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Pediatric Peanut Allergy Prevalence Review: An Integrative Review of Literature

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Abstract

**Background:** The rates of childhood allergies are increasing, prompting the need for continued research. The specific immune reaction to the allergen, peanuts, is the highest reported food allergy in children. The gap in knowledge is regarding the reasons behind the increased prevalence rates and the discrepancies in recommended guidelines for infant introduction of peanuts.

**Purpose of Study:** The review of studies narrowed down the reasons for prevalence and combined the current research into one integrative review. Additionally, the research standardized protocol recommendations for the early introduction of peanuts in infancy. The integrative review consolidated recent research on peanut prevalence and closed the gap in discrepancies.

**Method:** This literature review examined the prevention methods prescribed by medical professionals and allergies as a public health issue. This review used the databases CINAHL, PubMed, and Proquest. Search terms included peanut allergies, prevalence, genetic predisposition, and early exposure.

**Result:** The increased prevalence of peanuts allergies in the pediatric population has tripled in the last 15 years. The research identified a genetic predisposition, environmental influences, and a hygiene hypothesis as leading causes behind the increased allergy prevalence. The research also stated early introduction of peanuts into an infant’s diet reduces pediatric peanut allergy rates.

**Conclusion:** Continued research is needed to analyze the information on why there is a dramatic increase in peanut allergy. Researchers have amended guidelines for the early introduction of peanuts for infants but the advice to avoid delaying the allergen is still widespread.
Pediatric Peanut Allergy Prevalence Review

**Background**

Pediatric peanut allergy prevalence has increased enough in the last 20 years to warrant further research into the causation. According to Food Allergy Research and Education (FARE), a national organization advocating for food allergies, 3 million American children report peanut allergies (2017). From 1997-2013, the Centers of Disease Control reported an increase of 50% in food allergies (Food Allergy Research and Education, 2017). In the last 15 years of focused research on the topic, peanut allergies have nearly tripled with more than 2% of pediatric patients being affected (Reddy, 2015). The recorded incidence rates vary by geographical location due to patient’s self-reporting of the allergy versus medical diagnosis.

The FARE’s findings on pediatric allergies in the United States warranted pediatric allergies to become a public health issue. This prevalent health problem has several proposed reasons for the reasoning behind the increase. The reasons range from ideas on genetic predispositions, environmental influences, and a hygiene hypothesis (Liu, 2007). The recent study of introducing peanuts into an infant’s diet earlier follows research studies in Europe. Medical professionals have revised the previous recommendations of waiting to introduce the allergen. Newer studies suggest early exposure to the allergen during infancy is a better preventative measure (Reddy, 2015). The findings studied infants at risk for developing the allergy due to genetic predisposition or a sibling with the allergy. Now as early as four months of age, an infant should have at least three exposures to peanut powder to introduce the allergen (Reddy, 2015).

Despite the increased prevalence, a protocol for treatment and prevention strategies has not been standardized. A protocol would specify introduction of peanuts to an infant, the effect
of peanuts during maternal gestation, and newer treatment options. In the last five years, the recommendation on early exposure to peanut powder in infancy was lowered to 4 months of age for high-risk infants (Collins, 2017). The term high risk is infants with eczema, asthma, egg allergy, or a positive result on a skin prick test (Collins, 2017). Gideon Lack, a professor of pediatric allergy at King's College of London and senior author of the study states, "At least with respect to peanuts, avoidance may actually worsen the problem" (Reddy, 2015). The immune system is not required to work without exposure thus preventing proper immune cascades (Reddy, 2015). During an allergic response, IgE reacts to the peanut by attacking the body rather than responding normally to the food (Reddy, 2015). It is not only the peanut that causes the reaction in patients but several simultaneous immune responses (Reddy, 2015).

**Problem Statement**

The problem of increased prevalence of pediatric peanut allergies affects future generations interactions with food. The research focuses on ways to improve the life of pediatric patients with this allergy as well as ways to prevent the continued increasing numbers of peanut allergies. The gap in the standard protocol for early introduction of peanuts for infants is an issue for pediatric medical professionals and parents alike. My integrative review will address the gaps in standardized protocol and reasons behind the increased prevalence.

**Purpose**

The purpose of this integrative literature review is to examine the increased prevalence of pediatric peanut allergies. The proposed theories allowed researchers to focus their efforts on prevalence rates and prevention protocol. Additionally, it will include a review of experts’ recently amended guidelines on exposure to peanuts for infants.

**Research Questions**
The following research questions will guide this study:

1. Which researched hypothesis proposes the overall rationale for the increase in peanut allergies?

2. What are the recommendations for early introduction of peanuts for infants?

**Conceptual Framework**

The primary focus of pediatric allergy research is protection against severe reactions and stressors. This literature review will use Betty Neuman’s systems model to analyze the multidimensional factors in pediatric peanut allergies (Nursing Theory, 2016). The system theory is based on the patient’s relationship to stress, reaction to it, and reconstituting factors that are dynamic. The resources patients use to combat stressors are their normal line of defense and flexible lines of resistance (Nursing Theory, 2016). The probable stressors associated with this research question are food avoidance behaviors and how this affects social interaction. In line with this theory, the normal line of defenses against an allergen is compromised and incapable of protection. As referenced in this theory, the well being of the patient is dynamic and continually changing with allergen interaction.

**Methods**

**Research Design**

This literature review used an integrative approach to examine the pediatric peanut allergy prevalence. The analysis concentrated the information presented in the most recent studies. This literature review clarified the protocol utilized by doctors for recommendations on allergy prevention. The appropriate introduction of peanuts into infants’ lives has changed in the last five years thus requiring a review of the literature for conclusive reasoning. Because of the recent changes, there is not a standard recommendation by allergists and pediatric disciplines.
An integrative review of research is used to identify, analyze, and synthesize results from independent studies to determine the current knowledge in a particular area (Burns, Grove, 2015). This format of study review is appropriate for consolidation of quantitative and qualitative research. The information gathered in this integrative literature review will create a framework for prevention protocol for peanut allergies.

**Literature Search Strategies**

This literature review gathered information from evidence-based journals and clinical trials creating an encompassing review of the research. The sources are from the database: Cumulative Index of Nursing and Allied Health (CINAHL), PubMed, and ProQuest Nursing and Allied Health Source. The searches produced hundreds of results but were narrowed down by the use of new keywords and limiting the publication date to the last seven years. The keywords used in searches of the databases were combinations of: pediatric peanut allergies, food allergies, and pediatric allergy prevalence. Throughout the search process terms like: reason, increase, and prevalence allowed for more specific research articles. The databases provided a framework of research comparing preliminary beliefs about the condition and newer treatment and preventative measures.

**Literature Search Limitations and Inclusion/Exclusion Criteria**

Inclusion criteria: Sources used for the literature review were limited to articles written in the last seven years and within the nursing and medical disciplines. The articles were taken from only peer-reviewed journals where the full text version was available. The research articles included reports on new guidelines from researchers, clinical trial results, and prevalence rates reported by the CDC. The literature search included patients within the pediatric discipline of 21 years old or younger.
Exclusion criteria: The articles reviewed excluded any allergies not specifically to the peanut allergen. This exclusion removed allergies to tree nuts. Additionally, the research searches excluded treatment clinical trials currently in progress and trials performed on non-human subjects.

**Data Synthesis**

The data collected from the literature searched is organized according to the dominant themes. The research was analyzed appropriately manner so the reader can understand the basis of research found in the sources. The synthesis of data was discussed as a literature review of the problem.

**Data Reduction:** The studies were divided into groups according to which research question they answer. The first group of articles addressed the increased prevalence of pediatric peanut allergies while the second group will make recommendations on protocol for early introduction. This phase of the research organization facilitated logical understanding of how the prevalence rates of allergies lead to increased research on the early introduction of peanuts.

**Data Display:** The selected research studies presented information on causation behind increased prevalence rates for pediatric peanut allergies. Additionally, the research focused on the protocol of early exposure to peanuts in high-risk infants. The variables in these studies include early exposure, direct vs. indirect exposure, and sensitization. In the display, the author, year, design type, concepts, and results were displayed. The figure included common themes found with each article and how it relates to my purpose statement.

**Data Comparison:** I compared the results of the studies and literature reviews to formulate a cohesive guide of recommendations. For reference, I compared older recommendations for peanut allergy prevention in infancy to the new amended guidelines. This
comparison examined the data to identify themes within each study and correlating relationships between my researches.

**Results**

The results of the literature search identify three researched reasons for increased the prevalence of peanut allergies. The ideas discussed are the hygiene hypothesis, genetic predispositions, and environmental influences. Also, there is a review of guidelines for early introduction vs. later introduction of peanuts in an infant’s life.

**Hygiene Hypothesis**

The elimination of pathogens and allergens in an infant’s life leads to a full immune response when first interacting with these later in life. The early research shows a link between reduced microbial exposure and an increase in allergy prevalence. The interaction with microbes plays a role in the immune response and has contributed to the increase in allergic responses (Bloomfield, Rock, Scott, 2016). The development of the sophisticated defense pathways of the immune system is not occupied with frequent targets thus it attacks allergens as microbes (Asthma and Allergy Foundation of America, 2016). New preventative strategies supporting this reasoning theory aim to educate parents and medical professionals on the importance of natural interaction with microbes and limited antibiotic use (Lambrecht & Hammad, 2017).

**Genetic Predisposition**

There is evidence that genetic factors play a role in food allergies, but the specific genetic loci related to food allergies have not been identified (Hong, Tsai, & Wang, 2009). The term high risk in regards to allergies refers to infants being predisposed to acquiring allergies from their genes. High-risk infants often have eczema, other allergies, asthma, and a sibling or parent
with a food allergy. Genetic susceptibility alone does not explain the increase in the prevalence of food allergies but does contribute to a large number of reported cases (Dreskin, 2006).

**Environmental Influences**

The research supporting environmental influences as a sole reason for pediatric peanut allergy increase is limited. Researchers examined peanut production but found that production has not changed in the last twenty years. The environment directly influences the type of flora in the gut and thus affects the interaction between allergens and the gut. Through epidemiological studies, researchers suggest a relationship between air pollution and development of asthma and other allergic reactions (Jenerowicz, Polanska, & Olek-Hrab, 2012). The Division of Allergy and Clinical Immunology at the University of Texas researched the risk factors of diet, air pollution, food production, and psychological stress as contributing factors to allergies. The better understanding of these influences on the prevalence rates of allergies sets improves modes of treatment and prevention.

**Addendum to Early Introduction of Peanuts**

The previously recommended delaying of allergens such as peanuts in an infant’s life was changed in response to research with peanut consumption and peanut avoidance in the first year of life. A research study conducted found, the peanut consumption group had a prevalence of peanut allergy that was 74% lower than the incidence in the peanut-avoidance group (Du Toit, et al., 2016). The addendum provides 3 separate guidelines for infants at various risk levels for the development of peanut allergy and is intended for use by a wide variety of health care providers.

The guidelines recommend that infants with severe eczema, egg allergy, or both the have introduction of age-appropriate peanut-containing food as early as 4 to 6 months of age to reduce the risk of peanut allergy. Infants at the highest risk for developing an allergy should have
allergy testing to determine any other allergies. Other solid foods should be introduced before peanut-containing foods to show that the infant is developmentally ready. The total amount of peanut protein to be regularly consumed per week should be approximately 6 to 7 g over 3 or more feedings (Baker, et al., 2017).

**Discussion**

The recent Learning Early About Peanut (LEAP) study is the first prospective, randomized controlled trial to show a relative risk reduction of up to 80% with early — versus late — peanut introduction in children at high risk for allergy (Abrams, Becker, 2015). In this study, the rate infants who consumed peanuts in their first year of life and then having a peanut allergy was 3.2% whereas the group who avoided peanuts had a rate of 17.2% (Abrams, Becker, 2015). The results of the studies reviewed show a direct correlation between early introduction of peanuts leading to a reduced rate of peanut allergies.

**Limitations**

A limitation to the research was the wide variety of reasoning behind the increased prevalence. Although there is a known problem with the prevalence rate, the research cannot identify one risk factor or cause to the high increase in rates. There was significant research to complete this integrative research review; more comprehensive data needs to be collected for one reason can be selected as the cause. In several of the research articles reviewed, the sample size was small and limited to a specific population already receiving treatment. The consequences of a pediatric peanut allergy are significant for a lifetime. Peanut allergies are almost never grown out of and can continue to evolve throughout a patient's’ life (Warner, 1999). Without proper testing and avoidance of the allergen, peanut allergic responses are lethal (Warner, 1999).

**Nursing implications**
The nursing field focuses on patient-centered care and education of the pediatric allergy patients. Nurses teach vital, life-saving measures for severe allergies like peanuts. Peanuts are the most deadly allergen with the highest rate of mortality associated with accidental ingestion (Reddy, 2015). Nurses teach symptom identification following consumption of peanuts and work with families to understand the immune system’s response (Reddy, 2015). Nurses identify high-risk patients for severe hypersensitivity reaction and take preventative measure for them. Adherence to these clinical practice recommendations can help potentially reduce the number of peanut allergy reactions per year. However, this is accomplished with the cooperation of parents and health care provider recommendations (Rickman, Duby, Peters, & Freigeh, 2017).

Nurses in the UK are working to create allergy/asthma clinics to reduce the need for secondary referrals and prompt accurate diagnosis. This would allow specialized nurses to monitor chronic diseases like an allergy and effectively manage comorbidities (“Role of Nurse Lead-Care”, 2005). These types of clinics are an additional resource for parents and patients. Nurses would advise on their condition and offer supplemental demonstration and education. These nurses are well versed in current and upcoming clinical trials available and may find suitable patients (“Role of Nurse Lead-Care,” 2005).

**Future Research**

Researchers look into multiple generations to compare the outbreak of different illnesses, diseases, and health patterns. Although the geriatric populations suffered from several diseases that are no longer prevalent, the 50% increase in allergies reported by the CDC demonstrates the difference in generations affected by pediatric allergies (Food Allergy Research & Education, 2016).
Furthermore, research in pediatric peanut allergies can significantly affect future generations. If we continue to follow the steep trend upwards an even larger population of our youth will have allergies. I would continue research on early exposure to allergens and its ability to prevent allergic responses in those patients. The recent change in protocol for peanut power in infants to an earlier age shows promising results in changing the likelihood of developing a peanut allergy. Considering the difference in reported allergies from generations born in the early 1900s, I would compare their environmental factors and genetic makeup to find a reasonable cause.

Conclusion

This integrative review outlined the steps to researching the prevalence of pediatric peanut allergies. The search strategies and data synthesis compiled the evidence in related to the proposed purpose statements. The integrative literature reviewed examined medical recommendations for prevention of peanut allergies in infancy but also identified gaps in knowledge about the issue. This literature received complied information for pediatric allergists as well as thoroughly explained the process of an allergies impact on the body. This review looks at the multifaceted medical problem that is pediatric peanut allergies.
References


Journal of Allergy and Clinical Immunology: In Practice, 3(5), 649-651. doi:10.1016/j.jaip.2015.07.015


## Appendix

<table>
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<tr>
<th>Author Source</th>
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<th>Purpose</th>
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<td>Toit, Roberts, Sayre et al (2016)</td>
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<td>555 High risk infants</td>
<td>12 month avoidance effect on allergy</td>
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