Breathe Easier with the Hygiene Hypothesis

Introduction

The increase of asthma and allergies in children and adults has led scientists to discover what is causing this alarming increase. One of the answers that scientists found is the hygiene hypothesis. Hygiene hypothesis suggests that because children are not exposed to bacteria and infections at a young age, their immune systems are less resistant to infections later in life. Such infections include asthma and allergies.

There is also an inverse relationship between the decrease of family farms and the increase of asthma and allergy sufferers. This relationship has been shown through many different studies conducted throughout Europe (Kabesch & Lauener, 2004). Asthma and allergies are characterized by production of a specific immunoglobulin E (IgE) against common allergens such as house dust mites, pollen, or animal dander. A large percentage of the cases in the last five years of asthma occurred in industrialized nations. There are several factors that contribute to this increase in these nations including the decreased family size and fewer family farms.

Purpose

The purpose of this research brief is to describe the hygiene hypothesis and its possible relationship with agriculture. A literature review of the hygiene hypothesis and agriculture provided information about asthma and allergies, their causes, and methods of prevention. Three common themes, sibling effect; day care attendance and farm life, resulted from this literature review. However a more in-depth discussion of the hygiene hypothesis is needed to understand these terms.

Hygiene Hypothesis

The hygiene hypothesis is a theory which scientists have developed that could help us understand why more children today suffer from allergies and asthma as opposed to 50 years ago. The hypothesis is that people today live in an environment so clean and free of naturally occurring infections and microbial exposure that their immune systems do not build anti-bodies to prevent certain infections from harming their systems (Liu & Murphy, 2003). Many researchers also blame the increase of asthma and allergy cases to the decreasing family size which we have seen occurring in the last 50 years. (Shaub & Mutius, 2006) The theory also leads researchers to believe infections and unhygienic contact might give protection against the development of asthma and allergies.

Before looking more in-depth at the three most common themes within hygiene hypothesis research, it is important to highlight the complex nature of the hygiene hypothesis. It is similar to a jigsaw puzzle because it has four distinct pieces which must be assembled for the hygiene hypothesis to exist. Those four pieces are: the affected phenotype, time, the
environment, and genetic susceptibility. (Shaub, 2006)

Note: From “Hygiene Hypothesis: Fact or Fiction?” by A. Liu and J. Murphy, 2003, Journal of Allergy and Clinical Immunology, p. 472. Copyright 2003 by the Journal of Allergy and Clinical Immunology.

Sibling Effect
Fifty-three different studies have shown that the decreased family size has increased the odds of a child getting asthma and allergies. The number of cases of asthma could be reduced by 28% with a larger family size (Borchers, Keen, & Gershwin, 2005). Family size has been shown to have a negative correlation with asthma and hay fever development. The 53 studies were conducted using the decreasing family size from 1961 to 1991 (Borchers et al., 2005). It has also been observed that having more siblings is associated with less prevalence of allergies and asthma. This protection is found to occur generally within the early childhood years. The theory is that children will pick up infections from unhygienic contact with older siblings by the child or prenatal contact by the mother (Borchers et al., 2005).

Day Care Attendance
Studies have shown a correlation between day care attendance (group involvement) and the development of asthma and allergies (Borchers et al., 2005). This is partially due to the much greater risk of early infection to which children are exposed. Children in group settings such as schools and daycares exhibited wheezing and other hay fever symptoms. Researchers say this is because school and day cares are not as clean as most home environment. (Shedd et al., 2007) Schools and day cares generally have a small roach, dust mite, and dust problem. These three factors aggravate the already pre-existing asthma and allergy problems. Scientists are still working on completing the mystery as to why this correlation exists as compared to the sibling effect (Borchers et al., 2005).

Farm Life
Several European studies have shown there is a negative relationship between children raised on a family farm and the development of asthma and hay fever. (Kabesch & Lauener, 2004) This is due to several factors including: more pets, larger family size, heating with wood and coal, more dampness, and different dietary habits. Children on family farms are usually exposed to the farm life at a very early age. Generally this is within the first year of life. This is because both parents have to work outside and do the chores on the farm so they must take the child with them. Children that grow up on family farms are expected to help with the chores so they are exposed to
the dirt, pollen, and livestock on a daily basis (Kabesch et al., 2004).

**Conclusion**

After researching the subject and reading the acquired information, several factors were found to contribute to the increase in asthma and hay fever. The similar theme between all factors is parent involvement. Parents have a greater impact than ever-imagined on the development of asthma and hay fever in children. They contribute through genetics and the environment in which children live.

The studies have shown that family pets can do more for children than just teach them responsibility. Exposure to pets and pet dander helps children to build up their immune system. Pets also carry different types of bacteria into children’s environment which helps them build their immunity. Researchers also suggest that children be exposed to farm animals during the first few years of life. This is due to the bacteria that animals naturally carry. This exposure helps children’s systems build antibodies to resist the bacteria.

Research on the hygiene hypothesis is nowhere near completed. New studies are constantly being done to answer some of the questions about asthma, allergies, and their causes. There are still many questions that scientist are searching to answer in regards to the hygiene hypothesis. As with any hypothesis there are opponents to the hygiene hypothesis. The best advice for anyone who suffers from asthma or allergies is to remember that prevention can only be done before there is a problem.

**Audience**

Research in this brief will be beneficial to pediatricians and allergists who are treating children with asthma and allergies. It will also help doctors to share with parents some of the causes of asthma so the parents can better understand the disease.

**References**


