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Strabismus in children and its relationship with family history of strabismus: a descriptive study

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Abstract

Strabismus in children is a visual disorder characterized by an imbalance in the eyes, where the eyes do not look in the same direction and the condition is common among children, and it can be the result of many effects such as eye muscle disorders or an imbalance of force between the eyes. The aim of this study is to investigate the relationship between strabismus in children and its association with a positive family history of the condition. This literature review explores the relationship between strabismus in children and its association with a positive family history of the condition. The review encompasses four key areas: the introduction to strabismus in children, the definition and measurement of family history, the prevalence and magnitude of strabismus in children with a positive family history, and the genetic factors and familial patterns of strabismus. The results emphasize the important role that family history plays in strabismus prevalence and

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clinical consequences. In comparison to the general population, children who have affected family members, especially first-degree relatives, have a greatly increased risk of getting strabismus. The development of strabismus is significantly influenced by genetic factors, and familial patterns point to a significant genetic influence. The study recommends early detection & screening, increased awareness and education, as well as genetic counseling for families in making decisions about family planning and overseeing their children's visual health.

Keywords: *Strabismus, Family History, Children, Genetic factors*.

1. Introduction:

Children frequently experience strabismus, a visual disease defined by the eyes' misalignment. It poses a serious public health risk since it affects between 2 and 4 percent of children worldwide. Research indicates that there is a significant connection between family history and the emergence of strabismus, despite the fact that the precise causes of this problem are not entirely understood (Buffenn, 2021).

The risk of strabismus has acknowledged to be influenced by family history, as has been the case for many other illnesses. Children who have a family history of strabismus are more likely to experience the problem themselves, according to numerous studies. In fact, having a first-degree relative with the illness considerably increases the risk; siblings of people who are affected have a 10-fold higher risk of contracting it than members of the general population (Zedan et al., 2023).

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The fact that strabismus is heritable shows that a genetic factor contributes to its development. The development of the visual system and eye muscle control are two areas where research has found multiple potential genes that may be involved in the disorder. However, the genetic causes of strabismus are probably complicated, including a confluence of numerous genes and environmental variables (Althiabi et al., 2023).

Familial patterns of strabismus may also result from shared environmental factors among homes, in addition to genetic predisposition. For instance, a family member's strabismus may develop because of specific lifestyle decisions or environmental exposures. Additionally, the chance of strabismus development may be influenced by familial patterns of eye health and visual habits, such as reading or screen usage activities (Eroğlu et al., 2020).

Hence, it is crucial to recognize the connection between strabismus and family history in order to properly diagnose, treat, and counsel afflicted children. Therefore, this study aims at looking into the connection between childhood strabismus and a family history of the condition.

2. **Research Problem:**

A family history of strabismus is known to increase the likelihood of getting the disorder, following trends seen in a number of other diseases. Numerous studies have repeatedly shown that children who have a confirmed family history of strabismus are much more likely to develop

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the condition themselves. Particularly, the risk is significantly increased if a first-degree relative has been identified as having strabismus. According to the results of these investigations, siblings of affected people have a 10-fold higher risk of developing strabismus than people in the general population (Shrestha et al., 2020).

Therefore, the research gap in this study is the requirement for a thorough analysis into the relationship between childhood strabismus and its association with a family history of strabismus. Despite the fact that prior research has demonstrated a connection between family history and the emergence of strabismus, more research is still needed to comprehend the scope of this association, the underlying genetic factors at play, and the potential impact of shared environmental factors among families. Furthermore, it is important to investigate the effects of familial strabismus patterns on the methods used to diagnose, treat, and counsel affected children. By filling in these knowledge gaps, this study hopes to advance strabismus clinical care strategies and make significant contributions to the field of pediatric ophthalmology.

3. Significance of the study:

The importance of this research lies in its ability to improve the knowledge of the connection between childhood strabismus and its connection to a family history of strabismus. The study intends to address numerous significant issues by examining the frequency and size of this link, as well as the genetic and environmental factors involved.

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First off, the results of the study can offer important insights on how to estimate the risk of strabismus in young infants. Healthcare providers can help patients who may need closer monitoring and early intervention by identifying those who may have an increased risk due to a positive family history. This information can help doctors diagnose patients more accurately and prompt therapies can improve impacted children's visual outcomes.

The study's conclusions also have ramifications for family planning and genetic counseling. The likelihood of passing the condition down to future generations might be discussed between parents and medical professionals in light of the association between strabismus and family history. Families can use this knowledge to make educated decisions about having children and to get ready for any potential problems with a child's vision.

Finally, the study adds to the body of clinical and scientific understanding about strabismus. It advances the knowledge of the illness and its familial patterns by filling the knowledge gap in the literature, opening the door for additional research and breakthroughs in the field. The information gained from this study can be used as a springboard for future investigations and help in the creation of strabismus prevention techniques, treatment plans, and diagnostic tools.

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4. Research Methodology:

The research design for this study entails reviewing the existed literature review in which pertinent publications are found, screened, and analyzed to investigate the relationship between childhood strabismus and its association with a family history of strabismus. This method enables a thorough comprehension of the subject and offers a solid basis for reaching meaningful conclusions by synthesizing the body of knowledge from numerous investigations.

5. Introduction to Strabismus in Children

Children all across the world are vulnerable to strabismus, also known as crossed or mismatched eyes. It is defined by the eyes being out of alignment, which might seem as one eye turning inward, outward, upward, or downward while the other eye remains in its regular position. Binocular vision is disrupted by this misalignment, which can cause a variety of visual impairments and other problems (Cacodcar et al., 2018).

Children with strabismus may have major changes in their quality of life, general development, and visual health. Eye tiredness, decreased visual acuity, problems with depth perception, and focus problems are all potential effects of the disorder. If untreated, strabismus can result in amblyopia (lazy eye), which can damage vision permanently, as well as other long-term vision issues (Eroğlu et al., 2020).

The association between strabismus and a family history of the condition is one component of the study of strabismus that is of particular interest.

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Numerous studies have shown that children with affected family members have a higher prevalence of strabismus than children without such a history. For both clinical practice and genetic research, it is essential to comprehend the scope and nature of this link (Alemayehu et al., 2022).

Additionally, studying the familial patterns of strabismus can yield useful data for genetic studies. A better knowledge of the etiology and pathogenesis of the disorder may result from the discovery of particular genes or genetic variations linked to it. Further research into potential environmental elements that run in families may reveal non-genetic elements that may influence the emergence of strabismus (Bommireddy et al., 2019).

Therefore, the purpose of this literature review is to examine the body of knowledge that currently exists regarding the connection between childhood strabismus and its correlation with a family history of the disorder. This review aims to advance knowledge of familial strabismus patterns' prevalence, genetic and environmental influences, and clinical consequences by combining and evaluating pertinent data. In the end, the results of this review can improve genetic counseling, clinical management strategies, and open new avenues for pediatric ophthalmic research.

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5.1 Definition and Measurement of Family History:

Family history in the context of strabismus study refers to the prevalence of the condition among a person's biological relatives. It denotes a possible genetic predisposition and implies a higher than average chance of developing strabismus. Studying the association between childhood strabismus and a family history of the disorder requires precise definition and measurement of family history (Tegegne et al., 2021).

It is critical to specify the particular kin and the relationships among them that are taken into account when determining whether strabismus is present when describing family history. Due to their stronger genetic ties, first-degree relatives like parents and siblings often bear higher weight. Depending on the study's design and research purpose, distant relatives and second-degree relatives (such as grandparents, aunts, and uncles) may be considered (Althibi et al., 2023).

Various methods can be used in strabismus research to measure family history. Self-reporting is frequently used, in which individuals or parents/guardians report whether or not strabismus is present in their family. This technique is commonly employed in population-based research since it is reasonably simple to administer. It could, however, be affected by inadequate data or recollection bias (Alobaisi et al., 2022).

Using medical records as a proxy for family history is another method. Medical records, especially ophthalmology reports or diagnoses, can be used to learn about the occurrence of strabismus among family members

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in clinical settings or studies having access to medical databases. Although this approach offers a more unbiased and accurate evaluation of family history, it might be subject to availability and completeness issues (Kim & Kim, 2018).

Pedigree analysis is a more in-depth technique used in genetic research to evaluate family history. It entails building a family tree that graphically depicts the connections and impacted people within a family. Pedigree analysis can quantify a family's risk of strabismus, establish patterns of inheritance, and provide important information for genetic counseling (Alobaisi et al., 2022).

In conclusion, it is critical to precisely define and quantify family history when examining the association between childhood strabismus and a family history of the condition. When evaluating family history in strabismus research, it is crucial to take into account the inclusion of certain relatives, the use of self-reporting, medical records, or pedigree analysis as measurement methodologies, and the assessment of any biases or limits.

5.2 Prevalence of Strabismus in Children with a Positive Family History:

Numerous studies have been conducted to determine the association between childhood strabismus and a positive family history of the disorder, and the results consistently show that children who have afflicted family members are at higher risk. The prevalence and severity

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of strabismus in this particular demographic have been well-understood by numerous population-based research (Kim & Kim, 2018).

Compared to the general population, children with a positive family history of strabismus have the condition far more frequently. Siblings of people with strabismus are up to ten times more likely than the general population to experience the disorder, according to research. When both parents have strabismus, the likelihood of developing it rises with the number of affected family members (Buffenn, 2021).

Additionally, depending on the degree of relatedness, the strength of the relationship between family history and strabismus varies. The strongest correlation is seen when first-degree relatives, such as siblings and parents, are involved. Children with an affected sibling or parent are more likely to develop strabismus than children without affected family members, according to studies (Shah & Patel, 2015).

Important clinical consequences result from knowing the frequency and severity of strabismus in kids with a favorable family history. As children with afflicted family members are at a higher risk and may need closer monitoring, it helps healthcare providers estimate risk and identify the condition early. The visual and developmental effects of strabismus can be lessened with early intervention, such as optical correction, vision therapy, or surgical surgery (Tegegne et al., 2021).

In conclusion, analysis has shown a definite connection between strabismus in kids and a favorable family history of the disorder.

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Children with affected family members, especially first-degree relatives, are far more likely to have strabismus. It is essential for risk assessment, early identification, and intervention measures to comprehend the significance of this connection. Additionally, it has significant implications for family planning and genetic counseling, empowering families to make knowledgeable choices about their visual health.

5.3 Genetic Factors and Familial Patterns of Strabismus:

Like many other complicated illnesses, strabismus results from a confluence of hereditary and environmental variables. The knowledge of the genetic causes of strabismus and the explanation of the familial patterns found in affected families have advanced significantly (Zhang et al., 2021).

Numerous potential genes that are involved in the emergence of strabismus have been found through genetic investigations. These genes play a role in several biological functions, including as the growth of eye muscles, nerve signaling, and the development of visual pathways. The precise coordination of eye movements can be disrupted by mutations or changes in these genes, leading to the misalignment that characterizes strabismus (Shrestha et al., 2020).

The genetic factors underlying strabismus can be better understood by looking at familial patterns of the disorder. According to studies, strabismus has a substantial genetic component because it tends to cluster within families. When compared to the general population, people with

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affected first-degree relatives—such as parents or siblings—have a considerably higher risk of getting strabismus (Eroğlu et al., 2020).

Strabismus is seen as a complicated feature with a multifactorial inheritance model in terms of inheritance patterns. This implies that the likelihood of having the illness is influenced by a variety of hereditary and environmental factors. While specific genetic mutations or variants have been found in some strabismus cases, it is believed that the majority of strabismus cases are influenced by a combination of numerous genes, each of which has only modest impacts on the condition, as well as environmental variables (Gottlob et al., 2013).

It is significant to remember that hereditary factors do not entirely explain the development of strabismus. Environmental factors are also very important. An increased chance of developing strabismus has been linked to factors like delivery difficulties, preterm, low birth weight, maternal smoking during pregnancy, and specific systemic disorders. The interaction of these environmental factors with genetic vulnerability may increase the likelihood of developing the illness (Shrestha et al., 2020).

In conclusion, familial patterns emphasize the heritable character of the disorder and genetic variables have a role in the development of strabismus. Insights into the underlying genetic pathways can be gained by identifying candidate genes and comprehending their functional consequences. However, strabismus is inherited through a complex process that combines a number of genetic and environmental factors.

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The genetic architecture of strabismus must be uncovered, diagnostic methods must be improved, and individualized therapies must be developed that target particular genetic pathways.

6. Conclusion:

In conclusion, this comprehensive literature review has shed light on the relationship between strabismus in children and its association with a family history of the condition. The reviewed literature has highlighted the significant impact of family history on the prevalence, clinical implications, and genetic factors related to strabismus.

A robust and constant correlation exists between a family history of strabismus and misaligned eyes, a visual problem. Numerous studies have demonstrated that children who have affected relatives, particularly first-degree relatives, are at a much-increased risk of having strabismus compared to the general population. This information highlights the significance of family history as a significant risk factor in the early detection and management of strabismus in children.

Understanding the degree of the link between family history and strabismus requires precise definition and measurement of family history. Pedigree analysis, self-reporting, and medical data are often used techniques to evaluate family history. These methods give medical professionals the ability to more accurately assess the risk and offer the right interventions based on the strabismus status of family members.

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Familial patterns can shed light on the genetic mechanisms at play, which play a significant influence in the development of strabismus. The genetic architecture of strabismus is still complex, most likely involving a combination of numerous genes and environmental variables, despite the identification of particular genes and mutations. To further understand the underlying genetic processes and create individualized methods to diagnosis and treatment, genetic research must continue.

There are significant clinical ramifications to comprehending strabismus prevalence and familial patterns. It enables early detection, intervention, and management techniques for impacted kids, enhancing their overall and visual health. Additionally, by enabling families to make educated decisions about family planning and the potential danger of passing the illness down to future generations, this knowledge helps genetic counseling initiatives.

In conclusion, there is strong evidence linking childhood strabismus to a familial history of the disorder. Healthcare providers can improve their capacity to recognize and treat strabismus in children by taking family history into account as a significant risk factor. Clinical practice may become more individualized as a result of the incorporation of genetic research discoveries, which could enhance outcomes for those who are afflicted and their families.

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Based on the findings from the literature review on strabismus in children and its relationship with a family history of the condition, the following recommendations can be made:

1- Early Detection and Screening: Conduct regular eye exams for kids, especially those who have a positive family history of strabismus. Early strabismus detection enables prompt intervention and therapy, minimizing the possible effects on visual development and general quality of life.
2- Increased Awareness and Education: Spread knowledge about the value of family history in determining the risk of strabismus among educators, parents, and healthcare professionals. To underline the importance of early intervention and the potential genetic consequences of the condition, provide educational materials and tools.
3- Genetic Counseling: Provide families with a strabismus history with the services of a genetic counselor. Genetic counselors can be a great resource for families in making decisions about family planning and overseeing their children's visual health by sharing important knowledge about inheritance patterns, recurrence risks, and prospective genetic testing alternatives.
4- Public Health Initiatives: Speak up for initiatives that support eye health and the early identification of strabismus. Programs like this can give kids access to affordable eye care treatments, frequent eye exams in schools, and community awareness campaigns.

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الحول عند الأطفال وعلاقته بالتاريخ العائلي للحول: دراسة وصفية

الملخص

حالة الحول لدى الأطفال هي اضطراب بصري يتميز بعدم توازن العينين، حيث لا تنظر العينين في الاتجاه نفسه، وتعد الحالة شائعة بين الأطفال، ويمكن أن تكون نتيجة لتأثيرات عديدة مثل اضطرابات عضلات العين أو عدم اتزان القوة بين العينين. تهدف هذه الدراسة إلى التحقق من العلاقة بين الحول عند الأطفال وارتباطها بتاريخ عائلي إيجابي للحالة. تكشف مراجعة الأدبيات هذه العلاقة بين الحول عند الأطفال وارتباطها بتاريخ عائلي إيجابي للحالة. شملت هذه الدراسة المراجعة الأدبية لأربعة مجالات رئيسية: الحول عند الأطفال، وتعريف وقياس التاريخ العائلي، وانتشار وحجم الحول لدى الأطفال الذين لديهم تاريخ عائلي إيجابي، والعوامل الوراثية والأنماط العائلية للحول. تؤكد النتائج على الدور المهم الذي يلعبه تاريخ العائلة في انتشار الحول والعواقب السريرية. بالمقارنة مع عامة السكان، فإن الأطفال الذين أصيبوا بأفراد الأسرة، وخاصة الأقارب من الدرجة الأولى، معرضون بشكل كبير لخطر الإصابة بالحول. كما ويتأثر تطور الحول بشكل كبير بالعوامل الوراثية. توصي الدراسة بالكشف المبكر والفحص، وزيادة الوعي والتعليم، بالإضافة إلى تقديم المشورة الوراثية للأسر في اتخاذ القرارات المتعلقة بتنظيم الأسرة والإشراف على الصحة البصرية لأطفالهم.

الكلمات المفتاحية: *الحول، تاريخ العائلة، الأطفال، العوامل الوراثية.*