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A Statewide Survey of Pediatric Nurse Practitioners' Beliefs on Implementing IgE Allergy Testing in the Management Plan for Pediatric Patients with Persistent Asthma Symptoms

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"I certify that this document represents my work and is in compliance with current APA writing standards and policies within the Emory School of Nursing Student Handbook."

Abstract

Approximately 80% of pediatric asthma cases are allergic in nature, with exacerbations occurring in response to environmental triggers. National guidelines recommend allergy testing for patients with asthma to identify and manage sensitized triggers because this testing enhances pediatric providers' ability to predict asthma development and exacerbations. However, this practice is commonly underutilized by outpatient providers in the primary care setting. The purpose of this project is to conduct a statewide survey of Georgia pediatric nurse practitioners' beliefs on implementing IgE allergy testing in their management of pediatric patients with persistent asthma symptoms.

Keywords: IgE allergy testing, persistent asthma, asthma guidelines, pediatric asthma

Component 1: Problem Identification, Theoretical Framework and Review of the Literature, Project Design and Methods

Background

Asthma is an epidemic that affects more than 4 million children across the United States and is characterized by repeated episodes of wheezing, breathlessness, chest tightness, and nighttime or early morning coughing (CDC, 2023). Asthma is categorized into two major groups, intermittent and persistent. Persistent asthma is further sorted into mild, moderate, and severe categories. Moderate persistent asthma is defined as the child experiencing symptoms daily; having nighttime awakenings due to coughing more than once a week; daily use of rescue medications; and some limitations with daily activities (NAEPP, 2007). Severe persistent asthma is defined as the child experiencing symptoms throughout the day; having nighttime awakenings due to coughing seven times within a week; daily use of rescue medications several times per day; and extreme limitations in normal activity (NAEPP, 2007).

Seventy to eighty percent of children with asthma are atopic, meaning that they are sensitized to one or more common inhalant allergens (Klok et al., 2021). Children with more severe asthma are generally more atopic than those with milder cases of the disease (Klok et al., 2021). According to the American Academy of Asthma and Allergy (2020) common inhalant allergens include dust mites, pet dander, pollen, and other environmental factors. Therefore, asthma guidelines from the National Institute for Health Care Excellence recommend identifying children's casual or trigger allergens with specific IgE (sIgE) testing after a diagnosis of asthma has been made (Demoly et al., 2022). Additionally, the United States National Asthma Education and Prevention Program recommends evaluating the role of allergens in patients with persistent asthma, and the Global Initiative for Asthma recommends testing for patients with severe asthma symptoms (Demoly et al., 2022).

Aeroallergen sensitization testing enhances the ability to predict asthma development as well as the risk for future asthma exacerbations in children (Rodriguez del Rio et al., 2022). Asthma guidelines commonly recommend specific IgE testing, as it is completed by collecting a blood sample and readily available in most areas, however, allergen skin testing, which is less likely to be available in primary care, may also be used (Demoly et al., 2022). Despite guidelines recommending allergy testing as an adjunct to the management of pediatric asthma, literature suggests that it is exceedingly underutilized by providers, especially in primary care practices (Pudasainee-Kapri, 2021).

Significance

Considering that asthma is most commonly managed in primary care settings, it is imperative for these providers to adhere to the asthma evidence-based guidelines. Yet, the literature reveals that evidence-based recommended care may be inconsistent or absent in these settings (Demoly et al., 2022). Utilization of national asthma guidelines improves asthma outcomes, and improving primary care provider adherence to guidelines-based care is essential to reducing pediatric asthma morbidity (Fedele et al., 2023). However, in order to increase provider adherence, it is necessary first to understand this population's beliefs in regard to implementing allergy testing for pediatric asthma management.

The purpose of this project was to conduct a statewide survey of pediatric nurse practitioners' beliefs on implementing allergy testing in their management plans for pediatric patients with persistent asthma symptoms. The objective for this project was to collect data on pediatric nurse practitioners' knowledge on the benefits of using IgE allergy testing for managing patients with persistent asthma symptoms. This objective was met by developing a

survey and disseminating it to providers who are members of the Georgia chapter of the National Association of Pediatric Nurse Practitioners.

Clinical questions for this project included understanding what factors impact providers' decisions to implement guideline-recommended care and whether providers are aware of the guidelines that exist for their areas of practice. Additionally, it aimed to understand how social determinants of health may impact this aspect of practice, especially as it pertains to referrals and specialty care.

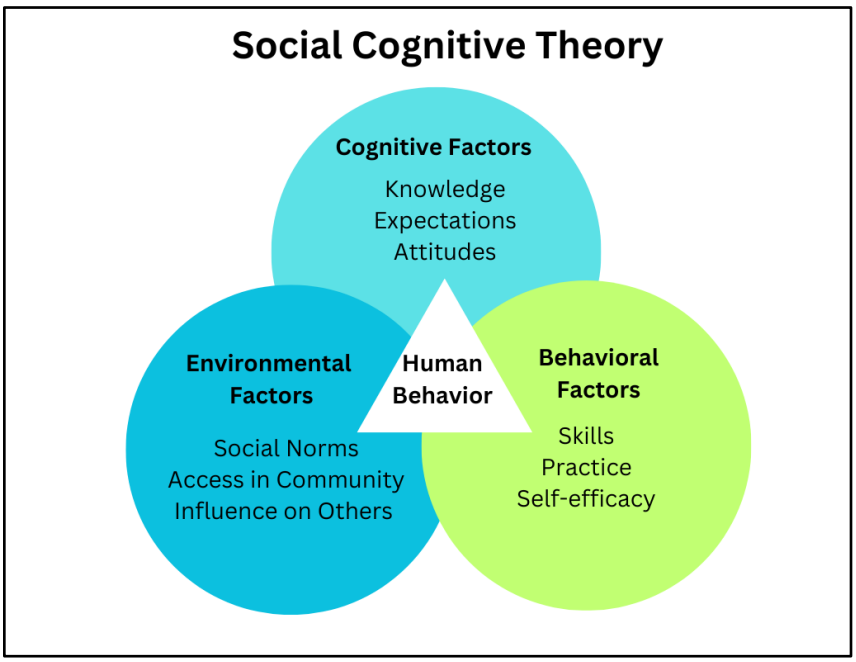
A potential limitation for this project included less than optimal response rates from pediatric nurse practitioners; however, strategies were implemented to assist in mitigating low responses in this busy clinician population.

Theoretical Framework

Bandura's Social Cognitive theory considers the unique way in which individuals acquire and maintain behavior, while also considering the social environment in which individuals perform said behavior (LaMorte, 2022). This model (Fig. 1) is composed of three factors that aim to describe human decision-making. Cognitive factors, also called personal factors, inquire about an individual's knowledge, outcome expectations, and attitudes. Outcome expectations refer to a person's expectation that performing an action will lead to a specific result (Lowenstein et al., 2013). Behavioral factors explore a person's skills, practices, and self-efficacy, or their ability to perform a given behavior (Lowenstein et al., 2013). Finally, environmental factors investigate social norms, access within an individual's community, and the ability for a person to change his or her environment by influencing others.

Figure 1

Social Cognitive Theory



Linking Bandura's Social Cognitive Theory to Clinical Questions and Purpose

The purpose of this project was to explore pediatric nurse practitioners' beliefs on incorporating IgE allergy testing into management plans for patients with persistent asthma symptoms. Therefore, Bandura's Social Cognitive Theory was relevant to this project's goal.

As it pertains to cognitive factors, applying this particular framework aided in addressing providers' knowledge about the link between allergy and asthma and the benefit of allergy testing for managing asthma. Additionally, cognitive factors addressed providers' expectations of outcomes of utilizing allergy testing for asthma management, as well as their general feelings about the practice. Previous studies have mentioned providers' lack self-efficacy as one of many barriers to utilizing allergy testing for asthma management.

The behavioral factors component of this framework addressed the self-efficacy piece and granted the opportunity to further understand what aspect of allergy testing is leading to

hesitancy among providers. Behavioral factors also addressed clinicians' current practice as well as assessed their current skills, which provided insight on why allergy testing is underutilized and whether it's a matter of inadequate time, lack of resources, or other factors.

Finally, addressing environmental factors, as highlighted by Bandura's framework, provided insight into the bigger picture surrounding individual clinicians and their practice. In clinical settings, it is common to adapt to the habits of other providers in the practice, so, it is possible that some pediatric nurse practitioners have the knowledge, the skill, and the self-efficacy, yet this is not something that is commonly done in their current practice. Therefore, instead of being an anomaly and going against what the practice as a whole is doing, providers may opt to allow what they would have routinely done take a backseat and follow their current locations' framework. Pediatric nurse practitioners' physical environment may also determine if there are resources allocated to carrying out allergy testing. Questions that may arise include if there is a location that offers allergy testing nearby and if said location is accessible for this particular patient population. Additional barriers to this could include factors such as insurance. A pediatric provider may be more hesitant to recommend this testing to a family knowing that the costs may not be covered, thereby potentially introducing a financial strain to the family.

The clinical questions addressed in this project sought to understand factors that impact human behavior, including knowledge, expectations, attitudes, practice, skills, self-efficacy, and social determinants of health, such as access in communities, all of which are components of Bandura's Social Cognitive theory. For this reason, this framework was the most relevant to this project, as it appropriately and wholly addressed the project's purpose and clinical questions.

Literature Review and Synthesis

The Association Between Asthma and Allergic Rhinitis

Asthma is a significant and common disorder in the pediatric clinical setting. There are several phenotypes for asthma that vary in severity, however, allergic asthma is the most common type in the pediatric population (Akar-Ghibril et al., 2020). Allergic, or atopic, asthma, is defined as asthma associated with sensitization to aeroallergens, which leads to symptoms (Akar-Ghibril et al., 2020). It is suspected that up to 80% of childhood cases of this disease have an allergic component (Akar-Ghibril et al., 2020). With this form of asthma, the introduction of certain inhalant allergens can result in a pulmonary reaction. Akar-Ghibril et al. (2020) outlines this process and explains that inhalation of the allergen leads to acute bronchoconstriction, resulting in inflammation that triggers an asthmatic response. This process is significant because it helps to further define the overlap between allergens and asthma and explains the role that environmental allergens can play in airway diseases.

Other reviews echo assertions made by Akar-Ghibril et al. (2020) by introducing supporting information. Rodriguez del Rio et al. (2022) reports that allergens are frequent triggers of asthma exacerbations and exposure to them can trigger a pulmonary response, while also reiterating that up to 80% of childhood asthma cases are allergic in nature. Additionally, Klok et al. (2020), states that sensitization to inhalant allergens is the hallmark of atopic airway disease, also referred to as atopic asthma. The introduction of inhalant allergens leads to sensitization, or the development of IgE antibodies. Over time, this sensitization can develop into an inhalant allergy, and exposure to that allergen can result in a pulmonary allergic reaction (Klok et al., 2020). This is what is commonly described as an asthma attack or exacerbation. To understand the impact that any form of allergy testing can have in managing the care of patients

with asthma, it is first necessary to be cognizant of the disease process. After gaining the knowledge, the next step is to determine how it can be used in the clinical setting. Most uncontrolled asthma in children is due to modifiable allergen exposure (Scotney & Saglani, 2020), and therefore, evaluating aeroallergen sensitization in patients is a key step to improving patients' care (Rodriguez del Rio et al., 2022).

Guideline Recommendations for Allergy Testing in Asthma Patients

The National Asthma Education and Prevention Program (NAEPP) released guidelines more than 20 years ago that are now recognized as the standard of care for patients with asthma. In 2020, updated guidelines were released that further emphasized the significance of allergy testing in this patient population. In this update of the third expert panel report (EPR-3), it was reiterated that all individuals with asthma, regardless of severity, be assessed for exposure to allergens at home and at work, for symptoms on exposure and for sensitization either by allergy skin testing or allergen-specific immunoglobulin E (Murphy & Solis, 2021).

Many other organizations have released reviews both citing and supporting the NAEPP guidelines. For example, the National Institute for Health and Care Excellence (NICE) recommends identifying trigger allergens with specific IgE testing after a formal asthma diagnosis has been made (Demoly et al., 2022). More specifically, there are recommendations for pediatric groups based on age, symptomatology, and severity. Demoly et al. (2022) describes additional recommendations from NICE that state that pediatric patients with difficult-to-control asthma should receive allergy testing. Difficult-to-control asthma is defined by NICE as the follows: three or more days per week with asthma symptoms; three or more days a week with the required used of a short-acting beta-agonist (SABA); or one or more nights a week awakening due to asthma symptoms (Demoly et al., 2022).

Other organizations, such as the Global Initiative for Asthma (GINA), share their input on asthma management via allergy testing by recommending that specific IgE or skin prick testing (SPT) be used for relevant allergens if not previously performed as part of the assessment of comorbidities and phenotyping those with severe asthma (Casale et al., 2020). There has been discussion about whether or not implementing allergy testing for this patient population is beneficial or if it will provide any substantial information. Casale et al. (2020) report that using allergy testing in managing asthma cases can assist in addressing common patient concerns about allergies, predicting exacerbation and response to therapies, and possibly increasing compliance with therapies. Demoly et al. (2022) shares similar information, stating that incorporating specific IgE testing into asthma management adds objective information to identify specific allergies, which can guide personalized treatment plans and reinforce patient-to-provider communication.

The timing of the decision to introduce allergy testing for patients with an asthma diagnosis varies depending on which algorithm is being used, however, a common theme continuously emerged - allergy testing is highly recommended for patients with asthma. However, this practice is frequently overlooked and underused in healthcare, and specifically in primary care settings.

Primary Care Providers Underutilizing Allergy Testing

As stated by Pudasainee-Kapri (2021), IgE allergy testing is frequently underutilized in primary care settings. Fedele et al. (2023) echoes this point, stating that poor adherence to national asthma guidelines among primary care providers is exceedingly common. This statement is both surprising and concerning, considering that most, if not all, asthma cases are managed by primary care providers. Although the importance of identifying allergic triggers for

asthma patients is well-reported, most primary care clinicians routinely do not test for allergic sensitivity in their patients with asthma (Akinbami et al., 2018). Additional studies suggest that allergy tests are performed in less than half of the children with asthma that are treated in primary care offices in the United States (Klok et al., 2021). Rodriguez del Rio et al. (2022) reports that an allergy evaluation was discussed in 33% of primary care office visits for asthma, with allergy testing only being documented in 2% of asthma cases over the course of one year. Furthermore, a study surveying clinicians' adherence to guidelines for asthma management reveals that 30.4% of primary care providers reported "never" using allergy testing in this patient population (Akinbami et al., 2018).

Evidence has and continues to demonstrate the benefit of allergy testing for patients with asthma. Simultaneously, evidence is also showing that this is not as common a practice in primary care settings as it should be. Some studies were performed in an attempt to understand the hesitancy among primary care clinicians. This deeper dive revealed that physicians' non-adherence to asthma guidelines in general is quite common (Klok et al., 2021). Casale et al. (2020) reports several barriers that might explain this non-adherence, including lack of awareness of the guidelines, lack of knowledge on the relevance of allergy testing for patients with asthma, or disbelief that this practice would have a significant impact on patient outcomes.

Additional barriers include lack of self-efficacy, lack of agreement with the guidelines, complexity within the guidelines, organization barriers, difficulties with reimbursement, and provider burnout, as reported by surveyed clinicians (Akinbami et al., 2018). Although allergies are frequently and commonly recognized triggers of severe asthma and exacerbations, the majority of patients with this disease are not investigated for underlying aeroallergen sensitization, despite the potentially preventable consequences (Casale et al., 2020). Overall, the

evidence indicates two pertinent findings: allergy testing is beneficial in managing asthma and increasing positive patient outcomes, yet it is commonly underutilized in these settings.

Study Limitations and Gaps in the Literature

While a surplus of information exists about the benefits of utilizing IgE allergy testing for patients with asthma, there are some limitations revealed in the literature that must be addressed as well. Several studies discussed some discrepancies with the tests themselves. For example, Akar-Ghibril et al. (2020) pointed out that specific IgE testing alone may not be clinically relevant because the interpretation of skin prick tests and specific IgE to whole allergen relies on arbitrary cut-offs. Additionally, Klok et al. (2021) mentions that sensitization to a particular allergen could be asymptomatic, therefore making the test results a weak predictor. This same study also reveals that there are disagreements between the different types of allergy tests, with different results sometimes populating in the same patient depending on the test used (Klok et al., 2021). Although these findings are significant and should be considered, the potential benefits of utilizing allergy testing for patients with asthma outweigh the reported potential risks of the testing not being impactful. Future research could focus on creating an educational program for providers on allergy testing and its benefits as well as disseminating a standardized algorithm that is distributed among all practices to clearly define when allergy testing is warranted.

Setting

Population

The study population for this project consisted of pediatric nurse practitioners who manage the care of school-aged to adolescent patients in the state of Georgia, in both primary and acute care settings.

Inclusion & Exclusion Criteria

The inclusion criteria for participants in this study included being a certified pediatric nurse practitioner working in the state of Georgia. Individuals were excluded from participating if they were: family nurse practitioners who were working in pediatric settings, nurse practitioners working outside the state of Georgia, or other healthcare providers such as physicians or physician associates.

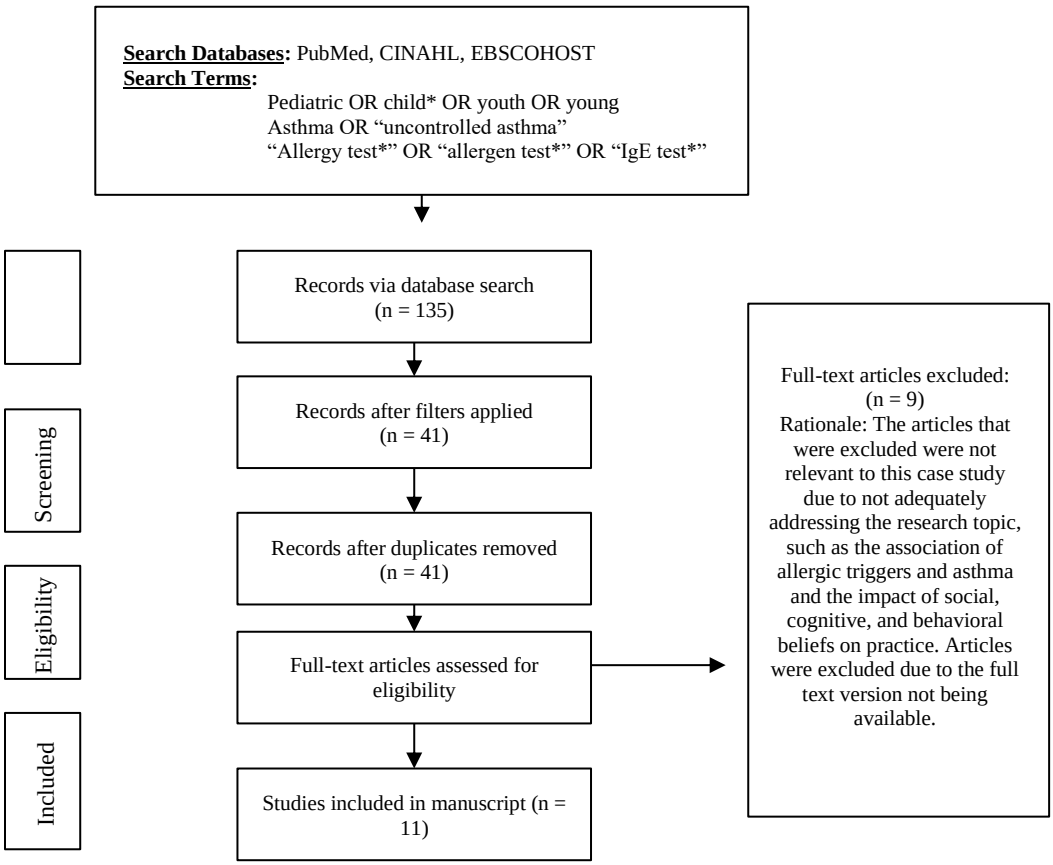
Methods

A literature search was completed using PubMed, CINAHL, and EBSCOHOST. The following search terms were used to yield results: (“allergy test*” OR “allergen test*” OR “IgE test*”) AND (child* OR pediatric OR young OR youth) AND (asthma OR “allergic rhinitis”). Both searches were filtered to search both full-text articles and abstracts. Results yielded were also filtered to only include articles published from 2013 to 2023. Forty-one relevant studies were identified in this search. Sixteen original research studies were selected for this literature review. Inclusion criteria for the literature review were articles that addressed national asthma management guidelines, IgE allergy testing use in primary care settings for patients with asthma, and clinicians’ perspectives on and frequency of using IgE allergy testing for asthma management. Articles that addressed the benefit of IgE allergy testing for asthma management in pediatrics were preferred, but articles that addressed allergy testing in any population were considered. Additional articles describing the social cognitive theory as outlined by Ablert Bandura and provider self-efficacy were also included. These articles were pertinent to describing the relationship between a provider’s belief and their clinical practice. Studies that were excluded did not directly address the association between allergic triggers and persistent asthma symptoms, the use of IgE allergy testing for asthma management or providers’

perspectives on this practice. The eleven research articles, along with resources from other academic sites, were sorted into different themes based on the findings. Three primary themes emerged, which include the idea that a significant overlap between asthma and allergic disease exists; the fact asthma guidelines strongly recommend specific IgE allergy testing for patients with asthma; and providers, specifically in primary care, routinely underutilize IgE allergy testing for patients with asthma. This process is illustrated below (Fig. 2).

Figure 2

Literature flow diagram



Data Collection and Analysis

This project gathered data regarding pediatric nurse practitioners' knowledge, beliefs, and practice when considering their pediatric patients with persistent asthma symptoms. To do this,

pediatric nurse practitioners who are practicing in the state of Georgia were asked to answer eleven survey items regarding how they perceive the association between allergic triggers and persistent asthma symptoms, recommendations and guidelines from healthcare organizations, and current practice related to asthma management. Each survey item had a clear link to Albert Bandura's Social Cognitive theory and was answered using a 5-point Likert scale that was modified for each item. An open-ended item was also included that provided the opportunity for pediatric nurse practitioners to describe any facilitators, challenges, or barriers to implementing IgE allergy testing for their patients with persistent asthma symptoms. The providers were asked to answer each item with the assumption that the patient has been consistently compliant with previously prescribed asthma regimens, to rule out any responses that may be related to medication non-compliance.

This data was collected, stored, and protected by the doctoral student using Qualtrics, a secure, web-based platform. SPSS software was used to analyze the data. The collection and analysis process produced data that is both valid and reliable. The survey items were formatted in a manner to address the primary research questions, which ensured that the results represented what the study sought to measure. It is expected that under the same conditions, similar results will be reproduced amongst the proposed group.

Protection of Human Rights

The population of interest for this study was pediatric nurse practitioners who practice in either acute or primary care in the state of Georgia. A link to the survey was emailed to prospective participants via the Georgia chapter of the National Association of Pediatric Nurse Practitioners (NAPNAP) by a member of the organization's executive board. This link directed prospective participants to a landing page that provided details regarding this research study as

well as a hyperlinked document describing the research study in full. These details included an overview of the study, the purpose of the project, and contact information for the principal investigator and Emory's Institutional Review Board. A statement explaining that informed consent would be indicated by proceeding with the survey was included on this page. If prospective participants wished to not participate, they were instructed to close the browser window at that time.

Minimal risk was anticipated for the pediatric nurse practitioners who opted to participate. Participants' rights were protected by requiring informed consent for participation. Additionally, the research team did not collect any identifying or protected health information for this study. The collected data was only shared with the project committee for purposes directly related to requirements for the doctoral student, and all communication with participants was facilitated by the Georgia NAPNAP executive board member. Key stakeholders for this project included the doctoral student implementing the study, the Nell Hodgson Woodruff School of Nursing at Emory University, and pediatric nurse practitioners who are committed to caring for the pediatric population.

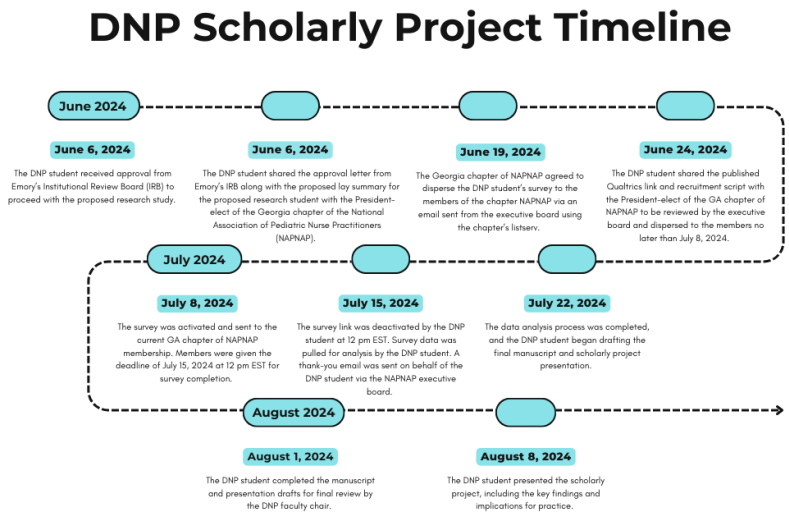
Implications Related to Social Determinants of Health and Diversity, Equity, and Inclusion

Implications related to social determinants of health and diversity, equity, and inclusion were included in this study. The second item on the survey asked providers to select whether they practice in an urban, suburban, or rural location. Frequently, practices located in rural areas serve patients that have less access to specialized healthcare. These locations also commonly do not have the resources to provide an abridged version of specialty care in their clinics, due to many factors including funding and staffing. The open-ended item included in the survey provided a space for providers to share any facilitators or challenges associated with

implementing IgE allergy testing for their patients with persistent asthma symptoms. Including this item served as an optimistic attempt to allow the surveyed pediatric nurse practitioners to provide context to their answers in the previous questions. By including these two items, the expectation was to identify associations between practice location, population served, and access. The previously mentioned events occurred based on the timeline pictured below (Fig. 3).

Figure 3

DNP Scholarly Project Timeline



Plan for Dissemination to Key Stakeholders

End-users for this project were pediatric nurse practitioners. The purpose of the project was to understand pediatric nurse practitioners' beliefs about implementing IgE allergy testing for patients with persistent asthma symptoms, with an ultimate goal of comparing the results to what the literature says about this practice. This information was used to understand what gaps exist between evidence-based guidelines and current practice as it pertains to pediatric nurse practitioners and asthma management.

The data that was collected and analyzed can used in combination with the current literature to further educate pediatric nurse practitioners on the allergic nature of asthma, the association between allergic triggers and asthma exacerbations as well as the benefits of IgE allergy testing in pediatric asthma management. This knowledge has the ability to be shared in a myriad of ways, including presentations at healthcare conferences such as the annual NAPNAP conference and the Georgia Nursing Leadership Coalition (GNLC) research symposium. The hope is that the target audience, being pediatric nurse practitioners, will either begin to implement this into their current practice or initiate their own research to better understand the potential impact that IgE allergy testing can have in developing management plans for their patients with persistent asthma symptoms.

Component 2: Results, Discussion and Conclusions, Implications and Recommendations

Descriptive statistics were used to analyze the collected data from the surveys by uploading responses to SPSS software. To prepare the data for analysis using SPSS Statistics, survey results were exported from Qualtrics to an Excel workbook using numeric coding. The responses for each survey item were given a corresponding numerical value, from one (1) to five (5), depending on how many choices were available for each question. Numbers were assigned in a manner consistent with the strength of the response. For example, lower numbers were assigned to responses that were "Rarely" or "Not knowledgeable at all" while higher numbers were allotted for responses that were in more agreement with the question, such as "Always" or "Extremely knowledgeable". The open-ended survey item was not assigned a numerical value, and therefore was removed from the workbook and saved in a separate document for later review. The Excel workbook was then uploaded to the SPSS software for analysis and exported into frequency tables for further evaluation.

Discussion

The primary objective for this project was to collect data on pediatric nurse practitioners' knowledge on the benefits of implementing IgE allergy testing in the plan for managing patients with persistent asthma symptoms. This was achieved by developing a survey utilizing Bandura's Social Cognitive Theory to formulate survey items. Questions sought to address cognitive, behavioral, and environmental factors that contribute to the providers' beliefs pertaining to this practice.

Local pediatric nurse practitioners (*n = 17*) participated by submitting their responses to the survey. This group was composed of both primary care (*n = 14)* and acute care (*n = 3)* pediatric providers working in urban, suburban, and rural communities.

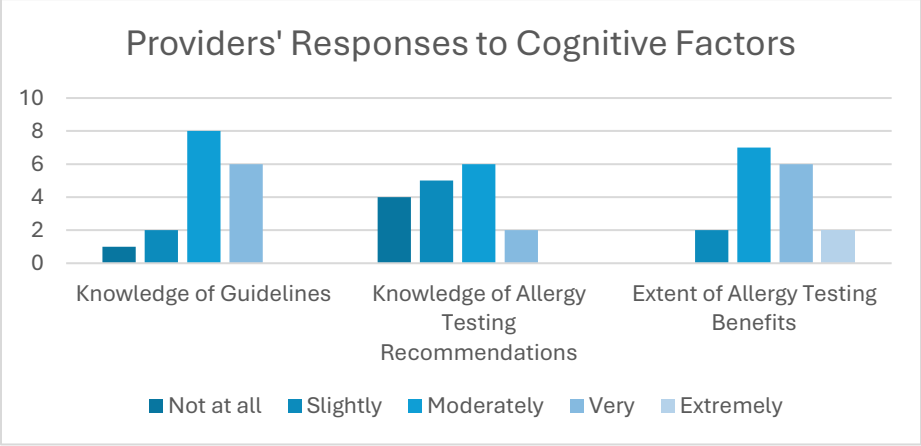
Theme 1: Cognitive Factors

Descriptive data collected suggested that 35.3 % (n = 6) of the surveyed providers reported being very knowledgeable of national guidelines for managing patients with asthma in a primary care setting, with 47.1 % (n = 8) being moderately knowledgeable, 11.8 % (n = 2) being slightly knowledgeable, and 5.9% (n = 1) reporting not being knowledgeable at all. When asked about their knowledge related to how IgE allergy testing can be used in patients with persistent asthma symptoms, 11.8 % (n = 2) reported very knowledgeable, 35.3 % (n = 6) reported moderately knowledgeable, 29.4 % (n = 5) reported slightly knowledgeable, and 23.5 % (n = 4) reported not knowledgeable at all.

Providers were also asked about their perception of the benefits of IgE allergy testing for patients with persistent asthma symptoms and the frequency at which they recommend their patients for this testing. The majority of the providers, 41.2 % (n =7), reported that they believed that this testing is moderately beneficial, with 35.3 % (n = 6) believing that it is very beneficial, 11.8 % (n = 2) stating either extremely or slightly beneficial. The visual of this data can be seen in Fig. 4 below.

Figure 4

Providers' Responses to Survey Items Related to Cognitive Factors



Theme 2: Environmental Factors

Participants were also asked questions pertaining to how their current environment may impact their beliefs and practices. One survey item asked pediatric nurse practitioners how frequently they saw their colleagues implementing IgE allergy testing for patients with persistent asthma symptoms. Of the respondents (n = 15), 13.3 % (n = 2) reported seeing this occur often, with 46.7 % (n = 7) reporting sometimes, and 20 % (n = 3) reporting both rarely and never (Fig. 6). Additionally, providers were asked how much support allergy testing for patients with persistent asthma symptoms received in their clinic. Of the providers that answered this item (n = 16), 18.8 % (n = 3) responded that their practice was very supportive, while 43.8 % (n = 7) reported moderately supported, and 18.8 % (n = 3) reported both slightly supported or not supported at all (Fig. 7).

The survey also considered the impact that parental compliance could have on the providers' readiness to recommend IgE allergy testing to their patients because it does often times requires referral to a specialist. For this survey item, providers (n = 16) disclosed that 31.3% (n = 5) of their patients either often or sometimes follow-through with their allergy testing recommendations (Fig. 5). One strategy to reduce the number of patients that have to be referred for specialist care is providing certain services, such as allergy testing in the office. When asked if their current practice offers on-site IgE allergy testing for patients, 64.7% (n = 11) of participants responded no, with 17.6 % (n = 3) of the providers responding that testing was available in their clinic, or that they were unsure (Fig. 8).

Figure 5

Providers' responses to how frequently patients comply with allergy testing

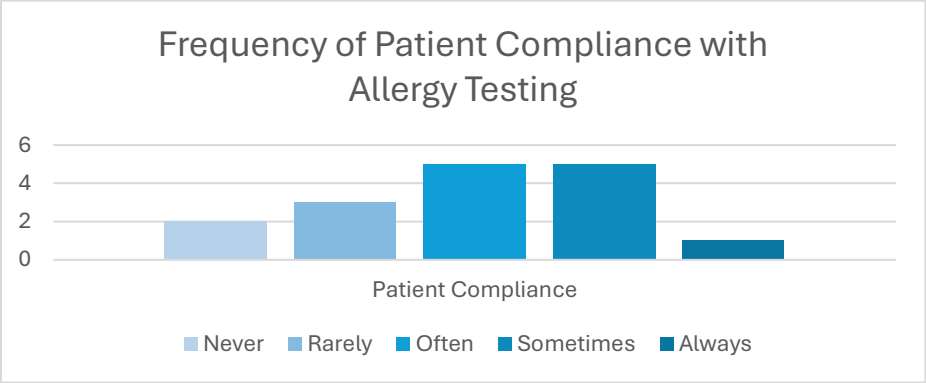


Figure 6

Providers' responses to how frequently they see colleagues recommend allergy testing

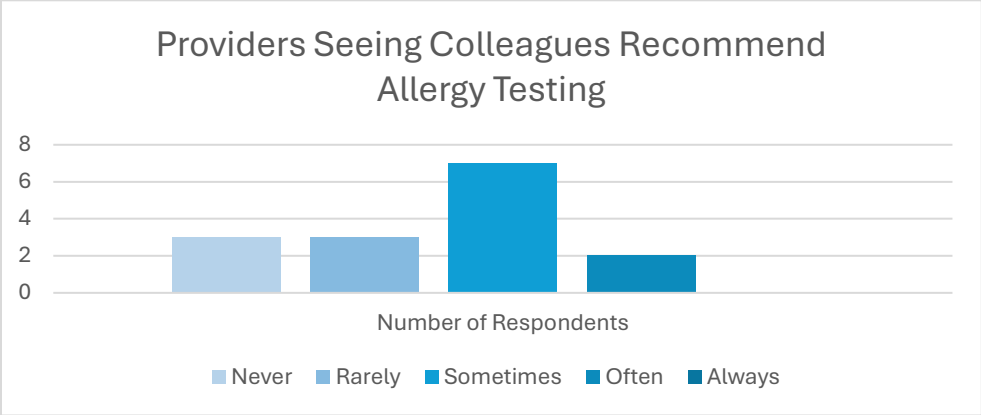


Figure 7

Providers' responses to level of clinic support for allergy testing

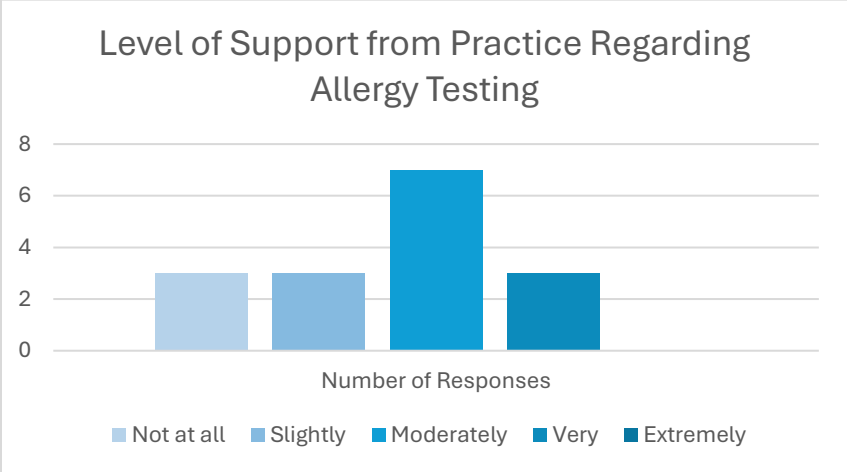
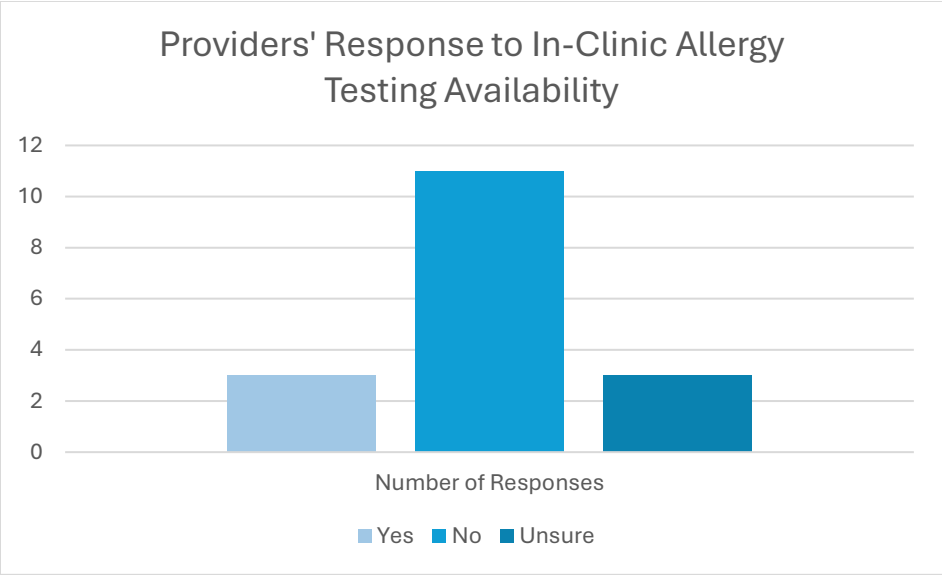


Figure 8

Providers' responses to whether or not allergy testing was available in their clinic



Theme 3: Behavioral Factors

While responses earlier in the survey suggested that a majority of the participants believed that allergy testing was moderately beneficial, only 5.9 % (n = 1) of the providers stated that they always recommended allergy testing for patients with persistent asthma symptoms. However, 35.3% (n = 6) of the respondents reported sometimes, 23.5% (n = 4) reported often, 11.8% (n = 2) reported rarely, and 23.5 % (n = 4) of providers reported never sending their patients with persistent asthma symptoms for allergy testing (Fig. 9).

A previous study mentioned that oftentimes, providers are reluctant to recommend allergy testing because they do not feel that they are appropriately trained to analyze the results. This idea was explored in the survey by asking participants how confident they were in their ability to request and analyze allergy test results, and of the providers who responded (n = 8), only 12.5 % (n = 1) reported that they would be very confident with this practice, while 25%

(n = 2) were moderately confident, 37.5 % (n = 3) were slightly confident, and 25 % (n = 2) reported not being confident at all (Fig. 10).

In addition to answering the multiple-choice items included in the survey, the participants were also encouraged to answer an open-ended question that asked them to highlight any facilitators, barriers, or challenges related to implementing allergy testing in their management plans for their patients with persistent asthma symptoms. A common challenge mentioned was that allergy testing was not available in the current practice. As a result, challenges such as parental hesitancy to travel and extended waitlists for specialty clinics that perform the testing emerged. Additionally, providers that have recommended allergy testing stated that they received incomplete or inaccurate panel results, which was not beneficial to the provider or the patient.

Providers who participated in the survey also expressed that their practice does not currently have any guidelines or standards of care related to implementing IgE allergy testing for patients with asthma, and one provider shared that their practice owner prefers that all patients be referred to a specialist for the test. Other barriers that were shared included the cost to not only the families but also the facilities and limited staff being available to execute what could be a time-consuming task. Finally, several providers mentioned that they were not aware that allergy testing was recommended for patients with persistent asthma symptoms, which is why they do not recommend or refer out for it.

Figure 9

Providers' responses to how often they recommend patients for allergy testing

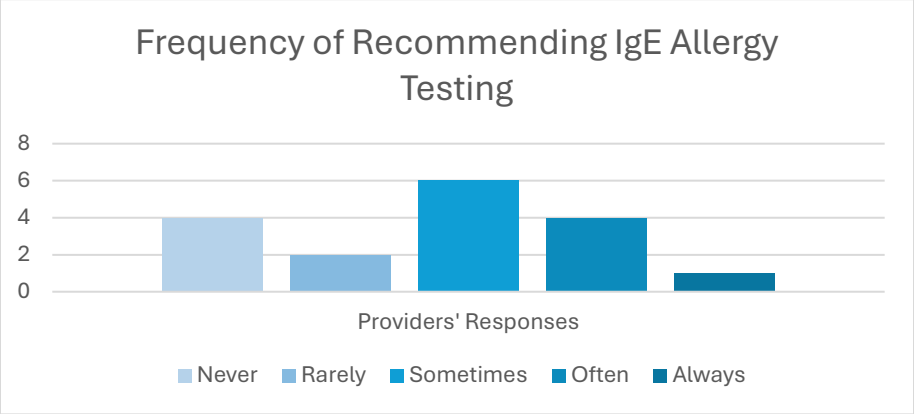
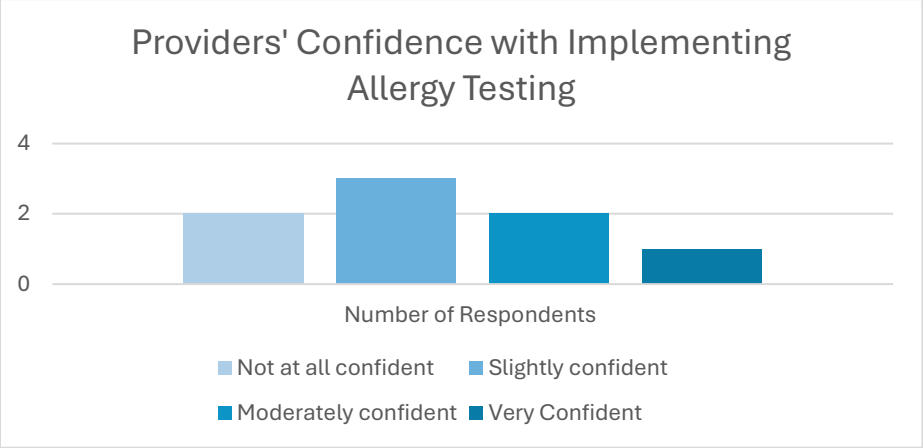


Figure 10

Providers' responses to their confidence level with implementing allergy testing



Limitations and Lessons Learned

Some limitations experienced with this project included fewer than desired responses from prospective participants, which was an anticipated challenge. This could be attributed to several factors, including the limited data collection period, the chosen dispersal method, or the clinicians' busy schedules during the time that the survey was open. In the future, broadening the dispersal method to include word-of-mouth as well as networking sites such as LinkedIn may be beneficial in receiving an increase in responses. Additionally, planning for an extended window

for clinicians to take the survey has the potential to yield more responses. For this project, clinicians were given two weeks to take the survey, but in future ventures, four weeks may allow for greater success.

Application to Practice

Overall, there are many valid challenges surrounding the practice of implementing allergy testing for this patient population. The survey data provided considerable insight into Pediatric Nurse Practitioners' beliefs on implementing IgE allergy testing for their patients with persistent asthma symptoms. Additionally, the responses provided context to how each providers' practice is impacted not only by their employer's perception of the recommendation but also their patients' willingness or ability to comply.

As a doctoral-prepared nurse practitioner, my role will be to recognize the patterns, identify the root causes, and present the evidence-based findings in a manner that will emphasize the need for solutions. I will also be expected to aid in uncovering those solutions. This can start now, during my time as a DNP student with this scholarly project.

A primary finding in the results of this project is that more education is always beneficial. Many of the project participants reported that they were aware of current asthma guidelines, including how IgE allergy testing falls into those recommendations, however, it was still less than the majority. Considering this, it is imperative that national healthcare organizations are intentional about how they deliver updates in standards of care and guideline recommendations to providers and that the same level of intentionality trickles down to regional, local, and community-based organizations as well.

Additionally, providers and their patients could benefit from increased interprofessional opportunities to create a space for sharing knowledge. In these spaces, specialty providers could

share what strategies, such as allergy testing, may be helpful to implement on the primary care side to gather useful data prior to specialty visits. In these same spaces, primary care providers could share what resources and types of support are needed from the specialty side to implement these practices. This team approach has the potential to mitigate some of the provider hesitancy related to limited parental/patient compliance and lack of knowledge surrounding this practice as well as parental hesitancy related to traveling to providers outside of their established community.

Component 3: Evaluation of the Process and Experience

Overall, my goal was to develop a project that would allow me to go through the process of having a question and finding an answer in a scholarly manner, and I do believe that I was able to do that. By completing the DNP scholarly project, I learned how to perform every step of this process. I started by observing interactions in the clinical setting during my rotations and noticing patterns that were occurring, which led to questions about why some practices were only happening some of the time. From there, I was prompted to formulate a question and start the process of researching what the literature said about it. After performing a thorough literature review, I felt confident that I could take what I had learned, compare it to what I wanted to know, and develop a project that would fill in some of the missing information.

The steps to fill in the missing information were simultaneously some of the most difficult and humbling but rewarding journeys I have ever completed. In this process, I learned how to create a proposal for the Institutional Review Board and communicate with professional organizations such as the Georgia chapter of NAPNAP. I also learned to create a questionnaire based on a theoretical framework and use the data collected to answer a clinical question. This also gave me the opportunity to analyze results and formulate conclusions based on the information I received, all while learning my academic writing style.

Overall, I believe that this was an impressive first attempt at using my knowledge and skills as a doctoral-prepared nurse practitioner to address clinical questions that arise, and I do believe that it was a great success. In the future, I would likely do many things differently, as this project taught me that missteps will happen, but what matters is that I learn from my mistakes and move on in a timely manner. However, I do appreciate this project and the process for what

it was, and I am excited to carry what I learned about research and project development over the past six semesters into my future as a DNP.

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Appendices

Qualtrics Survey -