

Understanding Strabismus-Related Health Beliefs and Delays: Literature Review

Aurellia Valmai Tjuitno^a, Reni Pratyani^b, Joni Susanto^c

^aaurelliatjuitno@gmail.com

^a Faculty of Medicine, Airlangga University, Surabaya 60132, Indonesia

^b Department of Ophthalmology, Dr. Soetomo General Hospital, Airlangga University, Surabaya 60132, Indonesia

^c Department of Anatomy and Histology, Airlangga University, Surabaya 60132, Indonesia

Abstract

Maintaining healthy binocular vision is paramount for perceiving the world accurately. Strabismus, a common condition where the eyes are misaligned, particularly affecting children, poses risks such as amblyopia. Despite its global prevalence, misconceptions persist, leading to delayed treatment, often for cosmetic reasons. Understanding the health beliefs and delay treatment on individuals with strabismus is crucial for developing preventive measures and enhancing overall eye health. This literature review investigates the correlation between strabismus and health beliefs, exploring delays in treatment and the multifaceted factors influencing patient decisions.

Keywords: Strabismus; Health beliefs; Delayed treatment; Health-seeking behavior, Binocular vision, Visual misalignment

1. Introduction

Maintaining healthy binocular vision, encapsulated by the adage "two eyes are better than one," is integral to perceiving the world in three dimensions. Binocular vision, with its advantages in visual acuity, contrast sensitivity, and a broader visual field compared to monocular vision, holds significant importance (Syauqie and Putri, 2014). However, a prevalent binocular vision issue is strabismus, a common disorder where eyes are misaligned and point in different directions, particularly affecting children (AAO, 2021; CDC, 2022). The impact of strabismus extends beyond double vision, potentially leading to permanent vision reduction in one eye, known as amblyopia. With estimates of strabismus prevalence ranging from 0.2% to 6.2% in children and 4% in the adult population globally, its significance is evident (Chia *et al.*, 2010; Shah and Patel, 2013). Despite its prevalence, misconceptions persist, as revealed by (Al-Omari *et al.*, 2022), indicating that many delay seeking treatment, primarily for cosmetic reasons. Understanding the health beliefs of individuals grappling with strabismus is crucial for developing preventive measures and enhancing overall eye health (Latunji and Akinyemi, 2018).

A substantial body of research has demonstrated that strabismus patient likely to delay their treatment. This literature review aims to further investigate the health beliefs among strabismus patients with delayed treatment.

2. Materials and Methods

A search of electronic databases was conducted on Google Scholar, PubMed, NCBI, Elsevier, and reputable health association websites. The search included key phrases such as strabismus, health beliefs, health literacy, treatment-seeking, delay treatment, health-seeking behavior, health-seeking, childhood, adolescence, and adult. The most recent search was conducted on October 20, 2023. The study included articles that examined the

correlation between strabismus and health beliefs among patients, encompassing health literacy, treatment-seeking, and health beliefs. No restrictions were imposed based on gender, language, or demographics, and studies with duplicate datasets were excluded.

3. Discussion

3.1. Strabismus: An Overview

Strabismus is a condition where the eyes do not align at the same point, preventing convergence. Without treatment, the brain may start to disregard the formed images, leading to a loss of focus and vision known as amblyopia. Convergence is crucial for maintaining depth perception and the three-dimensional perception provided by the brain (Scanlon and Sanders, 2007). There are three basic types of strabismus (illustrated in Figure 2.3): (1) horizontal strabismus, (2) torsional strabismus, and (3) vertical strabismus. Combinations of two or even three different types of strabismus are also common (Guyton and Hall, 2006). Strabismus can have primary or secondary causes. Both congenital or idiopathic primary strabismus may occur, but recognized risk factors can increase the likelihood of strabismus. Secondary strabismus occurs due to various other pathologies. One secondary cause leading to sensory strabismus is poor visual acuity (unilateral or bilateral), which can result in amblyopia in the affected eye (Bommireddy, Taylor and Clarke, 2020). As the brain neglects one eye due to strabismus, amblyopia can also occur. Strabismus can, in turn, result from or be exacerbated by other conditions causing visual disparity between the right and left eyes, such as asymmetric cataracts, refractive abnormalities, or other visual impairments. Accommodative esotropia, a type of strabismus, is caused by refractive abnormalities in one or both eyes. Crossed eyes may occur when greater accommodation is required, as in cases of severe hyperopia (Shah and Patel, 2013).

According to a study by (Chia et al., 2010), the global prevalence of strabismus in children ranges from 0.2% to 6.2%, and in adolescents, it ranges from 0.13% to 4.7%. The global prevalence of strabismus in the adult population reaches 4% (Sah, 2017). Reported prevalence in Asia is 1.3% to 5% (Lee et al., 2021). In the neighboring country, Singapore, the prevalence of strabismus in children aged 6 to 72 months is 0.80%. The exotropia to esotropia ratio is 7:1, with the majority of exotropia being intermittent (63%) (Chia et al., 2010). In the UK, 2.1% of children have strabismus, with 90% being isolated strabismus. The likelihood of isolated strabismus increases with various variables, including prematurity, low birth weight, intrapartum difficulties, assisted delivery or cesarean section, and neonatal illness in the first week of life (Bommireddy, Taylor and Clarke, 2020). Esotropia, occurring in 60.1% of children with strabismus, is more common than exotropia, occurring in 32.7% of children. Accommodative esotropia is the most common type.

Strabismus surgery should only be considered if conservative treatment proves ineffective in correcting misalignment. Surgery is usually recommended for esotropia exceeding 15 prism diopters (PD) and exotropia exceeding 20 PD. To achieve improved binocular vision, it is crucial to achieve postoperative deviation of less than 10 prism diopters (orthophoria), and for stereopsis development, residual deviation should be 4 PD or less. Successful outcomes of horizontal strabismus surgery are typically defined as a 60 percent reduction in overall deviation or a deviation of 10 prism diopters or less within six weeks of surgery (Kanukollu and Sood, 2023).

3.2. Concept of Health-seeking Behavior

Health-seeking behavior refers to any activities undertaken by individuals who believe they have health

issues to find appropriate treatment (Latunji and Akinyemi, 2018). Before engaging in health-seeking behavior, individuals and/or households must make decisions. This decision-making process is influenced by societal norms, expectations, and factors related to healthcare providers (Oberoi *et al.*, 2016). Health-seeking behavior is not uniform and depends on both cognitive and non-cognitive elements. According to the Health Belief Model, two critical factors influencing whether someone engages in specific health behavior are how much the disease (or other undesirable effect) is perceived as a threat and how much the health behavior is believed to be effective in reducing the risk of that disease. Poor health-seeking behavior is closely related to poor health conditions, increased morbidity and mortality, and a decline in health quality statistics (Oberoi *et al.*, 2016; Latunji and Akinyemi, 2018). The timing and type of healthcare services used by an individual can also impact public health. It has been proven that delaying medical treatment can increase the likelihood of worse consequences from the suffering disease. From the patient's perspective, health-seeking behavior often serves not as an effort to prevent disease but as an attempt to respond to discomfort or symptoms arising from a specific diagnosis not realized by the patient before medical consultation (Zhang *et al.*, 2020).

There are several models of health-seeking behavior theory, including:

- Health Belief Model: The Health Belief Model is the most popular model, developed since the 1950s. It is based on various individual perspectives and motivations, outlining decision-making steps in seeking healthcare driven by healthcare providers (Jones *et al.*, 2015).
- Andersen's Health Care Utilization Model: This model has been widely used in various research in different countries. It classifies factors influencing health-seeking behavior into three groups: predisposing factors, enabling factors, and need factors (Nagdev *et al.*, 2023).
- Kroeger's Health-Seeking Model: This model is a development of the Andersen model, based on extensive literature revision (Anyolitho *et al.*, 2023).

3.3. Characteristics of Health Beliefs on Strabismus Patient

In most cases, strabismus is a correctable anomaly that necessitates early detection and treatment. The effectiveness of the therapy, however, relies on the patient's awareness and approach. A lack of comprehension and information has an impact on the timeliness of strabismus management (Singh *et al.*, 2017). In a study by Paduca *et al.* (2021), it was reported strabismus surgery has been delayed for about 20 years in adult patients who could potentially benefit of it in childhood. It's constant with study by (Coats *et al.*, 2005), it was reported that patients delayed strabismus treatment for an average of 19.9 years (range, 1-72 years). The average time between surgical intervention and non-diplopia patients is 27.2 years, significantly longer than 12.7 years for patients with diplopia. This is because diplopia has a greater functional impact on patients, prompting them to seek treatment more quickly than non-diplopia patients.

Adult patients frequently postpone surgical intervention for extended periods due to factors such as insufficient awareness, refusal of offered surgeries, and previous unfavorable surgical encounters. On individuals with strabismus associated with thyroid ophthalmopathy and proposed that considering surgery might require stable strabismus angles for a minimum of 6 months (Lee, Oh and Hwang, 2010). Whereas the advantages of early surgery for early-onset strabismus, emphasizing the potential for improved motor and sensory outcomes when surgery is conducted at a young age. In summary, these articles collectively indicate

that individuals with strabismus might postpone treatment for various reasons, including lack of awareness and past negative experiences (Deller, 1988).

3.4. Reason Behind Delayed Treatment on Strabismus Patient

In a study by (Al-Omari et al., 2022), it was reported that reasons for patients delaying strabismus surgery included the belief that their appearance did not interfere with daily activities (15.2%), and patients never sought treatment (8.9%). In the same study, reasons for patients seeking treatment included cosmetic issues (27.8%), a better understanding of strabismus and its potential side effects (20.3%), peer pressure (16.5%), an increase in economic status (13.9%), relationship/marriage prospects (13.9%), and to improve job opportunities (7.6%). And a study in Norway reported reveal that The most frequent reasons for delays in strabismus surgery, as reported by patients, encompassed several factors: a lack of awareness regarding the surgical option (37.4%), instances where surgery was recommended during childhood but declined by parents/guardians (6.6%), fear of undergoing surgery (17.6%), assertions by eye specialists that surgery would not yield strabismus improvement (27.5%), past negative surgical experiences (6.6%), and financial constraints (4.4%) (Paduca et al., 2021a).

Furthermore, motives for seeking surgical treatment after this delay are as follows: About 27.8% of patients sought surgery for cosmetic reasons. About 20.3% expressed a desire to better understand strabismus surgery and its potential complications. A total of 16.5% reported feeling pressured by family and friends to undergo the procedure. About 13.9% mentioned an improvement in economic status as a motivating factor, while the same percentage expressed a desire to improve their prospects in relationships or marriage. Lastly, 7.6% sought surgery to enhance their chances of getting a job. Even in studies conducted in Bangladesh, it was discovered that socioeconomic status stands out as the most decisive factor influencing health beliefs among the researched population, overriding other factors such as age, gender, healthcare service quality, and the type of illness (Ahmed et al., 2005). Constant with it, study by (Paduca et al., 2021b) reported that the primary motivations prompting adults among our patient cohort to pursue strabismus surgery included aesthetic enhancement (38.5%), bolstering self-confidence (30.8%), improvement of social relationships (16.5%), better employment prospects (7.7%), and advice from family and friends (6.6%).

Approximately 80% of the delays in strabismus surgery among teenagers and adults resulted from a lack of awareness regarding the effectiveness of strabismus surgery. Additionally, there were misconceptions among primary health-care practitioners and some eye doctors who believed that surgery would not correct strabismus (Paduca et al., 2021a).

3.5. Association of Delayed Treatment with Post-treatment Outcomes

Strabismus most commonly occurs in children and newborns. However, this condition can also occur in adults. A common misconception in society is the belief that a child with strabismus will grow up normally, or that strabismus does not interfere with the child's growth. This is incorrect. Untreated strabismus can worsen and cause other vision impairments that can worsen the quality of vision (AAO, 2021).

The consequences of untreated strabismus include amblyopia (usually a unilateral reduction of two or more lines of visual acuity without visible organic lesions), loss of binocular vision, and cosmetic stigma. It also hinders the psychological growth of a child and their social interactions. Strabismus is a treatable disorder that needs to be identified and treated at a young age, especially before the age of two. Early intervention results in

a positive prognosis, higher stereopsis (depth perception), and satisfying cosmetic outcomes (Giorgis and Bejiga, 2001).

4. Conclusion

The primary motivations for seeking strabismus surgery in adulthood included aesthetic considerations, enhancing self-confidence, and improving social relationships. All these factors underscored the adverse impact of oculomotor disorders on the psychological well-being of patients. Emphasizing individual concerns and needs was particularly crucial for the recovery and overall well-being of adult patients with strabismus, reflecting a pivotal aspect of the patient-centered medical approach (*Paduca et al., 2021b*). The consequences of untreated strabismus are profound, affecting children and adults alike. Amblyopia, loss of binocular vision, and cosmetic stigma highlight the importance of early intervention. Contrary to misconceptions, untreated strabismus can hinder psychological growth and social interactions in children. The positive prognosis, higher stereopsis, and satisfying cosmetic outcomes associated with early intervention underscore the critical role of timely treatment in mitigating the impact of strabismus.

In conclusion, this literature review illuminates the intricate interplay between strabismus and health beliefs. It underscores the need for targeted educational initiatives, increased awareness, and holistic healthcare strategies to bridge gaps in understanding, reduce delays in treatment, and optimize outcomes for individuals affected by strabismus. Future research and healthcare interventions should focus on aligning medical knowledge with patient decisions to foster a patient-centered approach that enhances overall well-being.

Acknowledgements

The completion of this literature review on "Understanding Strabismus-Related Health Beliefs and Delays" has been made possible through the collaborative efforts and contributions of individuals associated with the Faculty of Medicine at Airlangga University. The valuable insights and expertise from the Department of Ophthalmology, Dr. Soetomo General Hospital as well as the Department of Anatomy and Histology, Airlangga University have significantly enriched the content of this review.

Furthermore, we extend our appreciation to the academic community and professionals in the fields of medicine, ophthalmology, and health sciences for their seminal research and publications, which have laid the foundation for this comprehensive review. Their commitment to advancing medical knowledge and patient care has been an invaluable source of inspiration.

References

- AAO (2021) *Eye Anatomy: Parts of the Eye and How We See*. Available at: <https://www.aao.org/eye-health/anatomy/parts-of-eye> (Accessed: 17 November 2022).
- Ahmed, S.M. *et al.* (2005) 'Socioeconomic status overrides age and gender in determining health-seeking behaviour in rural Bangladesh.', *Bulletin of the World Health Organization*, 83(2), pp. 109–117. Available at: <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC2623805/> (Accessed: 1 October 2023).
- Al-Omari, R. *et al.* (2022) 'Adults with Longstanding Strabismus: Psychosocial and Functional Impacts and Reasons behind Surgery Delay', *Journal of Ophthalmology*, 2022, p. e8682675. Available at: <https://doi.org/10.1155/2022/8682675>.
- Anyolitho, M.K. *et al.* (2023) 'Health-seeking behaviour regarding schistosomiasis treatment in the absence of a mass drug administration (MDA) program: the case of endemic communities along Lake Albert in Western Uganda', *BMC Public Health*, 23(1), p. 1072. Available at: <https://doi.org/10.1186/s12889-023-16020-z>.
- Bommireddy, T., Taylor, K. and Clarke, M.P. (2020) 'Assessing strabismus in children', *Paediatrics and Child Health*, 30(1), pp. 14–18. Available at: <https://doi.org/10.1016/j.paed.2019.10.003>.
- CDC (2022) *Keep an Eye on Your Child's Vision*, Centers for Disease Control and Prevention. Available at:

- <https://www.cdc.gov/visionhealth/resources/features/vision-health-children.html> (Accessed: 17 November 2022).
- Chia, A. *et al.* (2010) 'Prevalence of Amblyopia and Strabismus in Young Singaporean Chinese Children', *Investigative Ophthalmology & Visual Science*, 51(7), pp. 3411–3417. Available at: <https://doi.org/10.1167/iovs.09-4461>.
- Coats, D.K. *et al.* (2005) 'Reasons for delay of surgical intervention in adult strabismus', *Archives of Ophthalmology (Chicago, Ill.: 1960)*, 123(4), pp. 497–499. Available at: <https://doi.org/10.1001/archophth.123.4.497>.
- Deller, M. (1988) 'Why should surgery for early-onset strabismus be postponed?', *British Journal of Ophthalmology*, 72(2), pp. 110–115. Available at: <https://doi.org/10.1136/bjo.72.2.110>.
- Giorgis, A.T. and Bejiga, A. (2001) 'Prevalence of strabismus among pre-school children community in Butajira Town', *Ethiopian Journal of Health Development*, 15(2). Available at: <https://doi.org/10.4314/ejhd.v15i2.9886>.
- Guyton, A.C. and Hall, J.E. (2006) *Textbook of medical physiology*. 11th ed. Philadelphia: Elsevier Saunders.
- Jones, C.L. *et al.* (2015) 'The Health Belief Model as an Explanatory Framework in Communication Research: Exploring Parallel, Serial, and Moderated Mediation', *Health communication*, 30(6), pp. 566–576. Available at: <https://doi.org/10.1080/10410236.2013.873363>.
- Kanukollu, V.M. and Sood, G. (2023) 'Strabismus', in *StatPearls*. Treasure Island (FL): StatPearls Publishing. Available at: <http://www.ncbi.nlm.nih.gov/books/NBK560782/> (Accessed: 8 October 2023).
- Latunji, O.O. and Akinyemi, O.O. (2018) 'FACTORS INFLUENCING HEALTH-SEEKING BEHAVIOUR AMONG CIVIL SERVANTS IN IBADAN, NIGERIA', *Annals of Ibadan Postgraduate Medicine*, 16(1), pp. 52–60. Available at: <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC6143883/> (Accessed: 17 November 2022).
- Lee, S.H. *et al.* (2021) 'Association between refractive errors and horizontal strabismus: the Korea National Health and Nutrition Examination Survey', *Journal of American Association for Pediatric Ophthalmology and Strabismus {JAAPOS}*, 25(6), p. 340.e1–340.e7. Available at: <https://doi.org/10.1016/j.jaapos.2021.07.012>.
- Lee, Y., Oh, S.Y. and Hwang, J.-M. (2010) 'Is 6 months of stable angle of strabismus enough to perform surgery in patients with strabismus related to thyroid ophthalmopathy? | British Journal of Ophthalmology', *British Journal of Ophthalmology*, 94, pp. 955–956. Available at: <https://doi.org/10.1136/bjo.2008.154195> (Accessed: 17 November 2023).
- Nagdev, P. *et al.* (2023) 'Andersen health care utilization model: A survey on factors affecting the utilization of dental health services among school children', *PLOS ONE*, 18(6), p. e0286945. Available at: <https://doi.org/10.1371/journal.pone.0286945>.
- Oberoi, S. *et al.* (2016) 'Understanding health seeking behavior', *Journal of Family Medicine and Primary Care*, 5(2), pp. 463–464. Available at: <https://doi.org/10.4103/2249-4863.192376>.
- Paduca, A. *et al.* (2021a) 'Causes of concomitant strabismus surgery delay in teenagers and adults', *Strabismus*, 29(3), pp. 151–157. Available at: <https://doi.org/10.1080/09273972.2021.1948070>.
- Paduca, A. *et al.* (2021b) 'Causes of concomitant strabismus surgery delay in teenagers and adults', *Strabismus*, 29(3), pp. 151–157. Available at: <https://doi.org/10.1080/09273972.2021.1948070>.
- Sah, S.P. (2017) 'Health-Related Quality of Life (HRQoL) in Young Adults with Strabismus in India', *JOURNAL OF CLINICAL AND DIAGNOSTIC RESEARCH* [Preprint]. Available at: <https://doi.org/10.7860/JCDR/2017/24541.9389>.
- Scanlon, V.C. and Sanders, T. (2007) *Essentials of Anatomy and Physiology Fifth Edition*. Davis Company.
- Shah, D.J. and Patel, D.S. (2013) 'Strabismus: - Symptoms, Pathophysiology, Management & Precautions', 4(7), p. 5.
- Singh, A. *et al.* (2017) 'To assess knowledge and attitude of parents toward children suffering from strabismus in Indian subcontinent', *Indian Journal of Ophthalmology*, 65(7), pp. 603–606. Available at: https://doi.org/10.4103/ijo.IJO_619_16.
- Syauqie, M. and Putri, S. (2014) 'Development of Binocular Vision', *Jurnal Kesehatan Andalas*, 3. Available at: <https://doi.org/10.25077/jka.v3i1.17>.
- Zhang, Q. *et al.* (2020) 'A population-based study on healthcare-seeking behaviour of persons with symptoms of respiratory and gastrointestinal-related infections in Hong Kong', *BMC Public Health*, 20(1), p. 402. Available at: <https://doi.org/10.1186/s12889-020-08555-2>.