World Health Organization. https://www.who.int/emergencies/diseases/novel-coronavirus-2019/technical-guidance/naming-the-coronavirus-disease-(covid-2019)-and-the-virus-that-causes-it

World Health Organization. (2020a). *Shortage of personal protective equipment endangering health workers worldwide*. https://www.who.int/news-room/detail/03-03-2020-shortage-of-personal-protective-equipment-endangering-health-workers-worldwide

World Health Organization. (2020b, September 9). *Listings of WHO's response to COVID-19*. World Health Organization. Retrieved November 8, 2020, from https://www.who.int/news/item/29-06-2020-covidtimeline

Zaga, C. J., Berney, S., & Vogel, A. P. (2019). The feasibility, utility, and safety of communication interventions with mechanically ventilated intensive care unit patients: A systematic review. *American Journal of Speech-Language Pathology*, *28*(3), 1335-1355. https://doi.org/10.1044/2019_ajslp-19-0001

Zaga, C. J., Pandian, V., Brodsky, M. B., Wallace, S., Cameron, T. S., Chao, C., Orloff., L. A., Atkins, N. E., McGrath, B. A., Lazarus., C. L., Vogel., A. P., & Brenner, M. J. (2020). Speech-language pathology guidance for tracheostomy during the COVID-19 pandemic: An international multidisciplinary perspective. *American Journal of Speech-Language Pathology*, *29*(3), 1320-1334. https://doi.org/10.1044/2020_ajslp-20-00089

Zubow, L., & Hurtig, R. (2013). A demographic study of AAC/AT needs in hospitalized patients. *Perspectives on Augmentative and Alternative Communication*, *22*(2), 79-90. https://doi.org/10.1044/aac22.2.79

APPENDIX A

SURVEY

SURVEY

Informed Consent Form for Participation in Research

Title of Research Study:	*Exploring Communication Strategies Used by Speech-Language Pathologists and Nursing Professionals Prior to and During the Coronavirus Disease 2019 Pandemic*
Researcher(s):	Madeline Baretta, B.A., Audiology & Speech Language Sciences
Email:	madeline.baretta@unco.edu
Research Advisor:	Dr. Kim Murza, Ph.D., CCC-SLP, Audiology & Speech Language Sciences
Email:	kimberly.murza@unco.edu
Phone Number:	(970) 351-1084

Procedures: We would like to ask that you participate in a research study via a survey that will take approximately 10 minutes to complete. The primary purpose of this study is to investigate communication strategies and collaboration practices pre- and during- the COVID-19 pandemic as perceived by speech-language pathologists and nursing professionals. The survey will remain open for response for 30 days and you may receive one reminder email during this time. This research is intended for residents of the United States over the age of 18; if you are not a resident of the United States and/or under the age of 18, please do not complete this survey. Furthermore, this research is intended for speech-language pathologists and nursing professionals. Speech-language pathologists (SLPs) and nursing professionals will be the populations who will most benefit from this research.

Questions: If you have any questions regarding this research project, please do not hesitate to contact Madeline Baretta at madeline.baretta@unco.edu. If you have any concerns about your selection or treatment as a research participant, please contact Nicole Morse, the Research Compliance Manager at the University of Northern Colorado at nicole.morse@unco.edu or (970) 351-1910.

Voluntary Participation: Please understand that your participation in this research is voluntary. You may decide not to participate in this survey. You may decide to stop and withdraw at any time.

By starting this survey, you indicate your consent to voluntarily participate.

Q98 Please indicate your career.
- Nursing Professional
- Speech-Language Pathologist
- Other

Nursing Professional Survey

Q99 Are you a nursing professional practicing in a setting that is seeing COVID-19 positive patients?
- Yes
- No

NQ2 What type of setting do you currently work in?
- Acute Care
- Acute Rehab
- Intensive Care Unit (ICU)
- Step-down Unit
- Long Term Acute Care (LTAC)
- Critical Care (e.g., Pop-up COVID-19 care)
- Other

NQ3 Which best describes the type of unit you work in?
- Cardio
- Coronary
- Burn Care
- Pulmonary
- Neuro
- Surgical
- Emergency Room
- Other (Please describe below)

NQ4 In which state(s) do you currently work? If you work in multiple states, please select all that apply.
- Alabama
- Alaska
- Arizona
- Arkansas
- California
- Colorado
- Connecticut
- Delaware
- Florida
- Georgia
- Hawaii
- Idaho
- Illinois

- Indiana
- Iowa
- Kansas
- Kentucky
- Louisiana
- Maine
- Maryland
- Massachusetts
- Michigan
- Minnesota
- Mississippi
- Missouri
- Montana
- Nebraska
- Nevada
- New Hampshire
- New Jersey
- New Mexico
- New York
- North Carolina
- North Dakota
- Ohio
- Oklahoma
- Oregon
- Pennsylvania
- Rhode Island
- South Carolina
- South Dakota
- Tennessee
- Texas
- Utah
- Vermont
- Virginia
- Washington
- West Virginia
- Wisconsin
- Wyoming

NQ5 Which of the following best describes where you work?

- Rural
- Suburban
- City/Urban

NQ6 How long have you been working as a nursing professional?

- 0-5 years
- 6-10 years
- 11-15 years
- 16-20 years
- 21 years or more

NQ7 How long have you been working as a nursing professional in the acute care setting?

- 0-5 years
- 6-10 years
- 11-15 years
- 16-20 years
- 21 years or more

NQ8 How long have you been employed with your current employer?

- 0-5 years
- 6-10 years
- 11-15 years
- 16-20 years
- 21 years or more

NQ9 How many beds are in your hospital?

- 1-25
- 26-50
- 51-100
- 101-150
- 151-200
- 201 or more

The following are questions regarding your practices as a nursing professional **prior** to the COVID-19 pandemic.

NQ10 Prior to the COVID-19 pandemic, on average, what was the nurse-to-patient ratio?

- 1 patient : 1 nurse
- 2-3 patients : 1 nurse
- 4-5 patients : 1 nurse
- 6-10 patients : 1 nurse
- 11 or more patients : 1 nurse

For the purposes of this survey, collaboration will be defined as "two or more professions that learn about, from, and with each other to enable effective collaboration and improve outcomes for individuals and families whom we serve" (Johnson, 2016, p. 2).

Q101 Prior to the COVID-19 pandemic, please indicate how frequently you collaborated with speech-language pathology.

- I collaborated every day with speech-language pathology
- I collaborated a few days per week with speech-language pathology
- I collaborated once a week with speech-language pathology
- I rarely collaborated with speech-language pathology
- I never collaborated with speech-language pathology

NQ12 Please indicate how you collaborated with speech-language pathology prior to the COVID-19 pandemic (select all that apply).

- I confirmed or communicated about an order with speech-language pathology
- I received education information from speech-language pathology
- I received training from speech-language pathology
- Other (If other, please specify)

NQ13 Prior to the COVID-19 pandemic, did you work with mechanically ventilated patients, recently extubated patients, and/or patients who had tracheostomies?

- Yes
- No

NQ14 Please describe how often you worked with mechanically ventilated patients, recently extubated patients, and/or patients who had tracheostomies prior to the COVID-19 pandemic.

- I worked with mechanically ventilated patients, recently extubated patients, and/or patients who had tracheostomies every day.
- I worked with mechanically ventilated patients, recently extubated patients, and/or patients who had tracheostomies a few days per week.
- I worked with mechanically ventilated patients, recently extubated patients, and/or patients who had tracheostomies once a week.
- I rarely worked with mechanically ventilated patients, recently extubated patients, and/or patients who had tracheostomies.
- I never worked with mechanically ventilated patients, recently extubated patients, and/or patients who had tracheostomies.

NQ15 Please describe approximately what percentage of patients on your caseload were mechanically ventilated, recently extubated, and/or had tracheostomies prior to the COVID-19 pandemic.

- Less than 5% of my caseload
- 6-20% of my caseload
- 21-40% of my caseload
- 41-60% of my caseload
- 61-80% of my caseload
- 81-100% of my caseload

NQ16 Prior to the COVID-19 pandemic, did you receive training from a speech-language pathologist regarding communication strategies for mechanically ventilated patients, recently extubated patients, and/or patients with tracheostomies?

- Yes
- No

NQ17 Please describe how you received training from a speech-language pathologist regarding communication strategies for mechanically ventilated patients, recently extubated patients, and/or patients with tracheostomies prior to the COVID-19 pandemic (select all that apply).

- I received training in-person, within a group
- I received training in-person, one-on-one
- I received training via a handout, powerpoint, and/or email
- I received training via a webinar

NQ18 Please describe how often you received training from a speech-language pathologist regarding communication strategies for mechanically ventilated patients, recently extubated patients, and/or patients with tracheostomies prior to the COVID-19 pandemic.

- I received training every day
- I received training once a week
- I received training once a month
- I received training a few times a year
- I received training once a year

The following are questions regarding your practices as a nursing professional **during** the COVID-19 pandemic.

NQ19 Do you asses or treat COVID-19 positive patients?

- Yes, I exclusively assess and treat COVID-19 positive patients
- Yes, I sometimes assess and treat COVID-19 positive patients
- No, I do not assess or treat COVID-19 positive patients

NQ20 **During** the COVID-19 pandemic, on average, what has been your patient to nurse ratio?

- 1 patient : 1 nurse
- 2-3 patients : 1 nurse
- 4-5 patients : 1 nurse
- 6-10 patients : 1 nurse
- 11 or more patients : 1 nurse

For the purposes of this survey, collaboration will be defined as "two or more professions that learn about, from, and with each other to enable effective collaboration and improve outcomes for individuals and families whom we serve" (Johnson, 2016, p. 2).

NQ21 **During** the COVID-19 pandemic, please indicate how frequently you collaborate with speech-language pathology

- I collaborate every day with speech-language pathology
- I collaborate a few days per week with speech-language pathology
- I collaborate once a week with speech-language pathology
- I rarely collaborate with speech-language pathology
- I never collaborate with speech-language pathology

NQ22 Please indicate how you collaborate with speech-language pathology **during** the COVID-19 pandemic (select all that apply)

- I ask questions of speech
- I pass on orders to speech-language pathology
- I convey information to speech-language pathology
- I receive education information from speech-language pathology
- I receive training from speech-language pathology
- Other (If other, please specify)

NQ23 **During** the COVID-19 pandemic, do you work with mechanically ventilated patients, recently extubated patients, and/or patients with tracheostomies?

- Yes
- No

NQ24 Please describe how often you work with mechanically ventilated patients, recently extubated patients, and/or patients with tracheostomies **during** the COVID-19 pandemic

- I work with mechanically ventilated patients, recently extubated patients, and/or patients with tracheostomies every day
- I work with mechanically ventilated patients, recently extubated patients, and/or patients with tracheostomies a few days per week
- I work with mechanically ventilated patients, recently extubated patients, and/or patients with tracheostomies once a week
- I rarely work with mechanically ventilated patients, recently extubated patients, and/or patients with tracheostomies
- I never work with mechanically ventilated patients, recently extubated patients, and/or patients with tracheostomies

NQ25 Please describe approximately what percentage of patients on your caseload are mechanically ventilated, recently extubated, and/or patients who have tracheostomies.

- Less than 5% of my caseload
- 6-20% of my caseload
- 21-40% of my caseload
- 41-60% of my caseload
- 61-80% of my caseload
- 81-100% of my caseload

NQ26 **During** the COVID-19 pandemic, have you received training from a speech-language pathologist regarding communication strategies for mechanically ventilated patients, recently extubated patients, and/or patients with tracheostomies?

- Yes
- No

NQ27 Please describe how you received training from a speech-language pathologist regarding communication strategies for mechanically ventilated patients, recently extubated patients, and/or patients with tracheostomies **during** the COVID-19 pandemic.

- I received training in-person, within a group
- I received training in-person, one-on-one
- I received training via a handout, powerpoint, and/or email
- I received training via a webinar

NQ28 Please describe how often you received training from a speech-language pathologist regarding communication strategies for mechanically ventilated patients, recently extubated patients, and/or patients with tracheostomies **during** the COVID-19 pandemic.

- I received training every day
- I received training once a week
- I received training once a month
- I received training a few times a year
- I received training once a year

NQ29 Please respond to the following questions.
(Strongly agree, Agree, Somewhat agree, Neither agree nor disagree, Disagree, Strongly disagree)

- A lack of communication access has impacted the quality of care that a patient has received during the COVID-19 pandemic.
- A lack of training and/or education surrounding communication strategies has impacted the quality of care that a patient has received during the COVID-19 pandemic.
- I want better access to communication strategies to treat patients that are mechanically ventilated, recently extubated, and/or have tracheostomies.
- I want better access to training and/or education surrounding communication strategies to treat patients that are mechanically ventilated, recently extubated, and/or have tracheostomies.
- I am able to communicate effectively to adequately manage basic needs (e.g., pain) of patients who are mechanically ventilated, recently extubated, and/or have tracheostomies.
- It is within my job roles and responsibilities to facilitate effective communication for mechanically ventilated patients, recently extubated patients, and/or patients with tracheostomies.
- It is a priority of mine to facilitate effective communication for mechanically ventilated patients, recently extubated patients, and/or patients with tracheostomies.
- I believe that I have the time to facilitate effective communication for patients who are mechanically ventilated, recently extubated, or have tracheostomies.
- I believe that effective patient- provider communication directly impacts the quality of care a patient receives.
- I believe that effective patient- provider communication may prevent adverse events (e.g., pressure ulcers, ventilator associated pneumonias, falls, adverse drug events, etc.)
- I believe that poor patient- provider communication may result in a longer recovery time for the patient.
- I believe that poor- patient provider communication may result in negative emotions/feelings for the patient.
- I believe that poor- patient provider communication may result in physical discomfort for the patient.

The following are questions regarding communication strategies. Please click below for a guide to some of the materials referenced in the survey questions.

NQ30 Please indicate the high-tech AAC strategies you have utilized for mechanically ventilated patients, recently extubated patients, and/or patients with tracheostomies (both **prior** to COVID-19 *and* **during** COVID-19).
(Never, Rarely, Sometimes, Often, Always, I don't know)

- ICU- Talk
- Lingraphica
- Electrolarynx
- iPad/iPhone (please describe if specific app)
- Other (if other, please describe)

NQ31 Please indicate the low-tech AAC strategies you have utilized for mechanically ventilated patients, recently extubated patients, and/or patients with tracheostomies (both **prior** to COVID-19 *and* **during** COVID-19).
(Never, Rarely, Sometimes, Often, Always, I don't know)

- Pictures/Photographs
- Communication Binder/Book
- Alphabet Board
- White Board
- Pen/Paper
- In-line Speaking Valve for Tracheostomy (e.g., Passy Muir Valve)
- Other (if other, please describe)

NQ32 Please indicate the no-tech AAC strategies you have utilized for mechanically ventilated patients, recently extubated patients, and/or patients with tracheostomies (both **prior** to COVID-19 *and* **during** COVID-19).
(Never, Rarely, Sometimes, Often, Always, I don't know)

- Gestures
- Manual Signs
- Facial Expressions
- Verbalizations/Vocalizations
- Digital Occlusion for Tracheostomy
- Other (if other, please describe)

The following are additional questions regarding the COVID-19 pandemic and how it has/has not impacted your practice and/or your hospital.

NQ33 Did the availability of personal protective equipment (PPE) impact your ability to see COVID-19 positive patients?

- Yes
- No

NQ34 Please explain how the availability of personal protective equipment (PPE) impacted your ability to see COVID-19 positive patients.

NQ35 Did your hospital implement a schedule and/or position changes/reassignments to minimize contact with COVID-19 positive patients?

- Yes
- No

NQ36 Please describe the schedule and/or positional changes/reassignments your hospital implemented to minimize contact with COVID-19 positive patients (e.g., Five 8-hour shifts were changed to four 10-hour shifts, etc.)

NQ37 Does your hospital have a protocol for improving communication outcomes for individuals with complex communication needs?

- Yes
- No
- I don't know

NQ38 Please describe your hospital's protocol for improving communication outcomes for individuals with complex communication needs.

NQ39 Do you feel that your hospital's protocol for improving communication outcomes for individuals with complex communication needs is successful?

- Yes (please explain)
- No (please explain)
- I don't know (please explain)

NQ40 Please describe your hospital's response to minimizing aerosol generating procedures during the COVID-19 pandemic.

- I did not see any precautions being executed
- I occasionally saw precautions being executed
- I always saw precautions being executed

SPEECH-LANGUAGE PATHOLOGIST SURVEY

SLPQ1 Are you a speech-language pathologist practicing in a setting that is seeing COVID-19 positive patients?

- Yes
- No

SLPQ2 What type of setting do you currently work in?

- Acute Care
- Acute Rehab
- Intensive Care Unit (ICU)
- Step-down Unit
- Long Term Acute Care (LTAC)
- Critical Care (e.g., Pop-up COVID-19 care)
- Other

SLPQ3 In which state(s) do you currently work? If you work in multiple states, please select all that apply.

- Alabama
- Alaska
- Arizona
- Arkansas
- California
- Colorado
- Connecticut
- Delaware
- Florida
- Georgia
- Hawaii
- Idaho
- Illinois
- Indiana
- Iowa
- Kansas
- Kentucky
- Louisiana
- Maine
- Maryland
- Massachusetts
- Michigan
- Minnesota
- Mississippi
- Missouri
- Montana
- Nebraska
- Nevada

- New Hampshire
- New Jersey
- New Mexico
- New York
- North Carolina
- North Dakota
- Ohio
- Oklahoma
- Oregon
- Pennsylvania
- Rhode Island
- South Carolina
- South Dakota
- Tennessee
- Texas
- Utah
- Vermont
- Virginia
- Washington
- West Virginia
- Wisconsin
- Wyoming

SLPQ4 Which of the following best describes where you work?

- Rural
- Suburban
- City/Urban

SLPQ5 How long have you been working as a speech-language pathologist?

- 0-5 years
- 6-10 years
- 11-15 years
- 16-20 years
- 21 years or more

SLPQ6 How long have you been working as a speech-language pathologist in the acute care setting?

- 0-5 years
- 6-10 years
- 11-15 years
- 16-20 years
- 21 years or more

SLPQ7 How long have you been employed with your current employer?

- 0-5 years
- 6-10 years
- 11-15 years
- 16-20 years
- 21 years or more

SLPQ8 How many speech-language pathologists are employed in the facility in which you work?

- 1-3
- 4-6
- 7-9
- 10 or more

SLPQ9 How many beds are in your hospital?

- 1-25
- 26-50
- 51-100
- 101-150
- 151-200
- 201 or more

The following are questions regarding your practices as a speech-language pathologist **prior** to the COVID-19 pandemic.

SLPQ10 **Prior** to the COVID-19 pandemic, on average, how many patients did you see on your caseload daily?

- 0-5
- 6-10
- 11-15
- 16-20
- 21 or more

For the purposes of this survey, collaboration will be defined as "two or more professions that learn about, from, and with each other to enable effective collaboration and improve outcomes for individuals and families whom we serve" (Johnson, 2016, p. 2).

SLPQ11 **Prior** to the COVID-19 pandemic, please indicate how frequently you collaborated with nursing professionals.

- I collaborated every day with nursing
- I collaborated a few days per week with nursing
- I collaborated once a week with nursing
- I rarely collaborated with nursing
- I never collaborated with nursing

SLPQ12 Please indicate how you collaborated with nursing professionals **prior** to the COVID-19 pandemic (select all that apply)

- I answered a question for nursing
- I passed on an order for nursing
- I conveyed information for nursing
- I provided education for nursing
- I provided training for nursing
- Other (If other, please specify)

SLPQ13 **Prior** to the COVID-19 pandemic, did you work with mechanically ventilated patients, recently extubated patients, and/or patients who had tracheostomies?

- Yes
- No

SLPQ14 Please describe how often you worked with mechanically ventilated patients, recently extubated patients, and/or patients who had tracheostomies **prior** to the COVID-19 pandemic.

- I worked with mechanically ventilated patients, recently extubated patients, and/or patients who had tracheostomies every day
- I worked with mechanically ventilated patients, recently extubated patients, and/or patients who had tracheostomies a few days per week
- I worked with mechanically ventilated patients, recently extubated patients, and/or patients who had tracheostomies once a week
- I rarely worked with mechanically ventilated patients, recently extubated patients, and/or patients who had tracheostomies
- I never worked with mechanically ventilated patients, recently extubated patients, and/or patients who had tracheostomies

SLPQ15 Please describe approximately what percentage of patients on your caseload were mechanically ventilated, recently extubated, and/or patients who had tracheostomies

- Less than 5% of my caseload
- 6-20% of my caseload
- 21-40% of my caseload
- 41-60% of my caseload
- 61-80% of my caseload
- 81-100% of my caseload

SLPQ16 Did you counsel and/or educate patients, family members, and/or other health care professionals on communication strategies for mechanically ventilated patients, recently extubated patients, and/or patients who had tracheostomies **prior** to the COVID-19 pandemic?

- Yes
- No

SLPQ17 Please describe how often you counseled and/or educated others on communication strategies for mechanically ventilated patients, recently extubated patients, and/or patients with tracheostomies **prior** to the COVID-19 pandemic.

- I counseled and/or educated every day
- I counseled and/or educated a few days per week
- I counseled and/or educated once a week
- I rarely counseled and/or educated
- I never I counseled and/or educated

The following are questions regarding your practices as a speech-language pathologist **during** the COVID-19 pandemic.

SLPQ18 Do you assess or treat COVID-19 positive patients?

- Yes, I exclusively assess and treat COVID-19 positive patients
- Yes, I sometimes assess and treat COVID-19 positive patients
- No, I do not assess or treat COVID-19 positive patients

SLPQ19 **During** the COVID-19 pandemic, on average, how many patients did you see on your caseload daily?

- 0-5
- 6-10
- 11-15
- 16-20
- 21 or more

For the purposes of this survey, collaboration will be defined as "two or more professions that learn about, from, and with each other to enable effective collaboration and improve outcomes for individuals and families whom we serve" (Johnson, 2016, p. 2).

SLPQ20 **During** the COVID-19 pandemic, please indicate how frequently you collaborated with nursing professionals.

- I collaborate every day with nursing
- I collaborate a few days per week with nursing
- I collaborate once a week with nursing
- I rarely collaborate with nursing
- I never collaborate with nursing

SLPQ21 Please indicate how you collaborate with nursing professionals **during** the COVID-19 pandemic (select all that apply).

- I answer questions for nursing
- I pass on orders for nursing
- I convey information for nursing
- I provide education for nursing
- I provide training for nursing
- Other (If other, please specify)

SLPQ22 **During** the COVID-19 pandemic, do you work with mechanically ventilated patients, recently extubated patients, and/or patients with tracheostomies?

- Yes
- No

SLPQ23 Please describe how often you work with mechanically ventilated patients, recently extubated patients, and/or patients with tracheostomies **during** the COVID-19 pandemic.

- I work with mechanically ventilated patients, recently extubated patients, and/or patients with tracheostomies every day
- I work with mechanically ventilated patients, recently extubated patients, and/or patients with tracheostomies a few days per week
- I work with mechanically ventilated patients, recently extubated patients, and/or patients with tracheostomies once a week
- I rarely work with mechanically ventilated patients, recently extubated patients, and/or patients with tracheostomies
- I never work with mechanically ventilated patients, recently extubated patients, and/or patients with tracheostomies

SLPQ24 Please describe approximately what percentage of patients on your caseload are mechanically ventilated, recently extubated, and/or patients with tracheostomies

- Less than 5% of my caseload
- 6-20% of my caseload
- 21-40% of my caseload
- 41-60% of my caseload
- 61-80% of my caseload
- 81-100% of my caseload

SLPQ25 Do you counsel and/or educated patients, family members, and/or other health care professionals on communication strategies for mechanically ventilated patients, recently extubated patients, and/or patients with tracheostomies **during** the COVID-19 pandemic?

- Yes
- No

SLPQ26 Please describe how often you counsel and/or educate patients, family members, and/or other health care professionals on communication strategies for mechanically ventilated patients, recently extubated patients, and/or patients with tracheostomies **during** the COVID-19 pandemic.

- I counsel and/or educate every day
- I counsel and/or educate a few days per week
- I counsel and/or educate once a week
- I rarely counsel and/or educate
- I never counsel and/or educate

SLPQ27 Please respond to the following questions.
(Strongly agree, Agree, Somewhat agree, Neither agree nor disagree, Somewhat disagree, Disagree, Strongly Disagree)

- A lack of communication access has impacted the quality of care that a patient has received during the COVID-19 pandemic.
- A lack of training and/or education surrounding communication strategies has impacted the quality of care that a patient has received during the COVID-19 pandemic.
- I want better access to communication strategies to treat patients that are mechanically ventilated, recently extubated, and/or have tracheostomies.
- I want better access to training and/or education surrounding communication strategies to treat patients that are mechanically ventilated, recently extubated, and/or have tracheostomies.
- I am able to communicate effectively to adequately manage basic needs (e.g.pain) of patients who are mechanically ventilated, recently extubated, and/or have tracheostomies.
- It is within my job roles and responsibilities to facilitate effective communication for mechanically ventilated patients, recently extubated patients, and/or patients with tracheostomies.
- It is a priority of mine to facilitate effective communication for mechanically ventilated patients, recently extubated patients, and/or patients with tracheostomies.
- I believe that I have the time to facilitate effective communication for patients who are mechanically ventilated, recently extubated, or have tracheostomies.
- I believe that effective patient- provider communication directly impacts the quality of care a patient receives.
- I believe that effective patient- provider communication may prevent adverse events (e.g., pressure ulcers, ventilator associated pneumonias, falls, adverse drug events, etc.)
- I believe that poor patient- provider communication may result in a longer recovery time for the patient.
- I believe that poor- patient provider communication may result in negative emotions/feelings for the patient.
- I believe that poor- patient provider communication may result in physical discomfort for the patient.

The following are questions regarding communication strategies. Please click below for a guide to some of the materials referenced in the survey questions.

SLPQ28 Please indicate the high-tech AAC strategies you have utilized for mechanically ventilated patients, recently extubated patients, and/or patients with tracheostomies (both **prior** to COVID-19 *and* **during** COVID-19).
(Never, Rarely, Sometimes, Often, Always, I don't know)

- ICU- Talk
- Lingraphica
- Electrolarynx
- iPad/iPhone (please describe if specific app)
- Other (if other, please describe)

SLPQ29 Please indicate the low-tech AAC strategies you have utilized for mechanically ventilated patients, recently extubated patients, and/or patients with tracheostomies (both **prior** to COVID-19 *and* **during** COVID-19).
(Never, Rarely, Sometimes, Often, Always, I don't know)

- Pictures/Photographs
- Communication Binder/Book
- Alphabet Board
- White Board
- Pen/Paper
- In-line Speaking Valve for Tracheostomy (e.g., Passy Muir Valve)
- Other (if other, please describe)

SLPQ30 Please indicate the no-tech AAC strategies you have utilized for mechanically ventilated patients, recently extubated patients, and/or patients with tracheostomies (both **prior** to COVID-19 *and* **during** COVID-19).
(Never, Rarely, Sometimes, Often, Always, I don't know)

- Gestures
- Manual Signs
- Facial Expressions
- Verbalizations/Vocalizations
- Digital Occlusion for Tracheostomy
- Other (if other, please describe)

The following are additional questions regarding the COVID-19 pandemic and how it has/has not impacted your practice and/or your hospital.

SLPQ31 Did the availability of personal protective equipment (PPE) impact your ability to see COVID-19 positive patients?

- Yes
- No

SLPQ32 Please explain how the availability of personal protective equipment (PPE) impacted your ability to see COVID-19 positive patients.

SLPQ33 Did your hospital implement a schedule and/or position changes/reassignments to minimize contact with COVID-19 positive patients?

- Yes
- No

SLPQ34 Please describe the schedule and/or positional changes/reassignments your hospital implemented to minimize contact with COVID-19 positive patients (e.g., Five 8-hour shifts were changed to four 10-hour shifts, etc.)

SLPQ35 Does your hospital have a protocol for improving communication outcomes for individuals with complex communication needs?

- Yes
- No
- I don't know

SLPQ36 Please describe your hospital's protocol for improving communication outcomes for individuals with complex communication needs.

SLPQ37 Do you feel that your hospital's protocol for improving communication outcomes for individuals with complex communication needs is successful?

- Yes (please explain)
- No (please explain)
- I don't know (please explain)

SLPQ38 Please describe your hospital's response to minimizing aerosol generating procedures during the COVID-19 pandemic.

- I did not see any precautions being executed
- I occasionally saw precautions being executed
- I always saw precautions being executed

APPENDIX B

INSTITUTIONAL REVIEW BOARD APPROVAL

UNIVERSITY OF
NORTHERN COLORADO

Institutional Review Board

Date:	02/05/2021
Principal Investigator:	Madeline Baretta
Committee Action:	**IRB EXEMPT DETERMINATION – New Protocol**
Action Date:	02/05/2021
Protocol Number:	2101019942
Protocol Title:	Exploring Communication Strategies Used By Speech-Language Pathologists and Nurses pre- and during- the COVID-19 Pandemic
Expiration Date:	

2101019942

The University of Northern Colorado Institutional Review Board has reviewed your protocol and determined your project to be exempt under 45 CFR 46.104(d)(702) for research involving

Category 2 (2018): EDUCATIONAL TESTS, SURVEYS, INTERVIEWS, OR OBSERVATIONS OF PUBLIC BEHAVIOR. Research that only includes interactions involving educational tests (cognitive, diagnostic, aptitude, achievement), survey procedures, interview procedures, or observation of public behavior (including visual or auditory recording) if at least one of the following criteria is met: (i) The information obtained is recorded by the investigator in such a manner that the identity of the human subjects cannot readily be ascertained, directly or through identifiers linked to the subjects; (ii) Any disclosure of the human subjects' responses outside the research would not reasonably place the subjects at risk of criminal or civil liability or be damaging to the subjects' financial standing, employability, educational advancement, or reputation; or (iii) The information obtained is recorded by the investigator in such a manner that the identity of the human subjects can readily be ascertained, directly or through identifiers linked to the subjects, and an IRB conducts a limited IRB review to make the determination required by 45 CFR 46.111(a)(7).

You may begin conducting your research as outlined in your protocol. Your study does not require further review from the IRB, unless changes need to be made to your approved protocol.

As the Principal Investigator (PI), you are still responsible for contacting the UNC IRB office if and when:

UNIVERSITY OF
NORTHERN COLORADO

Institutional Review Board

- You wish to deviate from the described protocol and would like to formally submit a modification request. Prior IRB approval must be obtained before any changes can be implemented (except to eliminate an immediate hazard to research participants).
- You make changes to the research personnel working on this study (add or drop research staff on this protocol).
- At the end of the study or before you leave The University of Northern Colorado and are no longer a student or employee, to request your protocol be closed. *You cannot continue to reference UNC on any documents (including the informed consent form) or conduct the study under the auspices of UNC if you are no longer a student/employee of this university.
- You have received or have been made aware of any complaints, problems, or adverse events that are related or possibly related to participation in the research.

If you have any questions, please contact the Research Compliance Manager, Nicole Morse, at 970-351-1910 or via e-mail at nicole.morse@unco.edu. Additional information concerning the requirements for the protection of human subjects may be found at the Office of Human Research Protection website - http://hhs.gov/ohrp/ and https://www.unco.edu/research/research-integrity-and-compliance/institutional-review-board/.

Sincerely,

Nicole Morse
Research Compliance Manager

University of Northern Colorado: FWA00000784

2101019912

APPENDIX C

NURSING PROFESSIONAL DEMOGRAPHICS

NURSING PROFESSIONAL DEMOGRAPHICS

Survey Question	n (%)
Are you a nursing professional practicing in a setting that is seeing COVID-19 positive patients?	
Yes	15 (93.75)
No	1 (6.25)
What type of setting do you currently work in?	
Acute Care	2 (14.29)
Acute Rehab	0 (0)
Intensive Care Unit (ICU)	8 (57.14)
Step-down Unit	3 (21.43)
Long Term Acute Care (LTAC)	0 (0)
Critical Care (e.g., Pop-up COVID-19 care)	0 (0)
Other	1 (7.14)
Which best describes the type of unit you work in?	
Cardio	0 (0)
Coronary	0 (0)
Burn Care	0 (0)
Pulmonary	6 (46.15)
Neuro	0 (0)
Surgical	1 (7.69)
Emergency Room	0 (0)
Other (Medical/Tele, Med/Surg/Tele, Medical, Medical/ Tele/Stepdown, General ICU)	6 (46.15)
In which state(s) do you currently work? If you work in multiple states, please select all that apply.	
Alabama	0 (0)
Alaska	0 (0)
Arizona	0 (0)
Arkansas	0 (0)
California	1 (7.14)
Colorado	6 (42.86)
Connecticut	0 (0)
Delaware	0 (0)
Florida	0 (0)
Georgia	0 (0)
Hawaii	0 (0)
Idaho	0 (0)
Illinois	0 (0)
Indiana	0 (0)
Iowa	0 (0)

Kansas	0 (0)
Kentucky	0 (0)
Louisiana	0 (0)
Maine	0 (0)
Maryland	1 (7.14)
Massachusetts	0 (0)
Michigan	0 (0)
Minnesota	0 (0)
Mississippi	0 (0)
Missouri	0 (0)
Montana	0 (0)
Nebraska	0 (0)
Nevada	0 (0)
New Hampshire	0 (0)
New Jersey	0 (0)
New Mexico	0 (0)
New York	0 (0)
North Carolina	5 (35.71)
North Dakota	0 (0)
Ohio	0 (0)
Oklahoma	0 (0)
Oregon	0 (0)
Pennsylvania	0 (0)
Rhode Island	0 (0)
South Carolina	0 (0)
South Dakota	0 (0)
Tennessee	0 (0)
Texas	1 (7.14)
Utah	0 (0)
Vermont	0 (0)
Virginia	0 (0)
Washington	0 (0)
West Virginia	0 (0)
Wisconsin	0 (0)
Wyoming	0 (0)

Which of the following best describes where you work?

Rural	0 (0)
Suburban	7 (53.85)
City/Urban	6 (46.15)

How long have you been working as a nursing professional?	
0-5 years	5 (38.56)
6-10 years	4 (30.77)
11-15 years	1 (7.69)
16-20 years	1 (7.69)
21 years or more	2 (15.38)
How long have you been working as a nursing professional in the acute care setting?	
0-5 years	6 (46.15)
6-10 years	2 (15.38)
11-15 years	1 (7.69)
16-20 years	2 (15.38)
21 years or more	2 (15.38)
How long have you been employed with your current employer?	
0-5 years	9 (69.23)
6-10 years	2 (15.38)
11-15 years	2 (15.38)
16-20 years	0 (0)
21 years or more	0 (0)
How many beds are in your hospital?	
1-25	0 (0)
26-50	0 (0)
51-100	4 (30.77)
101-150	2 (15.38)
151-200	0 (0)
201 or more	7 (53.85)

APPENDIX D

SPEECH-LANGUAGE PATHOLOGY DEMOGRPHICS

SPEECH-LANGUAGE PATHOLOGY DEMOGRAPHICS

Survey Question	n (%)
Are you a speech-language pathologist practicing in a setting that is seeing COVID-19 positive patients?	
Yes	33 (52.38)
No	30 (47.62)
What type of setting do you currently work in?	
Acute Care	19 (57.58)
Acute Rehab	4 (12.12)
Intensive Care Unit (ICU)	4 (12.12)
Step-down Unit	0 (0))
Long Term Acute Care (LTAC)	0 (0)
Critical Care (e.g., Pop-up COVID-19 care)	0 (0)
Other	6 (18.18)
In which state(s) do you currently work? If you work in multiple states, please select all that apply.	
Alabama	0 (0)
Alaska	0 (0)
Arizona	0 (0)
Arkansas	0 (0)
California	2 (7.41)
Colorado	8 (29.63)
Connecticut	0 (0)
Delaware	0 (0)
Florida	1 (3.70)
Georgia	0 (0)
Hawaii	0 (0)
Idaho	0 (0)
Illinois	0 (0)
Indiana	0 (0)
Iowa	0 (0)
Kansas	0 (0)
Kentucky	0 (0)
Louisiana	0 (0)
Maine	0 (0)
Maryland	1 (3.70)
Massachusetts	3 (11.11)
Michigan	0 (0)
Minnesota	0 (0)
Mississippi	0 (0)
Missouri	0 (0)

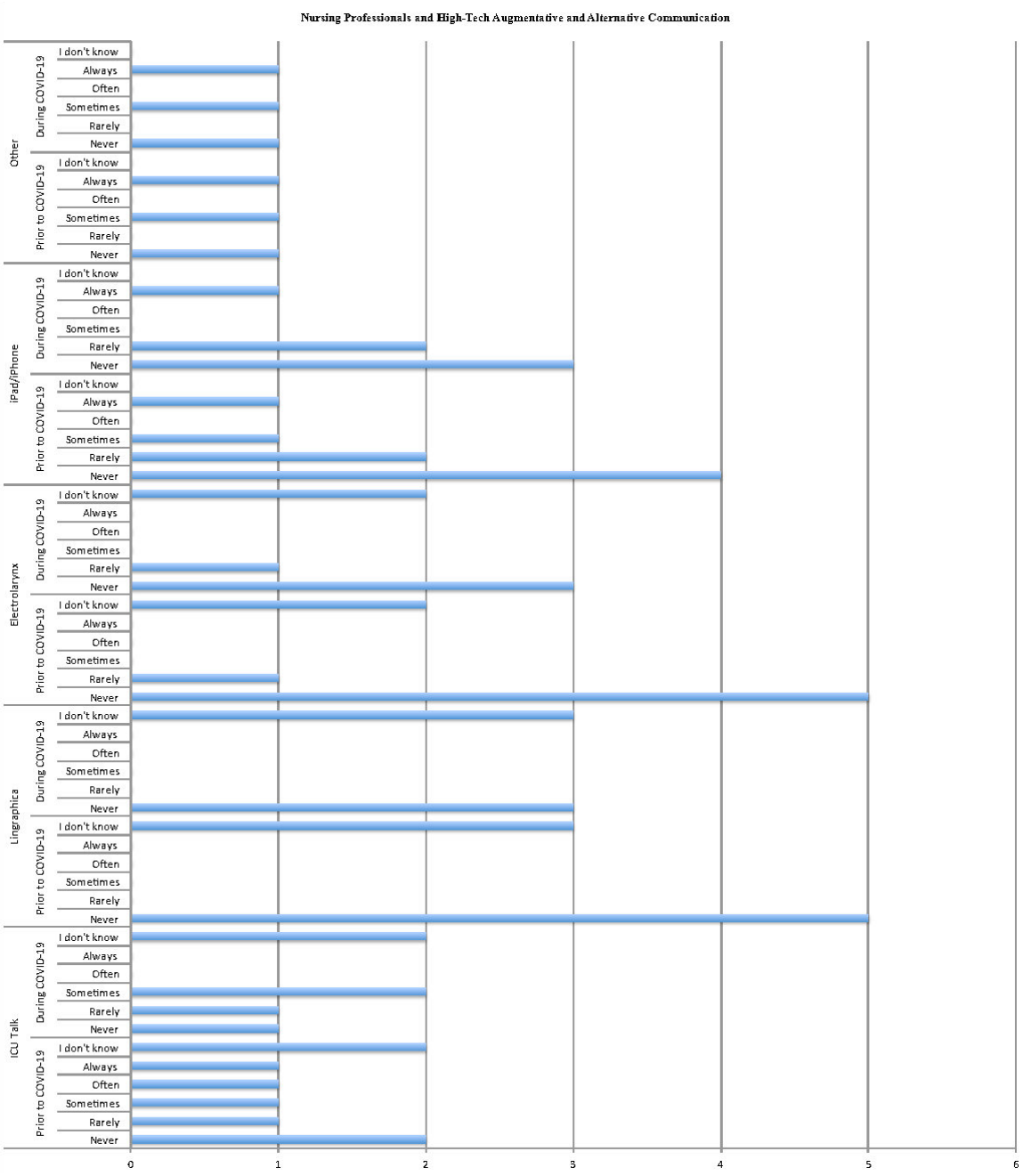
Montana	0 (0)
Nebraska	0 (0)
Nevada	0 (0)
New Hampshire	0 (0)
New Jersey	0 (0)
New Mexico	0 (0)
New York	1 (3.70)
North Carolina	1 (3.70)
North Dakota	0 (0)
Ohio	0 (0)
Oklahoma	0 (0)
Oregon	1 (3.70)
Pennsylvania	2 (7.41)
Rhode Island	0 (0)
South Carolina	0 (0)
South Dakota	0 (0)
Tennessee	0 (0)
Texas	0 (0)
Utah	0 (0)
Vermont	0 (0)
Virginia	0 (0)
Washington	0 (0)
West Virginia	0 (0)
Wisconsin	6 (22.22)
Wyoming	0 (0)
Which of the following best describes where you work?	
Rural	3 (11.11)
Suburban	4 (14.81)
City/Urban	20 (74.07)
How long have you been working as a speech-language pathologist?	
0-5 years	8 (29.63)
6-10 years	6 (22.22)
11-15 years	3 (11.11)
16-20 years	6 (22.22)
21 years or more	4 (14.81)
How long have you been working as a speech-language pathologist in the acute care setting?	
0-5 years	10 (37.04)
6-10 years	5 (18.52)
11-15 years	4 (14.81)
16-20 years	5 (18.52)
21 years or more	3 (11.11)

How long have you been employed with your current employer?	
0-5 years	15 (55.56)
6-10 years	5 (18.52)
11-15 years	2 (7.41)
16-20 years	2 (7.41)
21 years or more	3 (11.11)
How many speech-language pathologists are employed in the facility in which you work?	
1-3	3 (11.11)
4-6	9 (33.33)
7-9	3 (11.11)
10 or more	12 (44.44)
How many beds are in your hospital?	
1-25	0 (0)
26-50	2 (7.41)
51-100	3 (11.11)
101-150	5 (18.52)
151-200	3 (11.11)
201 or more	14 (51.85)

APPENDIX E

NURSING PROFESSONAL HIGH-TECH AUGMENTATIVE AND ALTERNATIVE COMMUNICATION STRATEGIES USED PRE- AND DURING THE CORONAVIRUS DISEASE-2019 PANDEMIC

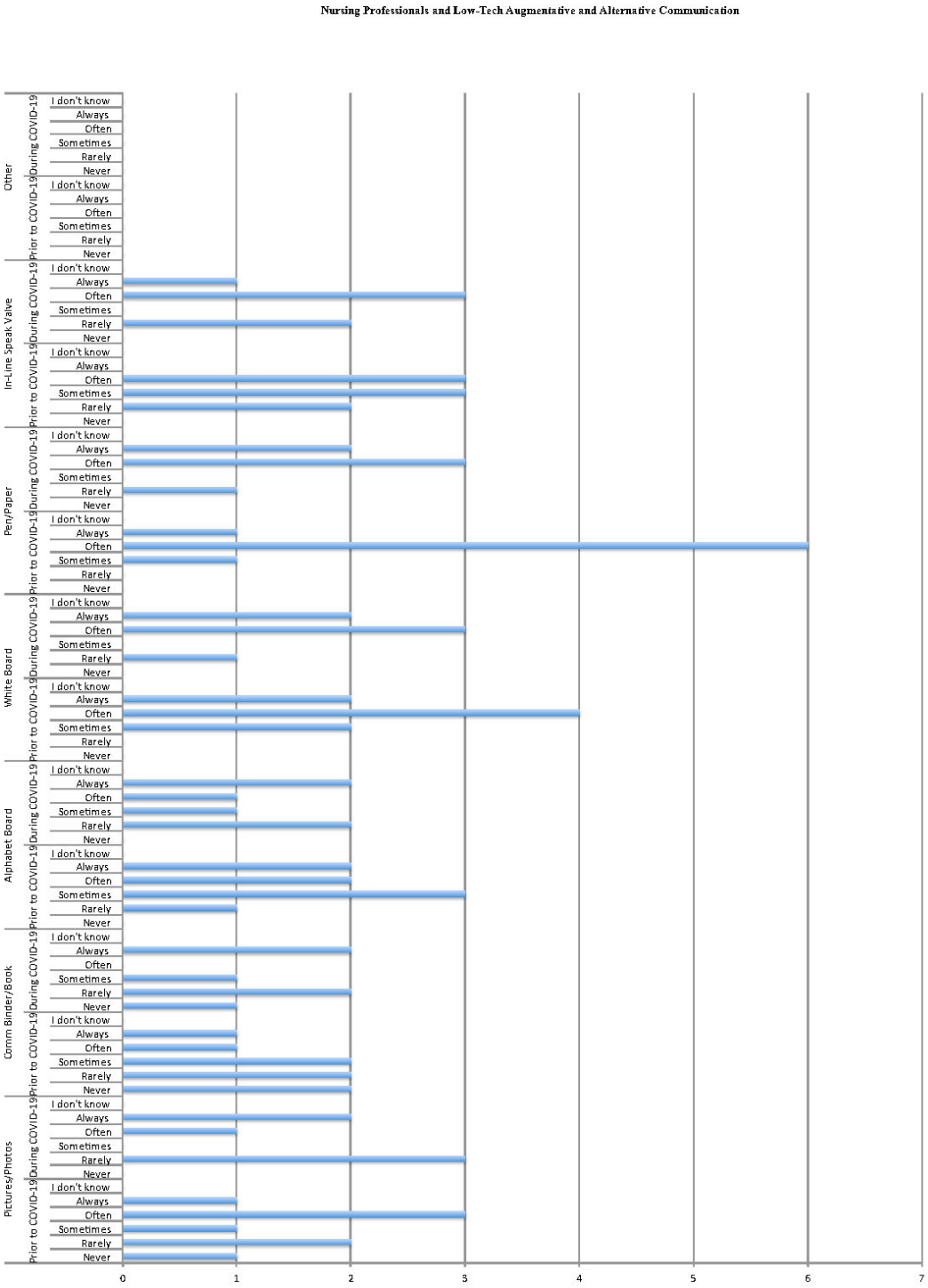
NURSING PROFESSIONAL HIGH-TECH AUGMENTATIVE AND ALTERNATIVE COMMUNICATION STRATEGIES USED PRE- AND DURING THE CORONAVIRUS DISEASE-2019 PANDEMIC



APPENDIX F

NURSING PROFESSIONAL LOW-TECH AUGMENTATIVE AND ALTERNATIVE COMMUNICATION STRATEGIES USED PRE- AND DURING THE CORONAVIRUS DISEASE-2019 PANDEMIC

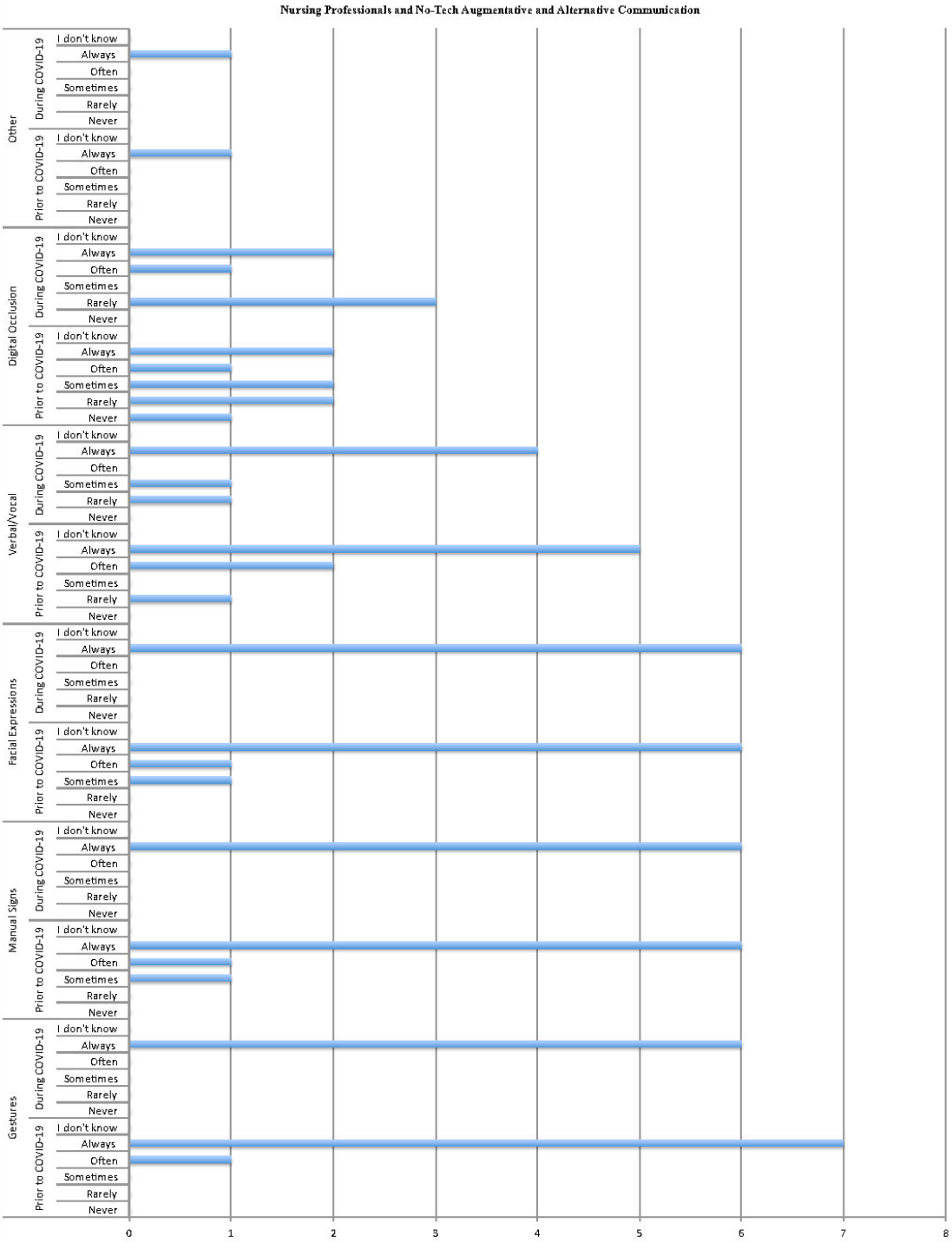
NURSING PROFESSIONAL LOW-TECH AUGMENTATIVE AND ALTERNATIVE COMMUNICATION STRATEGIES USED PRE- AND DURING THE CORONAVIRUS DISEASE-2019 PANDEMIC



APPENDIX G

NURSING PROFESSONAL NO-TECH AUGMENTATIVE AND ALTERNATIVE COMMUNICATION STRATEGIES USED PRE- AND DURING THE CORONAVIRUS DISEASE-2019 PANDEMIC

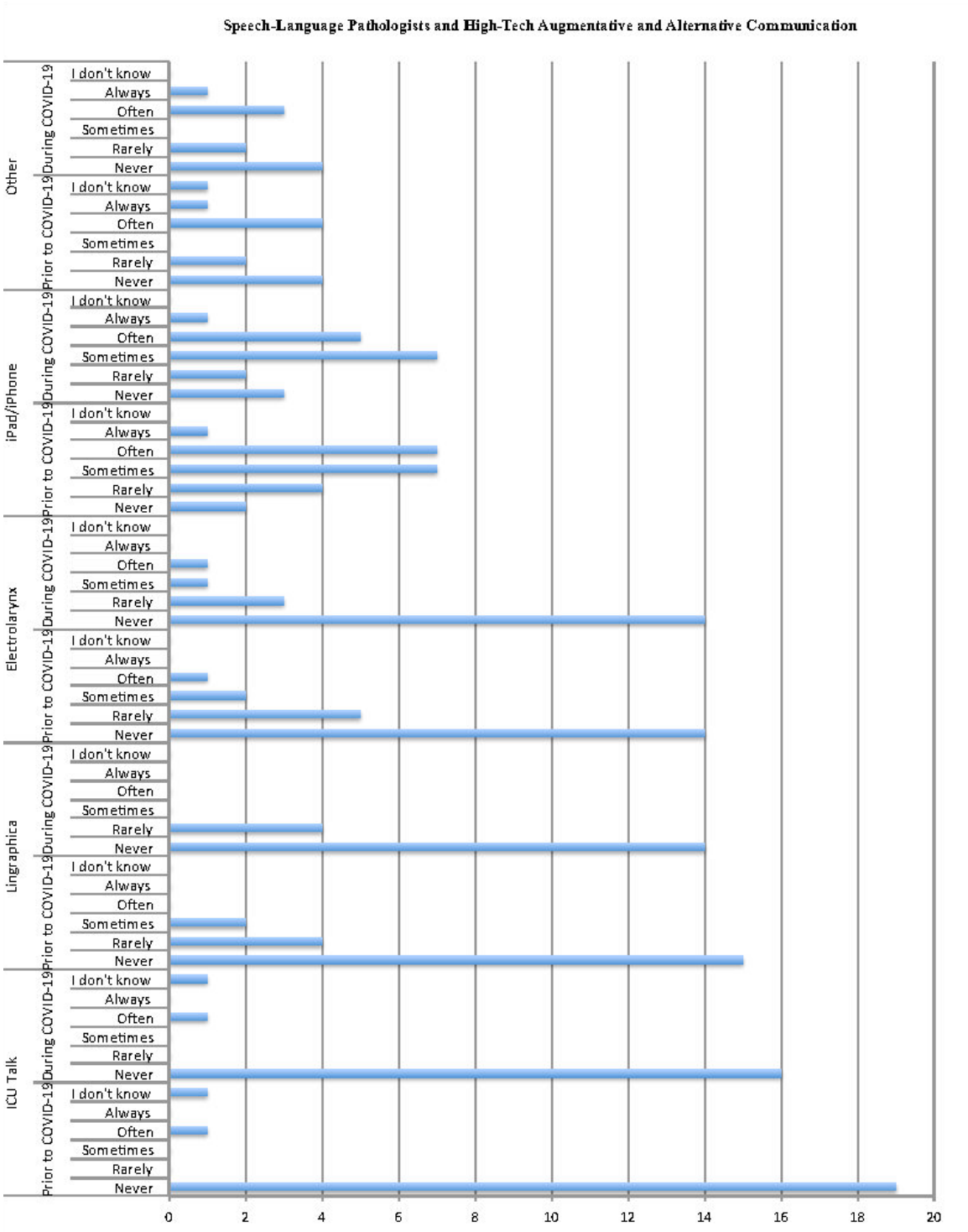
NURSING PROFESSIONAL NO-TECH AUGMENTATIVE AND ALTERNATIVE COMMUNICATION STRATEGIES USED PRE- AND DURING THE CORONAVIRUS DISEASE-2019 PANDEMIC



APPENDIX H

SPEECH-LANGUAGE PATHOLOGIST HIGH-TECH AUGMENTATIVE AND ALTERNATIVE COMMUNICATION STRATEGIES USED PRE- AND DURING THE CORONAVIRUS DISEASE-2019 PANDEMIC

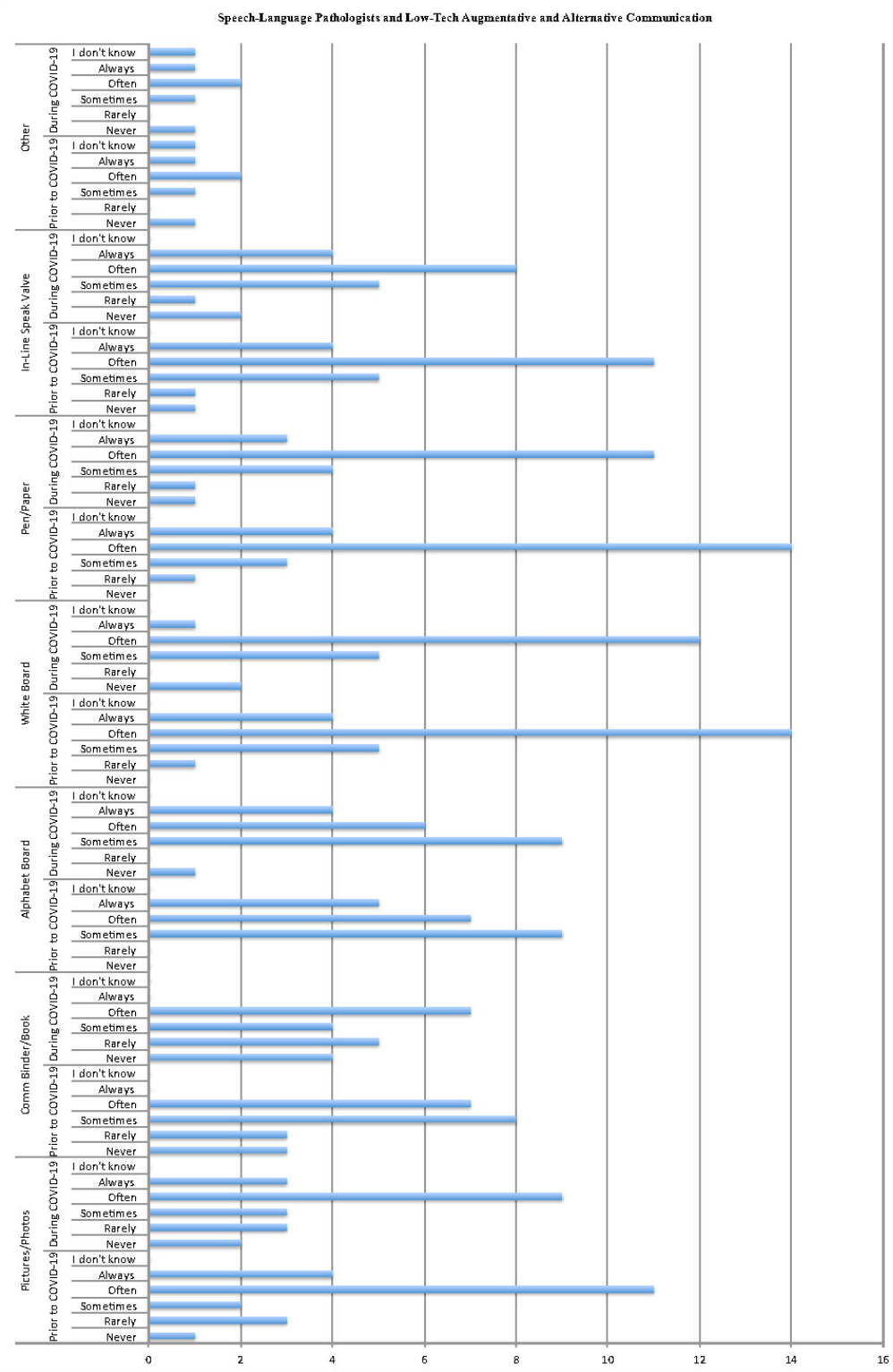
SPEECH-LANGUAGE PATHOLOGIST HIGH-TECH AUGMENTATIVE AND ALTERNATIVE COMMUNICATION STRATEGIES USED PRE- AND DURING THE CORONAVIRUS DISEASE-2019 PANDEMIC



APPENDIX I

SPEECH-LANGUAGE PATHOLOGIST LOW-TECH AUGMENTATIVE AND ALTERNATIVE COMMUNICATION STRATEGIES USED PRE- AND DURING THE CORONAVIRUS DISEASE-2019 PANDEMIC

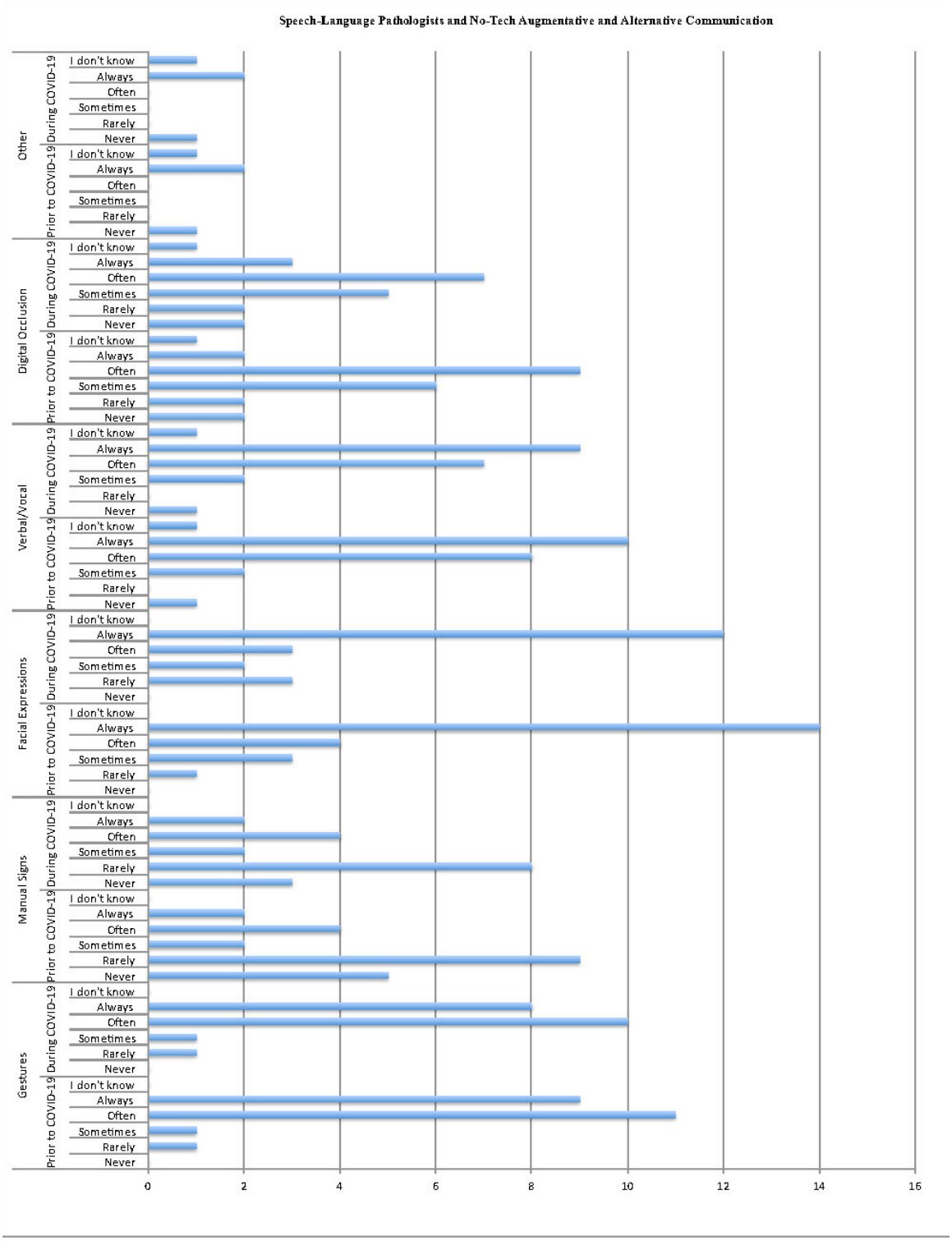
SPEECH-LANGUAGE PATHOLOGIST LOW-TECH AUGMENTATIVE AND ALTERNATIVE COMMUNICATION STRATEGIES USED PRE- AND DURING THE CORONAVIRUS DISEASE-2019 PANDEMIC



APPENDIX J

SPEECH-LANGUAGE PATHOLOGIST NO-TECH AUGMENTATIVE AND ALTERNATIVE COMMUNICATION STRATEGIES USED PRE- AND DURING THE CORONAVIRUS DISEASE-2019 PANDEMIC

SPEECH-LANGUAGE PATHOLOGIST NO-TECH AUGMENTATIVE AND ALTERNATIVE COMMUNICATION STRATEGIES USED PRE- AND DURING THE CORONAVIRUS DISEASE-2019 PANDEMIC



APPENDIX K

COMMUNICATION STRATEGIES GUIDE

COMMUNICATION STRATEGIES GUIDE

High-tech AAC

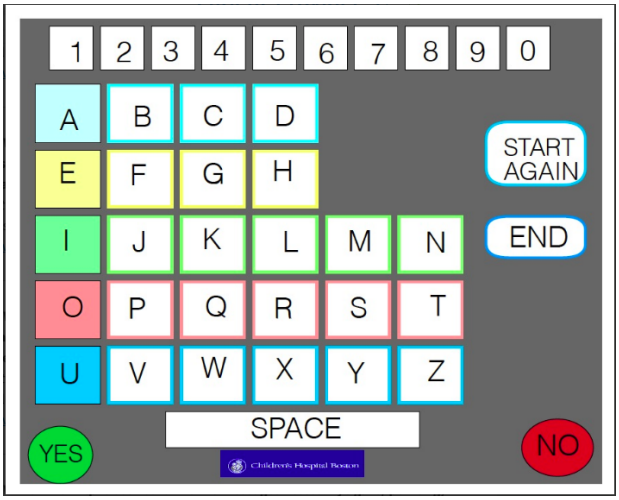
(1) ICU-Talk

(2) Lingraphica

(3) Electrolarynx

Low-tech AAC

(4) Alphabet Board



(5) In-line speaking valve

Image References:

(1) [Voxello – Better Patient Outcomes]. Closing The Gap. https://www.closingthegap.com/voxello-better-patient-outcomes/
(2) [Lingraphica AAC device]. Lingraphica. https://www.aphasia.com/aac-device-accessories/
(3) [TruTone Electrolarynx]. Griffin Laboratories. http://www.griffinlab.com/Products/TruTone-Electrolarynx.html
(4) [Vowels First Alphabet and Number Board Access]. Patient-Provider Communication; John M. Costello, Children's Hospital Boston. https://www.patientprovidercommunication.org/gallery/?Category=Alphabet%20Boards
(5) [Passy Muir Valves]. Passy Muir. https://www.passy-muir.com/