

Quality of Life in Patients Post-Strabismus Surgery : Literature Review

Diva Khansadea Fyamanda^a, Rozalina Loebis^b, Yunias Setiawati^c

^a*dkhansadea@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 *Departement of Psychiatry, Dr. Soetomo General Hospital, Airlangga University, Surabaya 60132, Indonesia*

Abstract

Strabismus is defined as a misalignment of the anatomy of the human eye, presenting as ocular misalignment either inward towards the nose (esotropia) or outward (exotropia). Detecting strabismus is crucial as its misalignment not only affects one's appearance but also seriously disrupts the eye's function as a visual sense organ. Strabismus can affect the psychosocial condition of individuals, such as decreased self-confidence and self-esteem. This literature review assesses and compares the post-surgery between pre-surgery quality of life of strabismus patients.

Keywords: Strabismus; Quality of Life; AS-20 Questionnaire

1. Introduction

Strabismus is a condition where misalignment in the eyes is found, where in each case, one eye fixates on a specific point (the fixing eye) while the other eye can move to view the desired object (the deviated eye) [1]. Based on research was conducted at 2021, the overall incidence rate of strabismus is higher in adults compared to children, with a prevalence touching 4% [2]. In Helveston's study, it is mentioned that there are several types of strabismus [1]. Firstly, esotropia is a condition where there is a deviation in one eye that turns inward or appears cross-eyed. Secondly, exotropia is identified when one eye deviates outward or appears wall-eyed. Thirdly, there's deviation in one eye towards the vertical axis, hypertropia when the deviation is upwards, and hypotropia when the eye deviates downwards [1].

The movement of the human eye is aided by 6 muscles that work and coordinate together. If there's an abnormality in the functioning of these muscles or in the nerves within the brain, it can be a cause of strabismus. However, there are other factors that can trigger the onset of strabismus, such as eye or brain injuries. Moreover, individuals with Down syndrome and brain tumors are also susceptible to having strabismus [3].

Strabismus can affect the psychosocial condition of individuals, such as decreased self-confidence and self-esteem [4]. A study in India also mentioned that strabismus significantly impacts the social life of those affected. Adult patients tend to fear social interactions, limit themselves from meeting others, and have high interpersonal sensitivity. The prevalence of social phobia among adult strabismus patients can reach 53.1% [5]. However, surgical intervention has a significantly positive impact, enhancing self-confidence and improving the quality of life for individuals affected [4].

The elaboration above indicates that the quality of life is closely associated with how well individuals with strabismus can navigate their daily lives. In a study, some patients showed a greater tendency to have mental health issues, including a higher risk of experiencing symptoms of depression and social phobia [6]. In Indonesia, there is still a scarcity of research addressing the quality of life of strabismus patients, especially post-surgery. This literature review further investigates the influence type of refractive error on the type of strabismus in children. This literature review further discusses the quality of life of patients with strabismus

who have undergone surgery.

2. Materials and Methods

The investigation used resources like Google Scholar, PubMed, NCBI, Elsevier, and trustworthy health association websites. The search utilized keywords such as strabismus, quality of life, and AS-20 questionnaire. Researcher conducted on December 14,, 2023. The research incorporated articles that explored the relationship quality of life patient with strabismus before and after surgery. No limitations were applied based on gender, language, or demographics, and studies without duplicated datasets.

3. Discussion

3.1. Strabismus: An Overview

Based on the direction of its deviation axis, strabismus can be classified into 2 types. According to the American Academy of Ophthalmology's book, "Pediatric Ophthalmology and Strabismus", abnormalities in strabismus patients can occur due to abnormalities in binocular vision or deviations in neuromuscular control of ocular motility [7]. Based on the direction of its deviation axis, strabismus can be classified into two types: horizontal and vertical deviations. Horizontal deviation includes esotropia, which is a disorder where one or both eyes turn inward (toward the nose), and exotropia, where the direction of the ocular deviation is outward. As for vertical deviation, it's divided into hypertropia and hypotropia [8].

Based on a study conducted on 91 strabismus patients at RSUP Dr. M Djamil Padang, it was found that approximately 62.6% of the patients had exotropia, with 41.7% being intermittent exotropia and 20.9% constant exotropia. Esotropia patients accounted for 37.4%, with 13.2% being accommodative esotropia and 10.9% non-accommodative esotropia, followed by congenital esotropia at 9.9% and incomitant at 2.2%. In this study of 91 strabismus patients, 54.9% were female and 45.1% were male. Moreover, 52.7% of the patients sought treatment at an age below 10 years old. The prevalence of strabismus worldwide varies significantly according to a meta-analysis study conducted in 2019 [9]. This diversity is supported by various factors such as age, geographical differences, and the publication year of a study [10].

The characteristic results of deviation direction in 1174 strabismus patients showed that 1048 (89.27%) patients experienced horizontal deviation, namely exotropia or esotropia, while 126 (10.73%) patients experienced vertical deviation [19]. Another study conducted in Hong Kong also stated that out of 133 strabismus patients, 117 (88%) experienced exotropia deviation and 12 (12%) experienced esotropia deviation [20]. However, a different outcome was observed in research conducted in the United States, where the prevalence of esotropia patients (2.31%) was higher compared to exotropia patients (0.73%) among Caucasian children [21]. Based on several aforementioned studies, this aligns with the research by Goseki and Ishikawa, where deviation prevalence can be influenced by racial factors. Esotropia deviation is more common among Caucasian populations, while exotropia deviation is more frequently found among Asian populations [22].

In adult strabismus patients visiting ophthalmologists, they commonly complain about discomfort in eye positioning, where upon examination, diplopia is found, leading to a decline in their quality of life [11]. Adolescent and adult patients often suffer from strabismus due to systemic conditions like diabetes mellitus or neurological disorders such as brain tumors. Additionally, decompensated heterophoria and head trauma can also induce strabismus [12].

One pair of movable and position-shifting eyes owes its functionality to the cooperative work of extraocular muscles. However, any abnormalities in these muscles or the controlling nerves can lead to strabismus [3]. According to the book "Vaughan & Asbury's General Ophthalmology 18th Edition", in

strabismus patients where one eye is fixated, it disrupts brain function and can cause amblyopia [13]. Clinically, amblyopia is defined as a condition where visual acuity decreases due to several factors such as strabismus, refractive errors, anisometropia, and cataracts [14]. Strabismus and amblyopia are interconnected, where amblyopia can also be one of the causes of strabismus [13].

3.2. *Quality of Life Patient with Strabismus*

The definition of quality of life according to WHO, as cited by Endarti, is an individual's perception of their life in accordance with the culture and values of the environment they reside in, while comparing it with their objectives, aspirations, and established standards [15]. Quality of life is focused on an individual's perception of their physical and mental health conditions and their relationship with socio-economic status and the social support surrounding them [16]. Quality of life is frequently used as an instrument in research as it can be utilized to understand how a medical intervention can assist a patient when needed [17]. Based on Moons, Marquet, Budst, & de Geest, the factors influencing quality of life consist of: gender, age, occupation, education, income, marital status, and relationships with others [18].

It's mentioned that there are differences in quality of life between men and women, with one study indicating that women have higher quality of life than men. Rugerri, Bisoffi, Fontecedro, & Warner in 2001 also suggested that age contributes to an individual's quality of life [18]. Adolescence, a transitional phase from childhood to adulthood, indicates significant changes, especially in one's attitude towards the environment [25]. Differences in quality of life are observed among individuals in various statuses: students, employed, unemployed, seeking employment, and unable to work. According to Wahl, Rustoen, Hanestad, Lerdal & Moum in 2004, quality of life tends to improve with higher levels of education obtained by an individual. Hence, education level stands as a significant factor influencing an individual's quality of life [18].

3.3. *Adult Strabismus-20 Questionnaire*

The Adult Strabismus Quality of Life Questionnaire (AS-20) is one of the specific questionnaires designed for strabismus patients to assess the impact of strabismus surgery on their daily lives [23]. This questionnaire comprises 20 questions that address how strabismus can affect a patient's life. These questions encompass ten aspects related to eye function and ten related to the patient's psychosocial life [24].

4. Conclusion

The assessment of quality of life in strabismus patients, both pre- and post-surgery, highlights a crucial aspect of their holistic well-being. Strabismus, classified into horizontal and vertical deviations, presents a multifaceted challenge. Studies reveal a diverse prevalence of deviation types across different populations, indicating potential racial influences on its occurrence. While exotropia prevails in Asian populations, esotropia appears more frequently in Caucasians.

Notably, strabismus significantly affects patients' lives, leading to discomfort in eye positioning, diplopia, and a subsequent decline in their quality of life. The correlation between systemic conditions like diabetes, neurological disorders, trauma, and the onset of strabismus in adolescents and adults underscores its complexity. Abnormalities in extraocular muscles or controlling nerves contribute to strabismus, which can lead to amblyopia, further impacting visual acuity and overall well-being.

The World Health Organization's definition of quality of life emphasizes an individual's perception aligned with cultural values and personal standards. Quality of life assessment, influenced by gender, age, occupation, education, income, marital status, and social relationships, aids in understanding its impact on a patient's health and social context. Tools like the Adult Strabismus Quality of Life Questionnaire (AS-20) play a pivotal role in evaluating the consequences of strabismus surgery on various aspects of patients' lives, encompassing both ocular function and psychosocial well-being. This comprehensive evaluation serves as a critical guidepost in

enhancing patient care and outcomes in the realm of strabismus treatment.

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References

- [1] Helveston, E.M., 2010. Understanding, detecting, and managing strabismus. *Community eye health*, 23(72), p.12.
- [2] Amita, A.S.D. and Faustine, G., 2021. Sudden Onset of Strabismus in Adults-Is It a Life-Threatening Sign?. *Mermin Dunia Kedokteran*, 48(9), pp.359-361. <https://doi.org/10.55175/cdk.v48i9.128>
- [3] Shah, J. and Patel, S., 2015. Strabismus:-symptoms, pathophysiology, management & precautions. *IJSR*, 4, pp.1510-4.
- [4] Sharma, P., Gaur, N., Phuljhele, S. and Saxena, R., 2017. What's new for us in strabismus?. *Indian journal of ophthalmology*, 65(3), p.184. https://doi.org/10.4103%2Fijo.IJO_867_16
- [5] Al Shehri, F., Duan, L. and Ratnapalan, S., 2020. Psychosocial impacts of adult strabismus and strabismus surgery: a review of the literature. *Canadian Journal of Ophthalmology*, 55(5), pp.445-451. <https://doi.org/10.1016/j.jcjo.2016.08.013>
- [6] Chang, M.Y., Velez, F.G., Demer, J.L., Isenberg, S.J., Coleman, A.L. and Pineles, S.L., 2015. Quality of life in adults with strabismus. *American journal of ophthalmology*, 159(3), pp.539-544. <http://dx.doi.org/10.1016/j.ajo.2014.12.003>
- [7] AAO, 2021. 2021-2022 Basic and Clinical Science Course, Section 6 : Pediatric Ophthalmology and Strabismus. American Academy of Ophthalmology.
- [8] Gunton, K.B., Wasserman, B.N. and DeBenedictis, C., 2015. Strabismus. *Primary Care: Clinics in Office Practice*, 42(3), pp.393-407. <https://doi.org/10.1016/j.pop.2015.05.006>
- [9] Putri, P. and Julita, J., 2020. Profil Strabismus Horizontal di RSUP Dr. M Djamil Padang Januari–Desember 2017. *Jurnal Kesehatan Andalas*, 9(1), pp.83-88. <https://doi.org/10.25077/jka.v9i1.1276>
- [10] Hashemi, H., Pakzad, R., Heydarian, S., Yekta, A., Aghamirsalam, M., Shokrollahzadeh, F., Khoshhal, F., Pakbin, M., Ramin, S. and Khabazkhoob, M., 2019. Global and regional prevalence of strabismus: a comprehensive systematic review and meta-analysis. *Strabismus*, 27(2), pp.54-65. <https://doi.org/10.1080/09273972.2019.1604773>
- [11] Peragallo, J.H., Pineles, S.L. and Demer, J.L., 2015. Recent advances clarifying the etiologies of strabismus. *Journal of neuro-ophthalmology: the official journal of the North American Neuro-Ophthalmology Society*, 35(2), p.185. <https://doi.org/10.1097%2FWNO.0000000000000228>
- [12] Rutstein RP, Cogen MS, Cotter SA, Daum KM, Mozzlin RL, Ryan JM. Care of the Patient with Strabismus: Esotropia and Exotropia. St. Louis: American Optometric Association; 2010
- [13] Emmett T. Cunningham, P.R.-E., Vaughan & Asbury's general ophthalmology. . 18th ed., Medica: McGrawHill
- [14] Birch, E.E., 2013. Amblyopia and binocular vision. *Progress in retinal and eye research*, 33, pp.67-84. <https://doi.org/10.1016/j.preteyeres.2012.11.001>
- [15] Endarti, A.T., 2015. Kualitas hidup kesehatan: Konsep, model dan penggunaan. *Jurnal Ilmiah Kesehatan*, 7, p.2.
- [16] CDC, 2000. Measuring healthy days: Population assessment of health-related quality of life.
- [17] Webster, J., Nicholas, C., Velacott, C., Cridland, N. and Fawcett, L., 2011. Quality of life and depression following childbirth: impact of social support. *Midwifery*, 27(5), pp.745-749. <https://doi.org/10.1016/j.midw.2010.05.014>
- [18] Salsabila, S. Mustamira., 2012. Kualitas Hidup pada Pasien Epilepsi (Studi Kasus Pasien Epilepsi Dewasa Awal di Yogyakarta). Universitas Islam Negeri Sunan Kalijaga Yogyakarta
- [19] Khorrami-Nejad, M., Akbari, M.R. and Khosravi, B., 2018. The prevalence of strabismus types in strabismic Iranian patients. *Clinical optometry*, pp.19-24. <https://doi.org/10.2147/OPTO.S147642>
- [20] Zhang, X.J., Lau, Y.H., Wang, Y.M., Kam, K.W., Ip, P., Yip, W.W., Ko, S.T., Young, A.L., Tham, C.C., Pang, C.P. and Chen, L.J., 2021. Prevalence of strabismus and its risk factors among school aged children: The Hong Kong Children Eye Study. *Scientific Reports*, 11(1), p.13820.
- [21] McKean-Cowdin, R., Cotter, S.A., Tarczy-Hornoch, K., Wen, G., Kim, J., Borchert, M., Varma, R. and Multi-Ethnic Pediatric Eye Disease Study Group, 2013. Prevalence of amblyopia or strabismus in asian and non-Hispanic white preschool children: multi-ethnic pediatric eye disease study. *Ophthalmology*, 120(10), pp.2117-2124. <https://doi.org/10.1016/j.ophtha.2013.03.001>
- [22] Goseki, T. and Ishikawa, H., 2017. The prevalence and types of strabismus, and average of stereopsis in Japanese adults. *Japanese journal of ophthalmology*, 61(3), pp.280-285. <https://doi.org/10.1007/s10384-017-0505-1>
- [23] Glasman, P., Cheeseman, R., Wong, V., Young, J. and Durman, J.M., 2013. Improvement in patients' quality-of-life following strabismus surgery: evaluation of postoperative outcomes using the Adult Strabismus 20 (AS-20) score. *Eye*,

- 27(11), pp.1249-1253. <https://doi.org/10.1038/eye.2013.174>
- [24] Gothwal, V.K., Bharani, S., Kekunnaya, R., Chhablani, P., Sachdeva, V., Pehere, N.K., Narasaiah, A. and Gunturu, R., 2015. Measuring health-related quality of life in strabismus: a modification of the Adult Strabismus-20 (AS-20) questionnaire using Rasch analysis. *PLoS One*, 10(5), p.e0127064. <https://doi.org/10.1371/journal.pone.0127064>
- [25] Setiawati, Y., Miranti, K. and Syulthoni, Z.B., 2020. The relationship between mother's parenting patterns and aggressive behavior of adolescent son in risk environments. *EurAsian Journal of BioSciences*, 14(1), pp.2513-2517.