Does the Hygiene Hypothesis Contribute to Autoimmune and Allergic Disease in Children With Focus on Type 1 Diabetes Mellitus and Asthma

Chad Briley
University of North Dakota

Follow this and additional works at: https://commons.und.edu/pas-grad-posters

Part of the Allergy and Immunology Commons

Recommended Citation
Briley, Chad, "Does the Hygiene Hypothesis Contribute to Autoimmune and Allergic Disease in Children With Focus on Type 1 Diabetes Mellitus and Asthma" (2016). Physician Assistant Scholarly Project Posters. 64.
https://commons.und.edu/pas-grad-posters/64

This Poster is brought to you for free and open access by the Department of Physician Studies at UND Scholarly Commons. It has been accepted for inclusion in Physician Assistant Scholarly Project Posters by an authorized administrator of UND Scholarly Commons. For more information, please contact zeinebyousif@library.und.edu.
**Does The Hygiene Hypothesis Contribute to Autoimmune And Allergic Disease In Children With Focus on Type 1 Diabetes Mellitus and Asthma**

**Chad Briley, PA-S**
Department of Physician Assistant Studies, University of North Dakota School of Medicine & Health Sciences
Grand Forks, ND 58202-9037

---

**Abstract**
The Hygiene Hypothesis first introduced in 1989 by an epidemiologist, Dr. Strachan, as he observed an increased prevalence of allergic diseases in society. Further clinical studies and research have included autoimmunity and inflammatory disease under the umbrella of the Hygiene Hypothesis. Article searches were done in the electronic medical database, PubMed, for articles related to the Hygiene Hypothesis and autoimmunity related to Type 1 Diabetes Mellitus (T1DM) and hygiene hypothesis and childhood asthma. Articles written in the last five years were utilized for the project. The subject group is male and female children ages 18 to 29 years old with subject populations throughout the world. Research has shown that the decreased burden on the immune system due to declining family sizes, improved household amenities, higher standards of personal cleanliness, vaccinations and antibiotic use have begun to alter how the immune system responds to pathogenic stimuli as well as nonpathogenic stimuli. These are factors leading to increased autoimmunity and atopy found in children of modern society. Further study is indicated for understanding about what causes some of these conditions in modern societies. This has applications towards antibiotic use, trendy hygiene practices and further understanding of the environmental causes of these and other more common conditions.

**Research Question**
Does the Hygiene Hypothesis Contribute to Autoimmune and Allergic Disease in Children with Focus on Type 1 Diabetes Mellitus and Asthma?

**Discussion**
- “Bacterial and viral infection during early life shift the balance of the maturing immune system toward Th1, away from pro-allergic Th2 responses, and the reduction in the microbial burden leads to weaker Th1 immune response, thus weakening the control of Th2 responses that cause allergy” (Figureo et al., p3 2013).
- “Genetic basis has not undergone any major changes in such a short period of time, environmental factors are highly suspected to be responsible for recent outbreaks” (Versini et al., p15 2013).
- “In 1998, about one in eight children in industrialized countries suffered from allergic diseases such as asthma, allergic rhinitis or atopic disease. This proportion has tended to increase over the past 10 years, asthma becoming epidemic phenomenon” (Okada, Kuhn, Feillet, & Bach, 2010).
- The incidence of asthma ranges from 2-3% in developing countries to 20-40% in developed countries. “This immunomodulation (from parasitic invaders), by avoiding an excessive activation of the immune system contributes to host protection against inflammatory disorders” (Versini et al., 2013).
- “Only 10% of those who are genetically predisposed to type 1 DM actually develop the disease” (D’Angeli et al., 2010).
- “The rise in Type 1 Diabetes Mellitus in western Europe and the USA during the twentieth century correlates strikingly with the decline in helminth infections” (Rook, 2012).
- Subjects growing up on a livestock farm were significantly less likely to suffer from asthma than subjects growing up in a city. The study population included 1181 cases of asthma (10.6%) and 2133 cases with wheeze (19.1%). Corresponding to an incidence of 2.14 per 1,000 persons-years for asthma and 3.94 for wheeze. (Timm, 2015)
- “The risk of asthma by age 7 is reduced by approximately 40% in children with two or more reported episodes of common cold in the first year of life” Kondrashova (2012)
- “In 1998, about one in eight children in industrialized countries suffered from allergic diseases such as asthma, allergic rhinitis or atopic disease. This proportion has tended to increase over the past 10 years, asthma becoming epidemic phenomenon” (Okada, Kuhn, Feillet, & Bach, 2010).
- “The rise in Type 1 Diabetes Mellitus in western Europe and the USA during the twentieth century correlates strikingly with the decline in helminth infections” (Rook, 2012).
- Subjects growing up on a livestock farm were significantly less likely to suffer from asthma than subjects growing up in a city. The study population included 1181 cases of asthma (10.6%) and 2133 cases with wheeze (19.1%). Corresponding to an incidence of 2.14 per 1,000 persons-years for asthma and 3.94 for wheeze. (Timm, 2015)
- “The risk of asthma by age 7 is reduced by approximately 40% in children with two or more reported episodes of common cold in the first year of life” Kondrashova (2012)

**Applicability to Clinical Practice**
- “Bacterial and viral infection during early life shift the balance of the maturing immune system toward Th1, away from pro-allergic Th2 responses, and the reduction in the microbial burden leads to weaker Th1 immune response, thus weakening the control of Th2 responses that cause allergy” (Figureo et al., p3 2013).
- “Genetic basis has not undergone any major changes in such a short period of time, environmental factors are highly suspected to be responsible for recent outbreaks” (Versini et al., p15 2013).
- “In 1998, about one in eight children in industrialized countries suffered from allergic diseases such as asthma, allergic rhinitis or atopic disease. This proportion has tended to increase over the past 10 years, asthma becoming epidemic phenomenon” (Okada, Kuhn, Feillet, & Bach, 2010).
- The incidence of asthma ranges from 2-3% in developing countries to 20-40% in developed countries. “This immunomodulation (from parasitic invaders), by avoiding an excessive activation of the immune system contributes to host protection against inflammatory disorders” (Versini et al., 2013).
- “Only 10% of those who are genetically predisposed to type 1 DM actually develop the disease” (D’Angeli et al., 2010).
- “The rise in Type 1 Diabetes Mellitus in western Europe and the USA during the twentieth century correlates strikingly with the decline in helminth infections” (Rook, 2012).
- Subjects growing up on a livestock farm were significantly less likely to suffer from asthma than subjects growing up in a city. The study population included 1181 cases of asthma (10.6%) and 2133 cases with wheeze (19.1%). Corresponding to an incidence of 2.14 per 1,000 persons-years for asthma and 3.94 for wheeze. (Timm, 2015)
- “The risk of asthma by age 7 is reduced by approximately 40% in children with two or more reported episodes of common cold in the first year of life” Kondrashova (2012)

**References**

---

**Acknowledgements**
Thank you to my advisors, Dr. Kurtz, Professor Amsbaugh and Dr. McCleary for all of your help and guidance on completing this scholarly project. Also, I thank my wife Erin Briley for her patience and support in completion of this project. Without your help and guidance on completing this project, I would never be able to accomplish so much!