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The official, peer-reviewed, international, scholarly journal of the American Nurses Association - New York (ANA-NY) dedicated to disseminating quality and rigorous research, evidenced-based and quality improvement initiatives, case studies and reviews or applications of research to improve nursing practice, education and health care policy.

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TABLE OF CONTENTS

Innovations in the lens of system thinking, research and nursing informatics:	
The editor's vantage point	3
Edmund J. Y. Pajarillo https://doi.org/10.47988/janany.98644712.2.2	
Becoming a Mother During the Covid-19 Pandemic:	
A Time of Resilience and Reflection	5
Karen Mancini https://doi.org/10.47988/janany.89232823.2.2	
Factors Influencing the Severity of Diabetic Retinopathy in Patients with Type 2	
Diabetes Mellitus in Korea	12
Yeong-Mi Jo, Yun-Jeong Boo & Susie Yoon https://doi.org/10.47988/janany.786428687081.2.2	
Overcoming Bar Code Medication Administration Scanning	
Challenges in the Emergency Department	20
Annie George and Rachel Jacob https://doi.org/10.47988/janany.23101964.2.2	
Critical Appraisal of Clinical Practice Guidelines (CPG) Training for Graduate Student Nurses:	
Exemplar of a CPG for the Management of Post-Traumatic Stress Disorder (PTSD)	28
Peter Torcivia, Ifeoma Nkemakolam, M. Danet Lapiz-Bluhm https://doi.org/10.47988/janany.33648481.2.2	
Support of LGBTQ+ People with Intellectual and	
Developmental Disabilities in Group Homes	35
Chinazo Echezona-Johnson https://doi.org/10.47988/janany.444764667081.2.2	
The Association between Neighborhood Factors and Bullying	
among Adolescents with Asthma	43
Ellen M. McCabe & Shiela M. Strauss https://doi.org/10.47988/janany.6410282831.2.2	
Language Proficiency and Academic Success of Bilingual	
Hispanic Nursing Students along the US-Mexico Border	49
Cristina Dominguez De Quezada, Danita Alfred, Melinda Hermanns, Danice Brown Greer, Shellye Vardaman & Maria Amaya https://doi.org/10.47988/janany.4491588158643655.2.2	
INDEX OF PEER REVIEWERS FOR 2022	60
https://doi.org/10.47988/janany.PR.index.2022	

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** We appreciate the work that Purdue University Online Writing Laboratory (OWL) offers to the public and allowing anyone to be able to use their available services.*

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Innovations in the lens of system thinking, research and nursing informatics: The editor's vantage point

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Editor-in-Chief

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Innovations are essential, particularly with technology having massive effects on our roles and processes as nurses. Innovations entail change and can be unsettling for most. For innovations to successfully transpire, there must be buy-in from all stakeholders and end-users. As nurses, we can and should drive our own future. We have the knowledge, capability and skills to identify system issues and gaps and effectively do something about them.

I have always motivated students and colleagues to identify and develop innovations, whether these are for practice, education, research or administration. Being constantly immersed in various systems as nurses, we witness egregious circumstances that can be mitigated to improve nursing and patient care outcomes.

The American Association of Colleges of Nursing (2021, p. 44) lists system-based practice as one of the core competencies that all nurses must have. It is “foundational to the delivery of quality care and incorporates key concepts of organizational structure ... knowledge of financial and payment models relative to reimbursement and healthcare costs ... (as well as) the impact of local, regional, national, and global structures, systems, and regulations on individuals and diverse populations ...” Patients, families, communities and populations are client-based systems, and one’s knowledge and application of system theory (such as Betty Neumann’s theory) can likewise be integrated when considering innovations.

Wolf et al. (2021, p. 206) described three components of innovation – idea, invention and diffusion. As one sees gaps in our roles and processes, an idea comes to mind, whether it is a clear or serendipitous thought about an actual or potential problem or the realization that there is something better than the status quo. This idea is then transformed into an invention; something that is novel and can remarkably improve the existing pattern or situation. With its stark novelty and significance, it implodes by way of diffusion either like wildfire or at its own pace.

Vanaki & Rafiei (2020) demonstrated the application of system theory in the prevention of pressure injuries among stroke patients by addressing various and typical stressors that affect the five components of the client-based system, i.e., physical, psychological, sociocultural, developmental, and spiritual. When critically examining the processes that we integrate in preventing pressure injury, we will have a more comprehensive analysis of care gaps when we deconstruct each of the five subsystems of the patient’s structure. It will be easy to find at least one idea from these components when an invention can be thought of and can readily be adapted. One example that I quickly identified is the effect of stroke on a patient’s mental state. We know that depression can readily set in among stroke patients. An idea that I thought of is the early initiation of psychotherapeutic preventive measures for both patient and families. This will enhance early awareness and

understanding of depressive symptoms once evident in order for targeted interventions to be implemented. I am sure you all can think of other ideas that you can turn into innovations that can eventually change care protocol and policy.

When mentoring or guiding nurses to think of innovations, several concepts and frameworks are useful. Some of these include: fundamentals in nursing; processes used in physical or community assessments; nursing interventions, pharmacogenetics or pharmacotherapeutics; principles of medication administration; or, basic nutrition and physiotherapy. Some or all can be replete of gaps or snafus. One needs to examine closely our many roles and processes using these concepts and frameworks in order to see where actual or potential problems can occur. We are also adept in the use of research in order to ascertain solutions to problems we encounter in nursing. This is where research becomes even more relevant when thinking of innovations. As we apply the many concepts, frameworks and theories in our practice of nursing, creative ideas come to our consciousness when confronted with anomalous, outdated or questionable practices. This is when we question the status quo, come up with ideas that turn into inventions, and easily adapted into practice after being validated using evidence-based research.

The same may be said of nursing informatics and many of its applications, e.g., the use of healthcare technologies, data analytics and project management. The compelling influence of nursing informatics in all facets of our lives is as palpable in nursing. While most of our processes have been automated, there are still many more that can be mitigated using nursing informatics concepts, tools and applications. Even our roles as nurses can be retooled in order to enhance our performance, effectiveness and sustainability. We see nurses who use their knowledge of data mining, analytics, technologies, and project management into innovative roles as independent practitioners, consultants, life coaches, health and wellness experts, data specialists, design thinkers, and many more. We are no longer confined to the traditional roles that we have been accustomed and trained to do. Our practice can be broad and extending, depending on how far our own imagination will take us. With innovations that we bring to life, we direct our own course.

We live at a time when the world is changing. Nurses are known to be innovators. This is the perfect opportunity for nurses to bring more meaningful, relevant and professionally satisfying roles and processes to our practice. What an exciting time to be actively part of the progressive changes occurring in nursing! Using our understanding of system theory, research and nursing informatics, our possibilities are endless. Would you care to join the movement towards innovative nursing?

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ORIGINAL RESEARCH

Becoming a Mother During the Covid-19 Pandemic: A Time of Resilience and Reflection

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Abstract

Background: Giving birth during a pandemic has not been experienced in the last 100 years. The psychological effects on new mothers related to the COVID-19 pandemic are not yet well-known. **Objective:** This research explored the lived experiences of mothers who were pregnant and gave birth during the pandemic. **Methodology:** The design of the study was a qualitative phenomenological analysis. Data were collected through one-on-one, semi-structured interviews conducted on a secure Zoom platform until thematic redundancy occurred. Colaizzi's method was used to analyze the narratives of a sample of ten mothers who gave birth during the pandemic. **Results:** Participants' poignantly described the joys and challenges of giving birth during the pandemic. Five theme clusters emerged from the data: *Expecting with fear and uncertainty while living in isolation; Giving birth in a changed environment; Breastfeeding, it's different every time; Not what I expected from life after giving birth, and A year of mixed emotions.* **Limitations:** The sample was limited to women living in the Northeast part of the U.S. Subsequently, the experience described may have been different from women in other regions and demographics. **Clinical Implications:** The findings of this study illustrate the need for health education, notably breastfeeding education for first-time and experienced mothers. Since the coming months and years will continue to be unprecedented times, nurses in obstetrics, pediatrics and primary care should be attentive to any long-term psychosocial problems during routine visits.

Keywords: COVID-19 pandemic, pregnancy, birth, breastfeeding

Funding: No funding was obtained

Conflict of Interest: There is no conflict of interest in the preparation of this manuscript.

Becoming a Mother During the COVID-19 Pandemic: A Time of Resilience and Reflection

Background

On March 16th 2020, the World Health Organization (WHO) announced that COVID-19 was a worldwide pandemic (WHO, 2020). The initial COVID-19 surge hit the Northeast region of the United States particularly hard, changing people's daily lives and health care delivery. This was especially true for childbearing women. Routines during pregnancy, birth and postpartum were significantly altered, as pregnant women were advised to be extra vigilant during the mandatory lockdown. Public health recommendations were changing weekly, leading to confusion and uncertainty. Hospitals restricted visitors, with some labor and delivery units even restricting the birth partner during the surge. Since giving birth during a pandemic is a phenomenon that has not been experienced in the last 100 years, the psychological effects on new mothers related to the COVID-19 pandemic are not yet well-known. The purpose of this study was to examine the lived experience of giving birth and mothering during the COVID-19 pandemic.

Becoming a mother is a transformational life stage normally characterized by feelings of ambivalence (Babetin, 2020). Joyful anticipation is often tempered with feelings of anxiety and uncertainty about the birth experience and impending motherhood. While these are expected characteristics of childbearing, the literature suggests that stressful events during pregnancy or birth can precipitate other mental health issues, including postpartum depression and post-traumatic stress disorder (Oni et al., 2015; Giarratano et al., 2008). Beck and Casvant (2019) examined the phenomena of post-traumatic stress related to traumatic birth. They found that following a birth perceived as traumatic, a woman may experience distressing symptoms and the mother-infant relationship may be affected. In addition to traumatic birth experiences, this phenomenon has also been studied regarding unprecedented events such as natural disasters. Studies suggest that giving birth during a natural disaster can have a negative effect on perinatal health (Harville et al., 2015). One study found that disaster-related stress can affect coping styles and may complicate pregnancy (Oni et al., 2015). Less research has been devoted to giving birth during disease epidemics. For example, the Zika virus outbreak was declared a public health crisis by the WHO in 2016 (Chen & Tang, 2016), and Potera (2018) reported that one in seven newborns exposed to Zika prenatally exhibited birth defects. Yet, few studies examined the psychological effects on the mother. Recent studies of COVID-19's effect on maternal and child health focused on transmission of the virus to the newborn, virus trajectory in pregnant women and new mothers, and effect on the newborn (Choi et al, 2020). Choi and colleagues suggest that given the changes to usual care, research and policies into maternal and child health during a pandemic are warranted. Fewer studies have examined the psychological and psychosocial effects of the COVID-19 pandemic on pregnancy and birth. Ostacoli et al., 2020 found a high incidence of depressive symptoms and post-traumatic stress disorder (PTSD) in postpartum mothers

who delivered during the pandemic in Italy which had been on total lockdown at the time of the study. The sample consisted of 163 mothers, 74 (45.4%) were first time mothers (Ostacoli et al., 2020). Lim et al., (2021) found that the mothers reported negative mood related to isolation and lack of exercise and poor sleep.

Uncovering the experiences of becoming a mother during a pandemic can add to the existing body of literature of the effects of stressful events on pregnancy and birth. This study examines the lived experience of women who gave birth during the COVID-19 pandemic.

Methodology

Research Design

Phenomenology as a research method seeks to understand human consciousness and self-awareness (Lopez & Willis, 2004). Phenomenology uncovers the essence of a phenomenon as lived by persons who have had the experience. An important tenet of phenomenology is the belief that essence of lived experiences may be revealed through one-to-one interactions between the researcher and participant (Wojnar & Swanson, 2007). Husserl, the founder of phenomenology, believed that in order to uncover the true essence the researcher should 'bracket' or keep notations of preconceived ideas (Husserl, 2012). Therefore, in order to preserve objectivity, the researcher kept field notes during participant interviews and analysis of the transcripts. To promote rigor of the study, the researcher practiced reflexivity during the study by journaling thoughts and perceptions. An audit trail was kept during the data analysis to ensure confirmability. These steps were undertaken to ensure trustworthiness of the data and to support rigor of the study (Korstjens & Moser, 2018).

Procedure

Institutional Review Board (IRB) approval was obtained from the researcher's university. Participants were recruited through a posting on a regional parents' Facebook group and continued through snowball sampling. Interested participants were directed to email the researcher who then responded by email with the informed consent attached. Those who agreed to participate emailed the researcher a statement that they had read the informed consent and agreed to participate. Virtual face to face interviews were conducted on the university's secured Zoom platform. Interviews were conducted from December 2020 through March 2021. The interviews were audio recorded and transcribed by a transcription service. Interviews continued until thematic redundancy was obtained. Participants were assured that a pseudonym would be used to protect anonymity. Confidentiality was maintained and the transcripts were secured by the researcher. A small token of a \$10 Amazon gift card, purchased by the researcher, was sent to participants by email.

Sample

Sampling was snowball in nature and consisted of ten mothers who gave birth between March 2020 and September 2020 in seven

hospitals across two Northeast states. Four participants were first-time mothers, four gave birth to their second child, and two gave birth to their third child. The mothers ranged in age from 29- 40 years of age. All but one participant was employed full-time prior to lockdown. One mother reported not being able to work during the pandemic, while eight participants were working full-time remotely. All participants were living with partners during the period of time they described, although one woman, whose husband was a healthcare worker, stayed with her parents temporarily for fear of contracting the virus. At the time of the interviews, which began December 2020 and continued through March 2020, the youngest infant was 5 months old and one child was about to celebrate the first birthday.

Interview Guide

A broad opening statement, “Tell me about your experience of having a baby during the pandemic,” was followed by prompts and follow-up questions such as “What do you remember about the days and weeks following the birth?” Finally, participants were asked, “When you look back on this experience, how do you think you will remember it?”

Table 1

Summary Table of Thematic Analysis

Significant Statement	Formulated Meaning	Theme cluster
“So, I was afraid the entire time. I remember before going to the hospital, making my wishes to my husband, giving him passwords to my accounts and everything just in case I didn't make it.”	Fear of illness or death	Expecting with fear and uncertainty while living in isolation
“So, it was literally just the five of us for months. And it was difficult because the girls couldn't go to school when we had planned. I felt like there wasn't enough of me for everybody and it was hard.”	Parenting challenges due to lockdown	Not what I expected from life after giving birth
“I wish there was a little more support regarding breastfeeding. I knew it was going to be hard. I heard so many women say, "Delivery's nothing, breastfeeding's the hardest thing about all of this." And you don't really know it until you experience it.”	Needing more lactation support	Breastfeeding: Its different every time
“I feel very lucky and blessed for a lot of the positive things that came out of giving birth this past year. But on the flip side it was completely isolating and lonely.”	Conflicting reflections	A year of mixed emotions

Data Analysis

Data was analyzed using the Colaizzi method of data analysis. Colaizzi's method constructs a thematic description that helps to apply meaning and understanding to the data (Creswell, 2017). In the first step of the method, the researcher read and reread the transcripts to glean significant statements which ensured that the phenomenon under study was the focus of the analysis. From the significant statements, the researcher developed formulated meanings which ascribed meaning and uncovered commonalities between participants. These phrases were clustered into themes, which when assembled, create a thematic description of the phenomenon under study (Table 1). In the final step, the researcher practiced member checking and returned to one participant to ensure that the meaning resonated with the experience.

Results

The resultant theme clusters are: *Expecting with fear and uncertainty while living in isolation; Giving birth in a changed environment; Breastfeeding, it's different every time; Not what I expected of life after giving birth; and A year of mixed emotions.*

Theme Cluster 1: Expecting with Fear and Uncertainty While Living in Isolation

All participants described their feelings when lockdown was announced. The excitement they felt about having a baby was suddenly tempered with uncertainty and fear. There was a general sense of uncertainty in the country because of the unknown aspects of the virus transmission and the staggering death toll. Fear of getting sick with coronavirus was especially relevant to pregnant women. This was demonstrated by all participants. One participant expressed,

And then all of a sudden, the pandemic hit, and it just became this long, elongated period of time where I just feel stressed about sickness, and now these concerns about coronavirus and not knowing what could happen to anyone, let alone just being a pregnant woman.

The usual concerns about getting sick with colds and flu took on a new meaning as the morbidity and mortality of the virus was unfolding. This fear was reported by all participants, who described feeling frightened with every sneeze or cough. Theresa, a healthcare worker shared her feelings poignantly, “I think one of my biggest fears was contracting the virus and not surviving the pregnancy, or God forbid dying and not being able to see the child”. In addition to the fear of getting ill, participants expressed their concerns about passing COVID-19 to their newborn. At that time, very little was known regarding transmission of the virus to the fetus. This was evident in Cassandra's statement: “The entire time I was pregnant I didn't go to a single place because I was afraid since there wasn't much research on what happens to pregnant women or the unborn baby if I were to get it.”

Participants who delivered early in the pandemic faced the uncertainty of delivering without their partner present. Elizabeth noted, “For a week or two it was looking like I was going to have to do it alone.” Due to unfolding scientific data, policies

were changing rapidly. This was seconded by Lisa, "... because I was due in May, could my husband be there or not? Would he be allowed to stay with me? Would I be allowed to have visitors? ... everything kept changing from week to week." All participants were able to have their respective partners present during their baby's delivery.

Living in isolation during lockdown was described in detail by the participants. This unprecedented phenomenon was especially significant to pregnant women. Lisa, who gave birth at the end of May described,

I basically felt like I couldn't see or be around anybody. I have a very close relationship with my parents and I saw my parents two times between March and the delivery. And it was just weird to be that pregnant and not feel like I could hug my mom.

The feelings of isolation extended to routine healthcare visits during pregnancy. Obstetrician and gynecology offices instituted strict protocols to prevent the spread of the virus. Lisa expressed "The doctor's office told me that not only was I not allowed to have any visitors, but nobody was allowed to be with me." Nurses and healthcare workers in antepartum care created innovative ways to help women feel connected, using technology to fill the void of having a support person present at visits. Theresa described her experience: "So, we would FaceTime just right at the time where they were doing the ultrasounds, so that I could place the camera towards the screen and he could see the baby and be part of the discussion."

Participants described ways they isolated to keep safe, sometimes altering the family unit for safety. This was noted by mothers who had a spouse who worked outside the home. Leslie said, "I actually stayed with my mother, because my husband is in the medical field and he was going to work every day, so I was very nervous about that. So, for a few weeks, I stayed with my mom and my son." She added, "I felt terrible leaving my husband."

Theme Cluster 2: Giving Birth in a Changed Environment

Participants described the COVID-19 restrictions put in place when they were admitted in labor. Restrictions included masking during delivery, no visitors, shortened length of stay, and less contact with staff. These restrictions, although rigorous, were welcome signs that health and safety were being monitored closely. Lisa offered, "My husband literally wasn't allowed to leave the room, not to go to the hallway, not to go downstairs and get food, none of it. But honestly, once she was born and we were at the hospital, it was fine." The restricted visitor policy was described by all participants and was enforced in all facilities. While participants expressed feelings of sadness about not introducing their newborn to family members, all participants described the time as peaceful, and an opportunity for uninterrupted bonding with their baby. The absence of visitors was noted by all the mothers, and the presence of the nurse was described as an important source of emotional and physical support.

Some participants described the nurse's presence decreased their anxiety surrounding COVID-19, as well as helping new mothers and fathers feel less overwhelmed on the postpartum

unit. Lisa explained, "I mean, the nurses, when you give birth, are your lifeline. They would just come in and chat a little bit. I just feel in general, the experience I had with them was they're just so calming." Others mentioned that nursing presence on the postpartum unit was less than they had experienced after previous deliveries. One participant who had a cesarean section described her experience with the nurses. "They were kind. They treated me with respect and empathy, but again, nothing out of the ordinary." Diane, who was assisted by a team of midwives, discussed the coordinated care and reassurance that the midwives and nurses provided.

And then the midwives also were just wonderful. I found them to be very warm and relatable. I had a little bit of a bleeding episode... and I was so nervous and one of the young midwives literally just climbed on the bed with me and was holding me because I was shaking and nervous. And so, I think this time around, I had the best care.

In addition to nursing presence, participants described shortened length of stay on the postpartum unit. Some participants were discharged in 24 hours, which impacted health education, notably breastfeeding education and assessment for postpartum depression. Participants shared that the screening for postpartum depression was perfunctory. Most participants stated that they filled out a paper survey, but it was not discussed in-depth by the nurses. Mary mentioned,

I think I was a little disillusioned, sort of, at the lack of genuine interest in the mother's health or mental health who were being discharged. The discharge form seems like something to cover the hospital for liability rather than to genuinely advise others of what postpartum depression could look like or feel like.

None of the participants reported having had postpartum depression, although most participants stated that they will continue to reflect upon and process the events of the last year.

Theme Cluster 3: Breastfeeding, it's Different Every Time

All participants discussed infant feeding and relayed vivid descriptions of breastfeeding their newborn. Most were not visited by a lactation consultant, which they assumed was due to COVID-19 restrictions. First-time mothers described the need for more support than was available. Sarah stated, "There was no lactation consultant, which was unfortunate. There were nurses that were on lactation. I didn't feel like they were super knowledgeable or supportive." Five of the mothers had previously breastfed, but as Lisa noted, "I had previously breastfed, but it's different every time." While participants stated that they realized person to person contact was kept to a minimum, even multiparas expressed the need for reassurance that feeding was going well. Feeling pressured to breastfeed from the nurses and staff was discussed. One participant stated, "I also felt so much pressure. There was guilt placed on me if I didn't breastfeed. Even when I mentioned anything about pumping, they're like, well, you just breastfeed now." Another participant mentioned about the pain and difficulty of breastfeeding for the first time as having been minimized and not fully addressed.

Theme Cluster 4: Not What I Expected of Life After Giving Birth

The participants discussed the postpartum period and beyond. There was a sense of loss for what they had anticipated. Leslie noted, "I couldn't even enjoy my maternity leave bonding with my daughter, because I'm trying to teach kindergarten to a five-year-old. So, there's a lot of challenges through it that are very frustrating." Another mother shared, "I found that it makes me mad or frustrated to not be able to enjoy my maternity leave." Participants discussed what they had planned for the first months that they were unable to do. Mary stated, "There were no maternal yoga classes, no mommy and me or anything. I didn't get to meet new parents." Anne summed her experience after bringing her newborn home, "But there's almost like a dark shadow over everything because you can't really celebrate the way you want to." Participants described reaching out to family and friends by FaceTime, but missed the human contact and visits from family, notably with the newborn's grandparents.

Theme Cluster 5: A Year of Mixed Emotions

When participants were asked how they would remember the experience of becoming a mother during the pandemic, rich descriptions were shared; the period of time surrounding the birth of their child would be remembered with mixed emotions, blessings, and struggles. Participants expressed that the enormity of the experience had not really been processed at that time. A few of the participants became emotional when asked this question. Leslie shared, "So, I feel like, right now, this may not hit me until years from now, or when we start to get more normalcy, and I'll be like, what the heck just happened?" Mary offered, "Well, it was certainly memorable. I feel very lucky and blessed for a lot of the positive things that came out of giving birth this past year. But on the flip side it was completely isolating and lonely." The lockdown and isolation of the pandemic brought unexpected blessings that were common to all participants. The special time to bond with their newborn, partner and children was described as memorable and something that set this experience apart from previous birth stories. Leslie stated,

I just think that my daughter is going to have a really interesting story behind her birth, and I think there's a lot of positive out of it, like the fact that we got to spend time with her, just the three of us, which we may never be able to really get back again like that, that's a very nice moment.

The descriptions of how they will look back on the experience were inspiring and illustrated the strength of these mothers. Finally, Diane summed up the experience, "I'm going to tell them that I'm proud of our family for weathering a crazy, unprecedented storm, and I'm proud of myself for giving birth and then feeding this tiny human and taking care of the rest of my family the best I could."

Thematic Description: Becoming a Mother During the COVID -19 Pandemic: A Time of Resilience and Reflection

All participants revealed that having a baby in 2020 was far from what they expected from their pregnancy, birth and postpartum period. Quite suddenly, a routine pregnancy took on additional concerns and fears. The uncertainty of the pandemic infiltrated every aspect of participants' daily lives. While attending prenatal

appointments was once a joyful experience, they became layered with worry and uncertainty. Fear of getting sick with COVID-19 and the possibility of not surviving were paramount. Passing the virus to their newborn was another concern. Women attended doctor visits alone, but the use of technology using FaceTime and telehealth visits allowed partners to be involved. The expressed feelings of isolation during lockdown, and being apart from family, especially their own mothers was poignantly described. Although healthcare was dramatically changed, nurses and healthcare providers found innovative ways to reassure the women and to ensure that care was delivered in a safe environment.

The experience of giving birth at the hospital was both stressful, yet encouraging. The strict COVID-19 precautions offered a source of reassurance that the facilities were safe. Hospital staff and healthcare workers enforced strict visitor policies. Nevertheless, having the partner present at delivery after the period of uncertainty evoked a sense of relief. Since no other visitors were allowed, this was a source of ambivalence. New mothers found that they were able to have uninterrupted bonding with their newborn and partner. This was reported to be a welcome aspect of their postpartum experience. On the other hand, they missed introducing their newborn to their families immediately after birth. The mothers had a sense of feeling like some aspects of health education were missing, especially breastfeeding education. This was a source of concern for first-time mothers who wished they had additional support. The discharge procedure was expediated and screening for postpartum depression was sometimes cursory in the form of a written survey.

Participants' shared their experiences of the months following their infant's birth. Since lockdown was still in place in the Northeast, the experience of isolation persisted. All mothers shared what it was like to introduce their newborn to family and friends through FaceTime instead of in-person. Managing toddlers and young children without the usual support network were discussed by participants who had older children. The anticipated joys of new motherhood such as getting together with other mothers for support was missed.

Looking back upon their pregnancy, birth of their baby and the postpartum period, participants described the joys of motherhood, the stress of living through a tenacious pandemic, and the feelings of pride for having persisted and held it together. Participants discussed that the experience of giving birth during the pandemic will be reflected upon for many years to come.

Discussion

The mothers interviewed for this study shared their insight into their pregnancy, birth, and postpartum experiences during the COVID-19 pandemic. Participants described the experiences of being pregnant, giving birth, and mothering infants in the following months. The transitional stages of Mercer's Theory of Becoming a Mother (2004) were found to be concomitant to the descriptions of the participants' experiences. Although only four of the mothers were first-time mothers, the transitional stages of mothering were reflected in first time and experienced mothers. According to Mercer (2004), the transition to motherhood involves moving from a woman's current reality to an unknown, new reality. Mercer articulated four stages of role acquisition when

becoming a mother. The anticipatory stage involves social and psychological adaptation to the maternal role during pregnancy. The formal stage recognizes the birth experience and reflects the interpersonal nature of childbearing. The informal stage reflects the mother's own ways of mothering in the early months of the postpartum period. The personal stage is ongoing and reflects the joys and tribulations of motherhood (Mercer, 2004). The findings of the present study illustrate the participants' experiences during the stages of mothering. Their adaptation to mothering depicts their resilience in a new and unexpected reality.

Meleis's Transitions Theory also explicates concepts applicable to the findings of the study. Pregnancy, giving birth and parenting are significant life transitions that nurses can play a role to help clients achieve healthy transitions (Meleis et al., 2000). Awareness, engagement, change, and critical events are concepts that explore the personal and environmental challenges during a period of transition (Meleis et al., 2000). All participants described giving birth during the COVID-19 pandemic as a critical event marked by awareness of the new reality they were facing. Through engagement with the health care system, family and social support, participants described mothering during a pandemic.

Pregnancy and giving birth are normally marked by conflicting feelings of joyful anticipation mixed with fear and anxiety (Babetin, 2020). However, the described feelings of isolation, fear of COVID-19, and changes to everyday life were unique to the pandemic and have the potential to exacerbate stress and anxiety. This is a similar finding by Lim et al. (2021) who found that the cancelation of important events, having to stay at home for much of the time and fear of getting sick could have an impact on maternal mental health. The researchers also found altered sleep and eating patterns to be significant, which were not described in the present study. Saccone et al. (2020) found that two thirds of respondents in a quantitative study on the psychological impact of COVID-19 reported increased anxiety, a similar finding to the present study. Ceulemans et al. (2021) found that women who gave birth during the pandemic experienced higher levels of stress and rated the quality of care they received as more negative. This is consistent with mothers in the present study describing the inconsistencies of breastfeeding education and postpartum depression assessment. The same research (Ceulemans et al., 2021) also reported high rates of postpartum depression. Although none of the mothers in the present study reported having postpartum depression, some participants expressed the feeling that the impact of giving birth during the pandemic has not been fully processed.

Limitations

This study was conducted with women who gave birth during the pandemic in the Northeast region of the United States. Therefore, the experience described may be different from women in other regions and demographics. In addition, none of the participants had been directly affected with COVID-19 at the time of the interviews.

Conclusions

This study has implications for nurses and health care providers. Since giving birth during a pandemic is a new phenomenon,

careful ongoing assessment for anxiety or mental health concerns should continue to be researched and published. In addition to maternal care, pediatric nurses should be alert to mothers' demeanor and body language while performing well baby visits. All mothers should be screened for postpartum depression or PTSD in ambulatory care settings during the infants' first year. Anticipatory guidance and education for all mothers is crucial for maternal and newborn health, notably breastfeeding education. Future nursing research should continue to focus on the physical and psychological effects of the COVID-19 pandemic on mothers and children, as well as examining factors to mitigate virus transmission.

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ORIGINAL RESEARCH

Factors Influencing the Severity of Diabetic Retinopathy in Patients with Type 2 Diabetes Mellitus in Korea

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Abstract

Background: To prevent the progression of diabetic retinopathy (DR), patients with Type 2 diabetes mellitus (T2DM) should take the lead in their health behaviors by understanding physiological indicators such as blood sugar, blood pressure, lipids, smoking cessation, and regular ophthalmologic examinations. The health provider's role is important in motivating diabetic retinopathy patients to practice healthy behaviors since they provide treatment information and feedback to the patient. Therefore, it is necessary to educate diabetic patients on their knowledge of diabetic mellitus (DM) to raise awareness of desirable health behaviors and to continue self-management through motivation with the support from family and health care providers. This is a descriptive survey research to identify whether patients' knowledge about diabetes, family support, and health care provider's support for autonomy impacted the severity of diabetic retinopathy of patients with type 2 diabetes mellitus. **Objectives/Significance:** The aim of this study is to determine the effects of diabetic knowledge, family support, and health care provider's support for autonomy on the severity of diabetic retinopathy among diabetic patients and use this information as primary data for developing health behavior practice programs to prevent and manage diabetic retinopathy. **Methodology:** Cross-sectional data were collected in South Korea in 2019. Participants were 136 patients who had T2DM who attended an outpatient endocrinology clinic. A chi-square test and analysis of variance (ANOVA) were conducted using SPSS software (version 24.0), and Cronbach's coefficient was used to measure the reliability of each test. A linear multiple regression analysis was performed to determine the predictors of diabetic retinopathy. The scale for knowledge about diabetes had 26 items, the scale for family support had 12 items, and the scale for the severity of DR was classified according to the international clinical diabetic retinopathy severity measurement standards. **Results:** The comparisons of the severity of diabetic retinopathy depended on general and disease-related characteristics, and there was a statistically significant difference between DR and diabetic complications ($t=4.07$, $p<.001$). Significant correlations with SBP ($r=.35$ and $p<.001$), DBP ($r=.37$, $p<.001$), HbA1c ($r=.29$, $p=.001$), LDL-cholesterol ($r=.18$, $p=.036$), and triglyceride ($r=.28$, $p=.001$) were identified. Also, health care provider's support for autonomy was significantly correlated with the severity of DR ($r=-.17$, $p=.048$). As a result of analyzing the influence of independent variables on diabetic retinopathy, DBP ($\beta=.281$, $p=.018$), DM complications ($\beta=.188$, $p=.024$), and health care provider's support for autonomy ($\beta=-.207$, $p=.002$) were found to affect the severity of diabetic retinopathy ($F=5.725$, $p=.018$). As a result of analyzing the influence of independent variables on diabetic retinopathy, DBP ($\beta=.281$, $p=.018$), DM complications ($\beta=.188$, $p=.024$), and healthcare provider's support for autonomy ($\beta=-.207$, $p=.002$) were found to affect the severity of diabetic retinopathy ($F=5.725$, $p=.018$). The explanation power of this regression model was 29.6%, and it was statistically significant ($F=5.725$, $p=.018$).

Keywords: Diabetic Mellitus, Diabetic Retinopathy, Relational Autonomy, Professionals

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Factors Influencing the Severity of Diabetic Retinopathy in Patients with Type 2 Diabetes Mellitus in Korea

According to the Korean Diabetes Association, one in seven adults age 30 and older in Korea have diabetes mellitus (DM), accounting for 13.8% of the population (Jung et al., 2020). Diabetic retinopathy (DR) is one of the micro-complications of DM patients and is a major cause of vision loss and blindness in adults (Yau et al., 2012). The prevalence of DR among diabetic patients over the age of 30 in Korea is about 15.9% (Chung et al., 2020). Globally, the annual incidence rate of DR is 2.2%–12.7% and the annual progression rate is 3.4%–12.3% (Health Insurance Review & Assessment Service, 2012; Sabanayagam et al., 2019). In Korea, the prevalence of DR is increasing as the prevalence of diabetes increases due to Westernized dietary habits and lifestyle changes, and an aging population (Seong et al., 2021). The medical cost burden of this increasing trend is expected to consequently rise exponentially (Song et al., 2018).

The severity of DR, mild non-proliferative DR, moderate non-proliferative DR, severe non-proliferative DR, and proliferative DR can be divided into four stages. For severe proliferative DR, vision loss develops gradually or rapidly; regular examination and management are therefore critically needed (Ghaem et al., 2018; Gye & Song, 2015). Hyperglycemia and hypertension are risk factors for diabetes-related microvascular complications in DM patients (Ting et al., 2016; Wong et al., 2016; Zheng et al., 2018). In addition, as glycated hemoglobin (HbA1C) and blood pressure increase, the risk of DR increases. Hyperlipidemia was also reported as a risk factor of DR (Wong & Sabanayagam, 2019).

In order to prevent the progression of DR, it is important for patients to take the lead in their health behaviors by understanding physiological indicators such as blood sugar, blood pressure, and lipids, as well as adherence to medications, diet, exercise, smoking cessation, and regular ophthalmologic examinations (Chang & Shin, 2016; Ghaem et al., 2018; Pérez-Manchón et al., 2017). Previous studies on health behavior practice and self-management factors of DR showed that high DM knowledge score correlates with low HbA1c; better self-management implementation is supported by spouses and families (Chang & Shin, 2016).

Meanwhile, DR patients are recommended to undergo regular ophthalmologic examinations every 1 - 3 months. Importantly, it is difficult to recognize the progression of DR for patients in the early stages because it does not significantly affect their vision (Cheloni et al., 2019; Korean Diabetes Association, 2019). Thus, the role of the health care provider is essential in motivating DR patients to practice healthy behaviors since they provide treatment information and feedback to patients (Williams et al., 2018; Wong & Sabanayagam, 2019). Health care providers' focus on patient autonomy means support by health care providers so that patients can choose and make decisions on their own to control their behaviors (Seo & Choi, 2011). Previous studies of Type 2 diabetes mellitus (T2DM) patients showed that support for self-management has a major positive effect on patient's self-management (Moon & Lee, 2014; Tahmasebi, 2015). Furthermore, a supportive family means that T2DM patients receive more

appreciation and understanding that encourage better diet control and exercise performance. It was found that self-care performance and blood sugar control were high in a T2DM patient group with high family support (Kim & Gu, 2016; Park et al., 2009).

It is therefore necessary to educate diabetic patients about DR in order to raise awareness of desirable health behaviors and for them to sustain self-management behaviors by way of family and health care providers' support (Kim & Jang, 2018; Lian et al., 2018). However, there has been insufficient research relating physiological indicators such as blood sugar, blood pressure, and lipids to such factors as DM knowledge, family support, and health care provider's focus on patients' autonomy and self-management, with regards to their effects on the occurrence of DR among DM patients. It was, therefore, the aim of this study to determine the effects of DM knowledge, family support, and health care providers' support for autonomy on the severity of DR in T2DM patients and to use the results as primary data for developing health behavior practice programs to prevent and manage DR.

Methods

Design

A non-experimental quantitative research approach with a cross-sectional predictive design was employed to determine the link between predictor variables and the progression of DR in T2DM patients in South Korea.

Participants and Setting

The sample for this study was composed of T2DM endocrinology patients in the outpatient clinics of Jeju University Hospital in Korea. Inclusion criteria were (1) patients over the age of 20 diagnosed with T2DM, (2) patients diagnosed with DR, (3) patients able to communicate in Korean, (4) patients without hearing or reading impairment, and (4) patients who would voluntarily participate in surveys. The exclusion criteria were patients with adrenal insufficiency or hypothyroidism that might cause hypoglycemia. A power analysis using G*power 3.1.9.2. indicated the desired sample size to be 89, based on the parameters for linear multiple regressions (Effect size $f^2 = .15$; Power $(1-\beta) = .95$; significance level $(\alpha) = .05$; two-tailed). One hundred and thirty-six (136) qualified patients provided informed consent and were enrolled as participants in this study.

Variables and Measures

The general demographic questionnaires included gender, age, marital status, education, background, job, and smoking status. The DM complications, HbA1C, LDL-cholesterol, HDL-cholesterol, and triglycerides were collected from the last medical records within the previous six months. Blood pressure (BP) was measured twice with a sphygmomanometer (OMRON, China), and the mean value was recorded, once after filling out a written consent form and once after completing the questionnaire. The

severity of DR was determined by the International Clinical Diabetic Retinopathy Disease Severity scale criteria: (1) no diabetic retinopathy, (2) mild non-proliferative diabetic retinopathy (mild NPDR), (3) moderate NPDR, (4) severe NPDR, (5) proliferative DR (PDR; Wilkinson et al., 2003). If the severity of DR in both eyes was different, the severity of the more severe eye was adopted. The severity of DR is scored from 1 point for no findings to 5 points for PDR, which means that the higher the score is, the more severe the DR is. The DM Knowledge level was measured using the design by Sim et al. (2006). It consists of a total of 26 questions: general knowledge about diabetes (6 questions), treatment goals (1 question), diet (3 questions), hypoglycemia (3 questions), and complications (7 questions). A higher score indicates higher diabetes knowledge. Cronbach's α in Sim et al. (2006) was .84, and Cronbach's α in this study was .78. Family support was measured using the design by Gu (1999). It consists of a total of 12 questions with a 4-point Likert scale. A higher score indicates higher family support. Cronbach's α in Gu (1999) was .85, and Cronbach's α in this study was .87. The health care providers' support for autonomy was measured by using the Health Care Climate Questionnaire (HCCG) in Williams et al. (1996), that was translated to Korean by Seo and Choi (2011). It consists of a total of 15 questions using a 7-point scale. A higher score indicates higher health care providers' support for autonomy. Cronbach's α in Williams et al. (2009) was .89, Cronbach's α in Seo and Choi (2011) was .84, and Cronbach's α in this study was .94.

Data Collection and Ethical Considerations

The study method and protocol were reviewed and approved by endocrinologists and nurses from the Department of Endocrinology and the Jeju University Hospital Ethics Review Committee (IRB No. JNUH 2019-03-012); the data were collected from June 17 to August 27, 2019. After explaining the study's progress to the patients during outpatient visits, a written, signed consent was obtained once they agreed to participate in the study. Participants completed a survey using a structured questionnaire. The research assistant explained the purpose and procedures of the research and the data collection method, as well as obtained participants' signatures on the consent form. The form included information about the right to withdraw participation at any point during the survey, and the assurance of the anonymity and confidentiality of the participants. The research assistant read the items verbatim without further explanation and filled out the questionnaires with the participants' responses if they requested assistance, such as in the case of patients with poor eyesight or those who had difficulty conveying meaning on paper. Participation in this research was voluntary, and all participants were required to complete the self-report questionnaire. The average time taken to complete the questionnaire was 20-30 minutes. Participants also consented for their medical records to be examined for blood test results, using those done within the last six months. All participants were informed of the preservation of their anonymity and the maintenance of confidentiality throughout the study. Additionally, completed questionnaires were kept in a locked cabinet to maintain the privacy of participants. Participation was completely voluntary, and patients were assured that their responses would

be kept confidential, with research results reported in aggregated format.

Statistical Analysis

A statistician confirmed the sample size calculation, statistical tests, and the analysis of the characteristics of the experimental data. Among the 140 structured questionnaires distributed, four were ultimately not included in the analysis owing to incomplete or missing data (response rate was 97.1%). In total, 136 patients were included in this study. The data from this study were analyzed using SPSS software (version 24.0). First, the frequencies and percentages were calculated for the general characteristics and disease-related characteristics of the participants. Means and standard deviations were analyzed using descriptive statistics for knowledge of DM, family support, health care provider's support for autonomy, and severity of DR. The differences in severity of DR according to the participants' characteristics (gender, age, spouse, education background, job status, smoking, DM complications, and experience with DM education) were analyzed using an independent t-test and one-way ANOVA test. Scheffé's test was performed as a post hoc test. The correlations between the participants' BP (Systolic BP, Diastolic BP), blood tests (HbA1c, LDL-cholesterol, triglyceride), DM knowledge, family support, and health care provider's support for autonomy were analyzed using Pearson's correlation coefficient. A linear multiple regression analysis was conducted and used for the analysis to confirm the effects of DR, diastolic blood pressure, DM complications, and health care provider's support for autonomy on the severity of DR, as well as variables that were significant according to subject characteristics, DM knowledge, and support from family and health care provider's support for autonomy.

Results

As for the participants' general characteristics, 95 (69.9%) were male, and the mean age was 62.04 years. The majority of the participants had a spouse (75.7%), were high school graduates (44.1%), had a job (51.5%), had quit smoking (77.2%), had non-DM complications (62.5%), and did not have experience with diabetes education (66.2%). In terms of disease-related characteristics of the participants, mean systolic blood pressure (SBP) and diastolic blood pressure (DBP) were 132.87 and 79.79 mmHg, HbA1c was 8.24%, LDL-cholesterol was 114.94 mg/dL, and triglyceride was 186.4 mg/dL.

Table 1
General and Disease-Related Characteristics of Participants (N=136)

Variables	Categories	N (%)	M±SD
Gender	Male	95(69.9)	-
	Female	41(30.1)	
Age (years)	< 50	19(14.0)	62.04±11.31
	50-59	33(24.3)	
	60-69	37(27.2)	
	≥ 70	47(34.5)	
Spouse	Yes	103(75.7)	-
	No	10(7.4)	
Education	< High school	33(24.3)	-
	High school graduate	60(44.1)	
	> High school	43(31.6)	
Job status	Yes	70(51.5)	-
	No	65(47.8)	
Smoking	Yes	31(22.8)	-
	No	105(77.2)	
DM Complications	Yes	51(37.5)	-
	No	85(62.5)	
Experience of diabetes education	Yes	46(33.8)	-
	No	90(66.2)	
Blood pressure (mmHg)	Systolic blood pressure		132.87±19.43
	Diastolic blood pressure		79.79±11.38
Blood test	HbA1c (%)		8.24± 1.31
	LDL-cholesterol (mg/dL)		114.94± 62.4
	Triglyceride (mg/dL)		186.4±98.85

Note. M±SD=Mean ± standard deviations; DM=Diabetes Mellitus; LDL=Low-Density Lipoprotein; HbA1c=Hemoglobin glycosylated hemoglobin.

Participants' DM knowledge was 11.45±3.71, family support was 39.30±7.33, and health care provider's support for autonomy was 81.01±12.93; the mean severity of the DR was 3.35±1.21.

There was a statistically significant difference between the severity of DR and DM complications (t=4.07, p<.001).

Table 2
Participants' DM Knowledge, Family Support, Health Care Provider's Support For Autonomy, and Severity of DR (N=136)

Categories	M	SD	Range
DM knowledge	11.45	3.71	2 -19
Family support	39.30	7.33	15 - 48
Health care provider's support for autonomy	81.01	12.93	42 - 105
Severity of DR	3.35	1.21	2 - 5

Note. There was a statistically significant difference between the severity of DR and DM complications (t=4.07, p<.001).

Table 3
Comparisons of the Severity of DR According to General and Disease-Related Characteristics of Participants (N=136)

Variables	Categories	M±SD	t/F	p
Gender	Male	3.41±1.250	.950	.344
	Female	3.20±1.122		
Age (years)	< 50	3.90±1.17	1.727	.164
	50-59	3.21±1.22		
	60-69	3.32±1.20		
	≥ 70	3.35±1.21		
Spouse	Yes	3.44±1.22	-1.559	.121
	No	3.06±1.17		
Education	< High school	3.30±1.24	2.576	.080
	High school graduate	3.13±1.10		
	> High school	3.68±1.30		
Job status	Yes	3.39±1.26	.371	.711
	No	3.31±1.18		
Smoking	Yes	3.45±1.21	.731	.582
	No	3.31±1.22		
DM Complications	Yes	3.86±1.17	4.066	<.001**
	No	3.04±1.14		
Experience of diabetes education	Yes	3.11±1.23	-1.638	.104
	No	3.47±1.19		

Note. M±SD =Mean ± Standard deviations. *p<.05. **p<.01.

The Scheffé post-hoc test revealed that there were no statistically significant differences in severity of DR according to general and disease-related characteristics of participants.

As a result of analyzing the correlation between the participants' disease-related characteristics (SBP, DBP, blood test), DM knowledge, family support, and health care provider's support for autonomy, and severity of DR, significant correlations with SBP ($r=.35, p<.001$), DBP ($r=.37, p<.001$), HbA1c ($r=.29, p=.001$), LDL-cholesterol ($r=.18, p=.036$), and triglyceride ($r=.28, p=.001$) were found. Therefore, the higher the SBP and DBP were, the greater the severity of DR. Also, the health care provider's support for autonomy was significantly correlated with the severity of DR ($r=-.17, p=.048$). On the other hand, DM knowledge and family support were found to have no significant correlation with the severity of DR.

Table 4

Correlations Between Blood Pressure, Blood Test Support, DM Knowledge, Family Support, Health Care Provider's Support for Autonomy, and Severity of DR of Participants (N=136)

Variables	X ₂	X ₃	X ₄	X ₅	X ₆	X ₇	X ₈	X ₉
X ₂	1	.						
X ₃	.74**	1						
X ₄	.24**	.21*	1					
X ₅	.27**	.14	.20*	1				
X ₆	.15	.06	.14	-.02	1			
X ₇	.01	.03	-.06	-.03	-.02	1		
X ₈	.03	.06	.12	-.06	.01	.23**	1	
X ₉	.35**	.37**	.29***	.21*	.15	-.02	-.17*	1

Note. X₂= Systolic blood pressure, X₃= Diastolic blood pressure, X₄= HbA1c (%), X₅=Triglyceride (mg/dL), X₆= DM knowledge, X₇=Family support, X₈=Health care provider's support for autonomy, X₉=severity of DR of Participants

* $p<.05$, ** $p<.01$, *** $p<.001$

A multiple regression analysis was performed to identify the influencing factors affecting the progression of DR. DM complications, physiological variables (DBP, HbA1c), DM knowledge, family support, and health care provider's support for autonomy were used as independent variables. As a result of examining the multicollinearity among independent variables, it was found that the tolerance limit was more significant than the general standard of 0.1, and the variance expansion factor (VIF) was smaller than 10. This means that the multicollinearity was satisfied (tolerance limit 0.833-0.983, VIF 1.017-1.072). The analysis of the influence of independent variables on DR proved to influence its severity – DBP ($\beta=.281, p=.018$), DM complications ($\beta=.188, p=.024$), and health care provider's support for autonomy ($\beta=-.207, p=.002$). The results showed that the regression equations account for 29.6% of the total variation. The F value was 5.725 ($p=0.018$), which was statistically significant in the regression model.

Table 5

Factors Affecting the Severity of DR (N=136)

Variables	B†	SE	β‡	t	p	Tolerance limit	VIF
Diastolic blood pressure	0.030	0.008	0.281	3.758	0.018	.933	1.072
DM Complications ^a	0.002	0.001	0.188	2.547	0.024	.960	1.041
Health care provider's support for autonomy	-0.019	0.007	-0.207	-2.843	0.002	.983	1.017

Adj R²=.296(F=5.725, p=.018) Durbin-Watson=1.751

Note. a 0=No, 1=Yes.

† unstandardized regression coefficients

‡ standardized regression coefficients

DM=Diabetes Mellitus; HbA1c=Hemoglobin A1c (glycosylated hemoglobin);

VIF=the variance expansion factor

Discussion

In order to prevent progression to severe retinopathy for T2DM, priority should be placed on identifying physiological indicators affecting DR, including those variables affecting self-management practice and maintenance identified as significant factors in previous studies. Therefore, this study investigated the effects of general characteristics, such as gender and age of outpatient T2DM and disease-related characteristics including physiological indicators, e.g., HbA1C and LDL-cholesterol, as well as DM knowledge, family support, and health care provider's support for autonomy on DR.

The results showed that from the overall multiple linear regression, including DM complications and physiological indicators (SBP, DPB, HbA1c, LDL, TG), DM knowledge, family, and health care provider's support for autonomy were statistically significant.

From the results of this study, it was determined that the progression of DR is relatively severe in patients who have DM complications compared to those with none. In addition, HbA1c was not identified as a significant variable affecting the severity of DR, but was found to have a significant correlation with the severity of DR statistically. High blood sugar is thought to have worsened the degree of retinopathy because it was not continuously controlled until DM complications occurred. Moreover, patients did not recognize retinopathy and were not diagnosed with it at an early stage since early DR does not significantly affect their eyesight. Matuszewski et al. (2020) found that hyperglycemia is a major risk factor and a modifiable factor for DR, regardless of diabetes type. Kumari et al. (2019) reported that patients with poor blood sugar control have a quadrupled risk of developing DR. Therefore, it is necessary to emphasize blood glucose control and education about complications among T2DM patients, including that of DR. Also, it is important to diagnose and manage DR at an early stage by identifying and managing patients who do not maintain blood glucose control as a risk group.

As the DBP of DR patients increased, the severity of DR decreased, and SBP also showed a significant correlation, indicating that BP control was a significant factor in controlling

the progression of DR severity. Several previous studies have shown that hypertension was associated with the risk of blood sugar control and DR, and studies using the Prospective Diabetes Study (UKPDS) trial and antihypertensive drugs reported that strict control of blood pressure reduces the occurrence and progression of DR (Raman et al., 2017; Song et al., 2016; Stratton et al., 2001; Wong & Sabanayagam, 2019). The Committee of Clinical Practice Guidelines of the Korean Diabetes Association set blood pressure control targets for diabetic patients at SBP of less than 140 mmHg and DBP of 85 mmHg and recommended that hypertension medication be initiated if blood pressure was not controlled through therapeutic lifestyle adjustments (Kim et al., 2019). High blood pressure damages the micro-vessels in the retina and worsens DR severity. Hence, patients should make continuous efforts to maintain a healthy lifestyle, including smoking cessation, limited alcohol consumption, regular exercise for targeted blood pressure management, and use of medications (when necessary) in order to delay the progression to DR (Chan & Shin, 2016).

This study identified healthcare provider's support for autonomy as a predictor of the severity of DR; as healthcare provider's support for autonomy increased, the less likely that the severity of DR worsened. Results of previous studies reiterated health care providers' support for DR patients' autonomy, e.g., offering information about regular ophthalmologic examinations and feedback on positive health behavior practices (Park et al., 2016; Williams et al., 2018). A cooperative relationship between health care providers and patients have shown a favorable effect on treatments and health behavior practices of patients with chronic diseases, and health care provider's support for autonomy motivated patients to continue with self-management (Lee et al., 2018; Lee et al., 2019; Wong & Sabanayagam, 2019). Weiss et al. (2015) emphasized the importance of early intervention in preventing DR among this high-risk population. Health care providers should provide frequent feedback using various strategies, whether face-to-face or otherwise, in order to facilitate self-management among DR patients. Providers should likewise recommend periodic outpatient visits, checkups, behavior modifications, and maintain positive relationships with their patients. Frei (2014) suggested that health care providers utilize a monitoring tool or semi-structured protocol that includes health behavior metrics, such as clinical parameters (e.g., HbA1C, BP, cholesterol level), evidence of dietary control, compliance with ophthalmologic examinations, medication adherence, etc. These provide opportunities for health care providers and patients to establish specific behavioral goals, develop self-monitoring skills and for patients to adopt healthy behaviors based on data obtained from the monitoring tool or clinical protocol (Frei, 2014). Health care providers can also pick up cues from the monitoring tool or clinical protocol that confirm positive behavioral changes to support patients' adherence to action plans in order to achieve desired outcomes (Pizzi, 2015; Simon, 2010).

Consistent with the results of this present study, Chang and Shin (2016) reported that diabetes knowledge did not have a significant effect on DR severity. However, the Korean Diabetes Association identified diabetes self-management education (DSME) as a standard of medical care for people with diabetes (Hur et al.,

2021). Umeukeje et al. (2020) reported that the attitudes of health care providers and their support of patients' autonomy had been linked to more effective counseling and patient education. Education and counseling for health management are pivotal nursing roles in patients' health recovery. Nurses are responsible for providing patients with sufficient information in order for them to make independent and informed decisions with regards to their own goals and values. Previous research also supported this, especially among diabetic patients (Williams et al., 1996). The support for autonomy and empowerment afforded by healthcare providers facilitate desirable physiological outcomes among T2DM patients with DR.

This study also showed that diabetes education experience did not have any influence on the severity of DR. In addition, it was challenging to compare family support, health care provider's support for autonomy, and DM knowledge to identify factors affecting the severity of DR. In the case of family support, the majority of the participants were 50-70 years old (51.5%) and had no diabetes education experience (66.2%). It is likely that most of the participants shared and obtained information related to diabetes management from their work or social community. Wong and Sabanayagam (2019) emphasized that improving self-care behaviors was necessary to manage blood sugar, and that patients need the knowledge to understand the severity of their condition at the time of DR diagnosis to facilitate the improvement of their health behavior. Beaser et al. (2018) conducted patient-centered DR prevention and management education programs for DM patients, and their research outcomes showed that patients' awareness of their healthcare condition and their motivation for self-care behavior increased after attending these educational programs.

It is necessary to educate patients more actively on blood sugar control and the importance of regular ophthalmologic examination during outpatient visits and provide nursing interventions for BP control. Educational materials and programs must be developed to prevent and manage DR. These must be in various means and formats so that patients can readily access them.

Study Limitations

This study focused on DR patients at a regional hospital and its results may not be generalizable to the larger population. It should be repeated using more rigorous sampling and research design.

Conclusion

Diabetic complications, DBP, and health care providers' support for autonomy were identified as factors affecting the severity of DR. Interventions to improve self-care behavior in managing T2DM, awareness of hypertension and DR complications, and the provision of DR screening services must receive more heightened focus among healthcare providers. Healthcare provider's support for patient's autonomy for self-management was found to be the most significant predictor of the severity of DR. The role of healthcare providers is quite relevant in forging a stronger professional relationship with patients. More novel and practical strategies must be thought of in order to have a more engaging provider-patient relationship that will enhance the achievement of favorable outcomes for these patients.

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QUALITY IMPROVEMENT

Overcoming Bar Code Medication Administration Scanning Challenges in the Emergency Department

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Abstract

Background: Bar Code Medication Administration (BCMA) scanning is a globally accepted technology. However, many clinicians do not understand the requirements as a metric for nursing quality and safety behind the BCMA process. **Objective:** The aim of this Quality Improvement (Q.I.) project is to improve the BCMA scanning compliance, to identify the percentage of noncompliance, along with the numbers representing the percentage and to raise awareness of the challenges of using BCMA in the Emergency Department setting. **Methodology:** The Institute of Healthcare Improvement's Plan-Do-Study-Act (PDSA) cycle was used to plan, test, and observe the results of this Q.I. project. This report followed the Standards for Quality Improvement Reporting Excellence (SQUIRE V.2.0) publication guidelines. **Results:** Following a series of PDSA cycle implementations over an 18-month period, BCMA scanning rates for patients were increased to 93%, and medication scanning was increased to 94%, with an overall increase of 33% and 34%, respectively. Timely documentation improved by 18%, which accounted for a total of 96% compliance. **Conclusion and Recommendations:** Leadership involvement, nursing workflow monitoring of BCMA safety, as well as staff accountability and recognition, were crucial factors in improving the overall compliance rate. Suggestions to improve scanning safety include modifying the dashboard and highlighting the noncompliance scanning percentage along with actual numbers to raise awareness among clinicians. Organizations need to implement ongoing monitoring, continued training, and education, along with improvements and modifications.

Keywords: BCMA, BCMA report, BCMA challenges, medication safety, nurse leaders

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Overcoming Bar Code Medication Administration Scanning Challenges in the Emergency Department

Medication errors are preventable and expensive human errors. A medication error is an error (of commission or omission) at any step along the pathway that begins when a clinician prescribes a medication and ends when the patient receives the medication (Agency for Healthcare Research and Quality [AHRQ], 2019). In the United States, medication errors result in an estimated 700,000 Emergency Department (E.D.) visits, 100,000 hospitalizations, 1.5 million adverse drug events (ADEs), and an estimated 7,000 deaths, costing almost \$21 billion each year (AHRQ, 2019). Medication errors can happen in any phase of the medication administration process, including prescribing, transcribing, dispensing, compounding, and administering. The Leapfrog Group (2020), a national non-profit organization that measures hospital performance, has reported that over 30% of medication errors occur during administration and 40% of the errors are preventable.

Implementation of health information technologies, such as Bar Code Medication Administration (BCMA) systems, are being considered as a major solution to address these challenges. The use of BCMA is recommended by The American Society of Health-System Pharmacists (2009) and the Healthcare Information and Management Systems Society (2013). BCMA, an electronic scanning system with preventive safety technology, has decreased or eliminated medication errors when safety steps are followed (Leapfrog Group, 2020; Mulac et al., 2021). Integrating BCMA with electronic medication administration record (eMAR) systems can translate details of medication administration orders, check algorithms, and provide real-time warnings and approvals for safe medication administration. BCMA technology automates the process of verification by scanning the barcode on the patient identification wristband followed by scanning the barcode on the medication, thus assisting nurses in confirming the five rights of medication administration: right patient, right medication, right dose, right route, right time, and right documentation (Mulac et al., 2021).

Hospitals have strongly supported BCMA implementation to improve medication administration safety (Leapfrog Group, 2020). The Leapfrog Group (2020) has recommended a 95% patient and medication scanning compliance rate for hospitals implementing BCMA technology. Nursing organizations such as the American Association of Critical Care Nurses (AACN, 2019) included a 95% BCMA scanning compliance rate as a quality outcome indicator to measure medication safety for the AACN Beacon designation. A study of BCMA and eMAR implementation in an academic medical center demonstrated a 41.1% reduction in errors in medication administration, with a 50.8% relative reduction in potential ADEs with significant financial cost savings (Leapfrog Group, 2020; Poon et al., 2010). A study conducted at The Mayo Clinic from 2008 to 2013 reported that medication administration errors decreased by 43.5% after introducing BCMA technology. It was also reported that medication errors decreased by 55.4% (Olson et al., 2018). A Quality Improvement (Q.I.) project conducted by Ho and Burger (2020) following a series of Plan-Do-Study-Act (PDSA) cycles

concluded that by improving the BCMA scanning rate (from 81% to 95%), the number of ADEs related to administration errors was decreased by 17% and opioid-related ADEs decreased by 2.6%. Along with improvements in preventing medication errors, there were significant annual cost savings.

Challenges to BCMA Scanning Compliance

According to Ho and Burger (2020), BCMA scanning compliance issues occur due to multiple factors, including clinician workflow changes, staff accountability, cultural obstacles, and cost. Organizational and patient care unit related factors could impact the effectiveness of the BCMA technology in clinical practice (Ho & Burger, 2020). Staff resistance to implementing BCMA and eMAR was primarily due to poor communication, negative perception of the technology, and frustration dealing with malfunctioning software (Naidu & Alicia, 2019). Ho and Burger (2020) further described that BCMA scanning compliance rates also depended on optimizing clinical nurses' workflow, pharmacy workflow, and educational efforts. Strategies such as integrating scanning compliance goals into annual nursing strategic initiatives, providing departmental education, addressing scanning barriers, and discussing opportunities for improvement were reported to improve BCMA scanning rates (Ho & Burger, 2020). Additionally, adding BCMA technology in high-risk areas, such as the E.D. and intensive care units, can improve accountability, control of the supply chain, and set standards of care at a higher level of reliability (Lachman & Wilden, 2021).

Background

This project was conducted at a 247-bed community hospital which is part of the largest public health system in the Greater Metropolitan area of New York. The E.D. at this hospital serves more than 80,000 annual visits to one of the most diverse communities in New York. The E.D. clinical providers include 39 attending physicians, 34 advance practice providers which include nurse practitioners and physician assistants, 73 registered nurses (RNs), seven licensed practical nurses (LPNs), 46 patient care associates, 5 behavioral health associates, and 24 clerical associates.

The hospital has a fully implemented Epic electronic health record (EHR), BCMA capability, and utilizes automated medication dispensing cabinets throughout the hospital. BCMA scanning is required on all inpatient units, the E.D., perioperative units, and specific outpatient settings, such as hematology. All new hires, and faculty from affiliate schools of nursing, receive Epic EHR and BCMA training as part of their nursing orientation. The facility's Nursing Professional Practice Model emphasizes improvement in both facility and unit level metrics under the three pillars of quality, culture of safety, and care experience. The BCMA scanning goal at this hospital is set at $\geq 95\%$. BCMA scanning reports are in the form of percentage of medications and patients scanned per user, along with a report of unscanned medications. Since 2018, the inpatient unit scanning compliance was 95%, however, the E.D. compliance was 18%.

E.D. nursing leadership included BCMA scanning compliance as one of their Q.I. goals in 2018. During this period, hospital leadership addressed BCMA technology challenges and system issues by introducing Rover version 4.2, a handheld wireless device (refurbished iPhone), improving Wi-Fi connectivity in the E.D., increasing the number of Rovers, and improving the quality and efficiency of devices by upgrading the Rovers to the 9.2.2 advanced version. However, regardless of these improvement efforts, the E.D. BCMA scanning compliance rate remained under 40% in 2018. Although the E.D. compliance was low, the goal to reach 95% compliance, similar to the inpatient units, was perceived as an impossible goal due to the ongoing remodeling of the department and spatial constrictions. After reopening the new E.D. in 2019, the BCMA scanning compliance was revisited, as the quality gap between inpatient units and the E.D. was perceived as a threat to patient safety.

This particular hospital established a process to improve the BCMA scanning compliance by monitoring the BCMA dashboard. This process also included the nurse informaticist sending out a BCMA report quarterly, as well as a detailed analysis of the report to unit nurse managers for review. This initial report shared details of patient's identifiers, administering user, scanning status for patient and medications, reasons for not scanning, administered time, and recorded time. Nurse managers looked at the percentage of BCMA compliance and were comfortable with scanning rates of 90% to 95% in most inpatient units. The leadership staff were not aware of the actual numbers associated with a percentage figure on the dashboard. For example, if a unit had a 90% scanning compliance on the dashboard, it gave the impression that it was closer to achieving the desired scanning goal. This also means that scanning was ineffective 10% of the time, and nurses were working around the safe-use scan system to administer medications. This is an unacceptably low level of reliability for effective BCMA scanning. This 10% non-scanning could potentially account for an average of 5,000 non-scanned patient and medication administrations per month. Another challenge found was delays in documenting medication administration in real-time, which defeats the purpose of BCMA scanning.

Objectives

The primary objective of this Q.I. project was to improve the BCMA scanning compliance in the E.D. following the PDSA methodology. The secondary objective of this Q.I. project was to identify the depth of noncompliance figures behind the dashboard numbers and raise awareness of the challenges of using the BCMA.

Patient Confidentiality

This manuscript complies with the Health Insurance Portability and Accountability Act (HIPAA). The authors did not utilize patient identifiers such as names, social security numbers, telephone numbers, email addresses, street addresses, or any other demographic information. All reported data are in aggregate and comply with the health systems' confidentiality policies. All data and spreadsheets are saved in the health systems approved share point site and are password protected. The data tables and

graphs are reviewed and approved by the Office of Research Administration at the health system corporate office.

Methods

A systematic method for performance improvement is the PDSA model, which tests the effectiveness of small changes before widespread implementation. The Institute of Healthcare Improvement (IHI, 2017) advocates for PDSA cycles to plan, test, observe the results of an intervention, and act based on the study results. The PDSA methodology was used in this Q.I. project to test changes over time, determine how new practices lead to an improvement, assess the magnitude of the improvement, and evaluate any change-associated unanticipated effects.

Rapid PDSA cycles were developed based on feedback from nurse leaders. An initial meeting was held with the directors of the E.D., pharmacy, nursing education, nursing quality, and the nurse informaticist to discuss medication safety challenges and quality improvement initiatives. A focus group meeting was held with ED RNs and LPNs on both shifts to identify BCMA scanning and compliance challenges. During these meetings, hospital and E.D. scanning compliance goals and patient safety were emphasized, and nurses were encouraged to communicate any potential challenges as they adopt BCMA scanning workflow in their medication administration process. For this Q.I. project, data on patient and medication scanning compliance and timely administration of medication were collected in six-month intervals beginning September 2019 and ending February 2021. These reports followed the Standards for Quality Improvement Reporting Excellence (SQUIRE V.2.0) publication guidelines (Ogrinc et al., 2016).

PDSA Cycle One (September 2019-February 2020)

The Q.I. team identified hospital executive leadership engagement and support as crucial factors for this project's success. A standard process and workflow for E.D. nursing staff were created to improve staff accountability for BCMA scanning compliance. The nurse informaticist, in collaboration with the Epic reporting and analytic team, created a meaningful scanning and compliance report for nurse managers. This modified report included metrics such as the total number of medication administrations by each staff in a given period, the total number of scanned medications, the total number of unscanned medications and the reasons for not scanning, the total number of patients scanned, the total number of unscanned patients and the reason for not scanning, the number of late administrations, and the number of delayed or late documentations. Before this modified process, E.D. nursing leadership was provided access to the detailed BCMA spreadsheet report, which included metrics such as scanning compliance for patients and medications. However, monitoring these metrics was suboptimal, and the scanning compliance remained less than 50%.

Two significant findings from the E.D. nurses focus group meeting were that nurses were unaware that barcode scanning compliance was a Q.I. goal and that the BCMA system was not well understood by these nurses as they continued to use workarounds to document medication administration. The nurse informaticist collaborated with the E.D. leadership to develop

a monitoring process to track compliance weekly. As the E.D. was recruiting a nurse educator for this Q.I. project, a designated LPN was identified and trained on BCMA reports and monitoring metrics. The weekly BCMA reports provided an overview of the scanning compliance and noncompliance with medication administration details for each R.N. and LPN. Information from this report was added to the E.D. visual management board every week for transparency and to display performance improvement. The scanning metrics also became a standing agenda item for the E.D. Daily Management System (DMS) huddle every Monday with multidisciplinary team members. This report was also emailed to each E.D. nurse by the nurse manager. By the end of February 2020, the BCMA scanning data was moving in a positive direction from 51% (September 2019) to a 65% monthly medication scanning rate for 13,755 medications administered. However, 35% of the monthly unscanned figure accounted for 7,436 medications.

PDSA Cycle Two (March 2020-August 2020)

While PDSA Cycle Two was in progress, the coronavirus disease of 2019 (COVID-19) pandemic added medication safety challenges in this healthcare setting. As the epicenter of COVID-19, this facility's E.D. provided care to more than 100,000 patients in 2020. During the peak of the COVID-19 pandemic, the overall BCMA compliance in the E.D. dropped to 30%, while the inpatient unit's scanning compliance remained between 88% to 96%. The hospital executive team verbalized increasing concerns over the low scanning compliance rate in the E.D. As a result, a meeting consisting of E.D. nursing leadership, the chief nursing officer (CNO), the chief operating officer, the E.D. pharmacist, the nurse educator, and the nurse informaticist was held to determine metrics to track performance, identify gaps in the workflow, as well as discuss the limitation of current reporting tools and the accountability of frontline nurses. Based on the above discussions with executive leadership, there was a commitment from E.D. nursing to improve BCMA scanning rates. The E.D. leadership continued to review the BCMA scanning data for each nurse, and E.D. nurse leaders reinforced the need to improve BCMA scanning compliance during the daily morning briefs. It became imperative to identify low performers and redesign the workflow process to overcome their barriers to success. One recommendation that resonated with the nurse leaders in improving the scanning compliance goal to 95% was to purposefully involve the E.D. nurses in a shared decision-making process. As a result, BCMA scanning compliance data became a standing quality indicator at the monthly E.D. council meeting, monthly nursing Q.I. meeting, and monthly pharmacy and therapeutic meetings. At the conclusion of PDSA Cycle Two, the BCMA monthly scanning rate increased to 64% with 9,722 scanned medications, while 36% of unscanned medications accounted for 5,400 administrations.

PDSA Cycle Three (September 2020-February 2021)

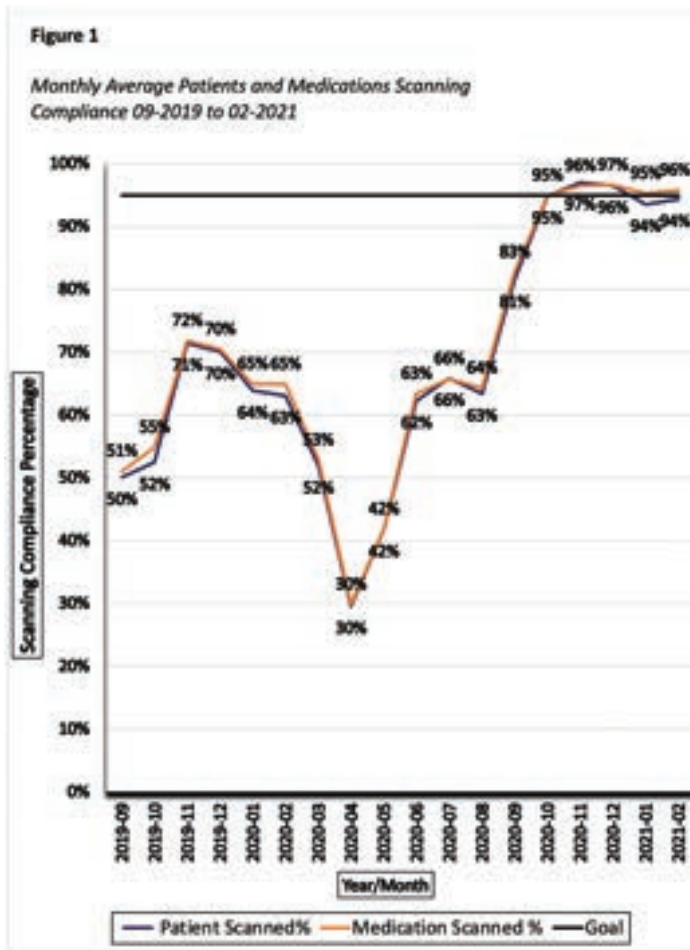
The involvement of the CNO and other executive leadership in the compliance monitoring process significantly influenced the appropriate implementation of BCMA workflow. The nursing leadership team communicated the need to improve E.D. BCMA

scanning compliance to the E.D. nurses. During this phase, the team continued efforts to reach the set goal for scanning compliance. Timely administration and real-time documentation were also included as monitoring metrics. The E.D. nurse educator identified opportunities for education and process improvement with direct observation. Timely administration and real-time documentation were also included as monitoring metrics. The active involvement of the E.D. nurse educator facilitated the understanding and engagement of the frontline staff in this Q.I. initiative. The E.D. educator created an educational plan which included a one-on-one meeting with each staff who had adherence issues. One of the major goals of the intense educational effort was to ensure that the nursing staff followed the designed technology workflow without creating workarounds. The educator addressed their educational gaps, reinforced correct scanning workflow, and the utilization of Rovers. The E.D. educator also created a group email and text message platform to inform staff nurses of daily updates and reminders. Information sharing also occurred through a hospital-approved virtual platform. The weekly BCMA reports provided patient and medication scanning compliance and noncompliance details for each staff nurse. The nurse manager analyzed each nurse's medication scanning rate performance and identified individuals outside of the scanning goal. When compliance fell below the required goal, the nurse manager met with the nurse involved and developed an individual action plan to reach the compliance goal.

At this phase in the improvement activities, the E.D. leadership sought to celebrate the overall success of this project. Each staff member who showed an improvement in scanning was recognized at the weekly ED DMS huddles. E.D. nursing leadership, along with the director of services, appreciated the effort by the nurse educator and rewarded staff members who had improved compliance with a monthly luncheon celebration. At the conclusion of PDSA Cycle Three, the monthly scanning rate increased to 96% for 14,091 medications, while 4% of unscanned medications accounted for 621 administrations.

Results

The Q. I. project achieved its primary and secondary objectives. The primary objective was to improve the BCMA scanning compliance in the E.D. This was achieved throughout the three PDSA cycles, which included a redesigned workflow, addressing challenges in the current process, and intense educational efforts. The secondary objective of this Q.I. project was to identify the depth of noncompliance figures behind the dashboard numbers and to raise awareness among the nursing staff. This was achieved by discussing and demonstrating the figures associated with the percentage of noncompliance and the total number of medication administrations. The monthly average scanning compliance for 18 months is shown in Figure 1.



Total Medications	127,924	101,796	90,697
Timely Documentation	PDSA Cycle One	PDSA Cycle Two	PDSA Cycle Three
Documented within 30 minutes of administration	105,039 (82%)	79,882 (78%)	86,776 (96%)
Documented after 30 minutes of administration	22,885 (18%)	21,914 (22%)	3,921 (4%)
Total Documented	127,924	101,796	90,697

The baseline scanning compliance for both patients and medication were 62% and 63%, respectively, during PDSA Cycle One. Although E.D. leadership continuously monitored the metrics during this period, the improvement was limited to 60%. During this period, the E.D. nurses administered 127,924 medications; of those, 47,022 were administered without scanning (63% medications scanned; 37% unscanned). As improvements were in progress, the hospital was faced with the challenges related to the COVID-19 pandemic. The global and local response to the COVID-19 pandemic, coupled with staffing and supply chain challenges, slowed down PDSA Cycle Two. At the peak of COVID-19, scanning compliance for both patients and medications dropped to 30%. Following improvement efforts, the average scanning compliance for patients and medications in PDSA Cycle Two improved to 50% and 51%, respectively. During this period, the E.D. nurses administered 101,796 medications, and of those, 50,147 were administered without scanning (51% medications scanned; 49% unscanned). The most significant improvement was seen during PDSA Cycle Three, where patient scanning compliance increased to 93% and medication scanning increased to 94%, with an overall increase of 33% and 34%, respectively. At this time, the E.D. nurses administered 90,697 medications, and of those, 5,713 were administered without scanning (94% medications scanned; 6% unscanned). Figure 2 shows the six-month averages of patients' scanning compliance and noncompliance for all three PDSA cycles.

Table 1 reflects the six-month average of the total number of patients and medications scanned or not, as well as the total number of medication administrations documented in relation to the 30-minute timely window for all three PDSA cycles.

Table 1
Scanning Compliance Data for Patients, Medications, and Timely Documentation During Three PDSA Cycles

Patient Scanning Status	PDSA Cycle One (September 2019 to February 2020)	PDSA Cycle Two (March 2020 to August 2020)	PDSA Cycle Three (September 2020 to February 2021)
Patient Scanned	79,387 (62%)	51,082 (50%)	84,328 (93%)
Patient Not Scanned	48,537 (38%)	50,714 (50%)	6,369 (7%)
Total Patients	127,924	101,796	90,697
Medication Scanning Status	PDSA Cycle One	PDSA Cycle Two	PDSA Cycle Three
Medication Scanned	80,902 (63%)	51,649 (51%)	84,984 (94%)
Medication Not Scanned	47,022 (37%)	50,147 (49%)	5,713 (6%)

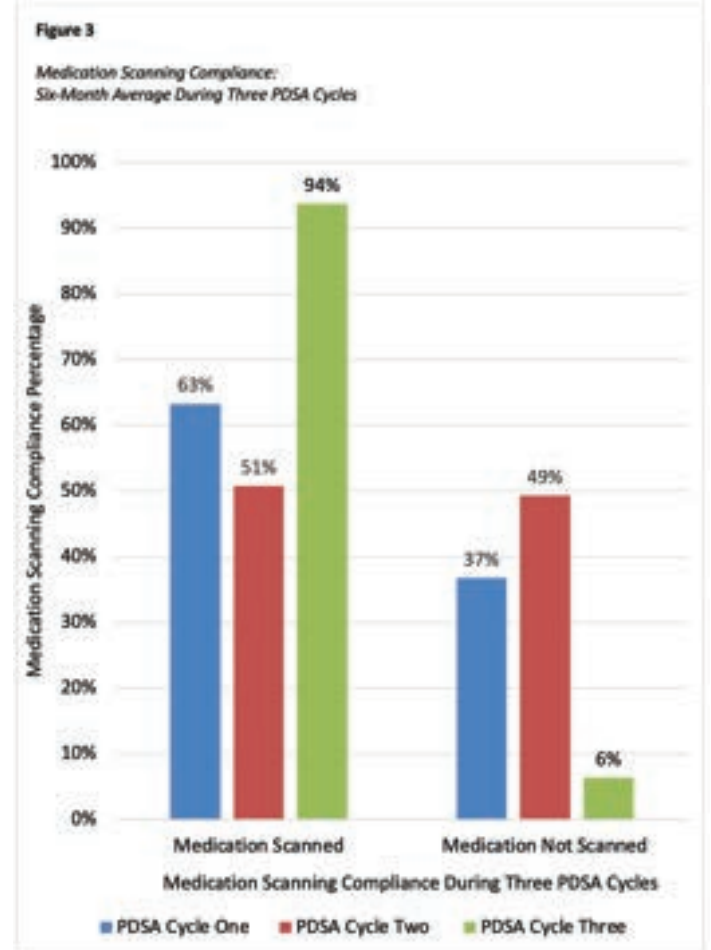
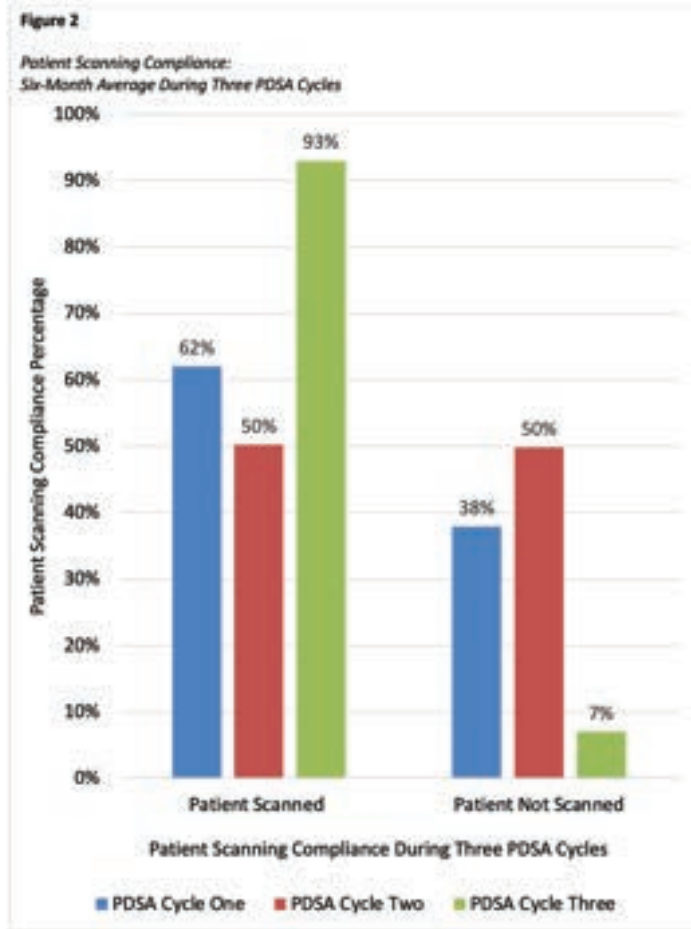
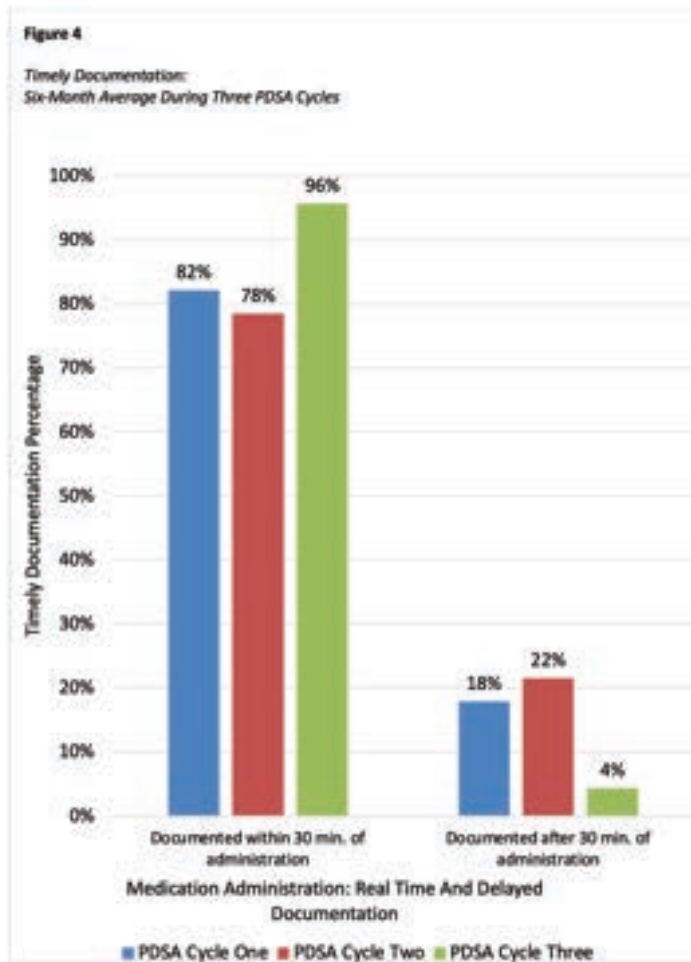


Figure 3 shows the six-month averages of medication scanning compliance and noncompliance for all three PDSA cycles.

Figure 4 shows the six-month averages of timely documentation compliance and noncompliance for all three PDSA cycles. Timely documentation was defined as completing patient and medication BCMA scanning and documentation of administration details within 30 minutes of the first scanning action.



Discussion

Over the 18 months that this Q.I. project was conducted, the E.D. was the only unit at the facility with a low BCMA scanning compliance rate. The sense of urgency to address this issue and the need for change were communicated to all nursing staff through focus group meetings, daily unit briefings, and education. Executive leadership's involvement, nurse leaders' ownership of the project, frontline staff accountability, addressing the gaps, and weekly dashboard displays were successful strategies in improving BCMA scanning compliance in the E.D. Early et al. (2011) observed similar strategies and results at an academic medical center as these authors reported a 15% improvement in scanning compliance after implementing a culture of safety campaign. As with this Q.I. project, Early et al. (2011) also noted that strong executive leadership support was a crucial factor in their success. A systematic review by Parand et al. (2014) reported that essential factors of success in establishing goals and strategies to improve quality lies with leadership activities such as engaging in and promoting a Q.I. culture, driving improvement through goal setting, providing feedback, and managing organizational resources for quality. Similar strategies implemented at this facility's E.D. included nurse leaders' ownership of the project and the need to support individual nurses through goal setting.

Another study at a 175-bed community hospital by Van Ornum (2018) found that refining the BCMA report and clinical workflows,

as well as engaging nurse leaders and supporting individual nurses' accountability, allowed the facility to achieve optimal scanning compliance, increasing from a scan rate of 95% to 98%. Similar to Van Ornum's (2018) approach, end-user accountability in our Q.I. project was established through education, recognition, coaching, and counseling, which contributed to the overall increase in compliance. The transparency of this project further challenged the E.D. staff nurses to utilize opportunities for improvement, as well as comply with the E.D. performance improvement goals. The importance of medication administration with BCMA technology became an important topic in new hire orientation and annual competency training of nursing staff. Adhering to the BCMA scanning goal is now an expectation among E.D. nurses and leaders at this facility.

Following the 18 months of this Q.I. project period, team members identified challenges with Rover, such as loss and underreported malfunctioning of these devices to the Information Technology (I.T.) department. To further address these challenges, staff nurses proposed a modified workflow by assigning a staff nurse every shift to monitor Rover usage and report malfunctions to the I.T. department. These nurses were instrumental in maintaining adequate working devices on the unit, which substantially improved the scanning compliance rate. This improvement was sustained following PDSA Cycle Three, as data from March 2021 to August 2021 demonstrated that the BCMA scanning compliance rate remained above 92%.

Each PDSA cycle was a lesson learned in improving the overall BCMA scanning processes. In the E.D., the BCMA scanning compliance rates improved by 31% post PDSA cycle implementation. In the PDSA Cycle Three phase of this project, the patient and scanning compliance increased to 93% and 94%, respectively. However, E.D. leadership targeted BCMA compliance rate of 95% or greater as a goal for individual nurses, and incorporated this into nurses' annual performance evaluation to further minimize medication administration errors.

These findings offer opportunities for shared decision-making between nurse leaders, clinical nurses, and other process owners to identify opportunities for improving BCMA scanning rates and sustaining compliance. It is important to note that using the metric of BCMA scanning rates can potentially put undue pressure on nurses to develop workarounds. It is recommended that ongoing real-time observations must be conducted to solicit E.D. nurses' feedback and address the challenges that lead to workarounds. It is also suggested that units preparing to improve BCMA scanning compliance rates implement this using a series of PDSA improvement cycles.

Limitations

Quality improvement projects require an investment of time and effort. A limitation of this project was the use of convenience sampling of nurses from only one unit (E.D.) at one community hospital. More BCMA usage Q.I. projects based on current evidence versus current practice are needed using a larger sample size of nurses across other E.D.s within and beyond a particular health system. Not having the support and expertise required for BCMA report development and refinement is another limitation. The availability of a board-certified nurse informaticist

contributed to the creation of weekly dashboard reports along with meaningful updates provided to E.D. nursing leadership. Facilities may consider employing a full-time nurse informaticist to provide ongoing support to evaluate existing workflow issues with medication administration scanning. Additionally, future projects can include assessing the educational impact of nursing quality metrics and soliciting feedback from nursing staff through surveys.

Conclusion

Although BCMA scanning is a globally accepted technology, many clinicians do not know the rationale behind the safety nets of the BCMA process. This article outlined our efforts to streamline the BCMA process for nurses in the E.D. setting. Adopting this process requires diligent efforts to redefine workflows and nurses' responsibilities through shared decision-making and educational support. The findings of our study suggest that the percentage of BCMA scanning compliance data must be analyzed and displayed, along with the total number of medication administrations, patients and medications scanned, representing the percentage for meaningful dashboard reports. For example, in this Q.I. project, 6% of unscanned medications may be interpreted as a small percentage. However, 6% represents a significant number of 5,713 administrations. Adherence to real-time documentation of all medication administrations using BCMA technology, except in emergencies, eliminates the potential for errors during administration. Ongoing monitoring and real-time feedback can increase clinicians' awareness about BCMA and further enhance patient safety. A BCMA compliance of 100% is achievable with continued focus on nursing workflow.

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ORIGINAL RESEARCH

Critical Appraisal of Clinical Practice Guidelines (CPG) Training for Graduate Student Nurses: Exemplar of a CPG for the Management of Post-Traumatic Stress Disorder (PTSD)

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Abstract

Background: Clinical practice guidelines serve as a framework for clinical decisions supporting best practices to optimize patient care. Critical appraisal of a clinical practice guideline is an important clinical skill for advanced practice nurses and other advanced healthcare professionals. Hence, advanced practice nursing students should receive appraisal training of clinical practice guidelines to develop their critical skills in determining their quality and potential incorporation into evidence-based clinical practice. **Objective:** This paper describes the incorporation of a critical appraisal of a clinical practice guideline in a graduate nursing program for advanced nursing practice. As an exemplar of the appraisal process, the clinical practice guideline from the United States (US) Department of Veterans Affairs and the Department of Defense (VA/DoD) on the management of post-traumatic stress disorder and acute stress disorder was critically appraised. **Methodology:** Students enrolled in a graduate nursing course were formed into groups of 3-4, and selected a clinical practice guideline according to their specialty. A group of four students enrolled in the Psychiatric and Mental Health Nurse Practitioner program critically appraised the VA/DoD clinical practice related to the management of posttraumatic stress disorder and acute stress disorder using the Appraisal of Guidelines for Research and Evaluation (AGREE) II Instrument. Students' performance and feedback were evaluated. **Results:** The students viewed the course activity positively and appreciated learning the CPG appraisal process and its use in practice. The VA/DoD clinical practice guideline was deemed of high quality and user-friendly for practitioners' use in clinical decision-making despite minor limitations. **Conclusion and recommendations:** Incorporation of clinical practice guideline assessment using the AGREE II Instrument in the advanced practice nursing curriculum should be considered. Participating graduate students considered the skill needed for their future advanced practice. Regular updates of clinical practice guidelines and their appraisals are also recommended.

Keywords: post-traumatic stress disorder or PTSD, clinical practice guideline appraisal, veteran care, advanced nursing practice, AGREE II Instrument

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Critical Appraisal of Clinical Practice Guidelines (CPG) Training for Graduate Student Nurses: Exemplar of a CPG for the Management of Post-Traumatic Stress Disorder (PTSD)

Clinical practice guidelines (CPGs) are systematically developed statements based on a rigorous review of the best available evidence and provide recommendations on how to optimize patient management. They are intended to affect decisions made by health care providers, policymakers, and patients. As outlined by Treateault et al. (2019), the main objectives of CPGs are to: synthesize and translate the highest quality of evidence into practice recommendations; optimize treatment outcomes and reduce the use of any harmful or unnecessary interventions; establish standards of care and reduce inappropriate practice variations; facilitate shared decision making among providers (e.g., physicians, nurse practitioners, physician assistants), patients, and their caregivers; and, inform policymakers in their decisions about the allocation of healthcare resources.

Intended to be used as guidelines, CPGs are not the sole reference for decisions related to patient management, reimbursement policies, performance measures, legal precedents, or comprehensive management. Quality evidence-based practice requires the combination of best research evidence, clinical expertise, and patient preferences.

CPGs are ubiquitous in healthcare systems. In 2011, the Guidelines International Network database reportedly had more than 3,700 guidelines from 39 countries; the US National Guideline Clearinghouse had a total collection of 2,700 CPGs (Institute of Medicine, 2011). Developers and users of CPGs include not only clinicians but also diverse organizations such as clinical specialty societies, disease advocacy groups, federal and local agencies, health insurance plans, and commercial companies. The Institute of Medicine Committee on Standards for Developing Trustworthy Clinical Practice Guidelines highlighted that some of the available CPGs suffer from shortcomings during the guideline development process, which undermined their quality and trustworthiness (Institute of Medicine, 2011). These shortcomings include variable quality of individual scientific studies; limitations in systematic reviews upon which the CPGs are based lack the transparency of development groups' methodologies; failure to convene multi-stakeholder, multi-disciplinary guideline development groups, and corresponding non-reconciliation of conflicting guidelines; unmanaged conflicts of interest (COI); and overall failure to use rigorous methodologies in the CPG development. In some CPGs, the evidence supporting clinical decision-making and CPG development relevant to subpopulations, such as patients with comorbidities, the socioeconomically disadvantaged, and those with rare conditions, are absent. Hence, there is a need for international standards for rigorous CPG development and appraisal. Guideline appraisal tools are used as a standard to evaluate the quality of available clinical practice guidelines

(Hoffmann-Eßer et al., 2018). The Appraisal of Guidelines for Research and Evaluation [AGREE] Instrument, which was updated to AGREE II, has been used to appraise the quality of CPGs.

Studies show that the AGREE II is a valid and reliable instrument widely used for assessing the methodological quality of practice guidelines (Brouwers et al., 2016). In 2018 alone, over 100 CPGs and studies were assessed using this tool (Canadian Institute of Health Research, n.d.); most were conducted by medical specialists. Considering the diverse quality of available CPGs, their appraisal is an important part of evidence-based practice for the implementation of the recommendations to optimize patient management (Torrens et al., 2020). Hence, healthcare providers should be adept at appraising CPGs for potential implementation to practice. Advanced nurse practitioners who are consumers of CPG need to have training on their appraisal. Hence, the inclusion of a CPG appraisal activity such as using the AGREE II among students enrolled in an advanced nurse practitioner program is highly recommended.

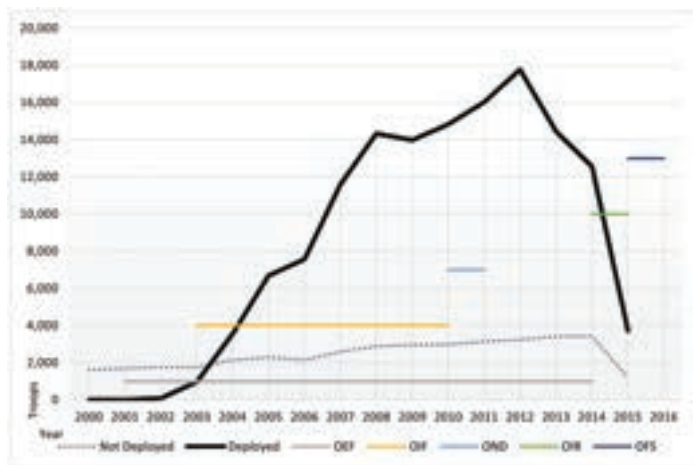
This study describes the critical appraisal of CPGs using the AGREE II as a learning activity for graduate students enrolled in the Psychiatric and Mental Health Nurse Practitioner program. The United States (US) Department of Veterans Affairs and the Department of Defense (VA/DoD) CPG for the management of Post-Traumatic Stress Disorder (PTSD) and acute stress disorder (ASD) was appraised as exemplar. To the best of our knowledge, this CPG has not been critically examined using the AGREE II Instrument.

Significance of PTSD and the Clinical Practice Guideline

Since 2001, the deployment of United States (US) military active duty, reserve, and national guard personnel have been associated with an increased incidence of PTSD and ASD in military members (Congressional Research Service, 2017). Newly diagnosed PTSD among service members reportedly peaked in 2012 (Figure 1), at approximately 18,000 per annum (Congressional Research Service & Fischer, 2015). About 7–20% of service members and veterans who served in Operations Enduring Freedom (OEF) and Iraqi Freedom (OIF) may have PTSD due to multiple deployments and prolonged combat-related stressors (Tanielian and Jaycox, 2008). A meta-analysis (33 studies with 4,945,897 OEF/ OIF Veterans) reported approximately 23% of US veterans have PTSD (Fulton et al., 2015), highlighting the significance of this condition.

Figure 1

Newly Diagnosed PTSD Cases per Annum - Combined all Service Branches on Active Duty



Note. Data from the Congressional Research Service (2015; 2017). Legend: OEF = Operation Enduring Freedom, Afghanistan; OIF = Operation Iraqi Freedom, Iraq; OND = Operation New Dawn, Iraq; OIR = Operation Inherent Resolve, Iraq and Syria; OFS = Operation Freedom's Sentinel, Afghanistan.

PTSD is characterized by a constellation of mental health symptoms associated with the traumatic event, including intrusion symptoms, persistent avoidance of trauma-associated stimuli, adverse alterations in cognition and mood, and marked alterations in arousal and reactivity lasting greater than one month and impairing daily functioning (American Psychiatric Association, 2013; Lapid-Bluhm & Peterson, 2014). PTSD may be comorbid with other health conditions such as traumatic brain injury (TBI), chronic pain, substance use disorder, and intimate partner violence (NCBI, 2014). The effects of PTSD are pervasive affecting immediate family, social relationships, and work (Tanielian & Jaycox, 2008). To address PTSD, the Department of Defense (DoD) and the Department of Veterans Affairs (VA) offered multiple programs for early screening, diagnosis, treatment, and vocational rehabilitation for veterans suspected of, or at particularly high risk for PTSD. To this end, a robust, client-centric clinical practice guideline is needed.

In 2010 and later revised in 2017, the VA and DoD published a CPG for PTSD and ASD to improve patient management and clinical outcomes by providing critical decision points in PTSD and ASD management and advising clear and comprehensive evidence-based recommendations that incorporate current information and practices for practitioners throughout the DoD and VA Health Care systems (U.S. Department of Veterans Affairs, 2017). The CPG is based on a systematic review of both clinical and epidemiological evidence and developed by a panel of multidisciplinary experts, to provide a clear explanation of the logical relationships between various care options and health outcomes while rating both the quality of the evidence and the strength of the recommendations (U.S. Department of Veterans Affairs, 2017).

Methodology**Sample and Setting**

Students ($N=21$) enrolled in a Master of Science in Nursing (MSN) course, Translating Research for Advanced Practice Nursing, for the Fall 2018 semester at the University of Texas Health Science Center at San Antonio, completed a module on clinical practice guidelines. The module introduced the role of CPG in evidence-based practice (EBP), the development process, and appraisal. Students were required to identify a CPG of interest, preferably one that applies to their specialty. Students received CPG search instructions and an introduction to the AGREE II and received in-class training on how to calculate the domain scores, scaled domain scores, and overall scores with an Excel spreadsheet created by the faculty. Subsequently, students completed an independent online tutorial on the AGREE II to ensure adherence to the appraisal process (AGREE II NextStep Consortium, 2017). Throughout this learning experience, the students regularly met with the faculty for supervision and support. They were also asked to share their reflection on the activity following module completion.

Data included in this paper is from the appraisal process of four students enrolled in the Psychiatric and Mental Health Nurse Practitioner program. This group of students (hereafter is referred to as the "team") chose to find a Clinical Practice Guideline for the management of Post-Traumatic Stress Disorder. Each team member independently conducted a systematic search between October 9–18, 2018 of databases, including the Turning Research Into Practice (TRIP) database, Guidelines and Measures of the Agency for Healthcare Research and Quality, and the National Institute for Health and Care Excellence (NICE), and relevant web pages (e.g., American Psychological Association, US Department of Veterans Affairs). A systematic search was also performed in MEDLINE and EMBASE, using terms such as 'post-traumatic stress disorder' or 'PTSD' and 'clinical practice guidelines' or 'CPG.' They limited their search to the last five years. The team compiled all search results, which was limited. They subsequently chose to appraise the most recent 2017 VA/DoD CPG for the management of PTSD found on the VA website (US Department of Veterans Affairs, 2017).

The AGREE II Instrument

Each student member of the team independently assessed the CPG using the AGREE II Instrument (Brouwers et al., 2010a, 2010b; 2010c). In 2016, a study assessed the construct validity of the items and user's manual in the β version of the AGREE II (Brouwers et al., 2016) among individuals from diverse educational backgrounds or levels (i.e., physician, registered nurse, bachelor's, master's, Ph.D.) and roles (i.e., clinicians, policy or decision-makers, researchers). Multivariable analysis of variance yielded a significant main effect for guideline quality ($p = 0.005$). The AGREE II Instrument reliably discriminated between high and low-quality CPGs. CPG designed to be of high quality was rated higher than low-quality content; in 18 of 21 cases, the differences were significant ($p < 0.05$). The mean usability scores of the β version of the user's manual across each of the AGREE II items were high, with a range of 5.43–6.43 for the measure of appropriateness, 5.33–6.33 for that of ease of application,

and 5.21–6.27 for that of ability to discriminate (Brouwers et al., 2016). The participants also provided considerable written feedback, including specific suggestions for improvements to the instrument. All feedback was formally discussed by the AGREE Next Steps Consortium, and final modifications were made to develop the AGREE II (Brouwers et al., 2016).

The AGREE II has six domains: 1-Scope and Purpose, 2-Stakeholder Involvement; 3-Rigor of Development; 4-Clarity of Presentation; 5-Applicability; and 6-Editorial Independence (AGREE Research Trust, 2014). Within these domains are a total of 23 items targeting various aspects of practice guideline quality. The AGREE II also includes two final overall assessment items requiring the appraiser to make overall judgments of the practice guideline while considering how they rated the 23 items. Each item required a rating on a seven-point Likert scale from strongly disagree (rating=1) through strongly agree (rating=7). Domain scores can be used to identify the strengths and limitations of guidelines, compare methodological quality between guidelines, or select high-quality guidelines for adaptation, endorsement, or implementation (AGREE Next Step Consortium, 2017).

The AGREE Research Trust (2014) funded by the Canadian Institutes of Health Research provides extensive resources about the AGREE II Instrument and its uses. The institution recommends that the appraisal process have at least two, preferably four, appraisers for each clinical guideline to increase the reliability of the assessment. Before applying the tool, the appraisers should read fully the clinical guideline, as well as any accompanying documents. The appraisal includes two scoring steps: (1) using individual appraisers' scores and (2) reaching a consensus. The purpose of the appraisal is to identify limitations of the clinical guideline being considered and to select high-quality clinical guidelines for implementation.

Each student was provided a copy of the AGREE II Instrument's scoring sheet (AGREE Next Step Consortium, 2017) and independently rated each of the six domains and provided rationales for their ratings. The scores of the individual items in each domain were added to calculate the maximum possible score for that domain. The team made an overall assessment of the guideline and rated its overall quality and recommendation for use. After completion of the individual CPG appraisal, the members met and pooled together the ratings and calculated the scaled domain score. For each domain, the names of the team members were entered on an individual row with their ratings. The domain scores were calculated and the ratings from each member were summed. All sums were calculated for the total domain score. The team discussed their ratings and comments related to each item as well as recommendations. The course faculty reviewed the completed AGREE II appraisal of the CPG and provided feedback.

Figure 2
Steps of AGREE II Instrument Appraisal Calculation with an Example

1. After fully reading the chosen clinical practice guideline (CPG), provide the rating for the six domains, per AGREE II description.

A sample scoring for Domain 1 (Scope and Purpose) is shown below. The same scoring is with all the other domains

Example scores for Domain 1

Group Member Names	Item 1	Item 2	Item 3	Total
Sample Appraiser 1	5	6	6	17
Sample Appraiser 2	6	6	7	19
Sample Appraiser 3	2	4	3	9
Sample Appraiser 4	3	3	2	8
TOTAL	16	19	18	53

2. Calculate the minimum and maximum group domain scale scores, as shown below.

For each domain, the minimum possible score is equal to:

$$1 \text{ (strongly disagree)} \times (\text{Number of items for a domain}) \times (\text{Number of team members})$$

Example for Domain 1 shown above:

$$1 \times 3(\text{items}) \times 4 \text{ (number of team members)} = 12 \text{ (minimum possible score)}$$

For each domain, the maximum possible score is equal to:

$$7 \text{ (strongly agree)} \times (\# \text{ of items in that domain}) \times (\text{Total } \# \text{ of students in your group})$$

Example for Domain 1 shown above:

$$7 \times 3(\text{items}) \times 4 \text{ (number of members in group)} = 84 \text{ (maximum possible score)}$$

3. Calculate the scaled domain score by performing the equation below, then multiplying by 100 to derive the scale percentage score:

Obtained total (BLUE) score - Minimum possible score
Maximum possible score - Minimum possible score

Example:

$$\frac{53 - 12}{84 - 12} \rightarrow \frac{41/72 = 0.5694}{0.5694 \times 100 = 57\%}$$

Ethical Approval

The publication of the CPG appraisal activity was approved as non-regulated research from the Institutional Review Board of the University of Texas Health Science Center at San Antonio.

Results

Student Performance and Feedback

The students performed well on this activity with grades from 81% to 97% out of a 20-point grading scale. Aspects for improvement included the provision of the rationale for domain ratings and documentation of consensus discussion. Students' reflective feedback highlighted the importance of the skills of searching for relevant CPGs, especially knowledge of the available databases, and appraising a CPG. One shared, "It was important for me to know the different databases to search for a CPG. It will be handy for me as an APN." Another shared, "We looked at every database and finally found one developed by DoDIVA."

With regards to the actual appraisal training, the students highlighted that they could identify and be aware of the strengths and limitations of guidelines and select those that are of high-quality for adaptation in clinical practice. One student shared, "Through this experience, I now know how to assess and appraise

a CPG. As an APN, when I look at a CPG, I can identify various aspects of the document such as its strengths and limitations.” Another student shared, “Knowing the strengths and limitations of a CPG will allow me to decide more objectively if I am going to adapt the recommendations to my clinical setting.”

Appraisal of the VA/DoD Guideline for the Management of PTSD and ASD

This section describes the student team appraisal ratings per domain and highlights the domain items (Table 1).

Table 1

Appraisal Rating of the VA/DoD Clinical Practice Guideline for the Management of Posttraumatic Stress Disorder and Acute Stress Disorder

Domain	Group Sum	Max Possible	Percent	Appraisal Rating
Scope and Purpose:	79	84	94%	Strongly Agree
Stakeholder Involvement	73	84	87%	Moderately Agree
Rigor of Development	194	224	87%	Moderately Agree
Clarity of Presentation	83	84	99%	Strongly Agree
Applicability	94	112	84%	Moderately Agree
Editorial Independence	49	56	88%	Moderately Agree
Overall Assessment	24	28	86%	Moderately Agree

Domain 1- Scope and Purpose

For Domain 1, the team considered the clarity of the main objectives of the CPGs, the health questions that the CPGs address, and the identified target population. The scaled Domain 1 score of the VA/DoD CPG was 94%. The group was nearly unanimous that the overall objectives of the guideline and the target patient population were clearly described. One member indicated that the health questions (Item 2) for the guideline were not clear. The consensus for this domain was that the CPG provides clear objectives and health benefits as well as the relevant health questions. The guidelines were specified for the adult patient target population, but do not address treatment options for children and adolescents.

Domain 2- Stakeholders Involvement

For Domain 2, the team focused on the extent to which the CPG was developed by the appropriate stakeholders and how well it represented the views of its intended users. The scaled score for Domain 2 of the VA/DoD CPG was 87%. Most of the team members strongly agreed that the stakeholder guidelines were clearly defined. However, the team considered that the stakeholders developing the guideline were not diverse enough to be representative of the intended users and recipients. The

guideline development group consisted of 12 representatives from the VA and the DoD, two representatives from the Office of Quality, Safety, and Value Veterans Health Administration, three representatives from the Office of Evidence-Based Practice, four representatives from the Lewin Group, four representatives from the Emergency Care Research Institute (ECRI), five US Army Medical Command representatives, one individual from the Sigma Health Consulting, LLC, and two representatives from the DutyFirst Consulting. It was not clear whether there was enough representation from community Veteran groups and patients, advanced nurse practitioners, and other mental health specialties.

Domain 3-Rigour of Development

For Domain 3, the team examined the method and process of evidence search, grading, summary, and the formulation of the recommendations articulated in the CPG. The Domain 3 scaled score for the VA/DoD CPG was 87%. The team members strongly agreed that the guideline provided a clear description of the criteria used for selecting the evidence. It described the strengths and limitations of the evidence, methods for formulating the recommendations, the health benefits, side effects, and risks. The recommendations were supported by research evidence. Before its publication, the guideline was appropriately reviewed by experts (independent and external to the development). However, the team was not unanimous regarding the clarity and description of the methods necessary for formulating recommendations nor the availability of a procedure for updating the guideline. While the VA/DoD CPG indicates the necessity of review and subsequent update (U.S. Department of Veterans Affairs, 2017), no specifics regarding the frequency of review or the process were noted.

Domain 4- Clarity of Presentation

For Domain 4, the team considered the presentation and format of the CPG. The scaled score for Domain 4 for the VA/DoD CPG was 99%. The team strongly considered the recommendations to be specific and unambiguous. The treatment options for PTSD were considered clear and the key recommendations easily identifiable. The guideline provided sufficient background information on PTSD and its related disorders. The explanations on the strong and weak recommendations were clear and easily understood. The team considered the guideline to contain comprehensive data on different treatment options for veterans with PTSD and included an algorithm to facilitate clinical decisions.

Domain 5- Applicability

For Domain 5, the team focused on processes related to guideline implementation, such as organizational facilitators, barriers, additional materials provided, cost implications, and monitoring or audit criteria. The Domain 5 scaled score for the VA/DoD CPG was 84%. Most of the team members strongly agreed that the guideline provided a good description of facilitators and barriers to its application. The guideline provided advice and tools for practice implementation and promotes patient-centered care by encouraging the clinician to individualize treatment plans and compare desirable versus undesirable outcomes before use. In terms of monitoring and auditing criteria, the individual rating for each team member varied to the extent that this criterion was

fully discussed. The team agreed that the VA/DoD CPG provided information on the treatment adherence level, medication, and symptom monitoring. However, the team deemed the monitoring and auditing criteria were not sufficiently covered because the guideline did not provide any method for monitoring and auditing.

Domain 6- Editorial Independence

For Domain 6, the team considered the funding conflicts and competing interests of experts involved in the guideline development. The Domain 6 scaled score for the VA/DoD CPG was 88%. The team strongly agreed that the views of the sponsoring organization did not appear to influence the content of the guideline. The guideline addresses the potentially competing interests of the development group members. The VA/DoD funded the project but maintained objectivity from the views of the workgroup. As documented in the guideline, the VA/DoD leadership supported the development workgroup throughout the project and solicited input from experts to analyze and appraise the CPG before publication (U.S. Department of Veterans Affairs, 2017). The members of the VA/DoD CPG workgroup were required to submit a disclosure statement indicating any conflict of interest. The team conducted an online search of the guideline workgroup members and other stakeholders and found no potential conflicts of interest.

Overall Rating Impression

For the overall rating, the team considered the comprehensive quality of the guideline and its recommendation for use in practice. The team's scaled rating for this criterion of the VA/DoD CPG was 86% and reflected the appraisal of the different domains. The team's overall impression was that this CPG is a reliable tool, useful for clinical decision-making in the treatment of PTSD. However, some minor issues related to its development were raised.

Discussion

Well-developed CPGs with valid recommendations can potentially minimize variations in healthcare and improve clinical outcomes (Sekercioglu et al., 2017). They guide healthcare providers on the management of specific conditions and should be of high quality. The AGREE II Reporting Checklist, developed by the AGREE Research Trust funded by the Canadian Institutes of Health Research, outlines the reporting standards needed to achieve a high-quality practice guideline. The Checklist is recommended for guideline development to ensure the inclusion of all necessary information in the CPG, as well as for the production of manuals and protocols (Brouwers et al., 2016). Practice guideline funding agencies and research institutions can promote or mandate adherence to the AGREE II reporting checklist to optimize transparency of required content and to reduce duplication. Additionally, the AGREE II Reporting Checklist can be used by scholarly publications in communicating expectations of submitted manuscripts that appraise CPGs (Brouwers et al., 2016).

On the user end, the AGREE II Instrument is a useful tool for healthcare practitioners when considering the adaptation and implementation of a CPG. Hence, it is important for healthcare

professional students, especially those in advanced practice, to receive training in the use of the AGREE II. The feedback of the graduate students on the CPG appraisal activity stands as a testament to the value of its inclusion in their educational program. Their feedback echoed with the AGREE II NextSteps Consortium's (2017) goals for CPG appraisal – to identify the strengths and limitations of guidelines, to compare methodological quality between guidelines, or to select high-quality guidelines for adaptation, endorsement, or implementation.

Appraisal of the VA/DoD CPG for the Management of PTSD and ASD

The students' appraisal of the VA/DoD CPG for the management of PTSD and ASD showcased their learning and skills. They considered the VA/DoD CPG to be of high quality (86% out of 100%) and their scaled scores were 80% and above for all domains. The outlined guidelines were deemed easy to use with the potential to improve clinical outcomes if implemented correctly. The inclusion of an evidence-based rationale for a given intervention and algorithm is useful for key decision-making in patient management, especially for new practitioners. It will also guide healthcare providers to tailor their evidence-based care with consideration of the clinical context and patient preferences. Some limitations of the CPG were also identified. The guideline did not include a scheduled review process or a specific update timeline. The guideline developers' feedback workshop for veteran and patient stakeholders may have also been limited. There were reservations about whether the focus group fully reflected patients' values and preferences as well as other relevant stakeholders such as nurses and caregivers. A more detailed description of the composition of the feedback group and the content is needed.

Based on the VA/DoD CPG for the management of PTSD and ASD appraisal, several relevant recommendations emerged. A CPG should outline criteria for review, not only in terms of time (i.e., within the last five years), but to consider emerging evidence that may deem current practice unsafe or ineffective. The workgroup developing a CPG should consider involving a broader diverse group (especially including patients, caregivers, and other healthcare specialties relevant to the condition) to provide feedback on the CPG before its approval and publication. The description of the composition of this feedback group and process should be detailed in the CPG to allow transparency and to facilitate the appraisal process. It is also recommended that clinicians should consider using the AGREE II Instrument to evaluate a CPG before implementation. Clinicians should receive training in the use of the AGREE II appraisal as part of their advanced practice education.

Limitations

This study has its limitations. Data were from one cohort of MSN students, which may introduce bias unique to this cohort. The MSN students who appraised the VA/DoD CPG were enrolled in the Psych/Mental Health Nurse Practitioner's Program. Their level of educational preparation at the time of the appraisal was a potential weakness. They were not yet advanced nurse practitioners with full practice authority. Their limited

advanced clinical experience may have influenced the appraisal. However, the students each had on average of over five years experience as registered nurses at the time of this appraisal. It is noteworthy that the AGREE NextSteps Consortium (2017) does not limit its use among advanced practitioners. It is structured for use among individuals who want to appraise a CPG. Moreover, the Consortium recommends an appraisal team of two, preferably four. Hence, the composition and number of appraisers meet the recommendation.

Conclusion

CPGs are important resources intended to improve patient outcomes; however, their quality may vary. The AGREE II Instrument is a valid and reliable resource to appraise CPG quality and has been widely used (AGREE II NextSteps Consortium, 2017). Clinicians, especially advanced practice nurses, should receive an introduction and appraisal training on the use of the AGREE II Instrument as part of their formal education.

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QUALITY IMPROVEMENT

Support of LGBTQ+ People with Intellectual and Developmental Disabilities in Group Homes

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Abstract

Background: Researchers indicate that the staff of group homes do not support LGBTQ+ individuals with intellectual and developmental disabilities (ID/DD) in expressing their sexuality or acknowledging their sexual orientation. **Objective:** The project's purpose is to develop staff education about support strategies for ID/DD individuals who identify as LGBTQ+ in group homes to reduce adverse behavioral issues. **Methods:** This is a quality improvement initiative. Data were collected from a convenience sample of the target population via post-workshop surveys adapted from the Knowledge about Homosexuality Questionnaire, pre-and-post community inclusion forms, review of agency's records and environment, and pre-and-post adverse behaviors of the study cohort. The convenience sample size is limited to 25 direct participants and 32 indirect charts. **Results:** Data were analyzed by content analysis and the use of the Statistical Package for the Social Sciences (SPSS) - Spearman's rho, paired-sample t-test, and Wilcoxon signed-rank test. Findings show that staff education and support would reduce adverse behavioral issues among the cohort. **Limitations:** This project is limited to a convenience sample of only one agency in New York City that provides services to Intellectual Disability and Developmental Disability (ID/DD) individuals who identify as Lesbian, Gay, Bisexual, Transgender, Queer, Questioning (LGBTQ+). Survey questions did not include specific questions about lesbians, transgender people, asexuals, pansexuals, and intersex. Only one question mentions bisexuality. **Conclusion:** There is a critical need to modify the agency's protocols, forms, cultural competency training, environment, and policies to emphasize the cohort's needs using interventions to diminish minority stress and improve positive psychology (PERMA model). Nursing education should include an in-depth curriculum on the intersection between LGBTQ+ and ID/DD populations.

Keywords: LGBTQ+, disabilities, group homes, sexuality, minority stress, PERMA.

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Support of LGBTQ+ People with Intellectual and Developmental Disabilities in Group Homes

Many healthcare agencies provide quality care for chronic illnesses but struggle to provide holistic care that addresses individuals' sexual needs for people with intellectual disabilities and developmental delays (ID/DD) who identify as Lesbian, Gay, Bisexual, Transgender, Queer, Questioning (LGBTQ+). This cohort is marginalized because of their sexual orientation and disabilities (Wos et al., 2020). ID/DD individuals who identify as LGBTQ+ are less likely to be educated and supported about their sexuality and lifestyle. Sexual frustrations may lead to behavioral and psychological issues such as elopement, destruction of properties, physical assaults on themselves and others, sexual assaults, depression, suicide, and distress (McCann et al., 2016).

Based on existing literature, there are gaps regarding the exact content to add when developing policies and protocols to guide nursing and staff support for these individuals. Many agencies have limited or no protocol, sparse information, inadequate training for nursing and support staff, inconsistent education for the ID/DD individuals who identify as LGBTQ+ population, and a lack of understanding of this cohort's intimate personal lives during unprecedented times like the COVID-19 pandemic (Achey, 2020; Wos et al., 2020).

ID/DD Populations are Social and Sexual Beings

People are social beings and desire relationships with others. Sexuality is a fundamental human right for everybody, regardless of orientation, gender, cognitive abilities, and age. People want to belong, socialize, be accepted, and have non-sexual and romantic relationships. Societal and cultural standards influence sexuality. Entrenched in the human formation of self-identity, well-being, and self-esteem is human sexuality. When these social and sexual relationships are unattainable or denied, people may experience physical, behavioral, and psychological deficits or stress (Achey, 2020; Dinwoodie et al., 2020).

In some cases, some people may even violate societal regulations resulting in criminal and civil legal cases (Dinwoodie et al., 2020; Rodríguez-Roldán, 2020). According to positive psychology and minority stress theories, meaningful, constructive, and healthy relationships help people find love, form romantic relationships, help build resilience, improve health, and decrease psychopathology (Meyer, 2003, 2020; Seligman, 2020). With increasing life expectancy of the developmental disability population, there is a growing demand for individualized, patient-centered care that addresses this population's sexual needs. In the past decades, sexuality for the ID/DD population was restrictive and repressed, particularly for the ID/DD individuals who identify as LGBTQ+ (McCann et al., 2016; Whittle & Butler, 2018). The sexual rights of the ID/DD population are considered taboo, hypersexual, or asexual. However, with the growing acceptance of the LGBTQ+ population, many studies advocate accepting, normalizing, and supporting this population's sexual rights (Rodríguez-Roldán, 2020).

Special Needs Population: LGBTQ+ with Disabilities

Studies about LGBTQ+ ID/DD and ID/DD individuals who identify as LGBTQ+ are divergent in different research areas. Furthermore, findings may not necessarily be transferable. Nursing and healthcare staff who provide care to LGBTQ+ individuals with disabilities still erroneously believe that this cohort cannot have sexual desires, give sexual consent, understand the complexities of having sex or having sexual partnerships (Dinwoodie et al., 2020; McCann et al., 2016; Whittle & Butler, 2018, Wos et al., 2020). LGBTQ+ individuals with disabilities barely receive relevant education about their sexual orientation and are dismissed as unable to understand sexual concepts. Some nursing and support staff, including those who identify as LGBTQ+, may not be willing to be role models or advocates for this cohort. Staff may be reluctant to correct their colleagues due to fear of discrimination or the possibility of being accused of sexual misconduct or violating the cohort's legal rights (Dinwoodie et al., 2020). Some nurses and support staff may have an underlying phobia, negative experiences, or implicit bias about same-sex activities due to their religion, values, beliefs, or culture (Wos et al., 2020).

Since all people desire social belongingness and relationships, LGBTQ+ individuals with disabilities may exhibit behavioral and psychological issues due to sexual frustrations and denial of socialization. These behaviors could lead to unnecessary hospitalizations, decreased satisfaction, social isolation, low self-esteem, and loneliness (Achey, 2020; Dinwoodie et al., 2020). Also, the lack of nursing and staff support and marginalization may lead to social isolation, low self-esteem, loneliness, and emotional, mental, and physical abuse by strangers, family members, and staff (McCann et al., 2016; Whittle & Butler, 2018).

According to James et al. (2016), LGBTQ+ individuals with disabilities experience more discrimination and oppression and are more likely to be neglected and abused in the healthcare arena. Disabled people who identify as LGBTQ+ are more prone than mainstream and heterosexual ID/DD populations to experience bigotry and social stress, leading to many physiological and psychological issues. ID/DD individuals who identify as LGBTQ+ people are likely to experience mood disorders such as anxiety, substance use disorders, invisibility, and depression (McCann et al., 2016; Whittle & Butler, 2018). Forty percent of people with disabilities who identify as LGBTQ+ reported mental health, such as suicide, bipolar, psychosis, aggressive behaviors, and depression. Consequently, this population may require more medical and nursing care for other health care diseases, including negative behavioral issues. Some of these diseases include chronic illnesses such as dual diagnosis of physiological diseases, psychological and behavioral, and classic advanced age-related disorders (Rodríguez-Roldán, 2020). McCann et al. (2016) found that 74% of people with developmental disabilities do not know about LGBTQ+ issues. Surprisingly, 70% of the ID/DD population who identify as LGBTQ+ have negative attitudes towards individuals who identify as LGBTQ+ and have difficulty accepting their own identity as LGBTQ+. The authors

also documented that some LGBTQ+ people with disabilities are unhappy about their sexual identity.

ID/DD people are likely to be supported and educated if they are heterosexual instead of preferring same-sex sexuality. LGBTQ+ people with disabilities, especially minorities, encounter double and triple discrimination due to their disabilities, ethnicity, gender identification, and sexual orientation (James et al., 2016; McCann & Brown, 2019). In a study, 28% of transgender people reported getting arrested for sexual identification, and 52 % of transgender ID/DD people reported uneasiness about seeking help from law enforcement for sexual crimes against them (Pettinicchio, 2019).

Methods

Project Question

Did implementing an evidence-based and culturally competent, supportive strategic education workshop for the group home nursing and support staff decrease behavioral issues in ID/DD individuals who identify as LGBTQ+ within five weeks?

Ethics/Human Subjects Protection

The project site did not have an Internal Review Board and did not require oversight and permission to complete a quality improvement project. The agency's Quality Improvement Director and the Chief Nurse Executive approved the project. Additionally, due to the nature of the project, strict confidentiality and HIPAA guidelines were maintained. Electronic health records were protected by ensuring that data collected did not have personal health information. All data had random numbers to identify the members of the cohort. All data collected were secured in a password and encrypted, protected file. All information and data were coded with non-identifying numbers. All personal health information was removed. All patient data were key-coded. No records were stored or removed from the practice site. When sharing results, no patient or participants' identifiers were used.

Online training allowed the participants to access the QueerAlly Workshop at their convenience. The post-intervention questionnaires were anonymous and administered through electronic means. There were no risks to the participants who voluntarily completed the anonymous questionnaire. Participants did not receive any compensation for completing the survey. There was no collection or tracking of participants' email or computer Internet Protocol addresses.

Study Interventions and Data Collection

The project started in the first week of July 2021 and concluded in the first week of August 2021. Different data collection sources were used, such as electronic surveys, electronic health records (community inclusion flow sheets), and post-intervention reported adverse behavior incidents.

This quality improvement project used an educational program to train group home nursing and support staff who provide services to ID/DD individuals who identify as LGBTQ+ on support strategies to reduce behavioral issues among members of this cohort. Data were collected and content analyses performed of the organization's existing cultural competency policy, forms and physical environment in terms of language supporting intellectual and developmental delays among individuals who identify as LGBTQ+. Additionally, data were aggregated from 32 pre-and-

post community inclusion forms. Finally, data from the agency's electronic health record also yielded the rate of psychiatric hospitalizations for ID/DD individuals who identify as LGBTQ+. The data were used as a benchmark to measure any changes in psychiatric admissions and adverse behavioral issues for the cohort after implementing the QueerAlly-IDD Workshop. A post-intervention electronic questionnaire evaluated participants' knowledge about ID/DD individuals who identified to be members of the LGBTQ+ cohort. The questionnaire collected demographic data about the respondents. These data included respondents' age, the highest level of education, tenure at the agency, sexual orientation, gender identity, and prior attendance in LGBTQ+ training. Additionally, the questionnaire collected data about the participants' knowledge and understanding of the cohort.

The QueerAlly-IDD Workshop used evidence-based information to educate staff to recognize, understand, and meet the specific needs of the ID/DD individuals who identify as LGBTQ+ cohort. The Workshop encompassed acknowledging the perceptions and feelings of nursing and support staff about the cohort, the impact of conscious and unconscious biases, cultural awareness and beliefs, cultural knowledge, and cultural skills. Positive psychology, PERMA (Positive Emotions, Engagement, Relationships (Positive), Meaning, and Accomplishment/Achievement) phases, and minority stress theory were incorporated into the training to decrease psychological stress and maintain positive social and sexual relationships for the cohort (Meyer, 2003, 2020; Seligman, 2020). The Workshop included approaches to addressing the cohort's sexual needs, treatment and support for cohort members changing their genders, symptoms monitoring, and how to help the cohort's adjustment. The Workshop also included clarifying issues about consent to sexual relationships and the capacity to consent. Finally, the Workshop addressed the protection of the individuals' rights to choose and self-determination, appropriate and practical training for the cohort, support for LGBTQ+ individuals, contraception usage, dating, sexual relationships, sexual pleasure, acceptable and unacceptable sexual conduct, and intimacy.

The project's post-intervention tool questionnaire was adapted from the Knowledge about Homosexuality instrument to measure the agency's staff knowledge after the QueerAlly-IDD. The tool was developed by Harris, Nightengale, & Owens (Harris, 1998). The instrument measures nurses, social workers, and psychologists' knowledge about homosexuality and sexual orientation issues. Additionally, the questionnaire was used to measure other disciplines' knowledge about LGBTQ+. Literature showed that the mean scores from the original administration of the questionnaire were 16.3 (eighty-two percent correct) for a sample of healthcare professionals, with a Chronbach's alpha of .70. The construct validity showed that the mean score was higher for health care professionals. The construct validity showed that people who have the education about and understanding of the LGBTQ+ community would score higher (Corrêa-Ribeiro et al., 2018). Permission was received from Dr. Harris to modify and use the instrument.

Measures and Outcomes

The Statistical Package for the Social Sciences (SPSS) Statistics was used to analyze the three data sets collected. In addition, the assessment of learning of nursing and support staff of new protocols were analyzed using data collected from community inclusion reports from the agency's archives. The assumption was that the variance between the data to be collected was homogenous, and the sample was more than 30 records with interval data.

The paired-student t-test was used to compare the pre-and post-community inclusion frequency of LGBTQ+ friendly community activities and sites by support staff for the ID/DD individuals who identify as LGBTQ+ after the Workshop. The parametric test was used to ascertain whether the frequency of the pre-workshop community inclusion sites are statistically significant compared to the post-workshop community inclusion sites. community inclusion is a mandated activity where staff document outside activities by individuals who live in group homes certified by the Office of People with Developmental Delay (OPWDD) in New York state. All the descriptive data of post-workshop participants and their Knowledge of LGBTQ+ were analyzed using SPSS. Content analysis was used to analyze the frequency of LGBTQ+ related information in the cultural competency workshop, policies, forms, physical environment, family, individual hand-outs and materials, and cultural competency policy. Wilcoxon's non-parametric test was used to analyze the Workshop's significance and the change frequency of adverse behavioral issues before and after the QueerAlly Staff Development Workshop. The assumption was that the data were not normally distributed and homogenous.

Content Analysis

The agency's environment, documents, policies, and Workshop were examined and analyzed. Reviewed documents include the agency's cultural competency workshop (PowerPoint handouts), forms (admission, intake, nursing assessment, community inclusion, triage form, medical appointment form), policies (cultural competency policy, medication administration; nursing assessment, community inclusion), and family and individual handouts and materials. Only 0.05% (12 lines) in the cultural

competency workshop and 0.15% (18 lines) in the cultural competency policy mentioned the LGBTQ+ phrases.

These lines did not indicate how nursing and support staff could support the cohort or explain LGBTQ+ terminologies. Also, only 0.42% (5 lines) of the agency forms mentioned some LGBTQ+ terminologies. The five lines did not mention protocols for collecting information pertaining to the cohort. In addition, none of the agency forms mentioned or provided opportunities for LGBTQ+ pronouns. The reviewed policies only mentioned LGBTQ+ in eight lines (0.03%). Also, there were no LGBTQ+-related illustrations, pictures, or LGBTQ+ friendly materials displayed in the agency. The content analysis did not reveal any LGBTQ+ images, posters, or information in the environment.

Community Inclusion

To ascertain the participants' knowledge and willingness to support the cohort, one month of pre-workshop and post-workshop of 32 randomized community inclusion samples were reviewed for visits to LGBTQ+ establishments such as clubs, bars, community settings, LGBTQ+ events, and shops. The paired-sample t-test was used to compare the pre-and post-workshop community inclusion frequency to LGBTQ+ friendly community activities and sites by staff for the ID/DD individuals who identify as LGBTQ+. Pre-workshop data showed minimal community inclusion of LGBTQ+ sites. The staff's anecdotal notes revealed that limited time (10-15 minutes) was spent at these LGBTQ+ sites. No anecdotal documentation exists about the experience or the satisfaction of the ID/DD individual's visits to the LGBTQ+ sites. A paired-sample t-test was conducted to compare the mean scores for the same data group on two separate occasions. The Workshop's impact on nursing and support staff's backing and facilitating of individuals attending community inclusion to LGBTQ+ friendly sites were likewise examined.

Data showed that there was an increase in staff taking the ID/DD individual to LGBTQ+ community inclusion-friendly sites from pre-workshop ($M=.38$, $SD=.609$) to post-workshop ($M=.69$, $SD=.780$), $p<.001$ (two-tailed). The mean increase in the LGBTQ+ community inclusion was $-.312$, with a 95% confidence interval ranging from $-.545$ to $-.080$. The eta-squared statistic (0.20) indicated a small effect.

Table 1

Content Analysis

Material	Estimated Lines	Lines with LGBTQ+ content	Estimated Illustrations (%)	Illustrations of LGBTQ+ content (%)
Cultural competency workshop-PowerPoint, handouts	24,450	12 (0.05%)	60	0
Forms- Admission, Intake, Nursing Assessment, Community Inclusion, Triage forms, Medical Forms	12,000	5 (0.042%)	0	0
Physical environment	20	0	30	0
Cultural competency policy	12,000	18 (0.15%)	0	0
Family and individual handouts and materials	2000	0	20	0
Policies – Medication administration, Nursing Assessment, Community Inclusion	28,000	8 (0.03%)	0	0

Table 2

Community Inclusion

		Paired Samples Test					Significance			
		Paired Differences								
		Mean	Std. Deviation	Std. Error Mean	95% Confidence Interval of the Difference		t	df	One-Sided p	Two-Sided p
					Lower	Upper				
Pair 1	Pre-Workshop Community Inclusion – Post-Workshop Community Inclusion	-.312	.644	.114	-.545	-.080	-2.743	31	.005	.010

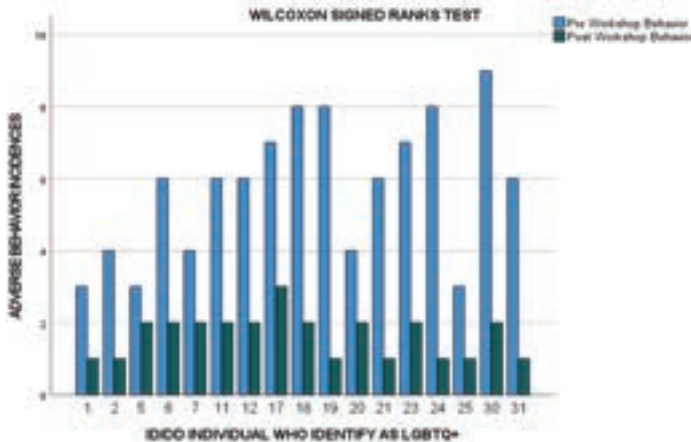
Adverse Behavioral Issues

The Wilcoxon signed-rank test was used to analyze the Workshop’s significance and the change frequency of adverse behavioral issues pre-and-post Workshop. The data collection for one month was obtained from all 32 group home individuals regarding any behavior documentation, emergency services activation, and any psychiatric hospitalizations for being a threat to self or others. These behaviors include physical aggression towards objects or people, self-injury, elopement, prostitution, sexually inappropriate behaviors, and offending behaviors such as public masturbation, feces-smearing, and stealing. Pre-workshop data showed that the frequency of adverse behavior among the ID/DD individuals who identify as LGBTQ+ is high. These negative behaviors range from minor incidents such as throwing food on the floor or punching the walls to more severe behaviors such as elopement and self-injurious behaviors.

A Wilcoxon signed-rank test showed $z = -4.718$, $p < .001$ (2-tailed). The difference in adverse behaviors among the cohort pre-and-post the workshop is statistically significant. Also, with a large effect size ($r=.83$), this statistical difference was due to the intervention workshop. The median score on the adverse behavior per month for ID/DD individuals who identify as LGBTQ+ decreased from pre-workshop ($Md=4$) to post-workshop ($Md=1$).

Figure 1

Pre-and Post-Workshop Adverse Behavior Frequency



Knowledge About Homosexuality Survey

The post-workshop survey included 19 questions to evaluate the staff’s knowledge about LGBTQ+. The most correctly answered questions were those about coming out and bisexuality. The most incorrectly answered question is cultural-historical intolerance towards homosexuality. The majority of the respondents agreed that ID/DD individuals could identify as LGBTQ+, could have sex, could change their biological sex with medications, and go to LGBTQ+ events. A non-parametric test, Spearman’s rho, showed a moderate to strong correlation between these respondents’ survey answers and demographic factors such as the highest level of education, age, and participants’ involvement in a previous course with homosexuality in the curriculum. Conversely, post-workshop data also showed that age and gender did not affect the respondents’ knowledge of homosexuality.

The survey also included four questions (16-19) to ascertain participants’ specific knowledge about intellectually disabled and developmentally delayed (ID/DD) individuals who identify as LGBTQ+. For question 16, 2 (8%) respondents did not think that ID/DD individuals can identify as LGBTQ+, and 2 (8%) did not know ($M=1.24$; $SD=.5$). For question 17, one respondent (4%) did not think that ID/DD individuals can have sex. However, 18 (96%) responded that individuals with ID/DD who identify as Lesbian, Gay, Bisexual, Transgender, Queer, and Questioning (LGBTQ+) can have sex ($M=1.08$; $S.D. =.4$). For question 18, 7 (28%) did not believe that ID/DD individuals can change their biological sex with medications, while 15 (60%) believed they could. Four participants (12%) did not know the answer ($M=1.52$; $SD=.7$). For question 19, ID/DD individuals who identify as LGBTQ+ could go to LGBTQ+ events. Only 1 (4%) did not think the cohort could attend LGBTQ+ events ($M=2$; $S.D. =.4$).

Application to Nursing Clinical Practice and Nursing Education

The project aligns with the Institute of Medicine report on LGBTQ+ health issues and research gaps, the vital recommendations in Healthy People 2020, the Joint Commission’s LGBTQ+ Field Guide, and the implementation of the Patient Protection and Affordable Care Act (Brigham and Women’s Faulkner Hospital [BWFH], 2016). The American Nurses Association (ANA) emphasizes the importance of all nurses practicing in diverse settings to provide informed, educated, ethical, safe, effective, sensitive, and culturally congruent care to

members of LGBTQ+ populations. The problem of not addressing the sexual needs of the ID/DD individuals affect the cohort's quality of care and violates the cohort's ethical, legal, and human rights (Institute for Healthcare Improvement [IHI], 2018; Stokes, 2019).

The quality improvement project increased the cohort and staff satisfaction and decreased sentinel and never-events. This increase in safety and satisfaction could translate into increased reimbursement from the Centers for Medicaid and Medicare Services (CMS) and other payors. Likewise, the agency would meet the quadruple aim of healthcare - to enhance patient experience, improve population health, reduce costs, and improve work-life balance of healthcare providers, including nursing and support staff (CMS, 2017).

The project results would help agencies that support individuals who identify as LGBTQ+ to detect problems that would affect quality, cost-effective, safe, timely, effective, efficient, and patient-centered care. This project's results could explain and support quality improvement projects, sustainability of initiatives, and procurement of critical stakeholders' buy-in when changing policies, practices, and the environment to support the LGBTQ+ cohort (Porter-O'Grady & Malloch, 2018).

Furthermore, the project's findings would help detect the organization's cultural competence training needs for service delivery to culturally diverse populations, systems and organizational cross-cultural strengths identification, and staff development training topics (Mason, 1995). The education should measure behavioral nursing and support staff changes and reinforce the need for professional practice and language change when addressing this cohort. This training would lead to a supportive and safer work environment for the nursing personnel, support staff, and the cohort. Nursing and support staff members would build stronger relationships with their colleagues and ID/DD individuals who identify as LGBTQ+ (Achey, 2020). The anticipation is that the project's findings would allow the agencies to recruit and retain qualified nursing and support staff. These agencies would also be able to develop a positive and supportive environment and more appropriate policies for this cohort. A decrease in turnover rates for ID/DD specialty nurses would decrease sentinel and never events. This decrease would translate into increased reimbursement from the Centers for Medicaid and Medicare Services and other payors (Press Ganey, 2017), as well as staff and resident satisfaction.

Also, the findings of this quality improvement project reinforce the agency's efforts in collecting information on sexual orientation and gender identity to reduce LGBTQ+ health disparities. Healthcare agencies should list LGBTQ+ health and transgender care among their services (Achey, 2020). Also, institutions' forms and electronic health records should include LGBTQ+ terminologies and opportunities to include questions about sexual orientations and gender identity as part of the medical and sexual history. The National LGBT Health Education Center (NLHEC, n.d.) recommends that forms should have options to document preferred names and pronouns. These changes would help nursing and support staff comply with the cohort's wishes. The forms should not contain non-gender-neutral terminologies such as "father/mother," "husband/wife," or "family history." Instead, the

forms should have "parent(s)," "partner(s)," or "blood relatives." Also, forms should be gender-neutral (images without human shape) illustrations.

Healthcare agencies should modify their environments, policies, and forms to include evidence-based information about the cohort to focus on details about the social and sexual needs of the ID/DD population who identify as LGBTQ+. The metrics from this project could support initiatives for modifying the environment to become more welcoming to the cohort. The environment should include LGBTQ+ illustrations and LGBTQ+ related information and handouts for this population and their families (Rickards, 2019; NLHEC, n.d.). Some examples include LGBTQ+ rainbow stickers, flags, or decals on I.D. badges, nursing stations, and around the agency to show their support and acceptance of the cohort (BWFH, 2016; NLHEC, n.d.).

Nursing education and allied healthcare continuing education programs should integrate in-depth training about the intersection between LGBTQ+ and special populations (McCann & Brown, 2019). Policies, protocols, and continuing professional education of agencies that serve this population should include a sex education curriculum. The staff development competency goals include assisting these individuals in making current and educated choices about their well-being, sexuality, support, and promotion of their relationships (McCann & Brown, 2019; Rickards, 2019).

Positive psychology and the minority stress model principles would be combined to develop a staff education workshop, including support strategies for ID/DD individuals who identify as LGBTQ+ in group homes to reduce behavioral issues in the cohort. Nursing and ancillary staff education should also incorporate the use of the PERMA model, such as meeting and forming meaningful friendships and romantic relationships with others. These PERMA concepts would support and empower nursing and support staff to advocate and provide the cohort with privacy, support, and information to express their sexuality freely.

Additionally, this educational focus would decrease distal and proximal factors that cause physical and psychological chronic illnesses and preclude the cohort from achieving all five PERMA tenets (Lindley & Galupo, 2020). Staff support and flexible organization policies would serve as community strengths to produce positive subjective experiences and character strengths. These cohorts' character strengths, such as kindness, mindfulness, gratitude, love, and hope, would help them achieve and support the development of resilience, manage stressors, flourish, and improve their mental and psychological well-being (Seligman, 2020).

Nursing and ancillary staff education should incorporate exercises to facilitate self-assessment and self-reflection about their preconceived, implicit biases, personal prejudices about the cohort, and knowledge deficits that might adversely impact their attitude and support towards these individuals. Also, the curriculum should include knowledge deficits that might adversely affect nursing and support staff's attitude and caring towards this group of individuals (McCann & Brown, 2019; Rickards, 2019). The curriculum should discuss issues about ableism, transphobia, and homophobia. Staff education would produce a robust and knowledgeable nursing and support staff who will help this cohort socialize, develop coping skills and resilience to deal with the

distal and proximal factors of minority stress, hence, managing its chronicity. This stress reduction could occur through positive social interactions within institutions that add to these individuals' character strengths and subjective positive experiences to thrive and deal with their sexual orientation and social isolation (Meyer, 2003; 2020; Seligman, 2020).

Limitations

This quality improvement project was limited to only one agency in New York City that services ID/DD individuals who identify as Lesbian, Gay, Bisexual, Transgender, Queer, Questioning (LGBTQ+). The convenience sample size was limited to 25 nursing and staff members and 32 community inclusion documents. With this small sample size, the study findings may not be generalized to other similar agencies. Also, convenience sampling of nursing and support staff was a limitation to this project because it could lead to sampling bias. The participants were selected due to their accessibility and availability. As a result, some population members may not be adequately represented by the samples, such as unavailable nursing and support staff due to sickness or vacation. Further studies should use a large, random sample size of nursing and support staff and more community inclusion documents.

Due to the limited period between implementation of the workshop and data collection, data compiled from the post-workshop community inclusion may not have yielded complete information. The project took place within five weeks at a single New York City agency. Aggregated data showed the small effect of the workshop on the staff's willingness to start taking the cohort members to LGBTQ+ friendly sites. The project was limited because there was no investigation of the long-term effects of education on nursing and support staff attitudes towards the cohort. Also, data collected from the study may be affected by the limited duration of the post-workshop data collection and the small sample size of nursing and support staff. The assumption was that there would have been a more significant effect of the intervention on the frequency of LGBTQ+ friendly sites during community inclusion.

Finally, survey questions prohibited performing a comprehensive analysis of the results. Survey questions did not include specific questions about lesbians, transgender people, asexuals, pansexuals, and intersex. Only one question mentioned bisexuality. The inclusion of these other particular groups could have helped ascertain thorough and precise responses from the participants. Future studies should include questions about the different sexual minorities under the umbrella of LGBTQ+.

Conclusion

There is a critical need to modify protocols, forms, cultural competency training, environment, and policies of healthcare agencies to emphasize the cohort's needs using interventions that diminish minority stress and improve positive psychology (PERMA model). Overall, the findings of this quality improvement project support the effectiveness of nursing and staff education about support strategies for ID/DD individuals who identify as LGBTQ+ in group homes to reduce behavioral issues.

Educating nursing and support staff and creating a welcoming environment would increase the attention and nurturing of this population and assist them in accomplishing the five PERMA phases and decreasing minority stress. Staff education and support would also diminish minority stressors, promote and support resilience, enhance quality and meaningful lives, achieve a better sense of well-being, and support eudaimonic and hedonic happiness. The recommendation is that healthcare agencies that serve and support the ID/DD population who identify as LGBTQ+ should revise the cultural competency workshops for all clinical and non-clinical staff. Finally, these agencies should modify their environments, policies, and forms to include evidence-based information about these individuals in order to focus more on details about their sexual needs. Nursing education should consist of an in-depth curriculum on the intersection between LGBTQ+ and ID/DD populations. These modifications should follow the goals and objectives of the QueerAlly-IDD Workshop in recognizing, understanding, and meeting the cohort's specific needs.

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ORIGINAL RESEARCH

The Association between Neighborhood Factors and Bullying among Adolescents with Asthma

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Abstract

Introduction: Neighborhood factors may be associated with bully victimization, a serious health concern for adolescents with asthma. **Objective:** The purpose of this study was to examine associations between neighborhood factors and past year bullying in adolescents with asthma as reported by adult household respondents. **Methods:** Using data from the adolescent 2019 National Survey of Children's Health, we included in our analyses responses from adults of adolescents with asthma who replied to whether or not the adolescent was bullied over the past year and to the neighborhood factors of interest. These adults included 473 adult respondents of adolescent females with asthma and 551 adult respondents of adolescent males with asthma. Neighborhood variables included whether the adolescent's neighborhood had sidewalks or walking paths, a park or playground, a recreation center or a boys' or girls' club, and vandalism exposure. The complex samples module in IBM SPSS 27 with equal probability sampling without replacement was used to conduct the analyses. Descriptive statistics and chi-square analyses were also used. **Results:** Statistically significant differences were found in the proportion of adolescent females with asthma ever bullied compared to the proportion never bullied who had access to a park or playground (70.0% vs. 83.7%, respectively; $p=.038$) and were exposed to neighborhood vandalism (2.8% vs. 10.8%, respectively; $p=.028$). A significantly smaller proportion of adolescent males with asthma ever bullied than the proportion never bullied were exposed to neighborhood vandalism (4.9% vs. 14%, respectively; $p=.032$). **Conclusion:** It is important to examine the influence of neighborhood factors further to better understand their association with bully victimization in adolescents with asthma.

Keywords: Adolescent, Asthma, Bullying, Neighborhood

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The Association between Neighborhood Factors and Bullying among Adolescents with Asthma

Bully victimization, the unwanted, repeated, aggressive behavior by one or more persons that tends to target those who are or appear unable to defend themselves (Gladden et al., 2014; Olweus, 1997) is common among adolescents both internationally and within the United States (U.S.; Moreno et al., 2018; Currie et al., 2012). In fact, approximately 20% of adolescents in the U.S. reported being bullied at school in the past year (Kann et al., 2018). As the intention of bullying is often to hurt another person and frequently involves a power imbalance (Gladden et al., 2014; Olweus, 1997), bully victimization has adverse effects on physical and psychosocial well-being (Hertz et al., 2015).

Research indicates that the prevalence of bullying in the general high school population is higher in females than in males (Kann et al., 2018; Pontes et al., 2018), and prior research has demonstrated various gender differences regarding bullying. For example, males tend to be bullied through physically and verbally aggressive methods, including threats, compared with females who are more likely to experience relational aggression, such as social isolation (Zhang et al., 2019). Accordingly, males often experience effects on both physical and mental health, whereas females frequently experience more severe mental health effects, such as anxiety and depression (Zhang et al., 2019).

Even though both male and female adolescents with and without a chronic condition may experience bullying, adolescents with asthma are particularly vulnerable (Gibson-Young et al., 2014; Merrill & Hanson, 2016; Muhammad et al., 2018). Prior research has found that adolescents with asthma are more likely to experience bully victimization than those without asthma (Gibson-Young et al., 2014), and among adolescents with asthma, females are more likely than males to be victimized (Hertz et al., 2015). As was the case in our past research (McCabe & Strauss, 2020), many of the studies concerning male and female adolescent bully victimization among those with and without chronic medical conditions have focused on individual-level factors related to bully victimization (Gibson-Young et al., 2014; Muhammad et al., 2018). We found an association between bully victimization and asthma in adolescent females (McCabe & Strauss, 2020), with some individual characteristics, such as age and grade in school, differentiating adolescent females with asthma who were victims of bullying from those who were not.

General Risk and Protective Neighborhood Factors

What remains unknown is the role of neighborhood factors in bully victimization among adolescents with asthma. What is known is that the physical characteristics of neighborhoods and perceived neighborhood safety have been associated with childhood asthma prevalence (Camacho-Rivera et al., 2014; Vangeepuram et al., 2012). In addition, community resources, such as recreational opportunities, can create a cohesive neighborhood atmosphere and may be related to less bully victimization in adolescents (Schumann et al., 2014). Neighborhood factors may also affect the imbalance of power between individuals, such as friendships and social exclusion, thereby influencing the likelihood of being bullied and experiencing other victimization. One set of such

factors has been termed “community disorder,” describing a neighborhood environment in which residents may perceive that social control is weak and that there is little desire or ability to maintain a safe and orderly physical environment (Turner et al., 2013). Such neighborhoods may contain litter on the streets and experience vandalism (Kim & Conley, 2011). Research has demonstrated associations between community disadvantage and disorder and youth’s impaired mental health (Dawson et al., 2019) and the direct impact of neighborhood structural disadvantages on bully victimization (Choi et al., 2020). On the other hand, opportunities for recreation in the community may decrease the likelihood of bully victimization among adolescents with asthma. In fact, decreased bully victimization was found to be the case among adolescents who indicated that there were good places to spend their free time in the community (e.g., recreation centers, parks, shopping centers; Schumann et al., 2014).

Because the impact of neighborhood characteristics on bullying of adolescents with asthma has not been examined, the study’s specific aim is to examine relationships among risk and protective neighborhood factors and bullying in adolescents with asthma. To achieve this aim, we use data collected from adult household respondents (hereafter referred to as adult respondents) of adolescents with asthma in the 2019 National Survey of Children’s Health (NSCH) directed by the U.S. Census Bureau (U. S. Census Bureau, 2019) and funded and directed by the U.S. Department of Health and Human Services, Health Resources and Services Administration, Maternal and Child Health Bureau. It is hypothesized that (a) adult respondents of adolescents with asthma who report access to protective neighborhood resources will report less bullying of the adolescent than those without such resources; and (b) adult respondents of adolescents with asthma who report exposure to neighborhood risk factors will report more bullying of the adolescent than those without such exposure. Findings will be generalized to adolescents with asthma in the U.S. and aim to highlight neighborhood factors associated with bullying in this group of adolescents. This will inform practitioners, researchers, and clinicians with implications for primary care, psychology, social work, and education concerning the role of neighborhood factors related to bullying among vulnerable adolescents.

Methods

Sampling Procedures

The 2019 NSCH was administered online and by mail. Randomly chosen household addresses from across the U.S. were mailed directions to access the online screener survey; some households also received a paper version of the screener survey (U.S. Census Bureau, 2020). All adult respondents completed an initial screener questionnaire (U.S. Census Bureau, 2020). If adult respondents indicated on the screener questionnaire that a child aged 0-17 did not live in the household, they did not complete an additional topical questionnaire. If adult respondents indicated on the screener questionnaire that a child aged 0-17 did live in the household, they completed the initial screener questionnaire and then replied to a topical questionnaire (U.S. Census Bureau,

2020). A single child from the household was randomly chosen to be the subject of this topical questionnaire. Three separate topical questionnaire versions were created to capture data for children ages 0-5, 6-11, and 12-17 (U.S. Census Bureau, 2020). This study will use data from the questionnaire for children 12-17 years old, specifically focusing on adolescents with asthma aged 15-17 years, consistent with our prior research involving female adolescents with asthma (McCabe & Strauss, 2020). We subsequently refer to adolescents aged 15-17 years as adolescents.

Data Collection

NSCH gathers data related to the well-being of children, including access to and quality of health care, household relations, parental well-being, school and after-school events, and neighborhood features (U.S. Census Bureau, 2020). A comprehensive description of the 2019 NSCH questionnaires can be found at <https://www.childhealthdata.org/learn-about-the-nsch/survey-instruments> (Data Resource Center for Child & Adolescent Health, n.d.).

The current analyses examined responses to several neighborhood and demographic questions. A total of 29,433 households were eligible for and completed the topical questionnaire, with a complete weighted response rate for the 2019 NSCH of 42.4 % (U.S. Census Bureau, 2020). Data from this study were extracted from a combination of screener and topical survey responses.

Study Measures

Study measures were derived from four queries from the topical questionnaire with “yes” or “no” responses regarding whether the child’s neighborhood had sidewalks or walking paths, a park or playground, a recreation center or a boys’ or girls’ club, and vandalism exposure, such as broken windows or graffiti. Adult respondents were also asked, “During the past 12 months, how often was this child bullied, picked on, or excluded by other children?” Adult respondents could choose “never,” “1-2 times in the past twelve months,” “1-2 times per month,” “1-2 times per week,” and “almost every day.” Our recoding compared children who were never bullied versus ever bullied in the past year. In addition, we incorporated adult respondents’ replies to the “yes” or “no” question, “Has a doctor or other health care provider ever told you that this child has asthma?”

Data Analysis

In view of sex differences in bullying among adolescents with asthma, analyses were conducted separately for adolescent males and females with asthma. Because of the intricate survey sampling design, the complex samples module in IBM SPSS 27 with equal probability sampling without replacement was used to conduct the analyses. This allowed the data to be weighted to produce correct confidence intervals, standard errors, valid point estimates, and testing of hypotheses. In addition, it enabled extrapolation of findings to all adolescent males and females with asthma in the U.S. and their exposure to bullying in the past year (West et al., 2018).

Descriptive statistics determined the proportion of adolescent males and females with asthma whose adult respondents reported

the child ever being bullied and never being bullied in the past year. Chi-square analyses were used to examine statistical relationships between adolescent males and females with asthma whose adult respondents did and did not report the adolescent ever being bullied in the past year with neighborhood factors (Table 1).

Results

The study sample consisted of 473 adult respondents of adolescent females with asthma and 551 adult respondents of adolescent males with asthma. This sample includes those who responded to the bullying query as well as the selected neighborhood factors (Table 1). Of the adolescent females with asthma, 46% of adult respondents reported their adolescent ever being bullied compared with 54% who reported the adolescent never being bullied in the past year. Concerning neighborhood factors, results demonstrate that a significantly smaller proportion of adult respondents of adolescent females with asthma reported these females ever being bullied in the past year than the proportion of adolescent females with asthma never bullied who had access to a playground or park (70.0% vs. 83.7%, respectively; $p=.038$). In contrast, a significantly greater proportion of adult respondents of these females reported the females being bullied (10.8%) than the proportion of adolescent females with asthma never bullied (2.8%) in the past year who reported exposure to vandalism in their neighborhoods ($p=.028$).

Table 1

Adult Household Responses Regarding Neighborhood Characteristics for Adolescent Females with Asthma: Chi-Square Analyses of Differences between Those Who Were Ever Bullied and Those Who Were Not in the Past Year (%)

Neighborhood factors	Total	Never bullied	Ever bullied	p-value
Sidewalk or walking paths	70.5	75.8	64.3	.129
Park or playground*	77.4	83.7	70.0	.038
Recreation center	47.3	54.3	39.1	.085
Exposure to vandalism*	6.5	2.8	10.8	.028

* $p<.05$

When extrapolated to the population of adolescent males with asthma in the U.S., 32.1% of adult respondents reported the males ever being bullied compared with 67.9% who reported the males never being bullied in the past year. As shown in Table 2, there was a statistically significant difference concerning vandalism exposure. A significantly smaller proportion of adult respondents of adolescent males with asthma reported the males ever bullied in the past year (4.9%) than the proportion of adolescent males with asthma never bullied (14%) in the past year who were exposed to neighborhood vandalism ($p=.032$).

Table 2

Adult Household Responses Regarding Neighborhood Characteristics for Adolescent Males with Asthma: Chi-Square Analyses of Differences between Those Who Were Ever Bullied and Those Who Were Not in the Past Year (%)

Neighborhood factors	Total	Never bullied	Ever bullied	p-value
Sidewalk or walking paths	76.3	76.4	76.0	.949
Park or playground	71.1	73.4	66.3	.455
Recreation center	53.2	56.2	46.8	.366
Exposure to vandalism*	11.0	14.0	4.9	.032

* $p < .05$

Discussion

Our exhaustive review of the literature indicates that this is the first study to examine relationships between neighborhood factors and bullying in U.S. adolescents with asthma. In the general adolescent population, there is growing attention to bullying (Eugene et al., 2021; Salmon et al., 2018) and interest in neighborhood influences on asthma control (DePriest et al., 2018). Prior research has examined individual factors associated with bullying in the general population (Hertz et al., 2015; Merrill & Hanson, 2016), adolescents with asthma (Gibson-Young et al., 2014), and adolescent females with asthma (McCabe & Strauss, 2020). Still, there is a lack of reporting on the influence of neighborhood factors in adolescents with asthma and bully victimization.

Adult respondents indicated that 46% of their household adolescent females with asthma reported ever being bullied compared with 54% who reported never being bullied over the prior year. The adult respondents reported that 32.1% of adolescent males with asthma were ever bullied over the past year compared with 67.9% who were never bullied. Merrill and Hanson (2016) found that the proportion of adolescents with asthma who reported bully victimization was 23.87%. This is considerably lower than the proportions of both adolescent males and adolescent females with asthma reported to have been bullied in the current study. Of note, prior research involving bullying of adolescents with asthma, including that of Merrill and Hanson (2016) and McCabe and Strauss (2020), analyzed data that surveyed the adolescents themselves and the current data from NSCH 2019 surveyed an adult household member.

This study found significance across two neighborhood factors in adolescent females with asthma. Adult respondents of adolescent females with asthma indicated that a significantly smaller proportion of those females ever bullied over the past year compared with the proportion of adolescent females with asthma never bullied in that time frame had access to a playground or park in their neighborhood. As anticipated, concerning exposure to neighborhood vandalism, a significantly greater proportion of adult respondents who reported adolescent females with asthma being bullied than the proportion of adolescent females with asthma never bullied in the past year reported such exposure. DePriest et al. (2018) found associations with neighborhood perceptions of feeling unsafe being associated with higher asthma

prevalence or poorer asthma control in children. In addition, Espelage (2014) hypothesized that an unsafe neighborhood environment could influence bullying due to limited supervision or negative peer influences. These examples suggest the importance of further examining the complex influences of the neighborhood environment to understand better its role in the experiences of these adolescents.

In the case of adolescent males, our hypothesis was not supported. Concerning adolescent males with asthma, there was statistical significance when examining exposure to vandalism, but in the opposite direction of what we expected. A significantly smaller proportion of adult respondents of adolescent males with asthma reported the males ever bullied in the past year than the proportion of adolescent males with asthma never bullied in the past year who were exposed to neighborhood vandalism. Perhaps this finding reflects a lack of communication of adolescent males in sharing information with adult household members regarding bully victimization.

Limitations

This study has several limitations. First, the use of cross-sectional data prevented the analysis of causal relationships between neighborhood influences and bullying. Because research involving neighborhood factors in adolescents with asthma who experience bullying is novel, the cross-sectional design offers a preliminary understanding of those relationships. A second limitation was that the data were reported by a household adult and not the adolescent. It is possible that the adult may interpret bullying victimization differently from the adolescent. In addition, this study did not focus on the gender of the adult respondent, and it is possible that female adults and male adults may have differed in their responses to the questions on bullying. Finally, this dataset asked about bullying in general and did not specify in-person bullying versus electronic. Nor did it offer definitions of the types of bullying that an adolescent might experience. These omissions may have caused adults to misreport bullying experiences in their household adolescents.

Conclusion

This study found that particular neighborhood factors were significantly associated with bullying in adolescents with asthma. There were relationships with access to parks and/or playgrounds and vandalism among adolescent females with asthma. There was also a relationship between vandalism and adolescent males with asthma, but this relationship was the converse of the expected outcome. Study findings go beyond prior research that focused on individual level factors related to bullying in adolescents with and without chronic health conditions (e.g., Gibson-Young et al., 2014; Muhammad et al., 2018; McCabe & Strauss, 2020) in highlighting the need to also examine neighborhood factors regarding the bullying of adolescents with asthma. Of high importance is to study these various factors and acquire data from the source, the adolescents themselves. Generally, adolescents can share rich data concerning medical and social-emotional conditions and are typically developmentally capable to respond to clinicians and researchers to explore the root causes of concerns and implement change.

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ORIGINAL RESEARCH

Language Proficiency and Academic Success of Bilingual Hispanic Nursing Students along the US-Mexico Border

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Abstract

Background: The Texas Department of State Health Services reported an enrollment of 29.7% Hispanic heritage students in nursing schools in 2020. Hispanics comprise of 18.5% of the total US population. Hispanic communities are less likely to speak proficient English than non-Hispanic Whites due to lack of language concordance. A diverse nursing workforce is necessary to accommodate the changing community. English as an additional language is frequently identified as a barrier to a nursing degree. This study examined how English proficiency affects nursing academic success of non-BSN and BSN nursing students. **Methodology:** Non-experimental descriptive quantitative research with two open-ended questions were employed. Students from 27 non-BSN and BSN programs along the U.S.-Mexico border were surveyed. Participants (N = 158) self-reported Grade Point Average (GPAs) on a 4.0 scale and completed two language proficiency instruments, the Language Experience and Proficiency Questionnaire (LEAP-Q) and the English Language Acculturation Scale (ELAS). Participants responded to questions related to strategies that were either beneficial or barriers to their learning and success. **Results:** Regression of GPA on predictors of English proficiency yielded non-significant models. Convergent validity between the two language proficiency instruments was supported, and reliability was similarly high. MANOVA analysis revealed students on a BSN versus non-BSN program hold higher GPAs. Non-BSN students showed higher Spanish language proficiency than those on a BSN program. Seven themes emerged from the question data, three themes showed that English as an Additional Language (EAL) benefits students (support, communication, and academic resources) and four were barriers to learning (finances, time management, language, and self-perception). **Conclusion:** A diverse bilingual nursing workforce is essential to meet the future needs of the US. Even though language proficiency did not predict academic success, students enrolled in non-BSN and BSN students who utilized both languages were academically successful.

Keywords: EAL nursing education, Language proficiency, Bilingualism, Nursing education

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Language Proficiency and Academic Success of Bilingual Hispanic Nursing Students along the US-Mexico Border

The Texas Department of State Health Services (DSHS, 2021) reported an enrollment of 16.6% Hispanic heritage students in registered nursing (RN) schools in 2019; that increased to 29.7% in 2020. Faculty in higher education recognize that the number of international students who speak English as an Additional Language (EAL) or are bilingual has swelled in recent years. From 2009 to 2019, the enrollment of Hispanic students in US colleges and universities increased by 48% (Institute of Education Science, 2021). Hispanic students now constitute 19.5% of the total students enrolled in higher education. Twenty-seven percent of Hispanic students have diverse language backgrounds, an increase from 22% in 2009. In 2018, 75.2% of all Hispanic students in the United States (US) public schools cited Spanish as the most frequently spoken language at home (National Center for Education Statistics, 2021). Hispanics comprise 18.5% of the total US population, and it is expected that Hispanics will constitute 28.6% of the nation's population by 2060 (US Census Bureau, 2021). With the increase in the minority population, it behooves us to educate a diverse nursing workforce to meet the changing needs of our communities (Sepulveda et al., 2022).

Hispanic nurses account for 5.4% of the US nursing workforce (Cheshire et al., 2020). The Hispanic community is at an increased risk for health care inequities due to the poor conditions of daily life and social factors such as income, educational level, occupation, and social support (US Department of Health and Human Services, 2021). Hispanics are 20 times less likely to speak proficient English than non-Hispanic Whites (US Census Bureau, 2021). Language discordance can create a greater health care disparity gap among this population. According to the US Department of Health and Human Services (2021), the Hispanic population is twice as likely to be diagnosed with cancer, 1.3 times more likely to die from diabetes, and less likely to receive recommended immunizations compared to non-Hispanic Whites.

Trust is the bedrock of effective interpersonal communication between nurses and patients, and it is essential in providing quality care (Kwame & Petrucka, 2021). Conversely, language concordance between nurses and Hispanic patients can improve the quality of interpersonal interaction. A diverse nursing workforce is needed to meet the Hispanic community's language needs and to reduce many of the health care disparities this community experiences.

Background

Bilingual students of any origin face unique challenges during their education, including overcoming the challenges to write, comprehend, and communicate in a language different from their native tongue (Abrar et al., 2018). Luque and Morgan-Short (2021) indicated a necessary interaction between language and cognitive processes in bilingual individuals that allow them to control both native and additional languages to achieve linguistic proficiency. To achieve this, they must have cognitive academic language proficiency (CALP) and basic interpersonal communication skills (BICS). Both of which are critical components of the Cummins

Language Proficiency model that was used as the guiding framework for this study (Cummins, 1980).

Al Shamsi et al. (2020) discussed the need for research to explore the impact language barriers have on quality care when the medical language is different from the native language spoken by the patients and the health care team. This is known as the use of "English for a specific purpose," where the learner uses the English language for the purpose of health communication. This type of communication requires the learner to understand the context, grammar, and syntax necessary to communicate with others. Garcia Hernandez et al. (2019) stated, "education and communication processes are inseparable; one cannot happen without the other" (p. 3). The use of English for a specific purpose can help provide clearer communication among the health care team members, prevent unsafe practices, and improve the quality of care.

The terms used with bilingual education are diverse; therefore, a clearer definition of these terms is important for this study. English as a Second Language is a commonly used term that refers to individuals who have a language other than English as their first language (Matsubara, 2020). Another term that is important to address is English as a Foreign Language. The learner is taught English in school but interacts in a society where this is not spoken (Saarikoski, 2020). This is recognized as a global learner where the learner can interact with countries where English is the primary language. More recently, the term evolved to English as an Additional Language, where "learning English is adding to the student's capacities, either as a bilingual or multilingual learner, rather than displacing the language the student acquired earlier" (Bracken et al., 2017, p. 6). Bracken's definition was the most representative of the sample in this study.

Cummins Language Proficiency Model

Cummins (1980) developed the Cummins Language Proficiency Model to explain the language proficiency in minority, bilingual children. Cummins divides language proficiency into dimensions that can be measured by assessing reading, writing, listening, and speaking skills. These measures are strongly related to general cognitive skills and academic achievement. Language proficiency is further explained by two major areas, Cognitive Academic Language Proficiency (CALP) and Basic Interpersonal Communication Skills (BICS). CALP is comprised of general language proficiency, cognitive skills, and educational progress. BICS is more related to accent, oral fluency, and sociolinguistic competence, independent of CALP. Other concepts included in this model are the length of residence (LOR), which considers when learners acquire cognitive academic skills, at a younger or older age.

Abriam-Yago et al. (1999) addressed the importance of language acquisition among EAL nursing students. The use of the Cummins Model of Language Proficiency among EAL nursing students allows nursing faculty to develop effective teaching strategies that can help students achieve the higher cognitive

level required to interpret abstract concepts presented in class discussions, lectures, and textbooks. Nursing faculty can help EAL nursing students develop the CALP threshold by creating meaningful learning opportunities that promote the analysis, synthesis, and evaluation of class information to function at the highest level of Bloom's taxonomy.

Purpose

Multiple researchers have examined academic success predictors among the general population of nursing students enrolled in registered nurse (RN) non-Bachelor of Science in Nursing (BSN) and BSN programs. Al-Alawi et al. (2020) conducted a systematic review of predictors of students' success in baccalaureate nursing programs and identified pre-nursing GPA, collegiate science courses, and standardized entrance exams as predictors of academic success. Even in studies that include EAL nursing students, there is no clear indication of the impact of EAL on academic success. Al Shamsi (2021) conducted a review of literature on challenges that EAL nursing students experience when integrating into a specific learning environment. The review revealed that language and culture played an important role in academic success among these students. One of the studies reviewed reported that effective communication was primordial to relay information to teachers, peers, and other healthcare providers. Subsequently, Fooladi et al. (2018) suggested the need to collect standardized data among bilingual students enrolled in programs that help students obtain their registered nurse (RN) license to address these ongoing concerns.

This study had two purposes. The first purpose was to explore the role of language proficiency based on Cummins' model of language proficiency (experience, proficiency, preference, and acculturation) and the impact of language proficiency on academic success (self-reported GPA greater than 3.0). The second purpose was to identify the learning modalities and barriers that bilingual nursing students face while completing their nursing education.

Methods

A non-experimental descriptive quantitative research approach was used to gather information on the dimensions of language proficiency to understand the impact that EAL had on the academic success of bilingual non-BSN and BSN nursing students. In addition, two open-ended questions related to barriers and facilitators for success in nursing school were included to expand and enrich the quantitative data. These provided a complete picture of the student's perception of the influence of language proficiency on their academic success. The study received university-based Institutional Review Board approval.

Academic success can be interpreted in different ways. Academic success can be conceptually defined as the fulfillment of all course requirements in the projected time by utilizing specialized cognitive and linguistic abilities required to perform the academic-related task (Alyahyan & Dustegor, 2020). EAL nursing students need to have the language abilities to communicate the necessary information to be academically successful. The operational definition of academic success for this study was an overall self-reported 3.0 grade point average (GPA) on a 0 to 4.0 scale that demonstrates successful academic

achievement in prior classes. This is based on previous research studies where a GPA greater than 3.0 have predicted academic success among nursing students (Capponi & Mason Barber, 2020; Gartrell et al., 2020). The GPA should demonstrate the successful completion of all course requirements at this point in time.

Sample

A convenience sample of bilingual Hispanic nursing students was recruited through 27 non-BSN and BSN nursing programs along the US-Mexico border. Non-BSN programs included Associate Degree in Nursing (ADN) and LVN-RN programs; and BSN programs included Bachelor of Science in Nursing and RN-to-BSN degree programs; some BSN programs included tracks for accelerated second-degree students. Participants met the following eligibility criteria: English as an additional language; ability to read, write, and speak English; males and females ages 18 and over; enrolled in a non-BSN or a BSN nursing program along the US-Mexico border; and access to a computer and the internet to complete the online survey.

A power analysis using G* Power (Erdfelder et al., 1996) was used to determine the sample size. A total of 75 participants was needed to meet a *priori* power and effect size. Oversampling protected incomplete data or ineligible participation to meet the goals of a power of .80, an alpha of .05, and a medium effect size of $f^2 = .15$. A total of 158 data entries were received, and 62% percent of the entries met study requirements.

Measures

Language Experience and Proficiency Questionnaire (LEAP-Q)

The instrument captures important contributors to language status such as language competence, age of language acquisition, mode of language acquisition, prior language exposure and current language use, and the level of cultural identity for each culture recognized (Marian et al., 2007). Participants rated items from 0 to 10 (0 = *not a contributor*; 10 = *most important contributor*) for their speaking, listening, reading, and writing proficiency. The LEAP-Q showed a Cronbach alpha of .85 for the first language acquisition and .92 for the second language when tested for internal consistency reliability with 52 multilingual individuals (Marian et al., 2007). The LEAP-Q showed a Cronbach alpha of .86 for the Spanish language acquisition and .87 for the English language acquisition for this study. Language proficiency dimensions were specifically measured with mean months spent in an English environment (experience), fluency of English language (proficiency), the choice of bilingual students to read a text available in English (preference), and cultural identity (acculturation). With an 11-point scale, the LEAP-Q is considered to address variations in bilingual students (Kaushanskaya et al., 2020).

English Language Acculturation Scale (ELAS)

A five-item assessment of language proficiency, the English Language Acculturation Scale (ELAS), was included to determine if a shorter assessment might be sufficient for assessing English proficiency in this population. Participants rated themselves on 5 items related to language (speak, read, language spoken at home, thinking, and interacting with friends). The items were evaluated

on a scale of 1 to 5 (1 = *only non-English language* to 5 = *only English language*). The ELAS showed a Cronbach alpha of .94 with corrected item correlations between .84 and .89 when tested with 1,400 students (Salamonson et al., 2013). For this research study, ELAS showed a Cronbach alpha .84.

Data Collection

Nursing deans and program coordinators of non-BSN and BSN nursing schools located along the US-Mexico border were recruited by phone calls or emails. A total of 27 nursing programs including Associate in Nursing Degree (ADN), Licensed Vocational Nurse (LVN) to RN, Bachelor of Science in Nursing Degree (BSN), and Registered Nurse (RN) to BSN were recruited. No diploma programs were identified. Data collection was conducted through Qualtrics (Qualtrics, LLC, Provo, Utah, USA), an online survey platform.

Data collection was conducted virtually through an online Qualtrics survey in a three-month period from April through July 2017. Deans and/or program coordinators were encouraged to share the Qualtrics link through various online media including but not limited to school emails, learning management software programs, and social media. Participants received an electronic informed consent prior to answering any study questions. A total of 158 anonymous data entries were obtained, and 62% of these met all data analysis requirements (no critical missing data).

Data Analysis

Quantitative Analysis

Descriptive statistics were computed from the demographic information for both groups, non-BSN and BSN nursing programs. LEAP-Q data were tabulated to obtain scores for the dimensions of language proficiency and a total score. Data from the five-item ELAS were summed. All data were analyzed using SPSS version 26.0 (IBM Corp., Armonk, NY, 2019).

Additional Analysis

A total of 98 free-text responses were reviewed for content analysis; an approach used to extract coding categories derived directly from the data, for the two open-ended questions related to barriers and facilitators in nursing school. With this approach, the researcher was able to reduce the amount of text collected into categories for a better understanding of the research information (Graneheim et al., 2017). To better appreciate the relationship between language proficiency and academic success, the following questions were considered: 1) What language learning situation and modalities do bilingual nursing students find most beneficial to their academic success? 2) What barriers to academic success do bilingual nursing students encounter most frequently?

Procedures to Enhance Control and Rigor

Quantitative Control Measures

EAL nursing students from different nursing programs along the US-Mexico border were included to increase sample heterogeneity and provide a more accurate representation of the target population. Students received outlined English instructions at the beginning of the survey to minimize incomplete responses. Multiple measures from LEAP-Q and ELAS with strong

psychometric properties were used to increase measurement validity and better understand implications related to language proficiency in the bilingual nursing student population.

Additional Analysis Enhance Rigor

Documented textual data were read word by word to identify categories and themes for facilitators and barriers. The principal investigator first read and re-read the document to ensure rigor in identifying initial topics. Two qualitative experts reviewed textual data to ensure the correct identification of categories and themes. The research team met to discuss the identified categories and themes. No discrepancies were encountered, and research triangulation was achieved.

Results

Figure 1

U.S. and Mexico Border Participant Distribution (Map Mexico, 2022)



A total of 158 surveys were received; 87 surveys met the inclusion criteria (complete data) and were used in the final analysis. Chi-square or t-test test were conducted to examine demographic differences between non-BSN and BSN student survey entries; no significant differences were reported for gender ($p = .30$), dominant language ($p = .91$), native language ($p = .33$), age of English acquisition ($p = .02$), age of English proficiency ($p = .06$), English language use ($p = .94$), Spanish language use ($p = .76$), and reading as a contributor for learning English ($p = .57$). A significant difference was found with age ($p < .001$). Please see Figure 1 for the geographical distribution of the survey responses. Seventy-eight percent of the total respondents were female, and 21.8% were male. In the non-BSN program, 75.8% of the participants were female compared to 84% of the BSN students, and 24.2% of the non-BSN participants were male compared to 16% of the BSN students. Participants' mean age was 27.19, (SD = 7.05, range 18 - 52). Mean age for the non-BSN program was 28.61, (SD = 7.51), and 23.50 for BSN students (SD = 3.79). Seventy-one percent of the participants were enrolled in a non-BSN program [ADN (83.9%) and LVN to ADN (16.1%)] and 28.7% were enrolled in a BSN program [BSN (84%) and RN to BSN (16%)]. Eighty-two percent of participants had some college or a college degree among the non-BSN group and 76% for those in the BSN group. Seventy-seven participants stated English was their native language. For the non-BSN group, 61.3% stated English as their dominant language compared to 60% of

the BSN participants, and 74.2% of the non-BSN participants indicated English as their native language compared to 84% of the BSN program. Fifty-six percent identified themselves as Hispanic or Mexican American in terms of cultural identification. Bilingual nursing students reported a mean age of English language acquisition of 5.79 (*SD* = 4.41); the mean age for non-BSN students was 6.02 (*SD* = 4.94) and 5.24 (*SD* = 2.68) for BSN students. In addition, participants reported a mean age of English language proficiency of 8.98 (*SD* = 1.20); the mean age for the non-BSN student was 8.89 (*SD* = 1.31) and 9.20 (*SD* = .87) for BSN students.

English language use was reported as *X* = 65.24% of the time, *SD* = 22.20 when interacting with others compared to Spanish *X* = 34.65% of the time, *SD* = 22.66 for both groups. For the non-BSN participants, English language use was *X* = 65.02% of the time, *SD* = 22.39 when interacting with others compared to Spanish *X* = 34.09% of the time, *SD* = 22.47. BSN students reported English language use at *X* = 65.78% of the time, *SD* = 22.17 when interacting with others compared to Spanish at *X* = 36.22% of the time, *SD* = 23.51. Reading was the highest contributor with (*X*) = 8.77, *SD* = 1.60 for both groups, (*X*) = 8.66, *SD* = 1.62 for non-BSN students, and (*X*) = 9.04, *SD* = 1.56 for BSN students when learning English. Thirty-three percent of students reported visual problems (use of eyeglasses). No other sensory deficiencies were reported.

Table 1
Demographic Profile (N=87)

		<i>Non-BSN</i>	<i>BSN</i>	<i>Total</i>	<i>p value</i>
Gender	Female	75.8% (47)	84% (21)	78.2% (68)	.30*
	Male	24.2% (15)	16% (4)	21.8% (19)	
Age		28.61 (<i>SD</i> = 7.51)	23.50 (<i>SD</i> = 3.79)	27.19 (<i>SD</i> = 7.05)	.00**
<i>Type of Nursing Program</i>					
Non-BSN Program	Associates in Nursing Degree	83.9% (52)		59.8% (52)	
	LVN to AND	16.1% (10)		11.5% (10)	
BSN Programs	Bachelor Nursing Degree (BSN)		84% (21)	24.1% (21)	
	RN to BSN		16% (4)	4.6% (4)	
<i>Pre-Nursing Education</i>					
Highest Level of Education Prior to Nursing School	Less than High School		4% (1)	1.1% (1)	
	High School	3.2% (2)	8% (2)	4.6% (4)	
	Professional Training	4.8% (3)		3.4% (3)	
	Some College	25.8% (16)	32% (8)	27.6% (24)	
	College Degree	56.5% (35)	44% (11)	52.9% (46)	
	Some Graduate School	1.6% (1)		1.1% (1)	
	Masters		4% (1)	1.1% (1)	
Native Language	Other	8.1% (5)	8% (2)	8% (7)	
	Spanish	25.8% (16)	16% (4)	23% (20)	.33*
	English	74.2% (46)	84% (21)	77% (67)	
Dominant Language	Spanish	38.7% (24)	40% (10)	39.1% (34)	.91*
	English	61.3% (38)	60% (15)	60.9% (53)	
Primary Cultural Identification	American	21% (13)	16% (4)	19.5% (17)	
	Hispanic	19.4% (12)	24% (6)	20.7% (18)	
	Mexican American	35.5% (22)	36% (9)	35.6% (31)	
	Mexican	24.2% (15)	24% (6)	24.1% (21)	
Age of English Language Acquisition		6.02 (<i>SD</i> = 4.94)	5.24 (<i>SD</i> = 2.68)	5.79 (<i>SD</i> = 4.41)	.02**
Age of English Language Proficiency		8.89 (<i>SD</i> = 1.31)	9.20 (<i>SD</i> = .87)	8.98 (<i>SD</i> = 1.20)	.06**

Language Use	English	65.02% (SD = 22.39)	65.78% (SD = 22.17)	65.24% (SD = 22.20)	.94**
	Spanish	34.09% (SD = 22.47)	36.22% (SD = 23.51)	34.65% (SD = 22.66)	.76**
Highest Contributor to Learn English	Reading	8.66 (SD = 1.62)	9.04 (SD = 1.56)	8.77 (SD = 1.60)	.57**

*chi-square; ** t-test

Self-assessed Language Proficiency

A multiple regression analysis was conducted with LEAP-Q dimensions (experience, proficiency, preference, and acculturation) with both groups of nursing students. The model significantly predicted single measure of self-assessed proficiency ($R = .601$, $R^2 = .361$, $F(4, 82) = 11.594$, $p < .001$). English proficiency ($B = -.101$, $\beta = -.460$, $p < .001$) provided a significant individual contribution to the model whereas, preference ($B = .013$, $p = .086$), experience ($\beta = -.001$, $p = .385$), and acculturation ($B = .212$, $p = .443$) did not independently add significantly to the model.

Table 2

Test of the Effects of Self-Assessed Language Proficiency and Language Proficiency Dimensions

Predictor Variable	B	SE B	Beta	t	Sig (2-tailed)	95% CI	
						Lower	Upper
Constant	9.274	.667		13.900	< .001	7.946	10.601
Proficiency (fluency)	-.101	.028	-.460	-3.540	< .001	-.157	-.044
Preference	.013	.007	.231	1.739	.086	-.002	.027
Experience	-.001	.001	-.104	-.873	.385	-.003	.001
Acculturation	.212	.275	.070	.771	.443	-.335	.759

$N=87$; Model: $R = .601$, $R^2 = .361$, $F(4, 82) = 11.594$, $p < .001$

Academic Success and the LEAP-Q

Regressing self-reported GPA (academic success, GPA on 4.0 scale) on the four predictor dimensions of English proficiency for the final sample of 87 (non-BSN and BSN nursing students) yielded a non-significant model ($R = .224$, $R^2 = .050$, $F(4, 82) = 1.086$, $p = .369$). None of the four dimensions provided a significant contribution to the model of academic success, experience ($B = .000$, $p = .999$), proficiency ($B = .011$, $p = .417$), preference ($B = -3.60$, $p = .114$), and acculturation ($B = .142$, $p = .331$).

Table 3

Test of the Language Proficiency Dimensions and Academic Success

Predictor Variable	B	SE B	Beta	t	Sig.	Mean	Std. Dev.
English	3.177	.261		12.158*	<.001		
Experience	.000	.000	-.113	-.816	.999	219.68	128.83
Proficiency (fluency)	.011	.011	.123	.979	.417	26.94	3.60
Preference	-3.60	.002	.000	-.002	.114	65.24	22.20
Acculturation	.142	.089	.179	1.598	.331	.19	.39

$N=87$; Model: $R = .224$, $R^2 = .050$, $F(4, 82) = 1.086$, $p = .369$

Academic Success and the ELAS

A simple linear regression equation was used to predict academic success using language acculturation with both groups, non-BSN, and BSN nursing students. A non-significant regression equation was found ($R = .051$, $R^2 = .003$, $F(1, 85) = .225$, $p = .636$). Parallel to the LEAP-Q, language acculturation did not have a predictive effect on academic success ($B = .004$, $p = .636$).

Table 4

Test of the English Language Acculturation Scale and Academic Success

	B	SE	t	p
Constant	3.36	.157	21.44	.000
ELAs	.004	.009	.475	.636

$N=87$; $R = .051$, $R^2 = .003$, $F(1, 85) = .225$, $p = .636$

Convergent Validity Between the LEAP-Q and the ELAS

The convergent validity was calculated between the LEAP-Q-English Proficiency sub-scale, and the ELAS using Pearson's correlation coefficient. The correlation analysis was conducted on the total score of English proficiency LEAP-Q and ELAS, which show a significant relationship ($r = .427$, $p < .001$). Convergent validity between the two measures was supported, and the reliability of the two measures was equally strong in this study.

Additional Findings

According to Cummins' model, basic interpersonal communication skills (BICS) and cognitive academic language proficiency (CALP) are two threshold levels of language proficiency. The sum of six LEAP-Q items were tabulated to reflect CALP-English and CALP-Spanish. CALP is associated with academic success (Cummins, 2017). For this study, scores of 25 and higher on the LEAP-Q represented CALP. The mean score of CALP of all study participants (non-BSN and BSN students) was $X = 41.80$, $SD = 11.66$ for the English language and $X = 47.52$, $SD = 108.45$ for the Spanish language. The CALP for the non-BSN student was $X = 41.86$, $SD = 11.12$ for English and $X = 35.18$, $SD = 11.47$ for Spanish. For the BSN group, CALP was $X = 41.66$, $SD = 13.18$ and $X = 37.64$, $SD = 11.65$ for Spanish.

A MANOVA analysis was used to examine English and Spanish fluency, and self-reported GPA as dependent variables, and non-BSN and BSN nursing programs as independent variables. Descriptive analysis demonstrated that nursing students attending a non-BSN program ($X = 7.50$, $SD = 4.70$) had a higher fluency in Spanish than those in a BSN program ($X = 5.52$, $SD = 2.84$). Nursing students attending a BSN program ($X = 3.59$, $SD = .27$) had a higher self-reported GPA than those in a non-BSN program ($X = 3.38$, $SD = .30$). There was a significant association between the independent variable ($p = .040$). Assumptions of normality, linearity, and equality of covariance were met. The sample was small to medium, and the group size was slightly different. Pillai's trace revealed a significant effect of college versus university programs, $V = .19$, $F(3,80) = 6.09$, $p < 0.001$. Spanish fluency ($p = .01$) was significant among the students who attended a non-BSN versus a BSN program. Students attending a non-BSN program had greater Spanish fluency, but no significant differences were noted between English fluency and self-reported GPA.

Beneficial Learning Situation and Modalities

Three themes were identified from bilingual nursing students' responses that were perceived as helpful to their academic success: support, communication, and resources. Students reported using a

variety of resources, including print and online. Three sub-themes emerged and were categorized as multiple intelligences (Cavas & Cavas, 2020). In addition, a subtheme for support-communication was included.

Support

Bilingual students identified friends and family support as beneficial to their educational success. Friends and family helped not only with communication but also strengthened their confidence. In addition, participants stated that faculty had a major impact on their academic success by providing them with positive feedback during laboratory skill practice. Student S1 exemplified this support by stating,

"Friends to help me understand what words mean and how most of the words are like words in Spanish."

Student G4 stated that faculty had a major impact on their academic success. Key characteristics included:

"Caring instructors, positive feedback, laboratory areas to practice skills, and to make mistakes and not in the clinical setting."

Communication

Communication proficiency is an essential component when interacting with others, particularly in nursing, where most communication is verbal. Bilingualism was a valued component. Participants felt having bilingual abilities helped them communicate better with Spanish-speaking patients. It provided them with the opportunity to support patient care by translating to the nursing staff. Exemplars are as follows:

"I think here in the U.S. having some sort of Spanish can be really important. There are a lot of people who do not understand English and being in the medical field it's quite important to fully understand and communicate with patients (StudentK2)."

"I think being bilingual helped me in nursing school. Knowing two languages is a huge advantage in any field, especially living so close to the border. I am able to provide care for both Spanish and English speakers [sic] (StudentI2)."

Bilingual students felt having both languages gave them a better understanding of medical terminology. This also helped strengthen their confidence.

Educational Resources

Nursing students reported access to multiple resources that helped them to be successful. Participants felt language acculturation and cognitive learning were achieved using multiple sensory learning modalities. These were organized according to Gardner's multiple intelligence theory, which proposes that individual possesses a different form of intelligence, such as verbal-linguistic, body-kinesthetic, and visual-spatial (Cavas & Cavas, 2020). In addition, support-communication was included as a sub-theme. The subthemes associated with resources are displayed in Table 5.

Table 5*Resources Subthemes of Bilingual Nursing Students*

Exemplars	
Support and Communication	
Visual-Spatial	<p>“reading has been the most effective tool to be successful [sic] in nursing program [sic] (studentK3)”</p> <p>“Reading before class and doing practice questions are extremely helpful... (studentQ4)”</p> <p>“Watching YouTube videos (studentP4).”</p> <p>“Availability of multiple resources such as the web, social media, YouTube (studentE1).”</p>
Body-Kinesthetic	“Lab areas to practice skills and to make mistakes in the lab and not in the clinical setting (studentG4).”
Verbal-Linguistic	<p>“One of the things would be being on the borderland. Many of the instructors speak Spanish, which makes you able to have a better communication with them. Also, many of the students speak the language too (studentC3).”</p> <p>“Be able communicate with clients, family and fellow staff members (studentF1).”</p> <p>“... Well, having friends that are from foreign countries in which they don't speak Spanish, by this I am forced to speak in English and practice it more...(studentQ4)”</p> <p>“...discussions and reviews after lectures (studentA4).”</p> <p>“...Listening and taking notes in class (studentJ3).”</p>
Support-Communication	<p>“Many things have helped me be successful. First of all, the support of my family and friends (studentU2).”</p> <p>“My family support, my friends support (especially my nursing students' friend that pressures me in not giving up) ...(studentY2)”</p> <p>“knowing two languages has helped me in the clinical setting due to the bilingual population (studentO2)”</p> <p>Knowing the meaning of the Latin words. Knowing how to translate medical terms. Being able to describe subjects in both languages (studentQ2).”</p>

Barriers to Academic Success

Four themes were identified as most descriptive of hindrances or barriers to their academic success: finances, time management (full-time employment, family responsibilities), language barriers, and negative self-perception.

Finances. Participants expressed concern about their economic status and shared how this affected their educational experience. Specifically, many stated they had to work while going to school, which interfered with their academic success. Some exemplars of the finance's themes are:

“The ability to pay for schooling while unemployed has made me resort to school loans and scholarships. This added stress that I believe we all suffer (StudentQ4).”

“The only thing that has hindered my success in nursing school is my economic status. I have the need to work in order to sustain myself and that means having less time for school (StudentK1).”

Time Management. This theme was one of their primary concerns. It was most experienced in efforts to balance family with their educational responsibilities. Participants expressed, “Lack of time management skills, getting distracted easily when studying... (StudentI1)”

“There is a lot that the school asks of you in a very short period of time, with clinical lecture, studying, online tests, multiple chapters, and several books. It is very stressful, (StudentN3)”

Communication. While communication was identified as helpful, the participants also identified this as a barrier. Aspects of communication that limit students are communication skills, reading, writing skills, and comprehension of concepts. Participants felt their communication skills could be better, and it would help them interact with others. Lack of understanding of the English language is one main aspect students recognized as a limitation.

“My communication skills. I felt like my communication skills could flow better. I often have to think a lot about what I'm going to say before I say it. My vocabulary isn't as broad as my English native speaker classmates (StudentT3).”

“The language barrier is the first obstacle I always come across while studying or understanding instructions (StudentZ2).”

Self-perception. Bilingual nursing students identified various self-perceived traits as barriers to their academic success. These ranged from lack of self-esteem, being shy, to the lack of confidence necessary to accomplish school requirements. Students discussed this concept in the following manner,

“The discrimination from others, just because I have an accent. They assume I’m not intelligent (StudentH1).”

“Lack of confidence (StudentF1).”

Discussion

The study findings provide new knowledge on the benefits of bilingual language usage, English and Spanish, among EAL nursing students. These indicate that bilingual students in non-BSN and BSN programs appear to perform well in two languages and may be able to maintain a successful GPA across the two languages and cultures. It seems that bilingual nursing students along the border embrace bilingualism since the use of both languages allowed them to practice their language skills with friends, family, patients, and other health care providers. This is reflected in the mean scores of all participants with 41.80 for the CALP English score and 47.52 for the CALP Spanish score. The non-BSN CALP score was 41.86 for English and 35.18 for Spanish. Similarly, the BSN students’ CALP score was 41.66 for English and 37.64 for Spanish. Students from both non-BSN and BSN programs in this study were equipped to meet the academic demands of collegiate nursing education programs while also being able to interact appropriately in both English and Spanish.

Bilingual students experience more language-related needs in the classroom than monolingual students (Bialystok, 2017). EAL nursing students, both programs non-BSN and BSN, felt that educational resources were vital components to their success. The use of various resources was reported by students which helped with their academic success. Successful students utilized books, videos, study groups, lectures, and reading resources. Dube et al. (2018) conducted a quantitative study with the purpose to describe the perception of enrolled student nurses on factors that influenced students’ academic performance. The authors reported that 80% of students felt that the use of technological gadgets and the internet helped with academic performance. In addition, the authors reported that the use of electronic resources increased the students’ classroom interest and participation. Fooladi et al. (2022) conducted a mixed-methodology study to identify the factors that influence academic and clinical performance of undergraduate nursing students. Students felt that an interactive curriculum helped them to be successful. Among the resources used included peer-assistance, case-based studies, and small group learning. Providing EAL nursing students with different learning modalities can help ensure their academic success.

Program resources and support appear to be crucial components of nursing education for non-BSN and BSN EAL nursing students, specifically faculty support. The National Council of State Boards of Nursing or NCSBN (2020) explored the different program components that support nursing student success. The guidelines recommended by the NCSBN are similar to the qualitative findings in this study and included comprehensive student support services, opportunities for experience with diverse populations, availability of multiple types of support resources, and a strong structure within the nursing program. Kirui & McGee (2021) supported these findings. The authors conducted an integrative literature review to identify resources that help the retention of underrepresented nursing students. Several of the strategies that

helped enhance the academic success among this population included mentoring programs, financial support, student success programs, and academic and psychosocial support. Dube & Mlotshwa (2018) analyzed the impact nurse educator-student relationship played on academic success. Ninety-two percent of the participants indicated that a good and supportive nurse educator-student relationship fosters better academic performance. Supportive strategies increased EAL nursing students’ academic success. These helped students to build the communication skills and professional relationship skills that can be applied later as professional nurses.

Standardized assessment of bilingual nursing students’ English language skills is recommended (Fooladi et al., 2011; Kaushanskaya et al., 2020). The convergent validity of the LEAP-Q and ELAS provided a step forward into the standardization of data among EAL nursing students. LEAP-Q in conjunction with other instruments, such as the ELAS, can be instrumental in identifying language proficiency in EAL students (Kaushanskaya et al., 2020). These instruments can offer nursing programs across the country the opportunity to assess students’ English cognitive academic language proficiency and address weaknesses to help EAL students succeed academically. Having multiple options to measure language proficiency allows programs to select the one that best fits their specific time constraints and resources.

Limitations

A significant limitation of this research study was the recruitment of “only” academically successful students, thereby not considering unsuccessful students. Students who were not successful in one or more courses exit from the program, precluding them from study inclusion. In this study, academically successful nursing students self-reported GPAs of 3.0 and above on a 0 to 4.0 scale. This scale is most commonly used in colleges and universities in the Southwestern US. This suggests that successful EAL nursing students, non-BSN and BSN, are equipped with the cognitive academic language proficiency skills to face the English-only educational environment. Because this study only included students who were in school and looked at GPA as the measure of success, it is important to address students who were not admitted to nursing programs due to lower GPA or who were unsuccessful during their nursing education. The recruitment of these students may provide more information on the usefulness of language assessment and the value of knowing the BICS and CALPS scores in the advising and admission process. However, this type of recruitment would be labor and time-intensive and students who were not successful might still refuse to respond.

Conclusion

Workforce diversity, specifically nursing diversity, is important to meet future healthcare needs in the US. Since minority populations are increasing, culturally sensitive health care providers must be available to meet their needs. English cognitive academic language proficiency did not influence diverse nursing students’ academic success (GPA). Still, bilingualism is a trait that profoundly affects students’ ability to impact the care of both English and Spanish-speaking patients on the US-Mexico border.

The findings of this study highlight the benefits of bilingualism among non-BSN and BSN nursing students living along the US-Mexico border. Currently, there is a dearth of knowledge on the impact bilingualism has on the care of a multicultural and linguistically diverse population.

Furthermore, this study provides a new perspective for educators on the importance of language acquisition, proficiency, and comprehension in educating bilingual nursing students in an English-only curriculum. Having a better understanding of students' cognitive academic language abilities provides nursing educators with the necessary tools to increase their students' chances of academic success. Understanding the needs of Hispanic bilingual nursing students contributes to a climate of culturally responsive care where communication failures can be eliminated to provide safe and improved patient care (Day & Beard, 2019). Nurse educators may want to measure CALP and consider the potential impact of lower scores on nursing student success. Students who have lower CALP scores might benefit from programs geared to improving skills associated with cognitive performance in nursing school. Further research is needed to understand how bilingual cognitive abilities are acquired during nursing education. This will provide much-needed support to nursing educators and allow students to learn in an environment that ensures every student, regardless of their native language, has the chance to be successful.

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