2017

Assessing Teachers' Confidence in Implementing Food Allergy Emergency Plans

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This is to certify that the doctoral dissertation by

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May 2017

Abstract

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MS, University of St. Francis, 2003

BS, Governors State University, 2002

Dissertation Submitted in Partial Fulfillment

of the Requirements for the Degree of

Doctor of Philosophy

Public Health

Walden University

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Abstract

Food allergies are an increasing health concern in the United States, affecting nearly 6 million children under the age of 18 years. Research has suggested that 18% of school-age children will have their first allergic reactions at school. Life-threatening allergic reactions experienced by children in the school setting are on the rise; however, little is known about how schools implement policies and practices in response to this issue. The purpose of this quantitative cross-sectional study was to narrow the knowledge gap by examining teachers' knowledge, ability, and confidence level caring for students with food allergies. Bandura's social cognitive theory, which holds that education and experience influence confidence implementing tasks, served as the framework that guided this research. The electronic survey was distributed to a convenience sample of 300 elementary school teachers; 93 respondents completed it. Eighty completed surveys were used in the analysis. Multiple linear regression models were constructed to analyze the relationships among confidence, education, and training related to food allergies. Results showed that teachers who lacked knowledge of food allergies also lacked confidence implementing food allergy plans. School personnel responsible for planning or revising food allergy response protocols can use these findings. The potential for positive social change includes identifying training opportunities, developing policies to sustain food allergy knowledge, and building the capacity of all school staff to implement life-saving measures when children are experiencing allergic reactions.

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Dedication

The work of this dissertation is specifically dedicated to my brother, Rodney James Johnathan Hawkins, who succumbed on July 3, 2008, to anaphylactic shock directly related to the ingestion of seafood (crabmeat) hidden in a meal. Rodney, you are sadly missed, and through your experience, I hope that this study will help others to have a safer and healthier future, and will open up future research to the hidden mystery and prevention of food allergies. This also is a special dedication to all of the young victims of food allergies.

Acknowledgments

First, I want to acknowledge my Lord/God, the head and leader of my mind, soul, and spirit. He ordered and guided my steps through this endeavor and made everything possible through trust and faith in Him. Thank you, my dear Lord/God, as I am greatly appreciative and honored to know You. Next, I want to extend special thanks to my dissertation chair, Dr. Kai Stewart, who was by my side through it all and who continued to encourage me not to give up, saying, “You will get through this.” Thank you, Dr. Stewart. You taught me a lot, and you truly had the patience of Job working with me. I want to acknowledge and give special thanks to my five sisters, one brother, nieces, and nephews for being there and cheering me on to the finish line. I made it! Thank you to my church family and work colleagues, especially for helping to set up the participants, reviewing my work, and encouraging me to set deadlines. I am extremely grateful to the rest of my dissertation committee and my Walden family of friends whom I could depend on to send encouraging e-mails that gave me the extra push needed to get through. Finally, I extend a special thanks to my program chair, Dr. Nancy Rea, for listening.

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Chapter 1: Introduction to the Study

Introduction

A growing public concern is food allergies, affecting nearly 6 million children in the United States under the age of 18 years (Centers for Disease Control and Prevention [CDC], 2011; Gupta et al., 2011). Despite research efforts, food allergies are on the rise, and researchers are unsure of the cause (Branum & Lukacs, 2008). Food allergy is the body's reaction to a specific protein substance in a particular food (Lieberman & Sicherer, 2010). Food allergies accounted for 9,500 hospital discharges among children from 2004 to 2006 and more than 150 annual deaths in the United States (Lieberman & Sicherer, 2010). Although researchers have not identified any specific cause of food allergy, it had been suggested that if one or both parents are allergic to a particular food protein, their children will have a 75% chance of developing an allergy to the same food protein (O'Keefe et al., 2014). Boyce et al. (2010) found that physicians were confused as to why children's hospital admission for food allergy-related symptoms has increased by more than 500% in the past 20 years.

Based on prior research, American children most commonly suffer from milk, egg, peanut, tree nut, wheat, soy, fish, and shellfish allergies (O'Keefe et al., 2014). The following food allergies are the most common among school-age children: (a) milk allergy, the most common, affects children between the ages 1 and 6 years; (b) egg allergies, the second most common food allergy, affect nearly 3.2% of children; (c) peanut allergy affects nearly 1.2% of children; and (d) tree nut allergies, such as almond and walnut, affect 1.2 million children in the United States (Boyce et al., 2010;

Coleman-Collins, 2013). Most children will outgrow allergies such as milk, eggs, soy, peanut, tree nut, and wheat by age 6 years, with an additional 8% of children outgrowing food allergies past age 12 years (Boyce et al., 2010; Colman-Collins, 2013). Anaphylaxis, a more severe and potentially fatal allergic reaction, occurs in 20% of peanut and tree nut food allergy attacks (Boyce et al., 2010; Branum & Lukacs, 2008). Food allergies in general account for almost 50% of the cases of anaphylaxis (Boyce et al., 2010). Medications can stop some food allergic reactions, but no cure exists for food allergy (Olivier, 2013).

In 2011, the CDC reported that the number of children with food allergies went up 50% between 1997 and 2011. Results of a study by Tanner (2011) for the Children's Memorial Hospital in Chicago indicated that one of 13 school-age children in the United States has a food allergy, with at least two children in one classroom suffering from at least one food allergy (Branum & Lukacs, 2008). In addition, at least 15% of school-age children with food allergies suffer from allergic reactions in the school setting (Sicherer, Furlong, DeSimone, & Sampson, 2001). Results of the study by the Massachusetts Department of Public Health (2010) showed that 46% of food allergic reactions in Massachusetts occurred in the classroom. In addition, the U.S. Peanut and Tree Nut Registry confirmed that 79% of food allergic reactions were happening in the classroom (as cited in Young, Munoz-Furlong, & Sicherer, 2009). At least 18% of school-age children have their first allergic reactions at school (Sicherer & Mahr, 2010). Sheetz et al. (2004) suggested that all schools train nonlicensed health care staff such as teachers to administer epinephrine by autoinjector (EpiPen) to stop an allergic reaction. Lastly, More

(2013) recommended that teachers remain vigilant in the classroom, especially when doing class projects, and suggested that schools prepare to treat anaphylaxis, possibly saving a child's life.

Implications for social change include providing information that schools can use regarding the risk factors of students having one or more food allergies and allergic reactions at school. This study can bring awareness to help teachers identify several areas of importance: (a) Are they aware of students with a food allergy? (b) Do they know the allergy the student has (e.g., egg, peanut, milk, etc.)? (c) Do they understand how to recognize symptoms of an allergic reaction? and (d) How seriously do they take the symptoms, even if symptoms have visibly progressed? The findings will help to make school administrators and management aware of teachers' knowledge, attitudes, and confidence implementing food allergy emergency plans. I sought to close the gap in the literature by assessing teachers' confidence in implementing food allergy emergency plans and confidence in their ability to care for students with food allergies, level of training or experience in caring for students with food allergy, and knowledge of food allergies.

Background

Food Allergies

Food allergy occurs when a person consumes a food that has a protein that is resistant to the digestive process and does not break down (Olivier, 2013). The body's inability to digest the protein sends a harmful signal to the brain, which triggers the immunoglobulin E (IgE) to react (Olivier, 2013). This reaction is an immunoglobulin that

is produced by the immune system and sends signals of invaders causing histamine reaction (Olivier, 2013). During this process, the body sends a variety of warning signals characterized by such symptoms as tingling of the mouth, numbness of arms and legs, itching, swelling of the tongue and throat, and loss of consciousness (Lieberman & Sicherer, 2010; Olivier, 2013).

Anaphylaxis

Anaphylaxis is a severe, food-based allergic reaction that causes the whole body to respond immediately with abdominal pain, cramping, abnormal breathing, cough, diarrhea, difficulty swallowing, palpitations, slurred speech, and wheezing after contact with the food allergen (Rudders, Banerji, Corel, Clark, & Camargo, 2010). The life-threatening symptoms of anaphylaxis that cause death within a few minutes includes swollen lips, difficulty breathing, and reduced blood pressure (Rudders et al., 2010).

Anaphylaxis causes tissues in other parts of the body to release histamine, which closes the airway (Rudders et al., 2010). People with a previous history of anaphylaxis, asthma, and food allergies are at higher risk of life-threatening anaphylaxis (Rudders et al., 2010; E. Shah & Pongracic, 2008). The most effective way to prevent anaphylaxis when an allergic reaction occurs is to administer antihistamine medication such as Benadryl (pill or liquid) or EpiPen injection quickly (Rudders et al., 2010). The best way to avoid anaphylaxis is to (a) make all health care providers document anaphylaxis in medical records; (b) avoid contact with foods that cause allergic reactions; (c) read labels, especially on prepackaged foods; and (d) most importantly, wear a medical alert necklace or bracelet, or carry a med-alert key chain (Rudders et al., 2010). Furthermore, because

most allergic reactions require the use of two EpiPens to stop an allergic reaction effectively, researchers have suggested that children carry their own EpiPens (Rudders et al., 2010).

Food Allergy Emergency Plans

Because of the increased number of food allergies, the CDC, along with the American School Food Service Association; the National Association of Elementary School Principals; the National Association of School Nurses; the National School Boards Association (NSBA, 2011); and the Food Allergy and Anaphylaxis Network (FAAN, 2012), developed guidelines that require all public schools that receive financial assistance from the federal government to extend coverage to children with severe food allergies in compliance with Section 504 of the Rehabilitation Act of 1973 (as cited in Rowley, 2011).

The U.S. Department of Education, under Section 504, defined handicapped individuals as those who have substantial limits in one or more of their physical or mental life activities (as cited in Wilson & Bogden, 2005). The government required public schools to comply with the guidelines established under Title 34, Section 504, of the Rehabilitation Act of 1973, regarding discrimination of individuals with disabilities because children with severe allergies are considered disabled (Wilson & Bogden, 2005). According to the FAAN (2012), the established guidelines required school officials to adopt a system for school staff to respond quickly in the event of food-based allergic reactions (Powers, Bergren, & Finnegan, 2007). Food allergy emergency plans should be developed in collaboration with health care professionals, school officials, parents, and

the allergic children (Powers et al., 2007). The FAAN also has suggested that food allergy emergency plans include adequate steps to stop allergic reactions and that these plans be unambiguous, precise, and effortless to comprehend (as cited in Wilson & Bogden, 2005).

Problem Statement

In a health statistics report released in 2012, Schiller, Lucas, Ward, and Peregory reported that in the previous 12 months, at least 4.1 million school-age children had experienced at least one food allergy. In the United States, an estimated 6 million children have food allergies, with 25% experiencing their first allergic reactions at school (Sicherer & Mahr, 2010). What was unknown was teachers' preparedness, knowledge, and ability to respond to allergic reactions. A problem identified by Sicherer and Mahr (2010) was teachers' failure to identify and respond quickly to children's allergic reactions. Boyce et al. (2010) noted that failure to move into action quickly can simply be resolved by performing practice drills. Young et al. (2009) asserted that practice drills are especially important because 75% of allergic reactions occur in the classroom setting.

Allergic reactions can occur during classroom events with foods (e.g., holiday parties and birthday celebrations), or they can be the outcome of accidental exposure during classroom projects (e.g., crafts, arts, and science projects) and poorly organized or unsupervised field trips (Sicherer & Mahr, 2010; Young et al., 2009). Most allergic reactions that occur in the classroom usually are not related to ingested food, but to accidental exposure (Young et al., 2009). Undertreating severe allergic reactions and administering epinephrine presents another substantial problem (Young et al., 2009).

According to Fleischer et al. (2012), one of the problems administering epinephrine is that educators need constant vigilance regarding how to read labels accurately, how to avoid nonaccidental exposure, how to prevent cross-contamination, and how to administer epinephrine appropriately.

The negative outcomes in relation to allergic reactions to food could possibly be related to treatment delays resulting from teachers' inability to recognize the reactions (Sicherer & Mahr, 2010). The goal of this study was to understand whether teachers' lack of knowledge about food-based allergic reactions inhibited those individuals from following the food allergy emergency plans and administering injectable epinephrine in a timely manner (Sicherer & Mahr, 2010). Delays by first responders administering treatment to students experiencing allergic reactions have resulted in negative outcomes and even death (Sicherer & Mahr, 2010).

The FAAN (2012) reported that the biggest decision of the first responder, usually the teacher, is whether or not to administer injectable epinephrine. Another dilemma has to do with first responders' preparedness, knowledge, and comfort administering the injection (Sicherer & Mahr, 2010). Still another unknown is whether teachers need more education to familiarize themselves with the treatments necessary to stop, prevent, or hinder food allergic reactions (Sicherer & Mahr, 2010). I wanted to understand whether teachers had confidence in their ability to implement the food allergy emergency plans (Sicherer & Mahr, 2010; Tanner, 2011).

The intent of this study was to provide information about teachers' preparedness, knowledge, and confidence responding to food-based allergic reactions and to understand

whether training was needed so that teachers were fully capable of assessing the situations, making quick decisions, and responding quickly to save lives. Finally, even though research exists on the subject, few researchers have identified teachers' confidence in their ability to implement food allergy emergency plans in the school setting.

Purpose of the Study

The purpose of this quantitative study was to describe the effect of teachers' knowledge, training, and confidence implementing food allergy emergency plans in a school setting or environment. This study was necessary because food allergies continue to be a concern in the U.S. educational system (CDC, 2011; Gupta et al., 2011). There needs to be a concerted effort by educators and administrators to ensure the safety of children with food allergies while they are in the school environment. Researchers have estimated that 40% of students with food allergies experience reactions in schools and that 25% of children with food allergies have their first reaction at school (Sicherer, Munoz-Furlong, Godbold, & Sampson, 2010). According to McIntyre, Sheetz, Carroll, and Young (2005), four of every six deaths related to students with food allergies occur while the children are at school. The purpose of this study was to assess teachers' confidence in implementing food allergy emergency plans by determining whether the teachers' possessed the knowledge, skills, and ability necessary to identify when children were experiencing food allergic reactions. Another purpose of this study was to help schools to determine whether their food allergy emergency plans were adequate and included all the necessary information needed to identify and prevent food allergic

reactions.

Research Questions and Hypotheses

The research questions (RQs) were chosen for their potential in understanding the role of teachers' confidence in implementing food allergy emergency plans:

RQ1: Is there a relationship between teachers' confidence in implementing food allergy emergency plans and teachers' confidence in their ability to care for students with food allergies?

H_{01}: There is no relationship between teachers' confidence in implementing food allergy emergency plans and teachers' confidence in their ability to care for students with food allergies.

H_{a1}: There is a relationship between teachers' confidence in implementing food allergy emergency plans and teachers' confidence in their ability to care for students with food allergies.

RQ2: Is there a relationship between teachers' confidence in implementing food allergy emergency plans and teachers' level of training or experience in caring for students with food allergies?

H_{02}: There is no relationship between teachers' confidence in implementing food allergy emergency plans and teachers' level of training or experience in caring for students with food allergies.

H_{a2}: There is a relationship between teachers' confidence in implementing food allergy emergency plans and teachers' level of training or experience in caring for students with food allergies.

RQ3: Is there a relationship between teachers' confidence in implementing food allergy emergency plans and teachers' knowledge of food allergies?

H_{03}: There is no relationship between teachers' confidence in implementing food allergy emergency plans and teachers' knowledge of food allergies.

H_{a3}: There is a relationship between teachers' confidence in implementing food allergy emergency plans and teachers' knowledge of food allergies.

Theoretical Framework

The self-efficacy theory, based on Bandura's (1977, 1988, 1989a, 1989b, 2001a, 2001b) social cognitive theory (SCT), was the framework that guided this study. According to Bandura (1977, 1988, 1989a, 1989b, 2001a, 2001b), behaviors are determined by the reciprocal interactions among specific behavioral, cognitive, and environmental factors. SCT refers to the belief that confidence in the ability to perform a behavior is strongly related to behavioral change and maintenance (Bandura, 1977, 1988, 1989a, 1989b, 2001a, 2001b). According to Bandura (1988, 1989a, 1989b, 2001a, 2001b), self-efficacy beliefs influence the choices and goals that people make, the amount of effort applied toward these goals, how long they persevere at tasks in times of failure or difficulty, and the amount of stress experienced. This theory can apply to further understand the need and behavior of teachers as it relates to their attitudes, beliefs, training, confidence, and perception of success (Bandura, 1977, 1988, 1989a, 1989b, 2001a, 2001b).

Self-efficacy is a common understanding or construct related to the self-belief of individuals in their ability to function, perform specific tasks, and understand how those

beliefs affect their lives (Bandura, 1977, 1988, 1989a, 1989b, 2001a, 2001b). According to the SCT, people engage in goal setting as the result of cognitive self-regulation (Bandura, 1977, 1988, 1989a, 1989b, 2001a, 2001b). Individuals can gain or develop self-efficacy through performance of the model (Bandura, 1977). Therefore, the plan for this study was to understand the ideas and principles that individuals use to gain confidence by observing behaviors during certain situations and through experience and education (Bandura, 1977, 1988, 1989a, 1997, 2001b).

Using this learning theory helped to determine whether the teachers' confidence in implementing food allergy emergency plans was adequate or whether training would increase their confidence. Understanding what the teachers believed about food allergy outcomes and education regarding allergies could possibly lead to a decrease in food-based allergic reactions at school. By gaining knowledge and confidence, individuals can influence positive outcomes related to food allergies and safety measures. Bandura and Schunk (1981) stated that moral knowledge reflects individuals' competence when performing particular tasks and that self-efficacy involves the endurance to reach particular goals. I conducted this study to assess teachers' knowledge of food allergy emergency plans to determine what they were capable of doing, what they already knew about food-based allergic reactions, what their skills were related to administering the plans, their awareness of their schools' food allergy emergency plans, and their cognitive ability to construct the plans (Bandura, 1977, 1988, 1989a, 1997, 2001a; Pajares & Schunk, 2001).

According to federal government guidelines, FAAN (2012) emergency plans must be individualized according to each student's food allergy diagnosis (Martone, 2010). Researchers such as Martone (2010) have found that some school cafeteria workers have not made or are not making accommodations for children with food allergies in the lunch programs. However, when creating food allergy emergency plans, schools need to look at all situations that could possibly cause allergic reactions. The findings of this study will help to determine whether school staff need more training or whether schools should implement practice drills to increase teachers' confidence working with children with food allergies and subsequently reduce the number of anaphylactic incidents experienced by school-age children.

Bandura (1977) asserted that most human behavior is learned through modeling. By observing others, individuals form ideas how to perform behaviors and then use this information later to guide their actions. Bandura also determined that psychologically, education, experience, knowledge, and ability to communicate determine communicative social interactions.

The use of the SCT involved examining the difference between capability and performance (Bandura, 1977, 1988, 1989a, 1997, 2001b). Bandura (1977, 1988, 1989a, 1997, 2001b) stated that moral behavior can affect individuals while they are performing certain tasks, delaying cognitive courses of action because of their self-beliefs (Bandura, 1977, 1988, 1989a, 1997, 2001a). The rationale for using the SCT in this study was to understand the intent of teachers' use of the psychological constructs of reciprocal determination to describe the interactions among behavior, personal factors, and

environment (DuFour, 2004; Hord, 1997). The SCT guided the theoretical framework of this research by showing the relationship between the three independent variables (IVs) and the outcome of the dependent variable (DV; Bandura, 1977, 1988, 1989a, 1997, 2001a; Pajares & Schunk, 2001). The first IV, teachers' confidence in their ability to care for students with food allergies, relates to self-efficacy, one's belief in the ability to perform behaviors and assess confidence levels. Self-efficacy is rooted in how people feel, think, and behave (Tschannen-Moran & Woolfolk-Hoy, 2001). Self-efficacy relates to the judgment by individuals that they are capable of performing any sequence of actions (Tschannen-Moran & Woolfolk-Hoy, 2001). Bandura (1977) defined self-efficacy as "the belief in one's capabilities to organize and execute the courses of action required to manage prospective situations" (p. 2). Bandura (1986) stated that the sources of self-efficacy are based on vivid occurrences that are determined by observing others' past performance, verbal persuasion capabilities, physiological state, and confidence to perform under stressful situations (Bandura, 1977, 1988, 1989a, 1997, 2001a). Self-efficacy refers to the views that individuals hold about themselves, meaning that their perceptions, knowledge, skills, and abilities can increase performance (Bandura 1988).

Outcome expectancies, the second IV, was defined as teachers' level of training or education in caring for students with food allergies. This variable is the belief about the likelihood and value of consequences of behavioral choices. When people confidently believe something or anticipate a particular occurrence in the future, they are prepared for the event. Outcome expectancy suggests that behaviors can result in several outcomes, categorized as physical, social, or self-evaluative (Bandura, 1988, 2001a). People who are

more efficient have a tendency to visualize constructive rather unconstructive outcomes (Bandura, 1986, 1994, 1997, 1989a); therefore, outcome expectancy and self-efficacy influence performance of a particular behavior.

Lastly, the third IV was teachers' knowledge of food allergies, which was related to their knowledge and skills necessary to perform a behavior (Bandura, 1989b; Martin & Ajzen, 1975, 1980). This involved training-related actions to achieve the desired constructive outcome. For this study, it was imperative to assess teachers' confidence, knowledge, beliefs, attitudes, and training or experience regarding food allergy outcomes in an effort to understand their confidence in implementing food allergy emergency plans. This assessment helped to determine whether the teachers' confidence was connected to the institutional psychology influence of environmental conditions and also helped to understand the consciousness of the individuals during emergency situations (Bandura, 1989b; Martin & Ajzen, 1975, 1980). The SCT was appropriate to serve as the theoretical of this study.

Nature of the Study

I used a quantitative design to investigate the research problem. A quantitative design was appropriate for this study because of the following benefits: (a) It allowed me to use reasonable assessments when forming the hypotheses; (b) it allowed me to collect data to investigate the problem; (c) it presented measurable relationships of variables with ability to collect data at a set point and time; and (d) it was less time consuming; more cost effective; and facilitated data collection in small or large amounts at one time with the ability to manipulate variables, make observations of multiple factors of the target

population, and ensure the safety of the participants (Babbie, 1990, 2001, 2010; Creswell, 1994; Kruger, 2003). Using a convenience sample of approximately 60 to 300 teachers from one school district in Illinois, I assessed teachers' confidence in implementing food allergy emergency plans. The aim was to identify teachers' knowledge, attitudes, and beliefs related to food allergy emergency plans, and to assess their confidence in implementing food allergy emergency plans. As the researcher, I also calculated frequencies and percentages for categorical data (e.g., age, gender, and race or ethnicity) used to describe the composition and salient characteristics of the sample. Means and standard deviation provided scores on the Food Allergy Research Survey for Teachers (FARST); this information was used to describe averages and ranges for continuous data.

The participants electronically the FARST, which I e-mailed to a designated contact person at the school district. The contact person sent the survey to 220 full- and part-time teachers, which was more than the required 77 to ensure that the minimum number of participants was obtained. The survey items included closed-ended questions (i.e., true/false or I do not know); multiple-choice questions; and Likert scale responses of *strongly disagree*, *disagree*, *neither agree nor disagree*, *agree*, and *strongly agree*. The method of data collection utilized was an electronic survey questionnaire. Through this study, I aimed to understand teachers' confidence in implementing food allergy emergency plans and how that confidence related to knowledge, attitudes, and beliefs, as well as training or education regarding food allergies.

Definitions of Terms

Anaphylaxis: Occurs when a substance that a person is allergic to enters the body and causes a severe allergic reaction that results in itching, wheezing, and shortness of breath (Rudders et al., 2010).

Cross-contamination: An important food safety concern that occurs when a food that does not contain an allergen is tainted with an allergen during preparation, cooking, storage, or serving (Boyce et al., 2010).

Dairy allergy: a growing concern in school-age children with more than 300,000 children in the United States diagnosed with milk allergies (American College of Allergy, Asthma and Immunology [ACAAI], 2013). Various products can cause dairy-based allergic reactions: all types of animal milk, butter or margarine, cheese, chocolate, nougat and caramel, half-and-half, cream, sour cream, cottage cheese, ice cream, sherbet, gelato, protein powders, and whey (Narisety & Keet, 2012; Olivier, 2013). Children's dairy allergies can be affected outside the cafeteria setting because many items found in the classroom also contain milk protein (ACAAI, 2013). For example, glue, paper, and ink are other items in the classroom that contain milk protein and have the potential to cause allergic reactions (ACAAI, 2013).

Epinephrine: A synthetic form of the hormone adrenaline that is used to relax the airways and constrict blood vessels (Olivier, 2013).

Epinephrine autoinjectors: EpiPen, as it is more commonly referred, is an autoinjector that causes the heart to pump faster, increases blood pressure, and opens airways in the lungs (Olivier, 2013).

Food allergy: An adverse immune response to food proteins (Olivier, 2013).

Food allergy emergency plans: Guidelines from various federal government agencies to protect individuals with disabilities (Martone, 2010).

Nut allergy: In the past 5 years, 3.3 million people in the United States have been diagnosed as allergic to tree nuts (Sicherer et al., 2010). Tree nuts with allergens include cashews, chestnuts, almonds, hazelnuts, Brazil nuts, macadamia nuts, pine nuts, pecans, walnuts, and pistachios (Boyce et al., 2010; Sicherer et al., 2010). The classroom contains a variety of nonfood peanut allergen items such as furniture waxes, oils, lotions, and empty jars used as storage containers that have the potential to cause allergic reactions. An estimated 25% of EpiPen injections administered at school have been related to first-time allergic reactions to nut allergies (Young, 2006).

Seafood allergy: Seafood allergies (fish, mollusks, and crustaceans) have increased during the past 40 years and are the leading cause of anaphylaxis in the United States (Turner, Ng, Kemp, & Campbell, 2011). The CDC estimated that 6.9 million people are allergic to seafood and that 3% of food allergy deaths are from seafood allergies (as cited in Sicherer et al., 2010). Seafood allergens can be found in foods such as scaly fish and shellfish; the most common allergic reactions associated with seafood allergies include eczema, hives, asthma, digestive complications, and anaphylaxis (Turner et al., 2011). Even vapors from cooking or preparing seafood can cause allergic reactions.

Wheat allergy: Wheat is one of the most common food allergies in the United States (Rodriguez, 2014; Sicherer et al., 2010). The most common forms of wheat are found in breads and bread products, breakfast cereals, pastas, beer, hydrolyzed vegetable protein, soy sauce, condiments, processed meat products, dairy products, gelatinized and modified food starch, vegetable gum, licorice, jelly beans, and hard candies (Rodriguez, 2014). Some products in the classroom, including glues and Playdoh, contain hidden wheat allergens (ACAAI, 2013).

Assumptions

Ellis and Levy (2009) described assumptions as the beliefs of truths that researchers bring to their studies. The basis of this study involved several assumptions about the school district's educational environment and its relation to food allergies, as well as the participants in the study. One of the major assumptions was that all schools currently had one available nurse at least 1 day a week (Boyce et al., 2010). This was a concern because teachers were slow to respond when children were experiencing allergic reactions. The slow response was in part due to teachers' lack of knowledge regarding food allergy emergency plans (Boyce et al., 2010). Other reasons causing teachers' slow response was that they had never looked at the plans and that the teachers were not comfortable administering injections or other allergy prevention treatments (Boyce et al., 2010).

Another assumption was that participants needed to take part in training regarding food allergy emergency plans and the administration of epinephrine autoinjectors. I also assumed that the schools in the examining district were willing to implement widespread

training in order to stem the incidence of allergic reactions by students. The final assumption was that the use of Bandura's (1988, 2001a, 2001b) SCT was appropriate for this study.

Scope and Delimitations

With the growing concerning of food allergies among school-age children (Schiller et al., 2012), the scope of this study was to identify teachers' preparedness and knowledge to proactively respond to students experiencing allergic reactions. Because most allergic reactions occur in the classroom (Young et al., 2009), the scope was to identify the relationship among teachers' confidence implementing food allergy emergency plans and their ability to care for students with food allergies, teachers' level of training/experience caring for students with food allergies, and teachers' level of knowledge related to food allergies. The boundaries of the study were limited to elementary school teachers from pre-K to Grade 8 at the same school district in Illinois.

Ellis and Levy (2009) defined delimitations as the factors that researchers do not cover in their studies. I did not intend to publish identifiable traits of the school district and the participants. The study excluded teachers of students enrolled in high schools, charter schools, and/or magnet schools. Other delimitations were that no previous studies have assessed teachers' confidence in implementing food allergy emergency plans related to any areas of interactions with students. Potential generalizability of the study was the convenience sampling strategy that could have biased findings because the data came from just one school district.

Limitations

This quantitative study had limitations or constraints related to the participants. The target population had no knowledge of the study topic, which could have resulted in lost information and a reduction of data obtained. Limitations also included my ability to get all participants to answer the survey questions truthfully. If some participants had discussed the survey questions with potential participants who had not yet completed the survey, their responses could have been based on the predetermined or preconceived thoughts of their colleagues rather than their own thoughts. This study focused on assessing teachers' confidence in implementing food allergy emergency plans and did not address specific items or requirements listed on the food allergy emergency plans. This could have been another limitation if the teachers were unfamiliar with food allergy emergency plans. I was available to communicate via telephone to clarify any questions about the study topic as well as explain how and why the information was needed. Another potential limitation of the study was the participants' lack of familiarity with online surveys. If they were not comfortable with computers or unable to maneuver instructions to access the survey, the result could have been a lack of willingness to complete the survey.

I used the SCT to guide this study; however, the theory itself has limitations regarding learned behaviors. The theory does not explain how individuals who have learned a behavior respond differently when faced with the same situation as they have observed. The biggest limitation of the SCT is that it is loosely organized: It sometimes appears controversial, the self-efficacy expectancy situation specifically related to

personality, thus causing beliefs to appear unrelated to behaviors.

The correlational design of this research had biases. For example, it could uncover the relationship between variables, but it could not provide a conclusive reason for the relationship, and it did not reveal which variable did the influencing. A multiple regression analysis was used to address these limitations. Variables were evaluated "in terms of what it added to prediction of the dependent variable (criterion) that was different from the predictability of all other predictors" (Tabachnick & Fidell, 2001, p. 131).

Significance of Study

Contribution to Education

Although there has been research on and the implementation of policies at the state and federal levels regarding food allergies (Sicherer & Mahr, 2010), disparities remained in identifying items that caused allergic reactions, including teachers' lack of confidence, knowledge, and experience/education needed to implement food allergy emergency plans. The results of this study will yield benefits as a learning tool for teachers, school administrators, and even parents by enhancing their overall confidence, knowledge, and skills in the ability to recognize allergic reactions and provide immediate interventions. Because food allergies are emerging more often among school-age children, this study will add insight into the factors related to food allergies and provide school management with helpful information that can lead to the development and adoption of school policies to improve knowledge related to food allergic reactions at school.

Results of this study can provide guidance into ways to outline specific policies ensuring that the school environment is safe for children with food allergies and help to identify important factors, such as how to be prepared for emergencies, how to establish training and practice drills related to food allergy emergencies; ways to create a safe environment for students with food allergies; ensure that food allergy emergency plans are accessible to teachers; ensure that teachers often review students' food allergy emergency plans; ensure that schools have trained personnel available to administer epinephrine autoinjectors; share food allergy emergency plans with other school staff who have contact with students; and do follow-ups after allergic reactions to ensure that they were handled according to school policy or to evaluate whether the policy needs to be updated or changed regarding more accurate food allergy emergency plans.

Implications for Social Change

As previously stated, an estimated 40% of U.S. students with food allergies experience reactions in schools and that 25% of children with food allergies have their first reactions at school (Sicherer et al., 2010). Four of every six deaths related to food allergies occur while the children are at school (McIntyre et al., 2005). Because of these alarming statistics, it was the goal of this study to help school administrators and teachers identify what was known about food allergies and use the results to identify needed training in a variety of lifesaving measures. Other implications for social change include teachers becoming more aware of and recognize allergic reactions sooner, thereby contributing to a decreasing mortality rate associated with food allergies, and provide comfort that children with food allergies are safe at school. When school administrators

use the results of this study, they open up the opportunity to create greater awareness in the community at large, possibly identifying the potential that allergic reactions are possible when contact is made in areas such as vending machines; school stores; and school events (i.e., class parties, school field trips, cooking classes, and other school projects).

The overall awareness that can be obtained from this study will help to create a safer school environment for children with food allergies. School administrators will ultimately be able to empower teachers to educate students, thereby allowing them to assist in making the classroom a safe environment for all students with food allergies. Lastly, the results can help to reduce the social stigma that students with food allergies experience. Teachers will become advocates for parents, who will be assured that teachers know about their children's food allergies; and can provide quick interventions.

Summary

A food allergy is the body's reaction to the proteins in food. Food allergy symptoms vary depending on the allergy, and they can range from tingling of the mouth to swelling of the throat to anaphylaxis. The FAAN estimated that 6 million children have food allergies and that 18% of school-age children have allergic reactions at school (as cited in Sicherer et al., 2010). The goal of this study was to identify the potential need for additional training to educate teachers on ways to identify and respond quickly to food allergic reactions.

Chapter 2 is the review of relevant literature. The majority of the literature has shown how learning new knowledge, attitudes, and beliefs build confidence. Previous

researchers have found that teachers do not respond in an appropriate amount of time and are unaware of how to respond to food allergic reactions because of their lack of knowledge about their schools' food allergy emergency plans (Sicherer et al., 2010). By linking the resources related to building knowledge, skills, and abilities, I sought to determine that having increased knowledge, attitudes, and beliefs, and training and education about food allergies would increase teachers' ability to implement food allergy emergency plans.

Chapter 3 includes a review of the research design and a discussion of the correlation between the DV and IVs. Also presented in the chapter is information about the methodology, RQs and hypotheses, and data collection instrument. The chapter also details the recruitment process and ethical concerns and limitations. Chapter 3 concludes with explanations of the ways that the data were disseminated, stored, organized, and analyzed.

Chapter 4 describes the demographic characteristics of the participants, provides a detailed review of the data collection and analysis, and presents the findings in tables. Chapter 5 provides a detailed discussion of the results of the data analysis and an interpretation of the data, and a review of the limitations of the study. The chapter concludes with recommendations for future research.

Chapter 2: Literature Review

Introduction

In this chapter, I reviewed literature relevant to understanding teachers' confidence in implementing food allergy emergency plans. Food allergies have become a life-threatening health care issue (Branum & Lukacs, 2008; Sicherer, Munoz-Furlong, & Sampson, 2003). Food allergies in children under the age of 18 have increased dramatically over the last 20 years, accounting for 50% of cases of anaphylaxis in U.S. school-age children (Branum & Lukacs, 2009). Food-based allergic reactions account for 90% of anaphylaxis in school-age children as the result of contact with the allergens during school activities or after the consumption of food (McIntyre et al., 2005; Sicherer et al., 2001; Sicherer & Mahr, 2010; Young et al., 2009). The consequences associated with teachers failing to administer EpiPens quickly enough to stop allergic reactions have been associated with their inability to recognize the signs of allergic reactions (Sicherer & Mahr, 2010).

In Chapter 2, I discuss the results of previous studies related to teachers' knowledge, attitudes, and beliefs about food allergies. I also present gaps in the literature and discuss the relationship between food allergies and the role of teachers or school staff in managing allergic reactions in the school setting. I also present literature addressing the correlation between the DV of teachers' confidence in implementing food allergy emergency plans and the IVs of (a) teachers' confidence in their ability to care for students with food allergies, (b) their level of training or experience in caring for students with food allergies, and (c) their knowledge of food allergies.

Literature Search Strategy

To illustrate the need for this study, the reviewed articles were pertinent to the topic under investigation. The articles, all of which have been published within the last 2 decades, came from several databases: Medline and PubMed databases through the U.S. National Library of Medicine (National Institutes of Health). To find relevant literature, I used the following search terms: *food allergy (wheat, dairy, fish, peanut or tree nut, and soy)*; *children with food allergies*; *food allergy emergency plan*; *food allergy action plan*; *teachers' ability to implement*; *caring for children with food allergies in a school setting*; *assessing teachers' implementing allergy emergency plans*; *teachers' confidence related to food allergy*; and *teachers' knowledge of food allergies*, *caring for students with food allergies, confidence of teachers, food allergy caring for students, courage caring for student food allergies*, and *school staff knowledge of food allergy*. To further extend research information, search variations included specific names (e.g., *angioedema*, *immunology*, *antigen*, and *antihistamine*). The results of the search terms showed that previous studies were human observational trials first and clinical trials second, with prospective results related to allergic reactions. These full-text articles were located in specific journal websites at Walden Library and Northwestern University School of Medicine Institute of Healthcare Studies.

Theoretical Foundation

As previously stated, self-efficacy theory, according to Bandura's (1977 1988, 1989a, 1989b, 2001a, 2001b) SCT, was the framework that guided my study. The reciprocal interactions that occurred among specific behavioral, cognitive, and

environmental factors determine behaviors, and confidence in the ability to perform a behavior are strongly related to behavioral change and maintenance (Bandura, 1977, 1988, 1989a, 1989b, 2001a, 2001b). According to Bandura (1977, 1988, 1989a, 1989b, 2001a, 2001b), goals, the effort applied to these goals, perseverance in difficult times, and the amount of stress that people experience are all the direct result of self-efficacy beliefs.

The constructs of the SCT guided this study. The theoretical framework of SCT helped to explain teachers' behaviors related to food-based allergic reactions, self-efficacy, beliefs about food allergy outcomes, and levels of knowledge related to food-based allergic reactions in the school setting (Bandura, 1991; Schunk & Pajares, 2002). Using the SCT model as the construct for this study helped to explain human behaviors and how individuals react when performing certain tasks (Fertman & Primack, 2009). The foundation of moral behavior reflects individuals' competence and explains their capacity to perform particular tasks (Bandura, 1991; Schunk & Pajares, 2002). Bandura (1977, 1988, 1989, 1997, 2001) believed that changes in moral behaviors can offset individuals' abilities and competence, emphasizing the cognitive courses of action affecting their self-beliefs (Schunk & Pajares, 2002). In addition, individuals can change their self-beliefs or behaviors by acquiring knowledge that can revise their beliefs about consequences, positive social influences, positive emotions, and acquisition of abilities to address problems (Frances, O'Conner, & Curran, 2012).

The SCT helped me to determine whether a relationship existed between teachers' self-efficacy when implementing food allergy emergency plans (DV) and their

confidence in their ability to care for children with food allergies, their level of training and experience, and their knowledge of food allergies (IVs). For the first IV, I followed the rationale that self-efficacy refers to the ability to perform a task (Fertman & Primack, 2009). Self-efficacy is the view that individuals have about themselves and their perceptions, knowledge, skills, and ability (Bandura, 1986). Self-efficacy transpires through boundaries that influence decision making when pressured (Feger & Arruda, 2008; Fertman & Primack, 2009). Ultimately, self-efficacy gave the teachers the confidence needed to implement food allergy emergency plans by ensuring poise in behaviors and tasks, clear thinking, and motivation for positive behavior outcomes (Bandura, 1977; Tschannen-Moran & Woolfolk-Hoy, 2001).

The outcome expectancy, the second IV, refers to teachers' confidence in their ability to care for students with food allergies. It is the value or consequence of behavioral choices that anticipates a particular occurrence in the future, thereby preparing an individual for the event (Bandura, 1988, 2001b). Influenced by self-efficacy, outcome expectancy influences goals are used to perform particular behaviors by visualizing the outcome (Anderson-Bill, Winett, Wojcik, & Williams, 2011; Bandura, 1986, 1997). Lastly, the third IV, teachers' knowledge of food allergies, refers to behavioral capabilities related to obtaining knowledge and skills necessary to perform specific behaviors. It involves training in order to achieve the desired constructive outcome (Feger & Arruda, 2008; see Figure 1).

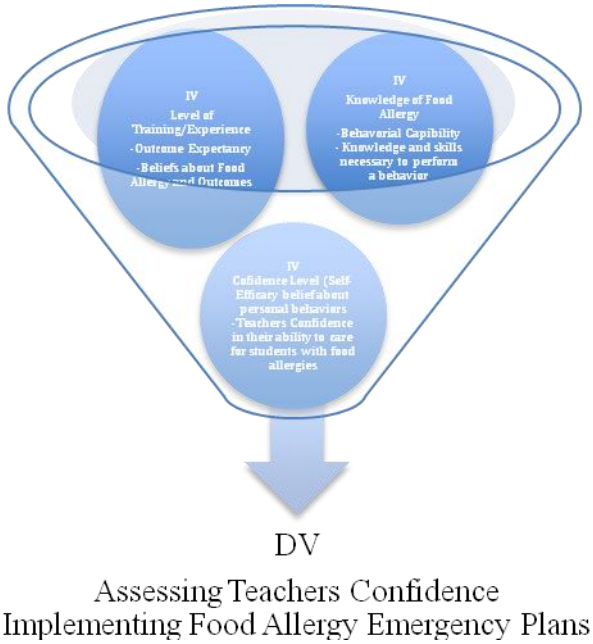

Figure 1. DV and IVs.

Literature Review Related to Key Variables and Concepts

I conducted a lengthy search for relevant literature using the search terms mentioned earlier, but I was unsuccessful in locating a significant database with articles specifically addressing RQ1, teachers' confidence in their ability to care for students with food allergies. However, several articles in support of the need for this study identified a problem with food allergy emergency plans not being available, teachers' responses to allergic reactions, and self-efficacy transpiring through boundaries that influence decision making (Feger & Arruda, 2008; Fertman & Primack, 2009). Studies by S. Shah, Parker, and Davis (2013); Sicherer et al. (2001); and Weiss, Munoz-Furlong, Furlong, and Arbit (2004) revealed that students experiencing allergic reactions at school seemed to be a problem because teachers were hesitant to respond to them. This lack of confidence stemmed from food allergy emergency plans not being accessible and being locked in the

nurse's office, and the nurse not being at the school every day (S. Shah et al., 2013; Sicherer et al., 2001; Weiss et al., 2004). To create confidence in teachers who are caring for students with food allergies, food allergy emergency plans should be available for continual review when needed for follow-up regarding food allergies, and teachers should be able to implement food allergy emergency plans quickly (Weiss et al., 2004).

Further articles on teachers' confidence in their ability to care for students with food allergies reveal that self-efficacy can create confidence. Increasing individuals' self-efficacy can increase their ability to perform by ensuring poise in behaviors and tasks, clear thinking, and motivation for positive behavior outcomes (Bandura, 1977; Tschannen-Moran & Woolfolk-Hoy, 2001). Teachers' development of confidence in their ability to care for students with food allergies can, as Bandura (1988, 1989a, 1997, 2001a) stated, make them competent in performing particular skills by learning about the tasks. As knowledge is gained, confidence grows, and the individuals become more successful in performing the task without hindrance (Bandura, 1988, 1989a, 1997, 2001a).

The four articles related to RQ2, teachers' level of training or experience caring for students with food allergies, not only supported the need for this study but also highlighted deficiencies in teachers' level of training or experience related to caring for students with food allergy. These articles identified the alarming concerns among teachers that they had little to no training or experience caring for students with food allergies; received no continual or updated training; and found food allergy emergency plans inadequate or nonexistent, making it impossible for teachers to implement the plans

properly (Gever, 2008; Sicherer et al., 2003). Weiss et al. (2004) noted that because teachers are the first responders, they should be ready with confidence to respond to children's allergic reactions. More details are described in the sections documenting inadequate or nonexistant food allergy emergency plans and who should understand food allergy emergency plans.

Other articles related to RQ2 showed that because teachers were untrained or lacked the education or training needed to recognize food allergic reactions, there were often delays in responding to students experiencing an allergic reactions (Sicherer, 2002). With the disparities related to delays by first responders, researchers have identified the need for schools to train and educate teachers to ensure that they understand the purpose and process in implementing food allergy emergency plans (Sicherer, 2002; Weiss et al., 2004). Examples of mortality caused by delays of first responders (i.e., potentially, teachers in the classroom) or the failure of teachers to recognize food allergic reactions as the result of being untrained or lacking the level of education/training needed to implement food allergy emergency plans are described in the Global Concerns of Food Allergies at School section.

I was able to find seven articles related to RQ3, teachers' knowledge of food allergies that explained that as knowledge of a subject increases, confidence and the ability to perform a specific task without hindrance increases (Gever, 2008; Moneret-Vautrin et al., 2001; Powers et al., 2007; Sicherer et al., 2003). According to S. Shah et al. (2011), education can significantly increase teachers' knowledge of food allergy causes, symptoms, and treatment of food allergic reactions in the school setting.

Teachers' knowledge of food allergies also can help to identify allergens elsewhere in the school (S. Shah et al., 2013). Most schools do not have a lot of money, so they take cost-saving measures like storing crayons in old peanut butter jars and containers (Kalb, 2007). Previous studies have reported on teachers' limited knowledge about food allergies and anaphylaxis, and the need for a thorough educational program for teachers when the school nurse is not available (Polloni, Lazzarotto, Toniolo, Ducolin, & Muraro, 2013). Having adequately trained school staff members, especially teachers, is crucial to significantly reducing food allergy emergencies and fatal allergic reactions (Polloni et al., 2013). According to Polloni et al. (2013), teachers in their study not only lacked knowledge and understanding of food allergy emergency plans but also emphasized the need for specific educational interventions and enhancements for schools to deal with allergic reactions and ensure students' safety and well-being.

Understanding Food Allergy Emergency Plans

Children With Food Allergies

Children with food allergies must recognize and understand the symptoms in order to be able to tell others when they are having allergic reactions (Bock, Munoz-Furlong, & Sampson, 2007). When children understand their food allergies, they know how to read and understand food labels, wear medical jewelry, know proper hand-washing techniques, know how to self-administer EpiPens, and know how to communicate with peers about their allergies (Bock et al., 2007). Although most children diagnosed with food allergies understand their allergies, research has shown that only 50% carry an EpiPen only when they feel at risk of having allergic reactions (Monks et

al., 2010). Monks et al. (2010) founded that most children reported being uninformed when responding to or treating their allergic reaction. Children with food allergies reported they would feel much better if they were educated about the critical outcomes of food allergies (Monks et al., 2010).

A multitude of strengths exist regarding children with food allergies knowing about their allergies and knowing how to prevent allergic reactions (Monks et al., 2010). For example, they can share with their friends the symptoms of food allergic reactions, enabling friends to assist when something happens. The students and/or friends can assist with reading labels and informing someone when they suspect that an allergen has been ingested. However, most children are embarrassed that they have food allergies and do not tell their friends or classmates (Bock et al., 2007).

Health Care Staff

Because of the increase in the number of students with chronic health care issues, it has become essential to have health care professionals (registered nurses, licensed practical nurses, etc.) in the school to plan, implement, and monitor health care plans for students adequately (Peterson & Wolfe, 2006). The best way for schools to manage chronic illnesses such as food allergies and allergy-induced anaphylaxis effectively is to have a nurse available on site at all times (Robinson & Ficca, 2012). School nurses can help to develop individualized health care plans for students with food allergies (Robinson & Ficca, 2012), and they should serve as the first source of health care management in the school as well as act as a source of information available to teach students about their allergens, proper avoidance, and what to do when experiencing an

allergic reaction (Murray et al., 2008). Nurses can develop food allergy teaching materials and train other school staff members about food allergy prevention and important first-responder techniques such as how to quickly obtain and use EpiPens to prevent fatal allergic reactions (Weiss et al., 2004).

A review of some studies identified the advantages of having nurses available in the school setting, but a review of other studies identified weaknesses related to nurses and the development of food allergy emergency plans (Carlisle et al., 2010). Even though nurses frequently are responsible for educating other school staff members and developing food allergy emergency plans, some nurses sometimes fail to set up a system for banning allergy-causing foods and are not present on field trips, thereby increasing the potential for fatalities related to food allergies (Carlisle et al., 2010). Nurses in Carlisle et al.'s (2010) study discussed the need for more professional material related to food allergies because they did not have access to resources to perform their roles proficiently. In the most extreme cases, schools still reported fatalities related to anaphylactic shock, despite having nurses on staff (Sampson, Mendelson, & Rosen, 1992).

Having a nurse on site means increasing the confidence of staff members, particularly when assisting children with chronic illnesses; response time also is faster. A nurse at the school would eliminate some health barriers and decrease the overall time that other school staff members spend responding to health care issues (Baisch, Lundeen, & Murphy, 2011).

Nonhealth Staff Members' Knowledge of Food Allergies

Most public schools have nurses available in the building at least 45% of the week, but because of budget cuts, nurses have had to cover many schools in a district (Robinson & Ficca, 2012). According to a report by the NSBA (2011), nurses were not available but had trained or provided training material to other staff members on the symptoms of allergic reactions. School staff members reported a wide array of barriers that caused delays in administering medications, including not being comfortable with the unavailability of school nurses, not having a stock of EpiPens on hand, lacking policies and guidelines, not receiving funds for training and medications, and lacking education about food allergies (Morris, Baker, Belot, & Edwards, 2011). Staff also have reported that although they had some training by a nurse, fatalities still occurred because of uncertainty regarding medication administration techniques (Job, Gardner, Ong, & Noimark, 2011). Despite the fact that training was provided on how to administer an EpiPen, school staff members reported that only 65% of the schools provided continual or annual updated training relating to accessibility of food allergy emergency plans (Job et al., 2011).

The NSBA (2011) identified the need to educate school staff members with training on ways to immediately access and administer emergency EpiPens, as well as read labels thoroughly. The recommendation was that schools not only train all staff members to recognize allergic reaction symptoms but also to respond immediately, with instructions posted throughout schools on ways to access emergency medical services (NSBA, 2011). An evaluation of school staff members revealed that schools provided

little to no training for teachers and other school staff members on responding to students experiencing allergic reactions (NSBA, 2011).

School staff members and teachers have reported limited training related to food allergy emergency plans because they had to develop their own ideas regarding how to manage allergic reactions and felt uncomfortable with the responsibility (Ercan, Ozen, Karatepe, Berber, & Cengilizer, 2012). School staff members expressed the desire for more training; in particular, they wanted step-by-step instructions on ways to respond to students experiencing allergic reactions (Moneret-Vautrin et al., 2001). Ultimately, school staff members identified that a lack of knowledge and experience in their ability to recognize food allergy reactions, coupled with the lack of training, only exacerbated their feelings of discomfort (Garcia, 2009; Gaudreau, 2000; Munoz-Furlong, 2004a).

Parent-School Communication About Food Allergies

Part of teachers' inability to implement food allergy emergency plans can initially lie with the parents. Not keeping the lines of communication open, not making it a habit to visit teachers to discuss their children's food allergies, and failing to learn their children's daily school schedule are parental actions that can hinder the efforts of teachers to deal with food allergies in the school environment effectively (Bock et al., 2007).

Sicherer and Mahr (2010) asserted that the outcomes for children with food allergies are better when parents are sure that all school staff members, especially teachers, understand their children's food allergies. To keep the lines of communication open, parents of children with food allergies should inform schools about the allergies;

provide them with a list of allergy-causing foods; and make personal food allergy emergency plans available to guide school staff members, especially teachers (Sicherer & Mahr, 2010).

Despite their efforts, some parents have reported that when they did provide schools with information about their children's food allergies, they still felt that the schools needed policies to train staff about food allergies because staff members do not take the allergies serious (Gupta et al., 2010). Food allergy emergency plans should be prepared by and with the parents (Bock et al., 2007; Munoz-Furlong, 2004a). Parents should first review the food allergy emergency plans to guarantee that they include all necessary information, such as specific food allergies, previous history of food allergies, whether an EpiPen is provided, other documented allergy prevention medications, and important contact information (Bock et al., 2007; Young et al., 2009).

There have been hindrances associated with teachers developing food allergy emergency plans with parental input largely because of the lack of parental knowledge about food allergies and parents not thinking realistically (Gupta et al., 2009b). The overall problem, according to Gupta et al. (2009b) is that some parents do not provide sufficient information to develop adequate food allergy emergency plans because parents believe that teachers and school staff members should know more about their children's food allergies than they actually do.

Physical Education Staff

Teachers and staff responsible for physical education or recess must receive training to recognize and respond to exercise-induced anaphylaxis and anaphylaxis

caused by allergens. With food-dependent, exercise-induced anaphylaxis, reactions occur only if physical activity is within a few hours after eating specific foods (Maulitz, Pratt, & Schocket, 1979). Although allergy prevention medications are not maintained in the gym, physical education teachers should understand and know how to implement food allergy emergency plans (Morita et al., 2009; Soyer & Sekerel, 2008). Physical education is an important part of children's education experience, so physical education teachers need to be aware that exercise-induced anaphylaxis, although rare, exists in various forms of physical activity (Aihara et al., 2001; Morita et al., 2009). The symptoms can include flushing, wheezing, nausea, abdominal cramping, and diarrhea; however, once exercise stops, the symptoms improve immediately (Aihara et al., 2001; Morita et al., 2009).

In some cases, because eating food prior to exercise will increase the chances of exercise-induced anaphylaxis, consumption of the food allergens should be avoided for up to 12 hours before engaging in exercise (Soyer & Sekerel, 2008). Individuals also should avoid exercising in extreme humidity and hot temperatures or during allergy season (Morita et al., 2009; Soyer & Sekerel, 2008).

Students with exercise-induced anaphylaxis should wear bracelets or some form of identification to alert school staff of the allergies and have an emergency supply of EpiPens available; schools also should have anaphylaxis management plans in effect (Simons, 2009). Because physical education or exercise can precipitate allergic reactions, all school staff should be trained to recognize the symptoms of allergic reactions (Simons, 2009). Simons (2009) also suggested that physical education staff have walkie-talkies, cell phones, or similar communication devices on hand for emergency contact

(Morita et al., 2009; Soyer & Sekerel, 2008).

Allergens Elsewhere in the School

The Environment

Children with food allergies can have reactions, regardless of location and food consumption. Allergens are present throughout the entire school building and are not just limited to the cafeteria. Allergens can be anywhere in the environment, so food allergy emergency plans should be specific to the allergies and list examples of the onset of allergic reactions (Perry, Conover-Walker, Pomes, Chapman, & Wood, 2004). Parents, teachers, and school administrators need to understand the school environment covers a vast area and can include desks, tabletops, chairs, doorknobs, walls, and even students' hands. These surfaces need to be cleaned thoroughly, especially after events such as bake sales, classroom arts and crafts, and snacks consumed outside of the cafeteria (Gold & Sainsbury, 2000; McIntyre et al., 2005; Sampson et al., 1992). Cleaning the environment after events is important, and the frequent use of common cleaning agents can eliminate allergens from the environment (Perry et al., 2004).

Parents of children with food allergies fear the school environment because of unforeseen environmental factors that might adversely affect the children (Leo & Clark, 2007). For example, schools often store crayons in old peanut butter jars, thus contaminating learning materials; use egg-based paints for activities; regularly stock chalk that is made with milk; and offered microwave popcorn containing such items as milk, eggs, and fish as a snack (Kalb, 2007). Physicians, parents, and school staff need to monitor the school environment by working together to develop and implement food

allergy emergency plans that not only identify students with respective food allergies but also provide awareness and prevention of specific environmental allergies (Leo & Clark, 2007).

The school environment can significantly influence the health outcomes of students with food allergies (Gaudreau, 2000). Therefore, changes in the classroom routine, the close monitoring of students with food allergies during special events such as field trips and extracurricular activities, and modified cleaning routines in the classroom can lead to better outcomes (Gaudreau, 2000). The aforementioned factors can affect the school environment, especially if school staff are not properly trained to read labels, identify and prevent allergic reactions, and properly clean surfaces to be sure that they are free of traces of the allergens (Gaudreau, 2000).

Cafeteria Preparation

Kilar (2012) discussed the importance of food allergies in the school cafeteria by reporting on the case of a 5-year-old student in Frederick, Maryland who nearly succumbed to anaphylaxis after eating a peanut butter sandwich at school. The student, who was offered a "credit lunch," a lunch subsidized federal funds, informed the cafeteria worker that she was not allowed to eat peanut butter (Kilar, 2012). The cafeteria worker, who believed that the student was being insolent, told the 5-year-old to eat the sandwich. She immediately went into anaphylactic shock but received an injection of epinephrine before being taken to the hospital (Kilar, 2012).

Eating in the cafeteria can be stressful for children with food allergies because of hidden allergens, cross-contamination of foods, and allergens left on the surfaces of

tables (Abbot, Byrd-Bredbenner, & Grasso, 2007). Cafeteria workers have an important role in food allergy management, but research has shown that cafeteria workers have no diet information about the children with food allergies and do not take precautions in preventing allergic reactions (Imani, 2005). Cafeteria workers need to be careful when preparing meals for children with food allergies (Schaefer, 2011). This means not using utensils repeatedly, offering special meals to children with food allergies at no additional costs, and substituting or modifying meals for students with food allergies (Schaefer, 2011). To ease the stress of food allergies, teachers should be proactive and ask parents for lists of allergens that need to be avoided (Schaefer, 2011). In addition, cafeteria workers need to be made aware of children with food allergies, informed on how to read labels carefully, designate an allergy-free work zone, and designate a cleaning person who will be responsible to ensure that cafeteria tables and nearby areas are thoroughly cleansed (Schaefer, 2011).

Adequate Policies

Inadequate Food Allergy Policies

It is imperative that schools develop policies to guide all staff members regarding the prevention of accidental exposure to food allergens. The policies also should provide direction regarding ways to respond to food-based allergic reactions (Sheetz et al., 2004). A review of the policies and guidelines developed by national school agencies have revealed that food allergy guidelines cater specifically to the responsibilities of schools, parents, and students. The guidelines, however, provide no in-depth specifications related to school staff members' knowledge and confidence in implementing food allergy

emergency plans. Neporent (2011) suggested that the ultimate reason for wanting schools to have policies and guidelines is that such implementation can be a life-saving document for schools on ways to handle food allergies. Some schools that have implemented the guidelines and national policies have taken them to the extreme; the documents have been bothersome and have consumed a large portion of the workday (Neporent, 2011).

ADA Section 504 Plan

Children with food allergies are protected under the Americans with Disability Act (ADA), which requires schools to develop food allergy and anaphylaxis emergency plans addressing Section 504 plan of the Rehabilitation Act of 1973 (Sicherer & Mahr, 2010). The NSBA (2011) suggested that all schools develop policy guidelines according to Section 504 to prevent food-based allergic anaphylaxis and provide instructions on ways to handle medical emergencies.

The policies and guidelines set forth under Section 504 direct school districts to create guidelines for each school in the district to follow as soon as the school becomes aware that some children have food allergies (Pohlman, Schwab, & Moses, 2005). The law states that each employee of a private or a public school district that performs health care services must be able to perform specific services related to the health care issues (Pohlman et al., 2005).

Section 504 of the Civil Rights Law section of the Rehabilitation Act of 1973 states that it is the duty of all public school districts to provide free and appropriate public education services for students with disabilities (Pohlman et al., 2005). Under Section 504, life-threatening food allergies classify individuals as disabled and protects them

from discrimination; the law requires schools to provide appropriate health care and emergency medical services (Pohlman et al., 2005). If schools have sufficient food allergy policies in place, children with food allergies are not prohibited from participating in the majority of school-related extracurricular activities, and Section 504 does not have to be in place (Pohlman et al., 2005). A sufficient food allergy policy should cover such important issues as (a) where the medication is stored; (b) health care records and where those records are filed; (c) which members of staff, including substitutes, are trained; (d) where students will eat snacks and who will be responsible for thoroughly cleaning those areas; and (e) food policies for buses, field trips, and afterschool activities (Pohlman et al., 2005).

According to the U.S. Department of Agriculture, schools that receive federal funding are required to establish food allergy policies and guidelines according to the standards of the Americans with Disabilities Act, the Individuals with Disabilities Education Act, Section 504 (Disability Act), the Family Educational Rights Privacy Act, and other state laws or district policies (as cited in Bock et al., 2007). The guidelines of the ADA suggest that teachers have continuous interactions with children with food allergies so that they can recognize the symptoms and know when to react in emergencies (as cited in Pohlman et al., 2005). Pohlman et al. (2005) suggested school staff members, mainly teachers, “try to eliminate all known food allergens in the child’s meal, arts and crafts, educational tools, and school activities” (p. 137). The guidelines suggest that school staff continually practice implementing food allergy emergency plans (Bock et al., 2007).

Another suggestion is that medical information about children with food allergies be in accordance with policies and guidelines set forth by federal, state, and district laws and regulations (Bock et al., 2007). Finally, schools should enforce food policies on school buses, develop strategies appropriate for managing food allergies on field trips, and ensure that children with food allergies are not harassed or bullied (Sicherer & Mahr, 2010).

State Department of Education Food Allergy Guidelines

Efforts to Reduce Barriers

According to the CDC (2013), guidelines were set up to manage food allergies in schools, promote policies in schools, and improve current policies. However, the guidelines were strictly volunteer based, so not every state had food allergy policies and guidelines. The following states have published statewide food allergy guidelines or developed regulations related to food allergies: Illinois, Georgia, Massachusetts, Virginia, and North Carolina.

Illinois State Guidelines

In 2011, the Illinois State Board of Education, along with the Illinois Department of Public Health, believed that schools were high-risk places for children with food allergies. Illinois subsequently developed guidelines for managing food allergies in schools, passing a state law that required each school board to develop a policy that (a) gave special consideration to children with food allergies (Section 504), (b) provided experts to train school personnel every 2 years, (c) implemented periodic emergency drills responding to food allergic reactions, and (d) developed guidelines and checklists

for parents and school personnel regarding activities inside and outside of the classroom. The Illinois guidelines also stated that school personnel should recognize food allergic reactions as documented in children's individualized food allergy and anaphylaxis emergency plans.

Georgia State Guidelines

The National State Board of Education State Schools Healthy Policy database found that Georgia had an active organization known as the Food Allergy Kids of Atlanta, Inc.; the organization was composed of four medical pediatric allergy/immunology specialists and one allergy/immunology internal medicine physician. Sponsors such as the FAAN, Namaste Foods, Sun-butter, and the Enjoy Life Eat Freely recommended that schools in Georgia set up policies and procedures according to the national guidelines established by the NSBA (2011). The Food Allergy Kids of Atlanta, Inc. was working with state legislators to develop guidelines.

The adoption of Georgia State General Assembly House Bill 227 in July 2011 allowed all school staff to administer an EpiPen to a child experiencing a food-based allergic reaction, even if there was no order from the child's physician for the injection. The bill also allowed students to carry and self-administer their own EpiPens. Bill 227 also required the state board to develop policies that trained school staff to administer autoinjectors to students experiencing allergic reactions. The goal of this bill was for schools to have a supply of autoinjectors ready and available at all times.

Massachusetts State Guidelines

The Massachusetts Department of Public Health (2010) developed a document outlining the management of life-threatening food allergies in the school setting. In addition, the Massachusetts State Government created a document in 2010 that included important aspects related to food allergy management and prevention in schools. The protocol specified that schools who had children with food allergies had to develop food allergy and anaphylaxis emergency plans and that each plan had to include an implementation process for school staff to follow (Massachusetts State Government, 2010). The components of the plan addressed what to do when allergic reactions occurred in the classroom; the gym; during art and crafts; during mathematics projects; during outdoor activities; in the cafeteria, on field trips (i.e., before and after regular school hours); in afterschool activities, and on the school bus (Massachusetts State Government, 2010).

Other guidelines of the protocol included a special emergency response process for school staff to (a) notify the school nurse, emergency medical services, parents or guardians, school administration, and primary provider; (b) administer epinephrine; (c) attend to classmates; (d) manage crowd control for the entrance of emergency responders; and (e) practice drills (Massachusetts State Government, 2010). The state gave specific guidelines regarding locations in schools where students might encounter allergens. However, unlike Illinois, guidelines were not specific as to where allergy prevention medication would be kept (Massachusetts State Government, 2010).

Virginia State Guidelines

Virginia had no guidelines for food allergies, but it still required the local school board to implement policies for EpiPen use. Virginia's guidelines allowed staff members (i.e., teachers, coaches, food service, etc.) and school nurses to administer allergy prevention medications to students experiencing allergic reactions (Gregory, 2012).

In support of making school environments safe for children with food allergies, Virginia developed guidelines for schools to follow when creating food allergy and anaphylaxis emergency plans. The Virginia Tech Cooperative Extension schools suggested that schools follow the same guidelines as those developed by the FAAN (Villalba, Boyer, & McKinney, 2010). The Cooperative Extension said that the FAAN guidelines created in 2007 required families, school staff members, and students to be responsible and play a role in preventing food-based allergic reactions at school while holding schools responsible for educating and training staff. The Cooperative Extension did make suggestions about allergy-free areas in the cafeteria, the elimination of food allergens on educational tools and arts and crafts projects, and the extent to which these accommodations should serve children diagnosed with food allergies (Villalba et al., 2010). Other researchers have reported that some schools in Virginia had developed their own food allergy and anaphylaxis emergency plans without the existence of state guidelines (Villalba et al., 2010).

North Carolina State Guidelines

North Carolina does not have statewide guidelines for schools to supervise children with food allergies, but the North Carolina Healthy Schools (2011) has

suggested that schools individually follow the guidelines developed by the FAAN. North Carolina developed its own guidelines according to those published by the Asthma and Allergy Foundation of America. North Carolina was awarded the Asthma and Allergy Foundation of American state honor roll for meeting 13 of the 18 suggested guidelines established by the foundation (FAAN, 2012). To assist with food allergy concerns, on April 19, 2011, the General Assembly of North Carolina (GANC) published House Bill 617, which required the legislative research commission to study the implementation of federal food allergy and anaphylaxis emergency guidelines in public schools. Articles in the bill reported that the Department of Agriculture, the U.S. Department of Transportation, and the U.S. Department of Education recognized food allergies as a disability eligible for Civil Rights (Rehabilitation Act 1972, Section 504). Schools were then required to develop food allergy emergency plans. Even though this act has been implemented, a lack of consistent training guidelines at the state and federal levels remains (GANC, 2011).

Global Concerns of Food Allergies at School

The United States

Several deficiencies exist in school districts, particularly among teachers acting as first responders, in failing to recognize and deal with food-based allergic reactions. These inadequacies have hindered teachers from providing a quick and appropriate allergy prevention medications (Young et al., 2009).

A review of newspaper articles found several reports of fatalities involving school-age children with food allergies (Ahmed-Ullah, 2010; Bowes, 2012). The reports

noted that the children went into anaphylactic shock at school as the result of contact with food allergens; in some cases, the children died. A 7-year-old child from a Chesterfield, Virginia, elementary school died from anaphylactic shock resulting from the consumption of a peanut allergen while on the school playground (Bowes, 2012). Although school staff were aware that the child had food allergies, they did not administer medication because the child's parents had not provides the school with the medication (Bowes, 2012). Bowes (2012) also reported that the school had an individualized allergy emergency plan on file for the child, which required the parents to supply allergy prevention medications. As a result of this incident, Virginia changed its laws, requiring schools to stock EpiPens at all times.

A similar report by Ahmed-Ullah (2010) revealed that in December 2010, a 13-year-old student died of anaphylactic shock after consuming food cooked in peanut oil. The food, which was contaminated with peanut allergens, was ordered at a restaurant near the student's school for a class celebration, despite the teacher's request that the foods not contain any peanuts or be cooked in peanut oil (Ahmed-Ullah, 2010). The school had a food allergy emergency plan available, and although staff members followed the plan, they did not attempt to administer the medication to stop the allergic reaction because of clinical requirements limiting their actions (Ahmed-Ullah, 2010). These requirements stated that an EpiPen was to be used only if the student's name was on the EpiPen prescription (Ahmed-Ullah, 2010).

Outside the United States

Researchers have discussed global concerns regarding food allergies in the school setting. Food allergies in children in the United Kingdom rose dramatically between 2004 and 2014, much to the confusion of experts and laypeople (Turner & Boyle, 2014). Turner and Boyle (2014) stated that in the United Kingdom alone, an estimated 7% of the children have food allergies and that one third of allergic reactions occur at school. They also noted that in the past 10 years, hospital admissions related to anaphylactic shock have increased sevenfold. Based on the results of Tuner and Boyle's study in the United Kingdom, the government recommended that schools develop policies to ensure that school staff are trained to identify food-based allergic reactions, locate medications to stop allergic reactions, and build experience administering EpiPens in emergency situations.

The United Kingdom, similar to the United States, has found that teachers acting as first responders do not know what to do if children have allergic reactions at school (Watura, 2002). Implementation of individualized food allergy emergency plans is key to preventing food-based allergic reactions at school (Moneret-Vautrin et al., 2001). It is crucial to have food allergy emergency plans in place, and staff members, especially teachers, who often are the first responders, should review the plans and know how to implement them (Moneret-Vautrin et al., 2001).

A school system in Australia reported that 40% of schools with children diagnosed with food allergies had EpiPens and food allergy emergency plans in place (Gold & Sainsbury, 2000). However, the remaining 60% of schools did not have food

allergy emergency plans; the administrators of these schools identified a serious need to train school staff members, especially teachers, to understand the potentially dangerous circumstances related to allergic reactions (Cicutto et al., 2012).

According to Cicutto et al. (2012), the majority of Canadian schools had not trained teachers to respond to allergic reactions, something that was discovered during the process of approving and passing Sabrina's Law by the government of Ontario. Sabrina's Law was based on the case of a 13-year-old student who went into anaphylactic shock and later died after being served French fries at her school cafeteria that had been cross-contaminated with dairy protein. After the law passed, the provincial government required schools to develop emergency procedures for staff members to respond to children with food allergies. The emergency procedures required schools to implement individualized food allergy emergency plans for children and provide training for staff regarding ways to deal effectively with food allergies on a regular basis and administer EpiPens.

Food Allergy Labeling Laws

Vending machines in schools are popular, making it difficult for teachers to prevent students with food allergies from obtaining foods from such machines. Knowing how to implement food allergy emergency plans will help to identify allergic reactions and ensure rapid responses (Sneed, Rothstein, McElmurray, & Hormel, 2004). In addition, the Food Allergen Labeling and Consumer Protection Act (FALCPA; Public Law 108-282, Title II; as cited in Thompson, Kane, & Hager, 2006) requires that foods processed and sold for retail purposes list the following eight major allergies: milk, egg,

fish, shellfish, tree nuts, wheat, peanuts, and soybeans. This law also includes other items that could possibly contain allergens, such as added flavors, colors, additives, gluten, cosmetics, health, art supplies, paints, and beauty aids that people often view as harmless (as cited in Thompson et al., 2006). According to FALCPA, the labels must print the common use of the allergen name in the list of ingredients; fresh vegetables and fruits were excluded from this law (Thompson et al., 2006).

A law similar to this, the Patient Protection and Affordable Care Act, required vending machine owners to post warning labels on the machines that list possible allergens found in foods supplied in each machine (as cited in Thompson et al., 2006). This law is not specific to schools with allergic students; instead, it requires the owners or operators of vending machine services to comply with the regulations (Thompson et al., 2006). Other than the FALCPA, no information or documented research related to vending machines, children with food allergies, or requirements to label vending for people with food allergies was found.

Limitations of Literature Reviewed

The review of current literature revealed gaps in relation to teachers' understanding of food allergy emergency plans. Given that food allergies are becoming more common in the educational setting and have the potential to develop into life-threatening food allergy reactions and anaphylaxis, the need for additional research became evident. Through this study, I attempted to address these gaps by providing valuable information that will be of great benefit to educators worldwide. By filling the gaps in the literature, this study adds to the database that educators can search to increase

their own understanding of food allergies and food allergy emergency plans in the school setting.

Summary

Food allergies in children are increasing. One of every 25 children in the United States is believed to have a food allergy, with many of these children experiencing anaphylactic shock in the school environment that sometimes results in death (Branum & Lukacs, 2009). Teachers, parents, and other school staff should work together to keep children safe at school; however, teachers carry the heaviest burden of ensuring safety in the classroom. To create a safe environment for children with food allergies, it is imperative that teachers know how to implement individualized food allergy emergency plans and obtain updated training frequently (Ercan et al., 2012; Sicherer et al., 2001). The goal of this study was to initiate progress in reducing the number of fatalities related to children's reactions to food allergies in the school setting. To assist with this goal, I used the SCT as the theoretical framework of this study. Chapter 3 presents a discussion of the study design and methodology. I will discuss the participants, setting, and apparatus relative to confidence, knowledge, attitudes, beliefs, and training and experience. Chapter 3 also details the ethics of the study, possible risks to the participants, data collection and analysis, and consent protocol.

Chapter 3: Methodology

Introduction

Chapter 3 outlines the methodology of the study. This chapter details the purpose of the study and describes the research design, sample, and data collection instrument. The chapter concludes with a discussion of the ethical issues and the ways in which they were addressed. The purpose of this quantitative study was to describe the effect of teachers' knowledge, training, and confidence in their implementation of food allergy emergency plans in the school setting. McIntyre et al. (2005) noted that four of every six deaths related to food allergies occur when the children are at school.

Research Design and Rationale

The instrument obtained for this study included four sections covering demographics, confidence, and training, with section topics focusing on teachers' knowledge about food allergies as well as attitudes and beliefs about food allergy outcomes affecting teachers working with students in Pre-K to Grade 8.

Research Questions and Hypotheses

The study was guided by three RQs and hypotheses:

RQ1: Is there a relationship between teachers' confidence in implementing food allergy emergency plans and teachers' confidence in their ability to care for students with food allergies?

H_{01}: There is no relationship between teachers' confidence in implementing food allergy emergency plans and teachers' confidence in their ability to care for students with food allergies.

H_{a1}: There is a relationship between teachers' confidence in implementing food allergy emergency plans and teachers' confidence in their ability to care for students with food allergies.

RQ2: Is there a relationship between teachers' confidence in implementing food allergy emergency plans and teachers' level of training or experience in caring for students with food allergies?

H_{02}: There is no relationship between teachers' confidence in implementing food allergy emergency plans and teachers' level of training or experience in caring for students with food allergies.

H_{a2}: There is a relationship between teachers' confidence in implementing food allergy emergency plans and teachers' level of training or experience in caring for students with food allergies.

RQ3: Is there a relationship between teachers' confidence in implementing food allergy emergency plans and teachers' knowledge of food allergies?

H_{03}: There is no relationship between teachers' confidence in implementing food allergy emergency plans and teachers' knowledge of food allergies.

H_{a3}: There is a relationship between teachers' confidence in implementing food allergy emergency plans and teachers' knowledge of food allergies.

Design

The purpose of this study was to determine whether an association existed between the DV of teachers' confidence in implementing food allergy emergency plans and the IVs of teachers' confidence in their ability to care for children with food allergies,

teachers' level of training or experience caring for children with food allergies, and teachers' knowledge of food allergies. Although most schools have food allergy plans in place, some teachers lack knowledge related to food allergic reactions, inhibiting their ability to implement food allergy emergency plans (Sicherer & Mahr, 2010). This lack of preparedness includes treatment delays that can result in negative health outcomes for students (Sicherer & Mahr, 2010).

This study followed a quantitative, correlational survey design that allowed me to collect statistical data to determine whether a relationship existed between the DV and the IVs. A quantitative research method was preferred for this study because it allowed me to collect data and identify relationships and distributions of variables as they occurred in their natural setting (Creswell, 2009). This type of study design also was appropriate to answer the RQs and recognize trends and patterns in data with no causes for behaviors and no manipulation of the variables.

I chose this type of design because it used numeric measurements and helped me to assess reliability and validity (Creswell, 2009). This type of research design was in line with previous studies that also had used this type of design to collect numeric and descriptive data to measure the variables and determine a possible correlation. Previous studies that have followed a quantitative research design have found barriers that were caused by inadequacies relating to the researchers' inability to identify the participants' truthfulness (Creswell, 2009). Therefore, as the researcher, I kept in mind that quantitative statistics were used to collect the data based on my hypotheses.

Because the purpose of this study was to assess teachers' confidence in implementing food allergy emergency plans, it was necessary to comprehend whether a lack of confidence resulted in limitations that potentially caused delays in assisting children experiencing allergic reactions. Sicherer and Mahr (2010) insisted that delays are partly the result of food allergy signs and symptoms ranging from mild to severe and life-threatening, making it difficult for teachers to decide when to administer medications to stop allergic reactions. Ultimately, assessing teachers' knowledge about food allergies, level of training or experience, and confidence in their ability to care for students with food allergies was consistent with research designs needed to advance knowledge in this field of study with new interventions that can reduce the incidence of allergic reactions at school.

Methodology

Population

The target population comprised teachers of children in Pre-K to Grade 8 from one school district in Decatur, Illinois. This school district was chosen because the school district has 20 schools, 15 of which are elementary schools (Pre-K-Grade 8) serving approximately 8,900 students. At the time of the study, the district was aware of students with food allergies and had already developed policies, procedures, and food allergy emergency plans. District staff included 14 nurses, who served all 8,900 students, making nurses unavailable in at least two schools per day. This lack of nurses meant that teachers had the primary responsibility of dealing with children's food allergic reactions. Additional aspects of this school district that made it the ideal target population for this

study included the following factors:

1. The superintendent reported that the school district had children with one or more diagnoses of food allergies and students had existing food allergy emergency plans in place.
2. School management provided no training to teachers related to food allergies and/or allergic reactions.
3. The district allowed teachers to be responsible for obtaining their own food allergy education and training that they felt that they needed.
4. The district did not assess teachers' knowledge or preparedness to respond to handle food allergic reactions.

The potential benefits to the school district for participating in this study included the ability to understand elementary school teachers' knowledge, attitudes, and beliefs about food allergies and whether the need existed for teachers to receive additional education or training related to food allergies.

Sampling and Sampling Procedures

When conducting research, it is impractical to survey every member of a particular target population; therefore, the selected sample should be representative of the population (McKenzie, Neiger, & Thackeray, 2008). I used convenience sampling, to select the participants from the target population, thus allowing me to fairly generalize the results back to the population (McKenzie et al., 2008). The use of convenience sampling was ideal for this study because the participants were taken from a group of teachers conveniently accessible who taught students in Pre-K to Grade 8. Convenience

sampling allowed me to collect accurate data and draw a more decisive conclusions with little possibility of biases.

Sample Size Calculation and Justification

I used convenience sampling to recruit potential the participants. I used G*Power 3.1.7 to calculate the most appropriate sample size. For a multiple regression analysis with a medium effect size, alpha of .05, and a power of .80, I had to have a minimum sample of 77 participants (Faul, Erdfelder, Buchner, & Lang, 2009). This school district reported a target population of 300 full- and part-time elementary teachers (Pre-K-Grade 8). I asked demographic questions about gender, age, and years working as teachers to obtain specific information about the characteristics of the participants. Distinctive demographic did not restrict participants' ability to join the study.

According to Cohen (1988), *r* effect sizes are small if they are 0.10, medium if they are 0.25, and large if they are 0.40. In choosing an effect size, I decided how small of a difference could be accepted and still find the results worthwhile. If allowing a very small effect size, then a large sample was required; if requiring large differences, then a small sample size was required. The larger the effect size, the greater was the power of the test.

A medium effect size was considered appropriate for this study and was used to determine the sample size. This was considered an average effect and was appropriate for the analysis. For this study, I opted to use effect size, $F^2 = .15$. The significance level for determining when to reject a null hypothesis (i.e., the probability of committing a Type I error) had to be established. The standard values for significance level represented by *a*

set at 10%, 5%, and 1% as a matter of policy (Aczel & Sounderpandian, 2006). This means that an = .05 corresponds to (1 -) = 0.95 probability of a correct statistical conclusion when the null hypothesis is true (Lipsey, 1990). In addition, a 0.95 probability was equivalent to a 95% confidence level to reject the null hypothesis (Aczel & Sounderpandian, 2006). For my study, I chose the level (= .05) for the analysis that was the most commonly designated value in social science research for this parameter (Lipsey, 1990).

The power of a test can be considered the opposite of β (beta), or a Type II error. Power refers to the probability that the researcher will correctly reject a null hypothesis when it is false (Cohen, 1988). Higher power levels are associated with better chances of correctly rejecting a false null hypothesis. Howell (2004) recommended that power be near .80. I originally anticipated getting a target population with a maximum of 300 participants; however, the minimum sample size needed to prove or disapprove the hypotheses was 77 participants.

Recruitment

The strategy to recruit the teachers for this study began with my meeting the superintendent of schools in Decatur, Illinois, to receive approval to recruit the participants from the school district; permission was granted (see Appendix A). I requested that the potential sample be recruited from teachers of students in Pre-K to Grade 8. The superintendent was concerned about the confidentiality of the participants and possible risks associated with the participation of the study. The superintendent agreed to designate a contact person at the school whom I could communicate with

during the recruitment process.

The recruitment process excluded face-to-face communication, so I contacted the school's designed contact person via telephone only after receiving approval from Walden University's Institutional Review Board (IRB approval # 04-07-16-0099917) to conduct the study. I sent an e-mail with the weblink to the survey. The recruitment of the teachers began with the designated contact person mass forwarding the weblink to the survey to the teachers.

Inclusion criteria required all participants to be teachers currently employed by the chosen school district. Teachers had to be working at least part time at the participating school district. The teachers also had to be responsible for elementary school-age students in Pre-K to Grade 8. Teachers who were responsible for high school students, who were retired, or who were no longer employed by the school district were excluded from being in the study.

Data Collection

After receiving IRB approval, I notified the school district's assigned contact person (i.e., director of student services), who distributed the survey electronically via SurveyMonkey. I then contacted the school's designated contact person to let her know that I would be forwarding an e-mail with the weblink to the survey. The contact person then sent me an e-mail acknowledging receipt of that e-mail. The designated contact person sent the weblink to all of the Pre-K-Grade 8 teachers. The survey included an introduction to the survey, the consent form, and information on how to contact me. After reading the consent form, if the teachers proceeded to the survey, it was considered

passive consent to complete survey. Once the teachers completed the survey, the document was automatically closed, and the responses were sent immediately to SurveyMonkey and securely stored. They were accessible only to me.

SurveyMonkey was the electronic tool that I used to develop, distribute, and gather the data because it offered the ability to develop questions in a variety of forms (multiple choice, dropdown, matrix rating scale, matrix dropdown menus, ranking, net promoter score, single text box, multiple text boxes, and comment box). The FARST (see Appendix B) had 46 multiple-choice questions that were simple, close-ended questions that let participants select one or multiple answers from a defined list of choices. SurveyMonkey also allowed me to password protect the surveys, as well as label, title, and number the surveys; track e-mail responses, view responses, and set an end date.

After participants clicked on the web link to the survey, they were directed to the welcome page of the survey, which had to be completed in one setting. The informed consent, which automatically appeared upon opening the weblink to the survey, explained the purpose of the study, provided information about me, explained ethical and confidentially protocols, gave an estimated time to complete the survey, and detailed how I would use and store the data. After participants read the document, they were instructed to click the “next” button to proceed to the survey.

The survey began with demographic questions about gender, age, and number of years as teachers to obtain information about the specific characteristics of the participants. This information did not restrict their participation in the study. The participants clicked “next” to proceed through each step of the survey. After completing

Sections 1, 2, 3, and 4 of the FARST, the participants clicked the “done” button. Anticipated time to complete the survey was 15 to 20 minutes. Once the survey was completed, responses were automatically uploaded to SurveyMonkey and stored in a folder under my account and accessible only to me. The folder was locked by a password phrase that only I was knowledgeable of. All data were securely stored in the SurveyMonkey folder until the close of the survey. Participants were given 3 weeks to complete the survey. To protect the confidentiality of all participants there were no onsite visits. After the conclusion of the survey there was no debriefing or requirements for follow-up, however a summary of the findings after the completion of the study is available to participants upon request.

Instrumentation and Operationalization of Constructs

Instrument

I received approval to use and adapt the CFARSGP for this study (see Appendices C, D, & E). The CFARSGP is a 35-item survey designed to measure the knowledge, attitudes, and beliefs of the general public about children with food allergies and the outcomes. The CFARSGP includes 11 additional items related to demographic variables, including age, gender, ethnicity, parental status, years of education, and occupation. Researchers with the Smith Child Health Research Program at Children’s Memorial Hospital, Chicago, IL; the Institute for Healthcare Studies, Northwestern University Feinberg School of Medicine, Chicago, IL; and the Division of Allergy and Immunology, Children’s Memorial Hospital, Chicago, IL, developed the CFARSGP to understand what knowledge members of the general public have about children with food allergies and

how members of the general public respond to children with food allergies, including their beliefs about food allergy outcomes (Gupta et al., 2009a).

The purpose and use of the CFARSGP instrument are multifold. It has been proven successful in bringing attention to childhood food allergies, helping to organize food allergy support groups in the United States, and creating national food allergy organizations to promote increased knowledge and awareness among the public. The developers also used the CFARSGP to obtain baseline assessments determining community attitudes about food allergies and assessing the efficiency of educational movements and trainings (Gupta et al., 2009a).

The CFARSGP was developed and tested from 2006 to 2008 to ensure its ability to assess the knowledge, attitudes, and beliefs of the general public (Gupta et al., 2009a). The methodological framework for this instrument was based on objectives used to assess knowledge, attitudes, and beliefs. The topics were put into groups with similar contents and formulated with the same aspects as the health belief model. The CFARSGP was constructed and tested for validity and reliability in three phases (Gupta et al., 2009a). The CFARSGP preliminary analysis in Phase 1 was a review of literature, setting up domains with review, revisions, and already developed themes.

Validity testing in Phase 2 occurred using cognitive interviews with the survey respondents to ensure understandability (Gupta et al., 2009a). The developers conducted reliability testing using coding facilitated by Atlas.ti, a qualitative data analysis software program. At least two reviewers independently coded each transcript, which was followed by reconciliation of the codes to produce a single coded transcript. Scores were

calculated and ranked in order of importance ranging from 0 (*not important*) to 2 (*very important*) as well as face validity (*invalid* = 0, *valid* = 1) of each item. Scores of 0 or 1 signaled a deletion, modification, or revision. The result was an overall knowledge score of 64.9% based on ranges between 12.5% and 100%. Further reliability testing was conducted to assess the relevance, reliability, and utility of attitudes and beliefs items on the survey. The developers asked nine focus groups and 220 participants to rate their attitudes and beliefs about the severity of food allergies (Gupta et al., 2009a). Based on cognitive interviews with the 220 participants and use of the qualitative data analysis program, reliability testing was greater than 10, which proved that the instrument was reliable for assessing attitudes and beliefs of food allergy outcomes.

Phase 3 was the final validation phase to ensure the validity of the instrument. The CFARSGP initially started with 52 items and was then divided into categories of importance testing face validity. Based on the qualitative data analysis program, the expert panel reviewed the responses from the general public, and items were then modified, added, and deleted. This occurred during short periods of interludes to test reliability and ensure the steadiness of the scores. The assigned scores ranged between 0 and 10. Items receiving scores between 4 and 8 were important. Based on scores, the researchers reduced the instrument to 35 items (Gupta et al., 2009a). Researchers have used the CFARSGP for assessments, determination of attitudes concerning food allergies, and evaluation of the effectiveness of educational courses (Gupta et al., 2009a).

Instrument Adaptation

Researchers of the GFARSGP have tested and have found the instrument valid and reliable to assess the knowledge, attitudes, and beliefs of members of the general public. Gupta et al. (2009a) originally developed and the CFARSGP for the general public, I found the CFARSGP for this study (Gupta et al., 2009a). Two other instruments from the CFARSGP (Parents of Children with Food Allergy and Primary Care Physicians) also were be used to assess food allergy knowledge, attitudes, and belief, and helped to assess the teachers' self-efficacy related to confidence (Gupta et al., 2009a).

After I was granted permission from the designers of the instruments to use and adapt the instruments to assess teachers' knowledge, attitudes, and beliefs affecting their confidence in their ability to implement food allergy emergency plans, I retitled the adapted instrument the FARST. The adapted instrument has four sections covering demographics, confidence and training, knowledge about food allergies, and attitudes and beliefs about food allergy outcomes affecting teachers working with students in Pre-K to Grade 8. Following are details about the adapted FARST, along with measurements, scores, and modified questions.

Section 1: Demographics. The FARST begins with seven demographic items: age, gender, ethnicity, highest level of education completed, years employed as teachers, grade taught, and knowledge of anyone with a food allergy.

Section 1.2: Confidence and training (Items 8-11). Three items in this section came from the Chicago Food Allergy Research Surveys for Primary Care Physicians and Parents of Children with Food Allergy. Gupta et al. (2009b) developed these two

instruments at the same time as the CFARSGP, and they also assess confidence in ability to perform, along with knowledge, beliefs, and attitudes about food allergies. The instruments were distributed only to parents and primary care physicians. The items paralleled information published in 2011 by the NSBA. The statements were based on recommendations that training related to developing and implementing food allergy emergency plans prepared teachers to confidently respond to food allergic reactions (NSBA, 2011; Sicherer & Mahr, 2010). As the researcher, I used dichotomous inquiries to obtain knowledge of teachers' self-efficacy (confidence) in their current knowledge and training through the use of two items. Item 9 stated, "Training received from school administration adequately prepared me to care for students with food allergies." The response format was yes or no. Item 10 stated, "As a teacher, I am confident in my ability to manage a child's/student food allergy emergency plan." The response format was yes or no.

Section 2: Food allergy knowledge (Items 12-30). The FARST has 18 items that assess teachers' knowledge and awareness of food allergies. Topics include (a) definition and diagnosis of food allergies (peanut, dairy, and shellfish); (b) symptoms and severity of food allergies; (c) triggers and environmental risks related to food allergies; (d) treatment and use of health care services; and (e) policy issues related to food allergies. Because of the consistency of the survey and its ability to assess knowledge, 15 items on the survey were suitable to collect data with responses in true, false, or I don't know format. I made a few revisions to ensure that the items on the survey related to the participants. Examples of the revised items follow:

Item 16: “People with food allergies can have an allergic reaction after touching a food” was revised as “Children with food allergies can have an allergic reaction after two

Item 17: “A person with a milk allergy can still drink low-fat milk without having an allergic reaction” was revised as “A child with a milk allergy can still drink low-fat milk without having an allergic reaction.”

The other three knowledge items on the survey were multiple choice and required responses to questions such as: “Which of the following is the most common food allergy in adults”? Participants had to mark one answer (milk, peanut, shellfish [shrimp, lobster, or crab], or I don’t know).

Gupta et al. (2009b) developed the CFARSGP with an answer key for all items. Each item with a correct answer receives 5 points, for a possible of 95 points. Incorrect response and I don’t know responses receive 0 points. I used the same answer key in scoring the FARST.

Section 3: Attitudes and beliefs (Items 31-45). Although the survey items addressed the main concerns of the study, I had to reword some items to make those items appropriate for the sample. Following are two examples of reworded items:

Item 32: “People with food allergies are treated differently because of their food allergy” was revised as “Children with food allergies are treated differently because of their food allergy.”

Item 35: “For someone who has a food allergy, staying away from the food that he or she is allergic to is difficult” was revised as “For children who have a food allergy,

staying away from the food that he or she is allergic to is difficult."

Responses to items in this section of the survey were scored on a 5-point Likert scale ranging from -2 (*strongly disagree*) to 2 (*strongly agree*). There was a possibility of receiving scores between 20 and -20. I added or deducted points from the overall survey score. Examples of how scoring commenced for Likert scale items follow:

Item 31: Having an EpiPen or Twinjet (injectable epinephrine) is important for most children with severe food allergies. A response of "strongly agree" received 2 points. were given for the questions. A response of "strongly disagree" saw 2 points being deducted.

Other items assessed were attitudes and beliefs about children with food allergies:

Item 46: "What would be the best way for schools to educate parents about how to protect children with food allergies?" was revised as "What would be the best way for schools to educate teachers about how to protect children with food allergies?" Participants were asked to respond by marking one answer (Handouts or brochures in the mail; presentation at parent-teacher meetings; parents of food-allergic children talking to other parents, doctors, or nurses about food allergies). If the participant responded to both questions, a score of 1 point was given; if the participant responded to one question, a score of .50 point was given; and if the participant did not respond to a question, 0 points were given (see Appendix F).

Variables

A "variable is a construct that is an object, event, idea, feeling, time period, or any other type of category that can be measured" (McKenzie et al., 2008, p. 375). The two

variables in this study were the DV and the IVs measured for correlation. The DV outcome variable had the ability to be changed, influenced, or manipulated depending on other factors measured (Creswell, 2009). The DV was teachers' confidence in implementing the food allergy emergency plans. Because this variable could measure and/or manipulate responses to questions related knowledge, beliefs, and attitudes regarding food allergies responses were scored. Example: A response to Item 10 on the FARST (As a teacher, I am confident in my ability to manage a child's/student food allergy emergency plan), could only be yes or no; there was no right or wrong response. A yes response yielded .05 point; a no response yielded zero points. Therefore, confidence was measured by a score of .05 or greater. The outcome data are available in Chapter 4.

IVs are the cause variables that influence or effect change; They stand alone and are not changed by other variables being measured (Creswell, 2009). There were three IVs in this study. The first IV was teachers' confidence in their ability to care for students with food allergies. Item 11 (I am confident in my ability to care for children with food allergies) required a yes or no response. The second IV was teachers' level of training or experience caring for students with food allergies. The third IV was teachers' knowledge of food allergies. Knowledge learned or obtained can greatly affect an individual's perception of safety, comfort and satisfaction by providing an orderliness and ability to conceptualize goals, anticipate and perceive events, and respond in accordance with the changing needs (Hunt, 2003). Examples of questions that assessed teacher's knowledge of food allergies were Item 16 (People with food allergies can have an allergic reaction

after touching a food) and Item 17 (A child with a milk allergy can still drink low-fat milk without having an allergic reaction).

Data Analysis Plan

I entered the data into SPSS v.22 for Windows for data management and analysis. Prior to conducting the analysis, I screened the data for accuracy, missing responses, and outliers. I used SPSS to calculate descriptive statistics for the variables of interest. Ranges for the variables, specifically the minimum and maximum values, were screened to ensure responses for the variables fell within the scope of feasible values. Participant data outside of the range of acceptable values were removed from the final data set. Thirteen respondents missing data on the salient variables or missing more than half of their response data, were removed from the data set. To examine univariate outliers, I calculated standardized values, or *z* scores, for continuous data (i.e., values for teachers' confidence, years of training, ability to implement food allergy training, and knowledge of food allergies). Values below -3.29 or above 3.29 were considered outliers and were removed from the data set (Tabachnick & Fidell, 2012).

I conducted descriptive statistics for demographic data and scores, and calculated frequencies and percentages for categorical data (e.g., age, gender, and race or ethnicity). This information described the composition and salient characteristics of the sample. I also calculated means and standard deviations for scores on the FARST to describe averages and ranges for continuous data. These descriptive statistics, along with the results of the analyses conducted on the RQs and associated hypotheses, are reported in Chapter 4.

To assess RQs 1 to 3, I conducted multiple regression analysis to determine the association between the IVs and the DV. For RQ1, I investigated the relationship between teachers' confidence in their ability to care for students with food allergies (IV) and their confidence in implementing food allergy emergency plans (DV). For RQ2, I assessed the relationship between level of training or experience caring for students with food allergies (IV) and teachers' confidence in implementing food allergy emergency plans. For RQ3, I investigated the relationship between teachers' knowledge of food allergies (IV) and the teachers' confidence in implementing food allergy emergency plans. This study involved an investigation of the relationships between the IVs and the DV while controlling for the following covariates: (a) years of experience teaching, (b) if teachers or someone they knew had a food allergy, (c) age, and (d) year or grade taught (e.g., Pre-K-Grade 8). I found multiple regression an appropriate analysis to assess the extent of a relationship among a set of dichotomous or interval or ratio predictor variables on an interval or ratio criterion variable.

I used standard multiple regression, the entry method. The standard method enters IVs (predictors) simultaneously into the model. Unless the theory sufficiently supported the method of entry, the standard multiple regression was the appropriate method of entry. Variables should be evaluated "in terms of what it adds to prediction of the [DV] (criterion) that was different from the predictability afforded by all the other predictors" (Tabachnick & Fidell, 2001, p. 131). The *f* test assessed whether the IVs collectively predicted the DV. R^2, the multiple regression correlation coefficient of determination, was used to determine how much variance in the DV was accounted for by the set of IVs.

The assumptions of multiple regression, linearity, homoscedasticity, and absence of multicollinearity were assessed. I assessed linearity and homoscedasticity by examining the scatterplots. Multicollinearity assumed that the predictor variables were not related and were assessed using variance inflation factors (VIFs); VIFs greater than 10 suggested the presence of multicollinearity (Stevens, 2009).

Threats to Validity

Potential threats to validity were addressed as follows: External validity refers to how well the data and theories in one location apply to data and theories in another location, and how the results can be applied beyond the sample (Creswell, 2009). Threats to external validity might include the IVs being significantly different from one another and obscuring the relationship being studied. If this had happened, it could have potentially shown a lack of connection between the variables, thereby producing biases or constraints and causing a severe threat to external validity. To reduce the possibility of this occurrence, this quantitative study provided numeric measurements that helped to assess reliability and validity with unbiasness (Creswell, 2009). According to the G*power 3.1.7 used to calculate the sample size, a minimum of 77 participants was necessary; however, the chosen target population had the potential for 300 participants, which was more than the required number.

Another threat to external validity was time. The participants were teachers from the same school district. Timing could have been a threat to validity, depending when the survey was disseminated. If done at the beginning of the school year, there would have been constraints that would have included the teachers getting their classrooms ready,

new rosters of students, orientations to the classrooms, and adjustment periods. These constraints would have made it difficult for the teachers to have the time to respond or time to think through the survey items and provide good data. A focus on other scheduled school events (e.g., holidays, workshops, parent/teacher conferences, etc.) could have taken the teachers time to respond to the survey or not pay attention when reading and responding to the survey items.

To eliminate or reduce the threat to validity, I disseminated the survey electronically through SurveyMonkey. What could have impacted results was that the teachers were able to respond at their convenience. The survey did not have to be disseminated during school hours, so the teachers could complete the survey from any computer. Teachers also were able to take as long as they wanted to focus and answer the survey items. The survey did not time out, and if left idle, the teachers could resume completing it at their convenience. The survey took no more than 15 to 20 minutes to complete. If the required number of participants had not responded by the scheduled close date of the survey, I had planned to extend the survey by a week.

The use of an adapted instrument could have increased the threats to internal validity, although the instrument had previously been tested and shown to be valid and reliable to assess the knowledge, attitudes, and beliefs of various individuals. It had been developed originally for use with members of the general public (Gupta et al., 2009a). Although the developers of the instrument allowed some adaptations to the instrument, the contents stayed the same; there were no modifications to the intended structure of the instrument. Without modifying the instrument, I would have been able to gather data only

according to what the developers of the instrument had already put together.

Constructs or variables measured in this study were already tested for reliability and validity. A reliability test was conducted using coding facilitated by Atlas.ti, a qualitative data analysis software program. The result was an overall knowledge score of 64.9% based on ranges between 12.5% and 100%. Further reliability testing was conducted to assess the relevance, reliability, and utility of the attitudes and beliefs items on the survey, which proved that the instrument was reliable for assessing attitudes and beliefs about food allergy outcomes. The final validation was done to ensure the validity of the instrument by dividing into categories of importance and testing face validity. Based on data analysis, program responses were reviewed, and items were modified, added, or deleted.

Ethical Procedures

When conducting research that involves human beings, it is important to follow ethical guidelines that protect the rights, welfare, and dignity of the participants. Ethics in research upholds the objective of the study and encourages trustworthiness and accountability, both of which are important when doing research that involves others. According to Larson (2005), any study encompassing the welfare, safety, freedom of choice, and dignity of individuals must be advantageous to the participants and donate knowledge to the human population. A procedure for collecting data and informed consent was submitted with the IRB application to Walden University for approval. As the researcher, I also met with the superintendent of the school district to obtain permission to recruit the participants. The superintendent provided verbal permission and

an approval letter to gain access and to recruit participants.

As mentioned earlier, after receiving IRB approval, I contacted the school's designated contact person. I followed-up with a phone call to ensure that the e-mails had been received and that access to the survey worked as planned. The consent form explained the purpose and nature of this study. It also outlined requirements for participation and addressed ethical concerns. To eliminate ethical concerns related to recruitment and to avoid obtaining participants' private information, I had no contact with them unless the participants chose to use the contact information provided in the informed consent. Participants were asked to read the informed consent carefully, and if they agreed and had no concerns, they completed the survey. Participants were informed that they could withdraw from the study at any time without penalty. They also were given the option of contacting me if they had any questions about the study.

After the data were collected, SurveyMonkey uploaded the results onto a spreadsheet document. I exported the results into SPSS for analysis. The survey results were stored in a file on my password-protected computer. Only I had knowledge of the password. The electronic survey results and data analysis also were stored on a password-protected USB flash drive that was accessible only to me. Because all of the data were anonymous, they could not be traced back to any individual participants. The data will be kept and stored until the study is completed and published, after which time, they will be destroyed.

Summary

This chapter described the research design and rationale, the study setting and potential participants, along with the agreement process to join the study. I described the CFARSGP and its adaptation as the FARST for use in this study. The process for determining the association between the DV and the IVs was described, along with the strategies used to recruit the participants. The chapter also outlined the methodology and discussed the validity and reliability of the instrument. Finally, I discussed data analysis, RQs and hypotheses, sampling size justification, and ethical concerns. Chapter 4 presents the results of the study.

Chapter 4: Results

Introduction

In this chapter, I present the findings of the analysis of the FARST data. The purpose of this study was to assess teachers' self-efficacy in implementing food allergy emergency plans in the school setting. Three RQs and hypotheses guided the study:

RQ1: Is there a relationship between teachers' confidence in implementing food allergy emergency plans and teachers' confidence in their ability to care for students with food allergies?

H_{01}: There is no relationship between teachers' confidence in implementing food allergy emergency plans and teachers' confidence in their ability to care for students with food allergies.

H_{a1}: There is a relationship between teachers' confidence in implementing food allergy emergency plans and teachers' confidence in their ability to care for students with food allergies.

RQ2: Is there a relationship between teachers' confidence in implementing food allergy emergency plans and teachers' level of training or experience in caring for students with food allergies?

H_{02}: There is no relationship between teachers' confidence in implementing food allergy emergency plans and teachers' level of training or experience in caring for students with food allergies.

H_{a2}: There is a relationship between teachers' confidence in implementing food allergy emergency plans and teachers' level of training or experience in caring for

students with food allergies.

RQ3: Is there a relationship between teachers' confidence in implementing food allergy emergency plans and teachers' knowledge of food allergies?

H_{03}: There is no relationship between teachers' confidence in implementing food allergy emergency plans and teachers' knowledge of food allergies.

H_{a3}: There is a relationship between teachers' confidence in implementing food allergy emergency plans and teachers' knowledge of food allergies.

An estimated 6 million children in the United States have food allergies; a quarter of these children experience their first allergic reactions at school, and 75% of these reactions occur in the classroom (Sicherer & Mahr, 2010; Young et al., 2009). Because students with food allergies may experience reactions at school, school staff members and personnel must be formally educated in how to respond (Fleischer et al., 2012).

The results of the data analysis are presented, and an overview of the data collection process is provided. A detailed accounting of the results of statistical analysis also are included. The chapter ends with a summary of the salient findings.

Data Collection

Planning and Recruitment Process

The data collection planning process began with a scheduled meeting with the superintendent of the school district where the teachers would be recruited to participate in the study. During the planning meeting, the superintendent recommended that a school staff person be designated as a liaison between me and the teachers. It was determined that the designated contact person or liaison would be the director of student services.

Once IRB approval was granted by Walden University I notified the liaison by phone and email that data collection could begin. School policy required that the liaison review the survey with the school management team (superintendent and assistant superintendent) and verify that the link to the survey functioned properly prior to dissemination to the teachers.

The school's liaison informed me that she forwarded the survey to teachers and requested that I let her know if they responded. I allowed a 3-week period for the survey to be completed. I informed the school's liaison that 65 teachers had responded, which was a lower number of respondents than I needed. The school's liaison informed me that she would resend the initial e-mail to the teachers regarding the survey. By the close of the data collection period, 93 teachers had completed the survey. The minimum of 77 participants was exceeded at the end of the 3-week data collection period, so the survey was closed.

Participants

Participants were 93 teachers who were employed as full-time or part-time teachers in a Decatur, IL, school district. All of the participants met the eligibility criteria. Participants were teachers of students in Pre-K to Grade 8 at one school. There was no time limit how long the participants had been teaching, but all teachers were representative of elementary teachers in the school district. Data were collected using the FARST, an electronic survey made accessible through SurveyMonkey. There were no discrepancies in the data collection process.

Response Rate

At the close of the survey, 93 teachers had completed it. The desired sample size calculated for this study was 77 based on a priori G*Power 3.1.7. After dissemination of the survey, 43 participants had responded in Week 1. By Week 2, the number was up to 65; by the end of Week 3, all 93 participants had responded. During the data collection process, there was no deviation from the plan to import the data from SurveyMonkey directly into SPSS. No interventions were conducted, and there was no interaction with any participants. The responses to the surveys were anonymous, and there was no follow-up contact or correspondence with any of the participants. Using this method maintained the confidentiality of the survey responses and the privacy of the participants.

Preliminary Data Management

The data comprised demographic information and responses to the FARST items. The FARST items were scored to reflect correct responses and scoring for Likert type items. The data were screened for inaccuracies, missing values, and outliers. Ranges were calculated to ensure that all responses were within feasible values. The accuracy of the data was confirmed through this process. The data were examined for cases missing data in nonrandom patterns. No nonrandom patterns were observed. Data for 13 individuals were removed for excessive missing values. Finally, standardized scores were calculated for the knowledge score. Values outside of 3.29 units from the sample mean were considered outliers (Stevens, 2009). No outliers were found in the data. Data from 80 participants were used for the analysis.

Results

Sample Description

To obtain accurate background information about the participants, they were asked to answer demographic items about age, gender, and race/ethnicity (see Table 1). The ages of the participants ranged from 21 years to 65 years. Frequencies and percentages were calculated for age, gender, and race/ethnicity. More than half of the participants were 25 to 44 years of age (*n* = 45, 56%). Most participants were European Americans (*n* = 69, 86%); the majority of participants were female (*n* = 66, 83%).

Table 1

Frequencies and Percentages for Age, Gender, and Race

Variable	*n*	%
Age		
21-24	6	8
25-44	45	56
45-65	28	35
Over 65	1	1
Gender		
Male	14	17
Female	66	83
Race/Ethnicity		
European American	69	86
African American	7	9
Hispanic American	1	1
Asian American	1	1
Other	2	3

Frequencies and percentages were calculated for the yes/no responses related to knowledge of someone with a food allergy, receipt of food allergy training, receipt of adequate food allergy training, confidence in managing food allergy emergency plans, and confidence in caring for children with food allergies. The majority of respondents responded yes to knowledge of someone with food allergy (*n* = 63, 79%); receipt of adequate food allergy training (*n* = 56, 70%); confidence in managing food allergy

emergency plans (*n* = 52, 65%); and confidence in caring for children with food allergies (*n* = 56, 70%). Responses were almost evenly split between yes (*n* = 41, 51%) and no (*n* = 39, 49%) for received adequate food allergy training (see Table 2).

Table 2

Frequencies and Percentages for Food Allergy Knowledge, Training, and Confidence

	n	%
Knowledge of someone with food allergy		
Yes	63	79
No	17	21
Receipt of food allergy training		
Yes	56	70
No	24	30
Receipt of adequate training		
Yes	41	51
No	39	49
Confidence in managing food allergy emergency plans		
Yes	52	65
No	28	35
Confidence in caring for children with food allergies		
Yes	56	70
No	24	30

Knowledge scores ranged from 0.80 to 2.27, with a mean of 1.66 (*SD* = 0.34). The mean of responses related to knowing someone with a food allergy was 1.79 (*SD* = 0.41). This score indicated that most participants either had a food allergy or knew someone with a food allergy. The mean score for received training was 1.30 (*SD* = 0.46), indicating that most participants had not received food allergy training. The mean score for the item assessing if participants felt that the training they received regarding food allergies was adequate was 1.49 (*SD* = 0.50), indicating that they were largely split regarding if the training they received was adequate in preparing them for food allergy emergencies. The means for participants' confidence in managing food allergy emergency plans and caring for children with food allergies were 1.35 (*SD* = 0.48) and

1.30 (*SD* = 0.46), respectively. These means indicated that the participants were not confident in either situation (see Table 3).

Table 3

Means and Standard Deviations for Food Allergy Knowledge, Training, and Confidence

	Min	Max	*M*	*SD*
Knowledge of someone with food allergy	1.00	2.00	1.79	0.41
Receipt of food allergy training	1.00	2.00	1.30	0.46
Receipt of adequate training	1.00	2.00	1.49	0.50
Confidence in managing food allergy emergency plans	1.00	2.00	1.35	0.48
Confidence in caring for children with food allergies	1.00	2.00	1.30	0.46
Knowledge	0.80	2.27	1.66	0.34

Statistical Analysis Findings

I conducted a linear regression analysis to assess the RQs. Three multiple linear regression models were constructed to investigate the relationships among confidence and training related to food allergies, knowledge regarding food allergies, and demographic characteristics. The results of the analysis are presented next.

RQ1. Multiple linear regression analysis was conducted to assess the relationship between teachers' confidence in implementing food allergy emergency plans and confidence in their ability to care for students with food allergies. The analysis was conducted while controlling for years of teaching experience, knowledge of someone with food allergies, and grade taught. Before conducting the multiple linear regression analysis, I conducted a chi-square analysis to test the association between confidence in managing food allergy emergency plans and confidence in caring for children with food allergies. The finding of the analysis, $\chi^2(1) = 48.39$, $p < .001$, indicated a statistically significant association between confidence in managing food allergy emergency plans and confidence in caring for children with food allergies. Of the participants who replied

that they were confident in managing food allergy emergency plans, 96% also were confident in their ability to care for children with food allergies. Of the respondents who replied that they were not confident in managing food allergy emergency plans, 79% also were not confident in their ability to care for children with food allergies. Table 4 shows the results of the chi-square analysis.

Table 4

Chi-Square Analysis Between Confidence in Managing Food Allergy Emergency Plans and Confidence in Caring for Students With Food Allergies

	Confidence in caring for students with food allergies Females			
Confidence in managing food allergy emergency plans	Yes (%)	No (%)	χ^2 (1)	*p*
Yes	50 (96%) 4.0	2 (4%) 52.6	48.39	< .001
No	6 (21%) 19.2	22 (79%) 24.2		

N = 80

Prior to the regression analysis, the assumptions of linearity, homoscedasticity, and multicollinearity were assessed. The assumption of homoscedasticity and linearity was assessed using a residual scatterplot (see Figure 2). Homoscedasticity assumes that the scores are normally distributed about the regression line (Tabachnick & Fidell, 2012). The assumption is met if there are no distinguishable patterns in the plot. Because the points were approximately rectangularly distributed, the assumption of homoscedasticity was met. Linearity assumes a straight-line relationship between IVs and DVs (Tabachnick & Fidell, 2012). The assumption of linearity was met, as evidenced by the scatterplot.

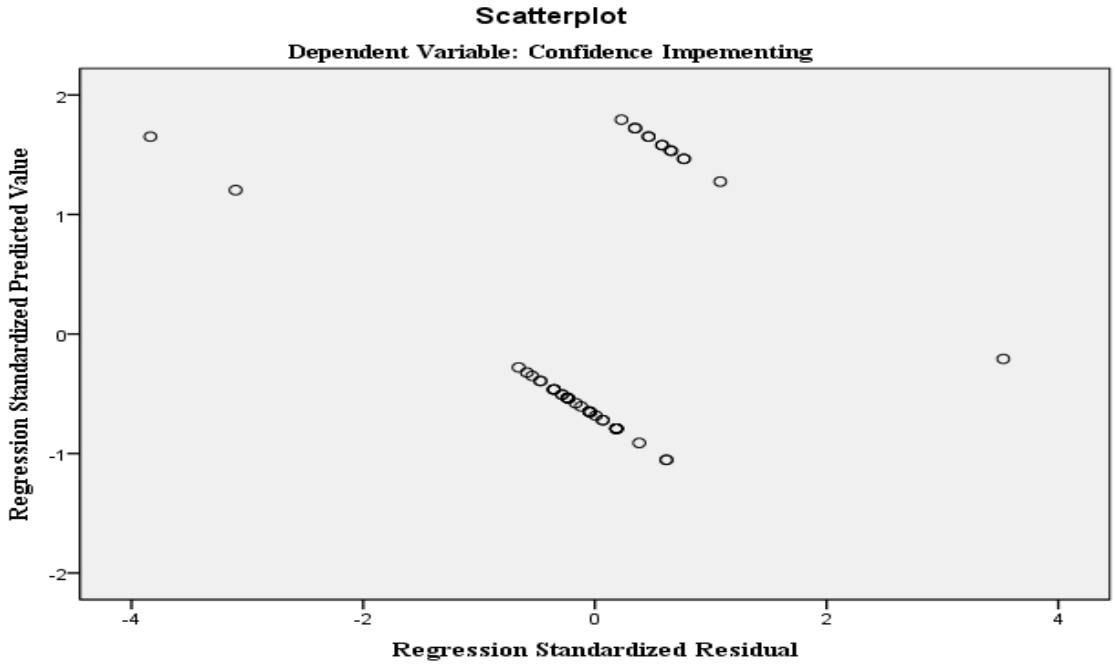

Figure 2. Residual scatterplot for linearity and homoscedasticity.

The absence of multicollinearity indicated that the IVs were not related (Pituch & Stevens, 2015). Multicollinearity was assessed using VIFs. None of the IVs had VIF values over 10, so the assumption was met (Pituch & Stevens, 2015).

Results of the multiple linear regression were significant, $F(4, 49) = 33.23$, $p < .001$, $R^2 = .73$, indicating that the model comprising confidence in caring for students with food allergy emergencies, years of experience, knowledge of someone with a food allergy, and grade taught contributed to 73% of the variance in teachers' confidence in implementing food allergy emergency plans. Null Hypothesis 1, which stated there was no relationship between teachers' confidence in implementing food allergy emergency plans and their confidence in their ability to care for students with food allergies, was rejected.

Because the model was significant, the individual predictors were assessed. Of the predictors, confidence in teachers' ability to care for students with food allergies was the only statistically significant predictor ($B = .837$, $p < .001$). This result suggested that as teachers' confidence in their ability to care for students with food allergies increased, their confidence in implementing the food allergy emergency plans also increased when teaching experience, knowledge of someone with a food allergy and grade taught were controlling for confidence in their ability to care for students with food allergies. Results of the multiple linear regression analysis are presented in Table 5.

Table 5

Results of the Multiple Linear Regression Between Confidence in Ability to Care for Students and Confidence in Ability to Implement Food Allergy Emergency Plans

Source	B	*SE*	β	*t*	*p*	VIF
Confidence caring for student with food allergies	0.84	0.07	0.86	11.40	.000	1.01
Years of experience	-0.03	0.03	-0.07	-0.96	.343	1.02
Knowledge of someone with food allergies	0.10	0.09	0.09	1.17	.248	1.00
Grades taught	-0.07	0.05	-0.11	-1.40	.169	1.02

RQ2. Multiple linear regression analysis was conducted to assess the relationship between teachers' confidence in implementing food allergy emergency plans and their level of training or experience in caring for students with food allergies. The analysis was conducted while controlling for teachers' years of experience, educational level, age, and gender. Before conducting the regression analysis, I conducted a chi-square analysis to test associations between receiving adequate training and confidence in implementing food allergy emergency plans. The finding of the analysis, $\chi^2(1) = 28.33$, $p < .001$, indicated a statistically significant association between confidence in managing or implementing food allergy emergency plans and receipt of adequate training. Of the

participants who replied that they had received adequate training, 73% also were confident in their ability to implement food allergy emergency plans. Of the respondents who replied that they had not received adequate training, 89% also were not confident in their ability to implement food allergy emergency plans. Table 6 includes the results of the chi-square analysis.

Table 6

Chi-Square Analysis Between Confidence in Managing Food Allergy Emergency Plans and Adequate Training

	Adequate training Females			
Confidence in managing food allergy plans	Yes (%)	No (%)	χ^2 (1)	*p*
Yes	38 (73%)	14 (27%)	28.33	< .001
	4.0	52.6		
No	3 (11%)	25 (89%)		
	19.2	24.2		

N = 80

Prior to the analysis, the assumptions of linearity, homoscedasticity, and multicollinearity were assessed. The assumption of homoscedasticity and linearity was assessed using a residual scatterplot (see Figure 3). Homoscedasticity assumes that scores are normally distributed about the regression line (Tabachnick & Fidell, 2012). The assumption is met if there is no distinguishable pattern in the plot. Because the points were approximately rectangularly distributed, the assumption of homoscedasticity was met. Linearity assumes a straight-line relationship between IVs and the DVs (Tabachnick & Fidell, 2012). Because a straight-line relationship existed, as evidenced by the scatterplot, the assumption of linearity was met.

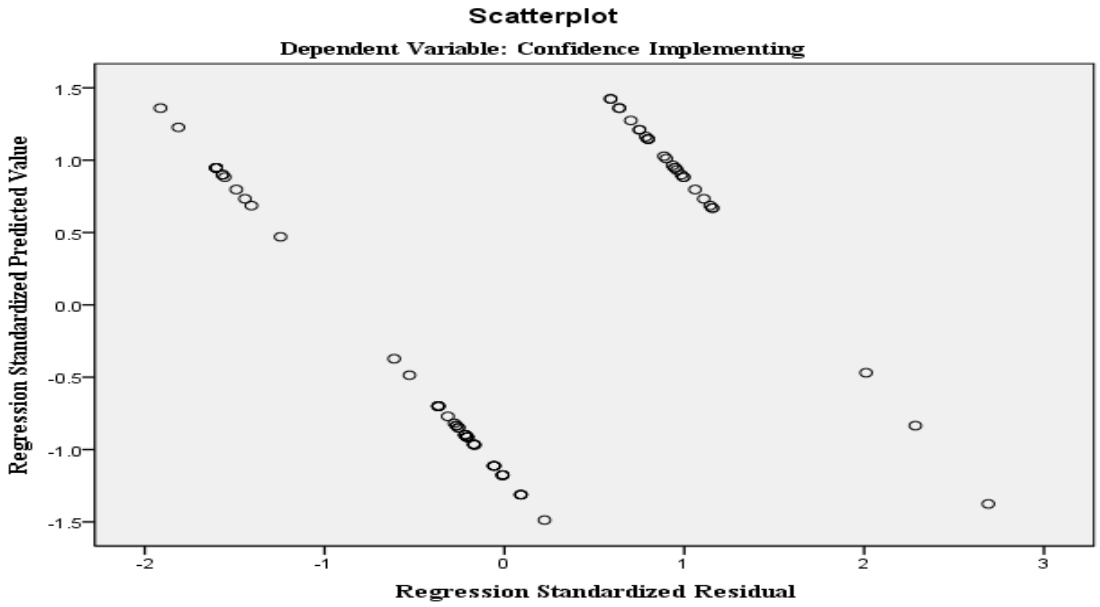

Figure 3. Residual scatterplot for linearity and homoscedasticity.

The absence of multicollinearity assumes that the IVs are not too related (Pituch & Stevens, 2015). The absence of multicollinearity was assessed using VIFs. None of the IVs had VIF values over 10, so the assumption was met (Pituch & Stevens, 2015).

Results of the multiple linear regression were significant, $F(5, 79) = 8.89$, $p < .001$, $R^2 = .33$, indicating that the model comprising training (adequate; yes/no), years of experience, education, age, and gender contributed to 33% of the variance in teachers' confidence in their ability to implement food emergency allergy plans. This finding suggests that a third of the variability in the criterion variable, confidence in ability to implement a food allergy plan, was accounted for by the model. However, the R^2 (0.33) value indicated a poor model fit overall between the predictors and the outcome variable. Null Hypothesis 2, indicating that there was no relationship between teachers' confidence in implementing food allergy emergency plans and their level of training or experience in

caring for students with food allergies was rejected.

Because the model was significant, the individual predictors were assessed. Of the predictors, adequate training was the only statistically significant predictor (B = .543, p < .001). This result suggested that teachers who perceived themselves to be adequately trained to deal with food allergies had increased confidence in implementing food allergy emergency plans when controlling for years of experience, educational level, age, and gender. Results of the multiple linear regression analysis are presented in Table 7.

Table 7

Results of the Multiple Linear Regression Between Training and Confidence in Ability to Implement Food Allergy Emergency Plans

Source	B	*SE*	β	*t*	*p*	VIF
Years of experience	-0.02	0.05	-0.05	-0.35	.730	2.26
Adequate training	0.54	0.09	0.57	5.83	.000	1.13
Education level	-0.06	0.08	-0.09	-0.78	.437	1.56
Age	0.16	0.12	0.21	1.39	.170	2.64
Gender	-0.01	0.12	-0.00	-0.04	.967	1.04

RQ3. Multiple linear regression analysis was conducted to assess the relationship between teachers' confidence in implementing food allergy emergency plans and their knowledge of food allergies. The analysis was conducted while controlling for teachers' years of experience, knowledge of someone with food allergies, age, education, and gender. Before conducting the multiple linear regression analysis, a chi-square analysis was completed to test the relationship between knowledge regarding food allergies and confidence in implementing food allergy emergency plans. The finding of the regression analysis, r = 0.25, p = .03, indicated a weak positive association between the two variables.

Prior to conducting the analysis, the assumptions of linearity, homoscedasticity, and multicollinearity were assessed. The assumption of homoscedasticity and linearity was assessed using a residual scatterplot (see Figure 4). Homoscedasticity assumes that scores are normally distributed about the regression line (Tabachnick & Fidell, 2012). The assumption is met if there is no distinguishable pattern in the plot. Because the points were approximately rectangularly distributed, the assumption of homoscedasticity was met. Linearity assumes a straight-line relationship between IVs and DVs (Tabachnick & Fidell, 2012). Because a straight-line relationship existed, as evidenced by the scatterplot, the assumption of linearity was met.

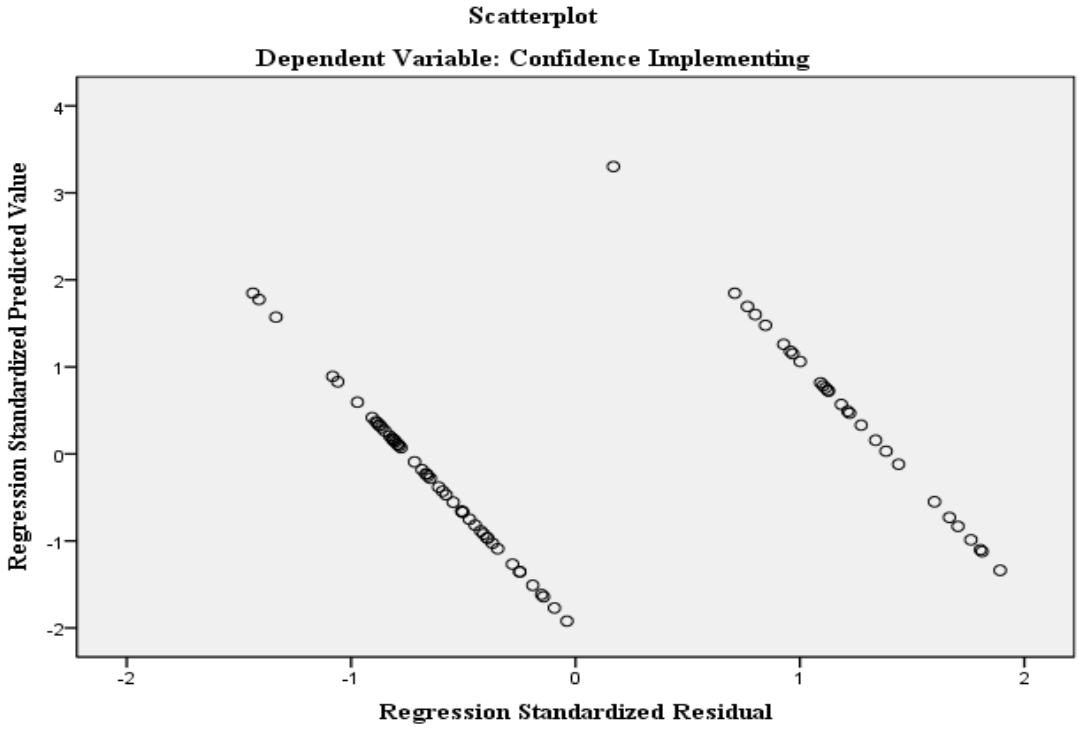

Figure 4. Residual scatterplot for linearity and homoscedasticity.

The absence of multicollinearity assumes that the IVs are not too related (Pituch & Stevens, 2015). The absence of multicollinearity was assessed using VIFs. None of the IVs had VIF values over 10, so the assumption of no multicollinearity was met (Pituch & Stevens, 2015; see Table 8).

Results of the multiple linear regression were not significant, $F(6, 79) = 1.82$, $p = .108$, $R^2 = .06$ indicated that the model comprising food allergy knowledge, years of experience, age, education level, gender, and knowledge of someone with food allergies contributed to 6% of the variance in teachers' confidence in implementing food allergy emergency plans. I failed to reject Null Hypothesis 3 that the model did not predict teachers' confidence in implementing food allergy emergency plans. The model was a poor fit for the prediction of teachers' confidence in implementing food allergy emergency plans. Because the model was not significant, the individual predictors were not assessed. Results of the multiple linear regression analysis are presented in Table 8.

Table 8

Results of Multiple Linear Regression Between Knowledge of Food Allergies and Confidence in Ability to Implement Food Allergy Emergency Plans

Source	*B*	*SE*	β	*t*	*p*	VIF
Food allergy knowledge	-0.31	0.16	-0.22	-1.87	.066	1.12
Years of experience	-.000	0.07	-0.00	-0.01	.991	2.43
Age	0.20	0.15	0.26	1.40	.165	2.99
Education level	-0.20	0.09	-0.28	-2.16	.034	1.43
Gender	-0.05	0.14	-0.04	-0.36	.723	1.07
Knowledge of someone with food allergy	0.02	0.14	0.02	0.14	.889	1.17

Summary

In Chapter 4, I provided a detailed description of the data analysis based on the survey results. Survey data related to food allergies were gathered from a sample of 93

teachers for analysis. Three multiple regression analyses were conducted to determine the predictive relationships between the IVs and the DV of confidence implementing food allergy emergency plans.

- RQ1: Based on the *p* value < .001, the results were statistically significant. I rejected Null Hypothesis 1 because as teachers' confidence in their ability to care for students with food allergies increased their confidence in implementing food allergy emergency plans also increased.
- RQ2: Based on the *p* value < .001, the results were statistically significant. I rejected Null Hypothesis 2 because teachers who perceived themselves to be adequately trained to deal with food allergies had increased confidence in implementing food allergy emergency plans.
- RQ3: Based on the *p* value = .108, the results were not statistically significant. I failed to reject Null Hypothesis 3 because knowledge of food allergies was not a statistically significant predictor of confidence in implementing food allergy emergency plans.

Chapter 4 described the data collection process for the current study, results of the analysis, and a brief summary of the results. Chapter 5 presents the findings, discusses social change implications, and offers recommendation for future research.

Chapter 5: Discussion, Conclusion, and Recommendations

Introduction

The purpose of this study was to determine whether an association existed between teachers' confidence in implementing food allergy emergency plans and (a) their confidence in their ability to care for children with food allergies, (b) their level of training or experience caring for children with food allergies, and (c) their knowledge of food allergies. For this study, I used Bandura's (1977, 1988, 1989a, 1997, 2001a) SCT as my theoretical framework. The purpose of using the SCT as the theoretical framework was to help with the development of outcome-based responses to the survey items. I used a quantitative, correlational survey design to collect statistical data to identify a relationship between or among the variables. Using a quantitative research method was preferred because it allowed me to collect data and identify relationships and distributions of variables as they occurred in their natural setting (Creswell, 2009). The ultimate goal of this study was to determine teachers' knowledge, attitudes, and beliefs related to food allergy emergency plans. This chapter includes the study findings, interpretation of the results, limitations of the study, recommendations, implications for social change, and a conclusion.

Summary of Study Findings

The intent of this study was to assess teachers' confidence in implementing food allergy emergency plans. The three hypotheses tested in this study were guided by the conceptual model to identify a correlation between teachers' confidence in implementing food allergy emergency plans and their confidence in their ability to care for students

with food allergies, their level of training or experience in caring for students with food allergies, and their knowledge of food allergies.

Research Question 1

Is there a relationship between teachers' confidence in implementing food allergy emergency plans and teachers' confidence in their ability to care for students with food allergies?

H_{01}: There is no relationship between teachers' confidence in implementing food allergy emergency plans and teachers' confidence in their ability to care for students with food allergies?

H_{a1}: There is a relationship between teachers' confidence in implementing food allergy emergency plans and teachers' confidence in their ability to care for students with food allergies.

Null Hypothesis 1 was rejected because there was a relationship between teachers' confidence in implementing food allergy emergency plans and teachers' confidence in their ability to care for students with food allergies ($B = .837$, $p < .001$). The multiple regression analysis did, however, identify the model comprised of teachers' confidence in caring for students with food allergies, which contributed to 73% of the variance in teachers' confidence in implementing food allergy emergency plans. In addition, confidence in teachers' ability to care for students with food allergies was the only statistically significant predictor variable. Based on these results, a relationship existed between the variables.

As previously reported, most public schools have nurses available in the buildings at least 45% of the week, but because of budget cuts, nurses are covering many schools in a district (Robinson & Ficca, 2012). As such, it was important that teachers demonstrate confidence in their abilities to care for students with food allergies and implement food allergy emergency plans (NSBA, 2011). Morris et al. (2011) asserted that this confidence was key because of the number of school staff members reporting a wide array of barriers that caused their delay in administering medications, which included a lack of comfort with the unavailability of school nurses, not having a stock of EpiPen autoinjectors on hand, a lack of policies and guidelines, a lack of funds for training and medications, and a lack of education regarding food allergies. Job et al. (2011) further reported that even though many teachers reported receiving training from a school nurse, fatalities still occurred because of their uncertainty regarding medication administration.

Gever (2008) and Sicherer et al. (2003) asserted that part of the essential care program that teachers should have in place includes understanding food allergy emergency plans. Good food allergy emergency plans will help the teachers to understand children's food allergies, symptoms, reactions, health history, emergency contact information, medications to administer to stop the onset of allergic reactions, and proper avoidance of the allergens. An additional need exists to make children feel safe at school, so schools should develop individualized food allergy plans as well as train teachers how to implement such plans (Sicherer et al., 2003).

Research Question 2

Is there a relationship between teachers' confidence in implementing food allergy emergency plans and teachers' level of training or experience in caring for students with food allergies?

H_{02}: There is no relationship between teachers' confidence in implementing food allergy emergency plans and teachers' level of training or experience in caring for students with food allergies?

H_{a2}: There is a relationship between teachers' confidence in implementing food allergy emergency plans and teachers' level of training or experience in caring for students with food allergies.

Null Hypothesis 2 was rejected because the results indicated that teachers who believed they possessed adequate training to deal with food allergies had increased confidence in implementing food allergy emergency plans. Increased confidence produces positive outcomes, and according to Bandura (1977, 1988, 1989a, 1989b, 2001a, 2001b), self-efficacy (i.e., confidence) beliefs influence the amount of effort individuals apply toward a goal and how they perceive a task in times of difficulty. This theory can apply to further understand the need and behavior of teachers related to their attitudes, beliefs, training, confidence, and perception of success (Bandura, 1977, 1988, 1989a, 1989b, 2001a, 2001b). Based on the outcome, it was determined that there was an associated correlation between the IV and the DV, demonstrating a correlation between teachers' confidence in implementing food allergy emergency plans and their level of training or experience.

It has been proven that teachers are the first responders and should be ready with confidence to respond to allergic reactions (Weiss et al., 2004). Teachers also have the primary responsibility as first responders to manage food allergic reactions (Sicherer & Mahr, 2010). As such, teachers need training and experience in dealing with students who have food allergies. Schools should not only evaluate the plans for thoroughness but also ensure teachers' ability to access emergency medications and understand how to implement actions based on food allergy emergency plans (Moneret-Vautrin et al., 2001).

Researchers have shown that although most teachers understand the severity of food allergies, they need additional training on ways to access and implement food allergy emergency plans (Gever, 2008; Moneret-Vautrin et al., 2001). Despite the fact that training had been provided on how to administer an EpiPen, staff members have reported that only 65% of their schools provided continual or annual updated training related to the accessibility of food allergy emergency plans (Job et al., 2011). The NSBA (2011) recommended that schools not only train all staff members to recognize allergic reaction signs and symptoms to respond immediately but also post instructions throughout the schools to inform staff members on ways to access emergency medical services.

Research Question 3

Is there a relationship between teachers' confidence in implementing food allergy emergency plans and teachers' knowledge of food allergies?

H_{03}: There is no relationship between teachers' confidence in implementing food allergy emergency plans and teachers' knowledge of food allergies.

H_{a3}: There is a relationship between teachers' confidence in implementing food allergy emergency plans and teachers' knowledge of food allergies.

For this RQ, I failed to reject Null Hypothesis 3. Results indicated a weak positive association between the two variables. Because the model was not significant, the individual predictors of food allergy knowledge, years of experience, and knowledge of someone with a food allergy were not assessed. As such, I was unable to prove a relationship between teachers' confidence in implementing food allergy emergency plans and their knowledge of food allergies. This finding directly counters the findings of Garcia (2009), Gaudreau (2000), and Munoz-Furlong (2004a), who posited that staff members who have a lack of knowledge regarding food allergies lack confidence in implementing emergency plans and suffer from exacerbated feelings of discomfort.

Limitations of the Study

The first limitation of the study was the use of convenience sampling to collect all data from teachers in one school district in Decatur, Illinois. Although the survey was completed online, it was made available only to teachers of students in Pre-K to Grade 8. Although not generalized, it eliminated the possibility of getting input from those who taught higher grades, possibly affecting the representation of the entire school population. This is important because it allowed for information to be collected only from elementary school teachers, thereby negating responses from a significant portion of the teaching population: high school teachers. Had this group been explored, the results might have been generalizable.

Data were collected via an online survey; however, participants who were not comfortable using computers, who did not have access to a computer outside of the school environment with little Internet access capability, and who did not like taking surveys online might have opted not to complete the survey, reasons that would explain the low participation rate. Because of the request for confidentiality, there was no follow-up with any of the participants. Even though my phone number and e-mail address were provided to them in case they had questions or required clarification and follow-up, I received no communication from any of the participants. Finally, the response rate might have been as low as it was because of the focus was on elementary school teachers (Kindergarten to Grade 8), excluding teachers of students in junior high school and high school.

The third limitation was that depending on the circumstances and environment in which the survey was accessed, participants might not have provided honest answers for fear of revealing their lack of knowledge; instead, they might have guessed at the answers they felt were appropriate responses to the questions. The fourth limitation was that 35 teachers did not respond to the question related to grade taught, which could have meant that the participants taking the survey were not representative of the target population. A follow-up visit by the researcher might have reduced the number of participants who did not respond to the question. I had expected this problem to be remedied through the inclusion criteria listed in Chapter 3.

I focused on assessing teachers' confidence in implementing the food allergy emergency plans. I did not address specific items or requirements listed on the food

allergy plans. Limitations also could have existed because the participants were school teachers. Current events or other events could have been happening at the schools during the time of the survey that might have impacted their responses, or lack thereof. Another limitation possibly existed with some participants not being honest and guessing in their responses to some questions. Another limitation of not knowing why some participants did not complete the survey existed, especially with a staff of more than 300 elementary school teachers (Pre-K-Grade 8). I expected that more than 93 participants would complete the survey.

Recommendations

Results identified no relationship between teachers' confidence in implementing food allergy emergency plans and their knowledge of food allergies. Therefore, I recommend that future researchers broaden the topic related to teachers' knowledge of allergies. Future research is necessary because food allergies are a growing concern in the American educational system (CDC, 2011; Gupta et al., 2011), with four of every six deaths related to food allergies occurring while the children are at school (McIntyre et al., 2005).

For future studies, I would recommend assessing parental knowledge of food allergy emergency plans to ensure that they understand the requirements of the plans. As the results confirmed, no relationship existed between teachers' knowledge of food allergies and their confidence in implementing food allergy emergency plans. Future studies would be beneficial in broadening the scope of related topics. I found no studies that had assessed teachers' confidence in implementing food allergy emergency plans.

Because there has been a lack of research and because food allergies are more prevalent in the educational setting and have the potential to develop into life-threatening anaphylaxis, I feel that the need exists for additional research to examine teachers' confidence in caring for students with food allergies.

Globally, numerous countries have barriers related to not accepting responsibility for food allergies and allergic reactions in the classroom, so there is a need to understand the importance of having confidence in the ability to respond to allergic reactions. Teachers and classroom attendants should have access to food allergy emergency plans. Further investigation into teachers' levels of education might identify the need to assess their ability to confidently make decisions regarding the implementation of food allergy emergency plans.

As reported in Chapter 2, there has been limited published literature identifying teachers' confidence in implementing food allergy emergency plans. Many researchers have cited the prevalence of food allergies among school-age children and teachers being the first to respond; continual food allergy training should be provided, and even practice drills would help to increase teachers' ability to quickly respond when children experience allergic reactions. Food allergies can become life-threatening health issues (Branum & Lukacs, 2008; Sicherer et al., 2003). Food allergies in children under the age of 18 years have increased dramatically in the last 20 years, accounting for 50% of cases of anaphylaxis in school-age children in the United States (Branum & Lukacs, 2009). Food-based allergic reactions account for 90% of anaphylaxis in school-age children as the result of contact with the allergens during school activities or after consuming food

(McIntyre et al., 2005; Sicherer & Mahr, 2010; Sicherer et al., 2001; Young et al., 2009). Finally, few researchers have assessed teachers' confidence in their abilities to implement food allergy emergency plans.

Implications of the Study

The purpose of this study was to assess teachers' confidence in implementing food allergy emergency plans. The implication of the study is to create social change by raising awareness of teachers' preparedness, knowledge, and confidence when responding to food-based allergic reactions. The results of the data analysis provided innovative findings that can contribute to the larger body of knowledge while providing feedback to support positive social change by increasing awareness of teachers' knowledge of food allergies and facilitating the creation of programs based on knowledge interventions for all employees of the school district. The majority of participants were confident in their training and/or experience, but there was the potential that the 32 participants who responded were not confident in their training or experience and the participants who did not respond to the questions will use the results to help identify areas where training is needed and hopefully make an effort to pursue the training, thereby increasing confidence.

By identifying what was known about teachers' knowledge and confidence about food allergies, teachers and school administrators might be able to use the results of this study to identify policies that can be implemented to prevent potential fatalities related to food allergies. If school administrators use the results of this study, they have the opportunity to create greater awareness among the community at large and make food

allergy information accessible in areas such as vending machines; the school store; and school events (i.e., class parties, school field trips, cooking classes, and other school projects). The overall awareness that can be obtained from this study will help to create a safer school environment for children with food allergies. Furthermore, school administrators might ultimately empower teachers to educate students about food allergies and assisting in making the classroom a safe environment for all students.

Positive Social Change

Food allergies are a growing concern in the U.S. educational system (CDC, 2011; Gupta et al., 2011). An estimated 40% of students with food allergies experience reactions in schools, with 25% of children with food allergies having their first allergic reactions at school (Sicherer et al., 2010). McIntyre et al. (2005) noted that four of every six deaths related to food allergies occur while the children are at school.

As for positive social change, results of the study can provide guidance in regard to outlining specific policies ensuring that the school environment is safe for children with food allergies. These policies can assist administrators and teachers in identifying important factors, such as how to be prepared for emergencies, required training and practice drills related to food allergy emergencies, ways to create a safe environment for students with food allergies, and ensuring that food allergy emergency plans are accessible to teachers. These policies also can ensure that teachers review students' food allergy emergency plans often and that the plans are shared with other school staff who might have contact with students who have food allergies.

Other positive social change includes the opportunity for school district administrators to identify interventions needed in multifaceted areas and put such plans into action. An important social change of the study is the ability to use data collected to focus on teachers' individual preparedness to provide appropriate education-related food allergies, thereby increasing confidence in their ability to implement food allergy emergency plans. Finally, the school district can provide education to increase knowledge about food allergies to help the general population of parents and students to possibly provide advanced overall knowledge producing lasting behavioral changes to a challenging and rapidly growing health care issue.

Conclusion

Food allergies are the body's reaction to proteins in food. An estimated 6 million children have food allergies, and 18% of school-age children have allergic reactions at school (Sicherer & Mahr, 2010). With food allergies emerging among school-age children, the results add insight to the factors related to teachers' preparedness for addressing food allergies and provide school administrators with helpful information that can lead to the development and adoption of school policies to improve knowledge related to food allergic reactions at school. As previously stated, the ultimate goal of this study was to identify the potential need for additional training to educate teachers about the ways to identify and respond quickly to food allergic reactions by linking the resources related to building knowledge, skills, and abilities. I aimed to determine whether there was a need for increased knowledge, attitudes and beliefs, and training and education to increase teachers' confidence in implementing food allergy emergency

plans.

This quantitative, correlational study was conducted to determine whether an association existed between teachers' confidence in implementing food allergy emergency plans and (a) their confidence in their ability to care for children with food allergies, (b) their level of training or experience caring for children with food allergies, and (c) their knowledge of food allergies. As such, I found that teachers who were confident in implementing food allergy plans also were confident in caring for students with food allergies and tended to have a distinct level of training and experience in caring for allergic students. I also found that even if teachers had knowledge of food allergies, they were not confident in implementing food allergy plans. Because of this, I recommend that further studies focus on teachers' confidence in caring for students with food allergies, despite preexisting teacher knowledge, because of the growing number of food allergy-related incidents in the classroom setting.

This study will allow teachers and parents alike to outline plans of action for school administrators and management to take further precautions to prevent allergic reactions at school and protect future generations of students with food allergies. School administrators can use the findings of the current study as a learning tool for teachers and parents to enhance their overall confidence, knowledge, and skills to recognize allergic reactions and provide immediate interventions. With policies such as these in place, school administrators and teachers have the potential to prevent further tragedies within the school environment, thereby ensuring that the school environment is safer for students with food allergies.

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Appendix A: Approval for Target Audience to Participate in Study

To Whom It May Concern:

In meeting with Ms. Keturah (Harriett) Hawkins, she has expressed interest in doing research with Decatur Public Schools regarding, assessing teacher's knowledge of food allergies. It is my understanding that she is doing a quantitative dissertation and would be using SurveyMonkey as a means of collecting data.

As my Health Coordinator stated, "It is always a pleasure to work with someone that is a champion for school health."

As the supervisor over Health Services for Decatur Public Schools, I give my full support and approval of Ms. Hawkins utilizing data collected from this district regarding allergies in school. She will be able to obtain data from 2 high schools, 2 middle schools, 1 alternative program, and 15 elementary schools.
Should you have any questions or concerns, please do not hesitate to contact me at the above number and address.

Dr. Director of Student Services

Appendix B: Food Allergy Research Survey for Teachers (FARST)

Proceed to the next page by clicking the "NEXT" button

Section 1: Please tell me a little about who you are.

Instructions: Please complete the section below by marking the box that best corresponds with your characteristics.

- What is your age range?
  - ☐ 21–24
  - ☐ 25–44
  - ☐ 45–65
  - ☐ Over 65
- What is your gender?
  - ☐ Male
  - ☐ Female
- What is your race /ethnicity?
  - ☐ White
  - ☐ Black
  - ☐ Hispanic
  - ☐ Asian
  - ☐ Other_____
- How many years have you been employed as a teacher?
  - ☐ One year or less
  - ☐ 2 - 5 years
  - ☐ 6 - 10 years
  - ☐ 11 - 20 years
  - ☐ Greater than 20 years
- What is the highest level of school you have completed or the highest degree you have received?
  - ☐ Bachelor's degree
  - ☐ Graduate degree
  - ☐ Post graduate or Doctorate degree.

6. What grades do you teach?
   - ☐ PreK through 1st

☐ 2nd through 4th

☐ 5th through 8th.

7. Do you know anyone with a food allergy?

☐ No

☐ Yes, (mark all that apply)

☐ Me

☐ Spouse/partner

☐ Child ages 0-18

☐ Child's classmate or friend

- Relative or Friend.

Section 1.2 Confidence and training.

8. Have you had any experience or training related to food allergy emergency plans?

☐ Yes

☐ No

9. Food allergy training received from school administration adequately prepared me to care for children/students with food allergies.

☐ Yes

☐ No

10. As a teacher I am confident in my ability to manage a child's/student's food allergy emergency plan.

☐ Yes

☐ No

11. I am confident in my ability to care for children with food allergies.

☐ Yes

☐ No

Section 2: Knowledge of Food Allergies

Instructions: Please complete the following scale by marking, True, False or I don't know next to the statement listed below.

12. An allergic reaction can happen when the body considers a food to be harmful.

True ☐ False ☐ I don't know

13. Lactose intolerance (trouble digesting dairy products) is the same as having a milk allergy.

True ☐ False ☐ I don't know

14. A person can die from having a food allergy reaction.

True ☐ False ☐ I don't know

15. Hives (red bumps or blotches on the skin that can be itchy) are a common symptom of a food allergy reaction. True ☐ False ☐ I don't know

16. People with food allergies can have an allergic reaction after touching a food.

True ☐ False ☐ I don't know

17. A child with a milk allergy can still drink low-fat milk without having an allergic reaction.

True ☐ False ☐ I don't know

18. Foods eaten by a mother can be passed to her child through her breast milk.

True ☐ False ☐ I don't know

19. Acidic foods (like lemons, oranges, and tomatoes) commonly cause food allergy.

True ☐ False ☐ I don't know

20. Allergic diseases run in families.

True ☐ False ☐ I don't know

21. Food allergies can go away as a person gets older.

True ☐ False ☐ I don't know

22. Food allergy is more common in children than adults.

True ☐ False ☐ I don't know

23. The number of children in the United States who have a food allergy has been increasing over the past ten years.

True ☐ False ☐ I don't know

24. There is a cure for food allergy.

True ☐ False ☐ I don't know

25. The only way to prevent an allergic reaction is to stay away from the food that causes the allergy. True ☐ False ☐ I don't know

26. A person can take a medicine everyday to prevent having food allergy reactions.

True ☐ False ☐ I don't know

27. There is a law in the United States that requires all foods to be labeled with allergy information.

True ☐ False ☐ I don't know

28. Which of the following are the **three** most common food allergies in **children**? Mark *three* answers.

☐ Egg Peanut; ☐ Wheat Tree nuts *(almonds, walnuts, pecans, cashews)*; ☐ Milk Shellfish *(shrimp, lobster, crab).*

29. Which of the following is the most common food allergy in children?
Mark *one* answer.

☐ Milk; ☐ Peanut; ☐Shellfish *(shrimp, lobster, crab)*; ☐ I don't know.

30. A boy with a milk allergy accidentally drank some milk. Please mark which of the following could be a sign of food allergy reaction. Mark *all* that apply.

☐ After 2 days he gets hyperactive and cranky and has headaches;

☐ After 15 minutes he gets hives on his face and chest immediately his tongue swells and he has trouble breathing;

☐ He has a stuffy nose that won't go away for weeks.

Section 3: What are your thoughts about food allergies?
Instructions: Please complete the following scale by marking Strongly Disagree, Disagree Neither Agree nor Disagree, Agree or strongly agree next to the statements listed below

31. Food allergy is a serious health problem in the United States.
☐ Strongly Disagree ☐ Disagree ☐ Neither Agree nor Disagree ☐ Agree ☐ Strongly agree

32. Children with food allergies are treated differently because of their food allergy.
☐ Strongly Disagree ☐ Disagree ☐ Neither Agree nor Disagree ☐ Agree ☐ Strongly agrees.

33. Children with food allergies have overprotective parents.
☐ Strongly Disagree ☐ Disagree ☐ Neither Agree nor Disagree ☐ Agree ☐ Strongly agree

34. Children with food allergies are teased at school.
☐ Strongly Disagree ☐ Disagree ☐ Neither Agree nor Disagree ☐ Agree ☐ Strongly agree

35. For children who have a food allergy, staying away from the food that he or she is allergic to is difficult.
☐ Strongly Disagree ☐ Disagree ☐ Neither Agree nor Disagree ☐ Agree ☐ Strongly agree

36. Children with food allergies worry a lot about their allergy.
☐ Strongly Disagree ☐ Disagree ☐ Neither Agree nor Disagree ☐ Agree ☐ Strongly agree

37. It is difficult for children with food allergies to safely eat at restaurants.
☐ Strongly Disagree ☐ Disagree ☐ Neither Agree nor Disagree ☐ Agree ☐ Strongly agree

38. Having an EpiPen or Twinjet (injectable epinephrine) is important for most children with severe food allergies.
☐ Strongly Disagree ☐ Disagree ☐ Neither Agree nor Disagree ☐ Agree ☐ Strongly agree

39. Schools should have plans for keeping children with food allergies safe at school.
☐ Strongly Disagree ☐ Disagree ☐ Neither Agree nor Disagree ☐ Agree ☐ Strongly agree

40. Which of the following do you think is the most important to help children with food allergies? Mark *one* answer.
Find the causes of food allergy; develop a cure for food allergy; improve the treatments of food allergy; Find the causes of food allergy; Promote school education programs for food allergy; Promote public awareness campaigns for food allergy.

41. Which of the following would be the best way to learn about food allergy?
Mark *one* answer.
☐ Radio
to learn about food allergy; ☐ Television (TV); ☐ Handout/Brochure;
☐ Internet/Email Newspapers/Magazines; ☐ Other: _____.
42. Schools should ban all products with nuts.
☐ Strongly Disagree ☐ Disagree ☐ Neither Agree nor Disagree ☐ Agree ☐ Strongly agree
43. Schools should have special tables where children with food allergies can safely eat lunch.
☐ Strongly Disagree ☐ Disagree ☐ Neither Agree nor Disagree ☐ Agree ☐ Strongly agree
44. It would be unfair if my child could not have a peanut butter sandwich because of another student's peanut allergy.
☐ Strongly Disagree ☐ Disagree ☐ Neither Agree nor Disagree ☐ Agree ☐ Strongly agree
45. I would worry about having a child with food allergy play at my house.
☐ Strongly Disagree ☐ Disagree ☐ Neither Agree nor Disagree ☐ Agree ☐ Strongly agree
46. What would be the best way for schools to educate teachers about how to protect children with food allergies? Mark *one* answer.
☐ Handouts/brochures; ☐ Presentation at teacher in-service; ☐Parents of food-allergic children talking with teachers; ☐ Nurses talking to teachers about food allergies;
☐ other.

Thank you for taking the time to complete this survey

Appendix C: Permission to Use Survey Instrument

Research Associate
Smith Child Health Research Program, Ann & Robert H. Lurie Children Hospital of Chicago Center for Healthcare Studies, Northwestern University Feinberg School of Medicine

T 312.503.3005 |Â FÂ 312.503.2755Â |Â clau@luriechildrens.org
225 East Chicago Avenue, Box 157, Chicago, Illinois 60611-2605

On Mon, Apr 29, 2013 at 10:08 PM, Gupta, Ruchi <RUGupta@luriechildrens.org> wrote:

Hi Harriett,

You are welcome to use our surveys. Â I am cc'ing Claudia and she will send them to you. Â Good luck with your work!

Ruchi

Ruchi Gupta MD MPH
Associate Professor of Pediatrics
Director, Program for Maternal and Child Health<http://www.feinberg.northwestern.edu/chs/programs/maternalchild.html>
Center for Healthcare Studies, Institute for Public Health and Medicine
Northwestern Feinberg School of Medicine<http://fsmweb.northwestern.edu/faculty/facultyProfile.cfm?xid=17229>, Northwestern University
Clinical Attending
Ann and Robert H. Children's Hospital of Chicago
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Author of: The Food Allergy Experience<https://collaborate.northwestern.edu/owa/www.ruchigupta.com>

Appendix D: Adapted Survey Questions

Variables	Survey instrument	Original question from survey	Item # on revised survey	Modified question
Teachers self-efficacy in implementing food allergy emergency plans (DV)	The Chicago Food Allergy Research Survey for Parents of Children with Food Allergies	I feel confident that the staff in my child's school or daycare is knowledgeable in the management of food allergy emergencies	#10	As a teacher I am confident in my ability to manage a child's/student food allergy emergency plan
Self-efficacy in their ability to care for students with food allergies (IV)	The Chicago Food Allergy Research Survey for the Primary Care Physicians	I am confident in my ability to care for patients with food allergies	#11	I am confident in my ability to care for children with food allergies
Level of training/experience caring for students with food allergies (IV)	The Chicago Food Allergy Research Survey for the Primary Care Physicians	My medical training adequately prepared me to care for food allergy patients	#9	Training received from school administration adequately prepared me to care for students with food allergies
Knowledge of food allergies (IV)	The Chicago Food Allergy Research Survey for the General Public	People with food allergies can have an allergic reaction after touching a food	#16	Children with food allergies can have an allergic reaction after touching a food
		A person with a milk allergy can still drink low-fat milk without having an allergic reaction	#17	A child with a milk allergy can still drink low-fat milk without having an allergic reaction
	Attitudes belief questions	People with food allergies are treated differently because of their food allergy	#32	Children with food allergies are treated differently because of their food allergy
		For someone who have a food allergy, staying away from the food that he or she is allergic to is difficult	#35	For children who have a food allergy, staying away from the food that he/she is allergic to is difficult
		People with food allergies worry a lot about their allergy	#36	Children with food allergies worry a lot about their allergy

Variables	Survey instrument	Original question from survey	Item # on revised survey	Modified question
		It is difficult for people with food allergies to safely eat at restaurants	#37	It is difficult for children with food allergies to safely eat at restaurants

Appendix E: Chicago Food Allergy Research Survey for the General Public

The following survey is part of a study being conducted by researchers at Children's Memorial Hospital and Northwestern University Feinberg School of Medicine in Chicago, Illinois. The goal of this survey is to assess food allergy knowledge, attitudes and beliefs of the general public.

- Do you know anyone with a food allergy?
  ☐ No
  ☐ Yes (Mark *all* that apply):

  ☐ Me

  ☐ Child ages 0-18
  ☐ Spouse/partner

  ☐ Friend or relative
  ☐ Child's classmate or friend

1a. Does your child have a current food allergy that has been diagnosed by a doctor?
☐ No, Yes

We're sorry, but you are not eligible for this survey.
Thank you for your interest.

- Are you a pediatrician or a family practitioner?
  ☐ Yes
  ☐ No

We're sorry, but you are not eligible for this survey.
Thank you for your interest.

- In which state do you live?

State _____.

Please mark one box for each statement

1. An allergic reaction can happen when the body considers a food to be harmful.

True ☐ False ☐ I don't know

2. Lactose intolerance (trouble digesting dairy products) is the same as having a milk allergy.

True ☐ False ☐ I don't know

3. A person can die from having a food allergy reaction.

True ☐ False ☐ I don't know

4. Hives (red bumps or blotches on the skin that can be itchy) are a common symptom of a food allergy reaction.

True ☐ False ☐ I don't know

5. People with food allergies can have an allergic reaction after touching a food.

True ☐ False ☐ I don't know

6. A child with a milk allergy can still drink low-fat milk without having an allergic reaction.

True ☐ False ☐ I don't know

7. Foods eaten by a mother can be passed to her child through her breast milk.

True ☐ False ☐ I don't know

8. Acidic foods (like lemons, oranges, and tomatoes) commonly cause food allergy.

True ☐ False ☐ I don't know

9. Allergic diseases run in families.

True ☐ False ☐ I don't know

10. Food allergies can go away as a person gets older.

True ☐ False ☐ I don't know

11. Food allergy is more common in children than adults.

True ☐ False ☐ I don't know

12. The number of children in the United States who have a food allergy has been increasing over the past ten years.

True ☐ False ☐ I don't know

13. There is a cure for food allergy.

True ☐ False ☐ I don't know

14. The only way to prevent an allergic reaction is to stay away from the food that causes the allergy.

True ☐ False ☐ I don't know

15. A person can take a medicine every day to prevent having food allergy reactions.

True ☐ False ☐ I don't know

16. There is a law in the United States that requires all foods to be labeled with allergy information.

True ☐ False ☐ I don't know

17. Which of the following are the **three** most common food allergies in **children**? Mark

three answers.

☐ Egg Peanut; ☐ Wheat Tree nuts *(almonds, walnuts, pecans, cashews)*; ☐ Milk Shellfish *(shrimp, lobster, crab).*

18. Which of the following is the most common food allergy in children?

Mark *one* answer.

☐ Milk; ☐ Peanut; ☐ Shellfish *(shrimp, lobster, crab)*; ☐ I don't know.

19. A boy with a milk allergy accidentally drank some milk. Please mark which of the following could be a sign of food allergy reaction. Mark *all* that apply.

☐ After 2 days he gets hyperactive and cranky and has headaches;

☐ After 15 minutes he gets hives on his face and chest immediately his tongue swells and he has trouble breathing;

☐ He has a stuffy nose that won't go away for weeks.

Please mark one box for each statement below.

20. Food allergy is a serious health problem in the United States.

☐ Strongly Disagree ☐ Disagree ☐ Neither Agree nor Disagree ☐ Agree ☐ Strongly agree

21. People with food allergies are treated differently because of their food allergy.

☐ Strongly Disagree ☐ Disagree ☐ Neither Agree nor Disagree ☐ Agree ☐ Strongly agrees.

22. Children with food allergies have overprotective parents.

☐ Strongly Disagree ☐ Disagree ☐ Neither Agree nor Disagree ☐ Agree ☐ Strongly agree

23. Children with food allergies are teased at school.

☐ Strongly Disagree ☐ Disagree ☐ Neither Agree nor Disagree ☐ Agree ☐ Strongly agree

24. For someone who has a food allergy, staying away from the food that he or she is allergic to is difficult.

☐ Strongly Disagree ☐ Disagree ☐ Neither Agree nor Disagree ☐ Agree ☐ Strongly agree

25. People with food allergies worry a lot about their allergy.

☐ Strongly Disagree ☐ Disagree ☐ Neither Agree nor Disagree ☐ Agree ☐ Strongly agree

26. It is difficult for people with food allergies to safely eat at restaurants.

☐ Strongly Disagree ☐ Disagree ☐ Neither Agree nor Disagree ☐ Agree ☐ Strongly agree

27. Having an EpiPen or Twinjet (injectable epinephrine) is important for most children with severe food allergies.

☐ Strongly Disagree ☐ Disagree ☐ Neither Agree nor Disagree ☐ Agree ☐ Strongly agree

28. Schools should have plans for keeping children with food allergies safe at school.

☐ Strongly Disagree ☐ Disagree ☐ Neither Agree nor Disagree ☐ Agree ☐ Strongly agree

29. Which of the following do you think is the most important to help children with food allergies? Mark *one* answer.

Find the causes of food allergy; develop a cure for food allergy; improve the treatments of food allergy; Find the causes of food allergy; Promote school education programs for food allergy; Promote public awareness campaigns for food allergy.

30. Which of the following would be the best way to learn about food allergy? Mark *one* answer.

☐ Radio

to learn about food allergy; ☐ Television (TV); ☐ Handout/Brochure;

☐ Internet/Email Newspapers/Magazines; ☐ Other: _____.

Before continuing, please answer the following questions:

1. Do you have children under the age of 18?

☐ No

Please skip to the next page.

☐ Yes

Please continue to the next question

Do your children attend any of the following?

Please skip to the next page

Mark all that apply.

☐ No children

☐ No children in school

☐ Preschool ☐ Elementary School

☐ Middle School

☐ High School

Please mark one box for each statement below.

31. Schools should ban all products with nuts.

☐ Strongly Disagree ☐ Disagree ☐ Neither Agree nor Disagree ☐ Agree ☐

Strongly agree

32. Schools should have special tables where children with food allergies can safely eat lunch.

☐ Strongly Disagree ☐ Disagree ☐ Neither Agree nor Disagree ☐ Agree ☐ Strongly agree

33. It would be unfair if my child could not have a peanut butter sandwich because of another student's peanut allergy.

☐ Strongly Disagree ☐ Disagree ☐ Neither Agree nor Disagree ☐ Agree ☐ Strongly agree

34. I would worry about having a child with food allergy play at my house.

☐ Strongly Disagree ☐ Disagree ☐ Neither Agree nor Disagree ☐ Agree ☐ Strongly agree

35. What would be the best way for schools to teach parents about how to protect children with food allergies? Mark *one* answer.

☐ Handouts/brochures in the mail;

☐ Presentation at teacher in-service; ☐ Parents of food-allergic children talking to other parents; ☐ Doctor or nurses talking about food allergies;

☐ other: _____

Please tell us about yourself

1. How old are you?

☐ 18– 24
☐ 25–44
☐ 45–65
☐ Over 65

2. What is your gender?

☐ Male ☐ Female

3. What is your race /ethnicity?

☐ White
☐ Black
☐ Hispanic
☐ Asian
☐ Other_____

4. What is the highest education level you have completed?

☐ Less than high school ☐ 4-year college

☐ High school ☐ Graduate school
☐ 2-year college

5. Which of the following categories best represents the **combined income for all family members in your household** for the past 12 months before taxes?

☐ Less than $25,000 ☐ $75,000 - $99,999
☐ $25,000 - $49,999 ☐ $100,000 - $149,999
☐ $50,000 - $74,999 ☐ $150,000 or more.

6. Have you had any experience or training with food allergy through your job or work?

☐ Yes ☐ No

Thank you! You have completed this survey.

Appendix F: Explanation of Scoring Process

Demographic and Yes or No Questions

There are 6 demographic questions (1-6) requiring one specific response. There is no right or wrong answer, therefore a response to each question will receive .05 points. If the participant responds to all 6 questions, then a total of 3 points is assigned. Zero points will be assigned to questions with no response. Additionally, in this section of the survey there are 5 questions (7-11) requiring "yes or no" response. The response to these questions is specific, there is no right or wrong answer. A yes response will yield .05 points, a no response will yield 0 points, as well as no response to a questions in this section will yield 0 points. There is the possibility for a total of 2.5 points for 7-11.

True/False/I don't know Questions

There are 15 knowledge items on the survey that require responses to true, false, or I don't know questions. Responses will be scored as follows: correct responses are worth 5 points, incorrect responses are worth 0 points, and I don't know responses are given 0 points. The number of possible points for the 15 true/false/I don't know questions is 75, with scores ranging between 0 to 75.

Multiple-Choice Questions

The survey has 4 multiple-choice knowledge questions with "mark one answer" are worth 1 point for the correct response, and 0 points for incorrect response. The two-part or variety multiple-choice questions are worth 1 point for the correct response to both parts of the question, .05 points for one correct response, 0 points for incorrect response 0 points for no response.

Likert Scale Questions

The surveys have a total of 15 Likert scale items addressing attitudes and belief about food allergies with 5 response categories: neither agree nor disagree = 0, strongly disagree = 1, disagree = 2, agree = 3, strongly agree = 4. If the participant “strongly agrees” then 2 points will be given for the questions. However, if the participant strongly disagrees than -1 point will be deducted, no point will be added or deducted for neither agrees nor disagrees. The total possible points for answering all questions correctly range between 2 to 30, with a deductible point range between -1 to -30.

Scoring

To calculate the mean, survey response values for each of the three sections will be added together to create a sum. The number of total questions on the instrument will then divide the sum or the number of participants that complete the survey. This will provide a composite score for the instrument.