NURSE EDUCATION REPORT

Asthma academy: A student nurse-led telehealth education program for low-income family caregivers of children with asthma

Cynthia Foronda[1] [iD] | Susan Prather[1] [iD] | Kenya Snowden[1] [iD] | Juan M. Gonzalez[1] [iD] |
Karina A. Gattamorta[1] [iD] | Jiye Lee[1] | Juan E. Gonzalez[1] | Monica Cardenas[2]

[1]School of Nursing and Health Studies, University of Miami, Coral Gables, Florida, USA

[2]Division of Pediatric Pulmonology, University of Miami, Miami, Florida, USA

Correspondence
Cynthia Foronda, School of Nursing and Health Studies, University of Miami, 5030 Brunson Dr, Coral Gables, FL 33146, 305-284-1525, USA.
Email: c.foronda@miami.edu

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Abstract

Aims: The aims of the Asthma Academy study were to (1) evaluate the telehealth performance of DNP students, (2) evaluate the perceived learning experience of DNP students and (3) investigate whether an association exists related to student performance and family caregiver outcomes.

Design: A descriptive study was conducted with doctor of nursing practice students.

Methods: Students conducted telehealth visits to help family caregivers of children with asthma and were rated on their performance by two faculty members using a rubric. Student perception data were gathered via survey.

Results: Out of a total possible score of 15 points, the mean telehealth performance score of students was 13.38 points. Students indicated the telehealth experience was valuable and that they were satisfied with their learning. This model of leveraging telehealth to bridge nursing students to the community may be adapted to help family caregivers of children with various disease foci.

KEYWORDS

asthma, caregivers, education, nursing, students, telehealth, telenursing

1 | INTRODUCTION

Asthma is the most common long-term illness in children in the United States that affects 8.5% of all children (Miller et al., 2016). According to the Agency for Healthcare Research and Quality, asthma represented the most common and most expensive reason for potentially preventable hospital stays in children in 2017, with 53,900 hospital stays and $278.1 million in aggregate costs (McDermott & Jiang, 2020). Asthma is associated with high Emergency Department (ED) and Urgent Care Clinic (UCC) utilization in children—almost twice as many compared to adults (Pate et al., 2021). Research has

shown that avoidable ED visits for acute asthma are prevalent in children, which contributes to a heavy cost burden of paediatric asthma on governments, healthcare systems, and on patients and families (Beydon et al., 2016).

Health disparities are an important factor to consider in paediatric asthma. Paediatric asthma is more prevalent among children from low-income families and among non-Hispanic Black children and those of Puerto Rican descent when compared to non-Hispanic White children (Zahran et al., 2018). Furthermore, health disparities are implicated in asthma-related ED visits and eventual hospitalizations. In low-income families, Black children were less likely to be

admitted to an inpatient unit during their first visit to the ED than White children and were more likely to return to the ED within 12 months when compared to White children (Aratani et al., 2020). In addition, households with poor housing quality, crowding, lack of amenities and no vehicle access were also associated with asthma diagnoses and ED visits in children (Hughes et al., 2017).

The treatment of asthma involves a variety of self-management activities including self-assessments, avoidance of asthma triggers and the proper use of medications. It is important to note that when the patient is a child, these complex responsibilities may rest with the parent, child, be shared by both, or not assumed by parent or child (Munzenberger et al., 2010). For parents and caregivers who assume these responsibilities, they often feel overwhelmed. Foronda, Kelley, et al. (2020) found that the psychosocial burdens of the parents of children with asthma include decreased mental health, quality of life, sleep, family stress, educational deficits, cultural and health disparities, and healthcare communication challenges, in addition to socioeconomic burdens including poor access to care, and work and financial challenges. Importantly, studies have demonstrated that there is a link between family caregiver health and child health outcomes (Foronda, Kelley, et al., 2020).

These complex psychosocial challenges can manifest in the caregiver and patient population of children with asthma in various forms, one of which is medication adherence. Medication adherence is a complex issue involving the patient, the caregivers and the multidisciplinary healthcare team (El-Rachidi et al., 2017). Adherence to medication has known to be one of the primary determinants of treatment success in paediatric asthma (Foronda et al., 2020); however, low adherence affects children of ethnic minorities and low-income families significantly, as poor socioeconomic status (SES) is associated with low adherence (Foronda, Muheriwa, et al., 2020). Additionally, literature has shown that factors such as daily hassles of life, stress and family conflict are barriers to medication adherence in children with asthma (Chappell, 2015).

1.1 | mHealth and telehealth

The COVID-19 pandemic has expedited the utilization of mHealth and telehealth as legitimate methods of healthcare delivery. Though this form of delivery is in its relatively nascent stage, telehealth interventions have shown to be just as effective when compared to in-person care in certain conditions (Shigekawa et al., 2018). Studies have used technological platforms as interventions to improve patient outcomes in recent years with success (Lv et al., 2019; Perry et al., 2018). For instance, a nurse-led asthma management intervention using a mobile application showed an appreciable decrease in asthma exacerbations, improved adherence, days of antibiotic use, days of school absence, parental work loss and medical expenses when compared to a group of children treated without the mobile application in China (Lv et al., 2019). In the United States, there have

been attempts to deliver asthma education programs via telemedicine in rural schools with predominantly Black children mostly from low-income households. In a study by Perry et al. (2018), the intervention group received asthma education via telemedicine while the control group received usual care. Participants in the intervention group reported significantly higher utilization of peak flow meters to monitor asthma and reported taking their asthma medications more frequently; however, there were no significant differences found in outcomes measures of quality of life, self-efficacy, asthma knowledge or lung function between the two groups. These studies demonstrate the need to further study how mHealth and telehealth can be optimally used to meet the patients and families' needs in this complex patient population.

Telehealth has become a staple in health care, yet many schools of nursing lack offering this form of clinical experience (Ali et al., 2015); however, some nursing programs in the United States have started to include telehealth components into the curricula and found that the students express overall positive experiences with telehealth simulations. For example, Powers et al. (2020) used telehealth to implement collaborative simulations and provide students with experiential learning. Furthermore, the American Association of Colleges of Nursing (AACN, 2006) includes a technology component in *The Essentials of Doctoral Education for Advanced Nursing Practice*, in which Doctor of Nursing Practice (DNP) graduates are encouraged to use information systems/technology to support and improve patient care and healthcare systems. Due to trends supporting integration of technology, there is a need for nursing schools to educate students on how to care for patients and families using this specialized care modality.

1.2 | Asthma Academy

The Asthma Academy was a program developed to address problems on two fronts: (1) lack of adequate education for parents of children with asthma and (2) lack of the provision of telehealth experiences for nursing students. The idea was to bridge doctoral nursing students to vulnerable family caregivers in the community through telehealth to reduce health disparities. The Asthma Academy was offered in English and Spanish. The majority of participating families identified as low-income Black or Latinx. Therefore, the Asthma Academy was designed to help vulnerable family caregivers while providing nursing students with telehealth experiences.

In the parent study of the Asthma Academy, the effects of the nurse-led intervention on family caregivers' knowledge of asthma, sleep, anxiety and depressive symptoms were examined (Foronda et al., 2021). The parent study showed that the Asthma Academy helped increase family caregivers' knowledge of asthma ($p = .004$) and significantly decreased depressive symptoms ($p = .021$). However, the purpose of this study was to evaluate the student performance and student learning outcomes resulting from their participation in the Asthma Academy.

1.3 | Aims

The aims of the study were to (1) evaluate the telehealth performance of DNP students, (2) evaluate the perceived learning experience of DNP students and (3) investigate whether an association exists related to student performance and family caregiver outcomes.

2 | METHODS

This study employed a descriptive design and was conducted in an urban section of the Southern United States. The study protocol was approved by the Institutional Review Board at the University of Miami School of Nursing and Health Studies under protocol 20190884. Six Doctor of Nursing Practice (DNP) students were recruited to participate in this study. Students were informed of the voluntary nature of the study and that they would receive credit for a portion of their required clinical hours as part of their Practice Immersion Course (NUR 678). The DNP students were informed about the risks of the study and provided verbal consent. DNP students were trained about the Asthma Academy and best practices in telehealth. Then, students practised by conducting peer-to-peer, remotely conducted simulations of telehealth visits.

2.1 | Asthma academy

The Asthma Academy involved two parts. First, a nurse educator provided mothers ($N = 18$) a one-hour, virtual education session about asthma. The education session covered pathophysiology of asthma, asthma triggers, rescue medication versus controller medication, communication and how to navigate the healthcare system. Then, half of the family caregivers ($n = 9$) were offered telehealth visits led by supervised doctoral nursing students. Some mothers used their computers, and others used their smartphones for the telehealth visit. The doctoral students conducted the telehealth visits via Zoom HIPAA-compliant software (Zoom Video Communications). One doctoral student led the visit with the family caregiver, while two doctoral prepared nurse faculty members supervised the visit. Students were guided by an interview script, and the telehealth visits lasted approximately 30 min. In the visits, students would ask family caregivers questions about their home environment, presence of symptoms, understanding of medications and ask about the child's asthma action plan. Family caregivers had opportunity to ask questions specific to their child. The student answered these questions and then provided individualized and tailored education as part of the telehealth visit. Each faculty member separately rated the student's performance using a rubric.

2.1.1 | Instruments

To evaluate the telehealth performance of students, the Telehealth Performance Rubric was used (Table 1). This rubric was developed by a doctoral prepared nurse faculty member based on the American Telemedicine Association practice guidelines (ATA, 2019). The rubric had the grading criteria of (1) Ethical Considerations, (2) Provider Care, (3) Communication, (4) Teaching and (5) Documentation. Students could receive a minimum score of 0 and a maximum score of 3 on each of the five criteria. Therefore, the minimum score one could receive on total performance was 0 and the maximum score was 15 points. It is a validated tool that was demonstrated reliable with a Cronbach's alpha of 0.79 in this study.

To evaluate the perceived learning experience of DNP students, a survey was created by the first author—a doctoral prepared nurse researcher. The survey was named the Asthma Academy Learning Outcomes survey. The survey comprised of a total of seven items (six items were yes/no/unsure and the last item was an open-ended question). The last item asked "what did you learn from participating in the telehealth visits?"

After the DNP students finished conducting the telehealth visits, a research assistant emailed the students a link to a survey offered via Qualtrics (Qualtrics, Provo, UT). The survey is designed to assess the students' perceptions of learning from the telehealth experience. Students were not asked to provide any identifying data and survey completion was optional.

2.1.2 | Data analysis

Student performance data from the rubric were aggregated with means reported to identify overall areas of strengths and weakness in performance. To investigate whether any association with student performance and subsequent family caregiver outcomes existed, linear regression models were used for each outcome (i.e. sleep, anxiety, depression and asthma knowledge) controlling for baseline levels of each outcome. Student perception data were aggregated and reported descriptively.

3 | RESULTS

3.1 | Telehealth performance

Out of a total possible score of 15 points, the mean telehealth performance score was 13.38 points. Students performed best in the categories of Ethical Considerations ($M = 3$), Provider Care ($M = 2.83$) and Communication ($M = 2.83$). Students performed lowest in the categories of Documentation ($M = 2.39$) and Teaching ($M = 2.33$).

3.2 | Learning experience

All students ($N = 6$) indicated that the Asthma Academy provided them with a valuable experience practising the art and science of telenursing. When asked whether they were satisfied with the learning accomplished during the Asthma Academy, all indicated "yes." Similarly,

TABLE 1 Telehealth performance rubric

Grading criteria	Points possible (1 point for each sub-criterion for a total of 3 points per criterion)	Marginal Points 1 (Performs 1 of 3 criteria)	Competent Points 2 (Performs 2 of 3 criteria)	Exceptional Points 3 (Performs 3 of 3 criteria)	Rater score
Ethical considerations	Starts visit by fully informing patients of their rights as per the script. Ensures that the workplace is secure, private, reasonably soundproof, and has a lockable door. Complies with privacy and confidentiality rules stipulated by HIPAA and other laws.	Starts visit by fully informing patients of their rights as per the script. Ensures that the workplace is secure, private, reasonably soundproof, and has a lockable door. Complies with privacy and confidentiality rules stipulated by HIPAA and other laws.	Starts visit by fully informing patients of their rights as per the script. Ensures that the workplace is secure, private, reasonably soundproof, and has a lockable door. Complies with privacy and confidentiality rules stipulated by HIPAA and other laws.	Starts visit by fully informing patients of their rights as per the script. Ensures that the workplace is secure, private, reasonably soundproof, and has a lockable door. Complies with privacy and confidentiality rules stipulated by HIPAA and other laws.	

TABLE 1 (Continued)

Grading criteria	Points possible (1 point for each sub-criterion for a total of 3 points per criterion)	Marginal Points 1 (Performs 1 of 3 criteria)	Competent Points 2 (Performs 2 of 3 criteria)	Exceptional Points 3 (Performs 3 of 3 criteria)	Rater score
Provider care	Conducts care consistent with professional regulatory, licencing, credentialing, privileging, and malpractice and insurance laws in jurisdictions of both where practising and where patient/family receives care Provides the evidence-based standard of care Provides safe, quality health care	Conducts care consistent with professional regulatory, licencing, credentialing, privileging, and malpractice and insurance laws in jurisdictions of both where practising and where patient/family receives care Provides the evidence-based standard of care Provides safe, quality health care	Conducts care consistent with professional regulatory, licencing, credentialing, privileging, and malpractice and insurance laws in jurisdictions of both where practising and where patient/family receives care Provides the evidence-based standard of care Provides safe, quality health care	Conducts care consistent with professional regulatory, licencing, credentialing, privileging, and malpractice and insurance laws in jurisdictions of both where practising and where patient/family receives care Provides the evidence-based standard of care Provides safe, quality health care	

(Continues)

TABLE 1 (Continued)

Grading criteria	Points possible (1 point for each sub-criterion for a total of 3 points per criterion)	Marginal Points 1 (Performs 1 of 3 criteria)	Competent Points 2 (Performs 2 of 3 criteria)	Exceptional Points 3 (Performs 3 of 3 criteria)	Rater score
Communication	Demonstrates a caring and professional tone with the patient/family. Adheres to eye contact etiquette (i.e. recognizes that rules of eye contact can differ by culture and age, locates camera above face, avoids placing camera too close to self, looks into the camera, avoids staring by occasionally shifting eyes) Demonstrates principles of strong communication (i.e. Allows time for patient/family to ask questions and respond to questions. Fully addresses patient/family questions.)	Demonstrates a caring and professional tone with the patient/family. Adheres to eye contact etiquette (i.e. recognizes that rules of eye contact can differ by culture and age, locates camera above face, avoids placing camera too close to self, looks into the camera, avoids staring by occasionally shifting eyes) Demonstrates principles of strong communication (i.e. Allows time for patient/family to ask questions and respond to questions. Fully addresses patient/family questions.)	Demonstrates a caring and professional tone with the patient/family. Adheres to eye contact etiquette (i.e. recognizes that rules of eye contact can differ by culture and age, locates camera above face, avoids placing camera too close to self, looks into the camera, avoids staring by occasionally shifting eyes) Demonstrates principles of strong communication (i.e. Allows time for patient/family to ask questions and respond to questions. Fully addresses patient/family questions.)	Demonstrates a caring and professional tone with the patient/family. Adheres to eye contact etiquette (i.e. recognizes that rules of eye contact can differ by culture and age, locates camera above face, avoids placing camera too close to self, looks into the camera, avoids staring by occasionally shifting eyes) Demonstrates principles of strong communication (i.e. Allows time for patient/family to ask questions and respond to questions. Fully addresses patient/family questions.)	

TABLE 1 (Continued)

Grading criteria	Points possible (1 point for each sub-criterion for a total of 3 points per criterion)	Marginal Points 1 (Performs 1 of 3 criteria)	Competent Points 2 (Performs 2 of 3 criteria)	Exceptional Points 3 (Performs 3 of 3 criteria)	Rater score
Teaching	When providing family member education, clearly articulates new information and encourages questions by family members. After education is provided, asks family member to repeat back or demonstrate what was learned. Assesses if learning occurred and addresses learning deficits with repetition and/or a different approach to instruction.	When providing family member education, clearly articulates new information and encourages questions by family members. After education is provided, asks family member to repeat back or demonstrate what was learned. Assesses if learning occurred and addresses learning deficits with repetition and/or a different approach to instruction.	When providing family member education, clearly articulates new information and encourages questions by family members. After education is provided, asks family member to repeat back or demonstrate what was learned. Assesses if learning occurred and addresses learning deficits with repetition and/or a different approach to instruction.	When providing family member education, clearly articulates new information and encourages questions by family members. After education is provided, asks family member to repeat back or demonstrate what was learned. Assesses if learning occurred and addresses learning deficits with repetition and/or a different approach to instruction.	

TABLE 1 (Continued)

Grading criteria	Points possible (1 point for each sub-criterion for a total of 3 points per criterion)	Marginal Points 1 (Performs 1 of 3 criteria)	Competent Points 2 (Performs 2 of 3 criteria)	Exceptional Points 3 (Performs 3 of 3 criteria)	Rater score
Documentation	Fully documents the interaction. Includes date, time, patient location and communication tools used. Follows coding practices based on state and national guidelines. Documents the education provided and family member's reaction/response.	Fully documents the interaction. Includes date, time, patient location and communication tools used. Follows coding practices based on state and national guidelines. Documents the education provided and family member's reaction/response.	Fully documents the interaction. Includes date, time, patient location and communication tools used. Follows coding practices based on state and national guidelines. Documents the education provided and family member's reaction/response.	Fully documents the interaction. Includes date, time, patient location and communication tools used. Follows coding practices based on state and national guidelines. Documents the education provided and family member's reaction/response.	
Total score out of 15 possible points					Total

when asked whether the Asthma Academy improved their comfort with practising via telehealth, all students indicated yes. All students (N = 6) indicated that the Asthma Academy improved their confidence about practising with telehealth. When asked, "Did you learn from the experience of conducting telehealth visits," five students (83%) indicated "yes" and one student (17%) indicated "not sure." Five of the six students (83%) recommended that we continue the Asthma Academy.

In response to the open-ended question, "what did you learn from participating in the telehealth visits," four comments were received. One student indicated, "I learned there is still a lot of education that needs to be done in regards to asthma." A second student commented, "how valuable telehealth can be to help parents with their children's asthma treatment." A third student said, "There is a great need for teaching regarding at home asthma management. Telehealth is an effective way to provide this education." The fourth student provided the following statement:

> The Asthma Academy was a wake-up call to the gaps in healthcare that still remain. I support the Asthma Academy because I understand the lack of support and guidance many families with children affected by medical conditions have to overcome every single day. I enjoyed and appreciated the learning opportunity and the trust that was placed in me to offer culturally sensitive education and interactions in people's lives. Telehealth was an opportunity to positively impact the community and empower the families to better advocate for their children at the doctor's office and at the school level.

3.3 | Association of student performance with family caregiver outcomes

One of the study aims was to investigate whether or not the quality of the student's telehealth performance impacted the family caregivers' outcomes (asthma knowledge, depression, anxiety or sleep). One may hypothesize that students who performed well may have a positive effect on the family caregiver outcomes. However, data demonstrated no significant association of student performance with sleep ($\beta = -0.63$, $p = .315$), anxiety ($\beta = -0.52$, $p = .524$), depression ($\beta = 0.33$, $p = .157$) or asthma knowledge ($\beta = -0.84$, $p = .722$).

4 | DISCUSSION

This study presented a novel model that provided students with telehealth experiences to assist family caregivers in the community. Working together with the parents, the students were able to identify and address various gaps in parental knowledge such as lack of understanding medications, asthma triggers and lack of an asthma action plan, among others. The parents indicated the asthma academy was a positive experience and helped them learn about how to

better care for their child. Students were able to conduct telehealth visits and experience the unique challenges and nuances of this care modality.

Student data about the experience of providing telehealth indicated that 100% of students who participated felt the Asthma Academy provided a valuable experience practising the art and science of telenursing, improved their comfort with practising via telehealth and improved their confidence about practising with telehealth. Eighty-three percent of students indicated that they felt they had learned from the experience of conducting telehealth visits. The majority of data supported a positive learning experience resulting from the Asthma Academy.

Students demonstrated the lowest skill performance in the area of teaching. Although efforts were made to prepare students to provide adequate education to family caregivers such as reading articles, following a script and practising a telehealth simulation, this area remained challenging for them. It was important that they were supervised by an experienced provider who could step in and answer specific questions when necessary.

As there is a movement to research if student performance links to patient outcomes, one of the aims of this study was to examine whether there was an association between student telehealth performance and the patient outcomes. No association was found. However, it is important to note that whenever a student started to provide incorrect information or was unsure of an answer, that a faculty member would intervene for safety reasons. Since the faculty and students worked together, it is not surprising that the patient outcomes were comparable. Given this realization, it is suggested that nurse faculty also consider use of simulation to provide telehealth experiences to allow students to practice independently.

4.1 | Comparison to previous research

The findings resonate and conflict with previous research. Studies have demonstrated that many nursing students find the experience of having telehealth simulations useful in their education (Powers et al., 2020) and that telehealth is an effective tool to provide patient care and education (Shigekawa et al., 2018; Yoost et al., 2017). This study had similar findings as students found the telehealth experience valuable. On the other hand, research has demonstrated that telehealth sessions by themselves may not significantly impact patient outcomes such as quality of life, self-efficacy, asthma knowledge or lung function, especially in disadvantaged patient populations with high inclusion of ethnic minorities and children from low-income households (Perry et al., 2018). In the parent study, 50% of the caregivers identified as Latinx. In terms of race, 50% identified as White, 44% identified as Black, and 6% identified as Asian. The majority (79%) indicated having low-incomes (<$40,000 USD/year), yet still demonstrated significant improvements in terms of knowledge and decreased depressive symptoms. The success of the Asthma Academy, in terms of improving student outcomes and family caregiver outcomes, holds promise for future work and expansion of the model.

4.2 | Limitations

The study was limited in several ways. The sample size of six students was small, and the study was conducted at a single site. It is also important to note that the focus of the telehealth visits was educational and geared towards the family caregivers rather than the more common diagnostic or treatment focus of traditional telehealth visits. However, students had opportunity to practice the etiquette and experience the nuances of technology to better prepare them to practice using this modality in the future. Additionally, all students were Registered Nurses who were obtaining a DNP. The results are not generalizable to undergraduate level students, although this model of leveraging student resources to provide community education through telehealth may be of interest to other schools of nursing.

4.3 | Recommendations

After conducting the pilot study of the Asthma Academy, several recommendations are suggested. First, it is imperative to use the correct software (i.e. HIPAA-compliant) when conducting telehealth visits with real patients. Second, students may benefit from training including use of simulation to practice beforehand. Third, it is important to have a faculty member supervise each visit to provide support and safety. Last, based on the success of this project, this model could be adapted to attend to the needs of other family caregivers who care for children suffering from other chronic disease foci. For example, such a model may be used to educate family caregivers of individuals with cancer or to support the parent of a newly born premature infant. The possibilities are limitless, but nursing hold a unique position to be empowered to fill this gap of inadequate family caregiver education.

5 | CONCLUSIONS

This study evaluated a novel model of bridging nursing students to the community through telehealth. The results suggested that the students found the Asthma Academy a valuable learning experience. As the use of telehealth continues to expand to both urban and rural populations, nurse faculty should consider adjusting curricula and increasing clinical experiences that incorporate telehealth. This model could be considered by other schools of nursing and may be readily applied to help family caregivers of patients with other chronic diseases.

AUTHOR CONTRIBUTIONS
Cynthia Foronda: Conceptualization, Methodology, Investigation, Writing—Original Draft, Funding Acquisition. Susan Prather: Investigation, Writing—Review and Editing. Kenya Snowden: Investigation, Writing—Review and Editing. Juan M. Gonzalez: Investigation, Writing—Review and Editing. Karina A. Gattamorta: Investigation, Formal Analysis, Writing—Original Draft. Jiye Lee: Writing—Original Draft: Juan E. Gonzalez: Writing—Review and Editing. Monica Cardenas: Writing—Review and Editing, Supervision.

ORCID
Cynthia Foronda https://orcid.org/0000-0002-8641-9456
Susan Prather https://orcid.org/0000-0001-6117-6198
Kenya Snowden https://orcid.org/0000-0001-5755-9583
Juan M. Gonzalez https://orcid.org/0000-0002-7301-8741
Karina A. Gattamorta https://orcid.org/0000-0001-5827-1389

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