

## Knowledge and Attitude Toward Strabismus in Saudi Arabia

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### ABSTRACT

**Background:** Strabismus is any ocular misalignment in which the eyeball deviates from its straight visual axis in different directions. Strabismus has a significantly negative psychosocial effect on the individual's life and other adverse effects on the individuals' life. The early management of strabismus is necessary to avoid further complications, and this requires early diagnosis. Having adequate knowledge is, in turn, necessary for early identification, diagnosis, and management.

**Aim:** To measure the level of knowledge and attitude towards strabismus in the Southern region of Saudi Arabia.

**Methods:** This study is observational, descriptive, and cross-sectional; it was conducted the individuals living in the Sothern province of Saudi Arabia. The study was conducted using an online-self administrating questionnaire that involved questions to investigate demographic data and the level of knowledge about strabismus. The analysis of the data was done using SPSS program version 21.

**Results:** There were 703 participants included in this study; the most reported cause of strabismus was hereditary (45.7%), and the major reported treatment options were eyeglasses (49.2%) and eye surgery (42.1%). The main source of information was family or friends (38.4%), followed by social media (30.3%). There were 77.2% had a low level of knowledge, whereas 22.8% had a high level of knowledge. The factors that affected the level of knowledge included gender ( $P=0.0001$ ), age ( $P=0.0001$ ), educational level ( $P=0.03$ ), marital status ( $P=0.0001$ ), and occupation ( $P=0.002$ ).

**Conclusion:** There was an overall low level of knowledge among participants regarding strabismus, and there was a gap in the knowledge of participants regarding the causes of strabismus.

**Keywords:** Strabismus, Knowledge, Attitude, Assessment

### INTRODUCTION

Strabismus is a condition affecting the alignment of the eyes in which the ocular visual axes aren't simultaneously directed at a given object. This misalignment is possibly present in all directions or in a particular gaze direction<sup>1</sup>. Strabismus has various names, such as crossed eyes, walleyes, wandering eyes, squint, and goggle eyes<sup>2</sup>. Strabismus can develop at any age, but it usually develops during childhood before six years of age. The peak onset is around three years. Strabismus frequently occurs in childhood secondary to other problems such as systemic diseases or mechanical damage<sup>3,4</sup>.

The overall prevalence of strabismus ranges from 2%-4% among children globally<sup>5</sup>. In Saudi Arabia, a study conducted in 1994 showed

that 0.5% of school boys in the Al-Baha region suffered strabismus<sup>6</sup>. A study published in 2010 conducted in Riyadh reported a prevalence of 0.53% among school-entrant children<sup>7</sup>. A significant increase among clinic-attending children was found in Dammam in 2015, where the prevalence was 38%<sup>8</sup>. A more recent study in Arar published in 2018 reported a prevalence of 14.7% of strabismus<sup>9</sup>.

The prevalence of strabismus has been reported to be higher among children of the same families and those born to consanguine parents<sup>10,11</sup>. Early detection and correction of strabismus are necessary before the brain attains full development in the growing child. Amblyopia is one of the critical complications of strabismus, and it was found among almost one-half of children with strabismus<sup>12</sup>. Also, cosmetic stigma is

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another complication of untreated strabismus<sup>13</sup>.

Poor knowledge of parents about the early detection and management and strabismus has a significant negative influence on the child suffering strabismus<sup>14</sup>. A previous Saudi study reported that public education and early detection, as well as management of strabismus, are necessary to improve the quality of life of strabismus patients<sup>15</sup>. Therefore, this study was conducted to assess the level of knowledge and attitude toward strabismus in the Southern region of Saudi Arabia.

## SUBJECTS AND METHODS

**Study Design, Subjects, and Tools:** This study is observational, descriptive, and cross-sectional; it was conducted for nine months starting on 4<sup>th</sup> March 2022. The study was conducted on individuals living in the Sothern province of Saudi Arabia. The study included individuals of both genders (males & females) aged 18 years and above and living in the Southern region of Saudi Arabia.

The study was conducted using an online-self administrating questionnaire via Google form with close-ended questions. the questionnaire was validated by a panel of ophthalmology experts and was distributed via social media platforms that are commonly used by the Saudi community, such as Twitter, WhatsApp, and others. The questionnaire was available starting on 24<sup>th</sup> March 2022 and filled by the participants who agreed to be involved in the study voluntarily. The questionnaire was available in both English and Arabic format to eliminate the language barrier. The survey was composed of multiple-choice questions arranged into two sections. The first one involved questions investigating demographic data such as age, sex, nationality, residency, educational level, marital status, job, and economic level. The second section estimated the level of knowledge about strabismus through a number of questions dealing with the definition, risk factors, symptoms, treatment options, consequences of the disease on the lifestyle of the patient, and the source of their knowledge about it.

The confidentiality of participants was ensured, as there was no personal information or identifier collection in the questionnaire. The study was carried out in compliance with the Helsinki declaration, and the privacy of the participants was respected.

**Statistical Analysis:** The analysis of the data was done using SPSS program version 21. Qualitative variables were represented in frequencies and percentages. The correlations between the level of knowledge and different variables were evaluated, where P-value at  $\leq 0.05$  was considered significant.

## RESULTS

This study included 703 participants; more than one-half were males, 382 (54.3%), and the largest proportion of 296 (42.1%) were 25 years and younger. More than one-half of participants had a university education or higher 445 (63.3%), and the large majority was Saudi 685 (97.4%). Less than one-half of participants were singles, 351 (49.9%) and 253 (36%) reported governmental occupation. There were 320 (45.5%) who reported a monthly income of less than 5000 SR, and most of the participants, 494 (70.3%), were from the Southern region. The large majority reported living with a family of 659 (93.7%); the demographics of the participants are shown in table 1.

**Table 1:** Basic characteristics of the studied group

| Variables | Description (n=703) |
|-----------|---------------------|
| Gender    |                     |

|                      |            |
|----------------------|------------|
| Male                 | 321 (45.7) |
| Female               | 382 (54.3) |
| Age                  |            |
| 25 or less           | 296 (42.1) |
| 26-35                | 120 (17.1) |
| 36-45                | 141 (20.1) |
| > 45                 | 146 (20.8) |
| Educational level    |            |
| Basic                | 61 (8.7)   |
| Secondary            | 197 (28)   |
| University or higher | 445 (63.3) |
| Nationality          |            |
| Saudi                | 685 (97.4) |
| Non-Saudi            | 18 (2.6)   |
| Marital status       |            |
| Single               | 351 (49.9) |
| Married              | 324 (46.1) |
| Divorced             | 18 (2.6)   |
| Widow                | 10 (1.4)   |
| Occupation           |            |
| Governmental         | 253 (36)   |
| Private              | 66 (9.4)   |
| Freelancer           | 24 (3.4)   |
| Others               | 360 (51.2) |
| Monthly income       |            |
| < 5K                 | 320 (45.5) |
| 5-10K                | 149 (21.2) |
| 10-15K               | 121 (17.2) |
| 15-25K               | 81 (11.5)  |
| > 25K                | 32 (4.6)   |
| Residence            |            |
| N                    | 10 (1.4)   |
| S                    | 494 (70.3) |
| M                    | 77 (11)    |
| E                    | 25 (3.6)   |
| W                    | 97 (13.8)  |
| Living with          |            |
| Alone                | 44 (6.3)   |
| With Family          | 659 (93.7) |

The knowledge of participants was investigated through ten questions (table 2); there were 421 (59.9%) reported that strabismus is a deviated one eye, and 246 (35%) reported that it started to appear six months to 7 years. The major cause of strabismus reported by participants was hereditary 321 (45.7%), whereas the least cause reported was prenatal exposure to toxic substances 101 (14.4%). The major symptoms reported were loss of visual ability to determine the distance of objects and place them in the correct place 308 (43.8%), followed by headache and eye pain 237 (33.7%). There were 542 (77.1%) reported that an ophthalmologist is the personnel who diagnoses strabismus and 566 (80.5%) reported that anyone can observe the eye of the patient. The major treatment options reported by participants were eyeglasses or contact lenses 346 (49.2%), followed by eye surgery 296 (42.1%). More than one-half of participants reported that psychological problems are complications of strabismus 375 (53.3%), followed by lazy eye 363 (51.6%) and cosmetic effect 327 (46.5%), then 287 (40.8%) reported the effect on the academic level of children. More than one-half of participants, 389 (55.3%), reported that psychological effect is an effect of strabismus on the family members of patients. The main sources of information reported included family or friends 270

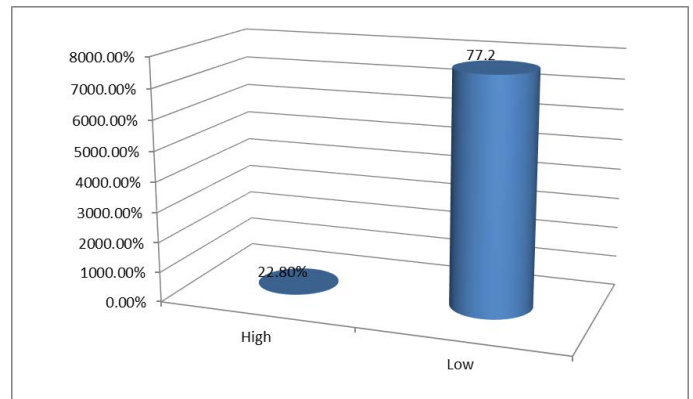
(37.4%), social media 213 (30.3%), and knowing someone with the condition or suffering the condition 162 (23%).

**Table 2:** Knowledge questions

| Variables   | Description (n=703) |
|---|---------------------|
| What is meant by Strabismus?  |                     |
| Deviated one eye  | 421 (59.9)          |
| Involuntary eye movement  | 103 (14.7)          |
| lazy eye  | 81 (11.5)           |
| I don't know  | 98 (13.9)           |
| When does Strabismus begin to appear?   |                     |
| At any age  | 172 (24.5)          |
| < 6 months  | 106 (15.1)          |
| Six months - 7 years  | 246 (35)            |
| I don't know  | 179 (25.5)          |
| Causes  |                     |
| head injury   | 159 (22.6)          |
| Prenatal (during pregnancy) exposure to toxic substances (smoking, radiation)                   | 101 (14.4)          |
| Uncorrected refractive error, especially hypermetropia  | 220 (31.3)          |
| Birth problems (low birth weight, prematurity)  | 108 (15.4)          |
| hereditary  | 321 (45.7)          |
| I don't know  | 199 (28.3)          |
| Symptoms  |                     |
| Photophobia   | 83 (11.8)           |
| Inability to read comfortably   | 215 (30.6)          |
| Loss of visual ability to determine the distance of objects and Place them in the correct place | 308 (43.8)          |
| Headache and eye pain   | 237 (33.7)          |
| No symptoms   | 84 (11.9)           |
| I don't know  | 160 (22.8)          |
| How can it be diagnosed as Strabismus?  |                     |
| Ophthalmologist   | 542 (77.1)          |
| Family physician  | 44 (6.3)            |
| Pediatrician  | 61 (8.7)            |
| I don't know  | 56 (8)              |
| Who do you think can observe the patient's eye?   |                     |
| Anyone  | 566 (80.5)          |
| Doctor  | 57 (8.1)            |
| Relatives & Friends   | 80 (11.4)           |
| Treatment options   |                     |
| Proper eye coverage   | 170 (24.2)          |
| eye surgery   | 296 (42.1)          |
| Botox injections  | 74 (10.5)           |
| Eyeglasses or contact lenses  | 346 (49.2)          |
| Spontaneous relief  | 31 (4.4)            |
| has no cure   | 31 (4.4)            |
| I don't know  | 135 (19.2)          |
| Complications/risks   |                     |
| Cosmetic effect   | 327 (46.5)          |
| social problems   | 252 (35.8)          |
| psychological problems  | 375 (53.3)          |
| financial problems  | 65 (9.2)            |
| Affects the child's academic level  | 287 (40.8)          |
| Loss of vision  | 210 (29.9)          |
| lazy eye  | 363 (51.6)          |

|  |            |
|--|------------|
| no effect  | 54 (7.7)   |
| Effect on the patient's family members                                     |            |
| The possibility of the problem occurring with other children in the family | 287 (40.8) |
| social embarrassment   | 285 (40.5) |
| Marriage problems  | 189 (26.9) |
| financial impact   | 145 (20.6) |
| psychological effect   | 389 (55.3) |
| I don't know   | 109 (15.5) |
| Sources of information   |            |
| Social media   | 213 (30.3) |
| ophthalmologist  | 120 (17.1) |
| I know someone with the same problem/I had the same Problem                | 162 (23)   |
| family or friends  | 270 (38.4) |
| Awareness campaigns  | 161 (22.9) |
| School, university, or workplace   | 161 (22.9) |

The overall level of knowledge among our participants was high among only 22.8%, whereas 77.2% had a low level of knowledge (figure 1).



**Figure 1:** The level of knowledge

The factors affecting the level of knowledge of the participants in this study are shown in table 3. There were significant impacts of gender (P=0.0001), age groups (P=0.0001), an education level (P=0.033), marital status (P=0.0001), and occupation (P=0.002) on the level of knowledge of participants.

**Table 3:** Factors affecting knowledge level

| Variables                | Knowledge level |            | P value |
|--------------------------|-----------------|------------|---------|
|                          | High            | Low        |         |
| <b>Gender</b>            |                 |            |         |
| Male                     | 40 (25)         | 281 (51.7) | 0.000   |
| Female                   | 120 (75)        | 262 (48.3) |         |
| <b>Age</b>               |                 |            |         |
| 25 or less               | 93 (58.1)       | 203 (37.4) | 0.000   |
| 26-35                    | 34 (21.3)       | 86 (15.8)  |         |
| 36-45                    | 24 (15)         | 117 (21.5) |         |
| > 45                     | 9 (5.6)         | 137 (25.2) |         |
| <b>Educational level</b> |                 |            |         |
| Basic                    | 7 (4.4)         | 54 (9.9)   | 0.033   |
| Secondary                | 40 (25)         | 157 (28.9) |         |
| University or higher     | 113 (70.6)      | 332 (61.1) |         |
| <b>Nationality</b>       |                 |            |         |
| Saudi                    | 159 (99.4)      | 526 (96.9) | 0.090   |

|                |            |            |       |
|----------------|------------|------------|-------|
| Non-Saudi      | 1 (0.6)    | 17 (3.1)   |       |
| Marital status |            |            |       |
| Single         | 112 (70)   | 239 (44)   | 0.000 |
| Married        | 47 (29.4)  | 277 (51)   |       |
| Divorced       | 1 (0.6)    | 17 (3.1)   |       |
| Widow          | 0 (0)      | 10 (1.8)   |       |
| Marital status |            |            |       |
| Married        | 47 (29.4)  | 277 (51)   | 0.000 |
| Not Married    | 113 (70.6) | 266 (49)   |       |
| Occupation     |            |            |       |
| Governmental   | 46 (28.8)  | 207 (38.1) | 0.002 |
| Private        | 10 (6.3)   | 56 (10.3)  |       |
| Freelancer     | 2 (1.3)    | 22 (4.1)   |       |
| Others         | 102 (63.8) | 258 (47.5) |       |
| Monthly income |            |            |       |
| < 5K           | 87 (54.4)  | 233 (42.9) | 0.114 |
| 5-10K          | 29 (18.1)  | 120 (22.1) |       |
| 10-15K         | 21 (13.1)  | 100 (18.4) |       |
| 15-25K         | 18 (11.3)  | 63 (11.6)  |       |
| > 25K          | 5 (3.1)    | 27 (5)     |       |
| Residence      |            |            |       |
| N              | 4 (2.5)    | 6 (1.1)    | 0.194 |
| S              | 118 (73.8) | 376 (69.2) |       |
| M              | 14 (8.8)   | 63 (11.6)  |       |
| E              | 2 (1.3)    | 23 (4.2)   |       |
| W              | 22 (13.8)  | 75 (13.8)  |       |
| Living with    |            |            |       |
| Alone          | 7 (4.4)    | 37 (6.8)   | 0.263 |
| With Family    | 153 (95.6) | 506 (93.2) |       |

## DISCUSSION

Untreated strabismus affects both children and parents<sup>16</sup>. Therefore, early identification, diagnosis, and management are necessary for a better outcome. Individuals and parents should have enough knowledge regarding strabismus for early detection. In our study, we conducted the study on the general population for the assessment of their knowledge.

There are many causes of strabismus, including refractive errors, glaucoma, neurological disease, and cataract, as well as life-threatening conditions such as retinoblastoma. The risk factors associated with strabismus include maternal smoking and premature birth<sup>17</sup>. Other risk factors include low birth weight, delayed development, maternal health, uncorrected refractive error, genetic factors, systemic illness, mechanical agents, and syndromes<sup>4,18</sup>.

In our study, the most reported causes of strabismus were hereditary as the major cause, followed by uncorrected refractive error, then head injury, birth problems including birth weight and prematurity, and finally, prenatal exposure to toxic substances. However, low proportions of participants reported these causes, although all of these causes can be selected as they all are causes of strabismus. Therefore, there is a gap in the knowledge of participants regarding the causes of strabismus.

The treatment options for strabismus involve glasses, surgery to correct the appearance of squint, and patching the good eye in case of amblyopia to force the use of the affected eye<sup>19</sup>. Also, strabismus can be managed by prisms and medicines<sup>4</sup>. In our study, the major treatment option reported as eyeglasses or contact lenses, followed by eye surgery.

Untreated strabismus may lead to negative functional and cosmetic outcomes leading to psychological aspects such as deterioration of social interaction and deterioration of the self-confidence of the child with a considerable deterioration of the quality of life of both parents and children<sup>16</sup>. Strabismus can also result in low performance in school, low self-esteem, and low confidence. Among adults, it can affect employment<sup>20,21</sup>. The most reported complication of strabismus by our participants was psychological problems, and the major reported effect on the family was also a psychological effect.

A study conducted in the Western Province of Saudi Arabia on 589 participants showed that 52.8% reported the correct definition of strabismus, and most of them (71.5%) agreed that strabismus is a treatable condition. The study didn't report the level of overall knowledge or the associated factors; it was reported that knowledge of strabismus treatability was associated with work state, gender, age, and level of education, but no factors were reported regarding the overall knowledge<sup>22</sup>. Our study also showed similar findings regarding the definition of strabismus. Our study reported the overall level of knowledge compared to the previous Saudi study, and we found that the largest proportion had a low level of knowledge. The factors associated with a low level of knowledge included male gender, older age, and married status.

In another Saudi study conducted on attendants of pediatric and ophthalmology clinics in Jeddah, it was found that 61.1%-74.6% of participants correctly defined strabismus. Heredity was reported by 68.9%, followed by trauma 61.3%, as the more frequent etiology identified. The knowledge about the treatment options revealed that 63.6% reported glasses, 60.6% reported surgery, and 47.8% reported muscle exercise. The major source of knowledge was friends' 69.8%, followed by the internet and social media 56.3%. The study revealed a high awareness level with misconceptions regarding psychological and economic consequences. It was found that females significantly had a higher level of knowledge compared to males<sup>5</sup>.

In our study, the rate of participants who defined strabismus correctly was lower compared to the previous study, but in agreement with the previous study, hereditary was the major cause reported for strabismus in our study. Similar to the previous Saudi study<sup>5</sup>, in our study, eyeglasses and eye surgery were the major reported treatment options. The main source of information in our study was family or friends, followed by social media; although this was similar to the previous studies, the rates of these two sources in our study were lower. In contrast to the previous study that reported a high level of awareness with misconception<sup>5</sup>, our study reported a low level of knowledge.

In a Saudi study conducted on parents of 81 children, there was an excellent level of knowledge among 50.6% of participants, and 70.4% had a positive attitude. The level of knowledge wasn't affected by any gender, age, educational level of parents, or type of strabismus<sup>23</sup>. The contrast was found in our study, where there was a low level of knowledge among most of the participants (77.2%). Also, in contrast with the previous study, gender, age, and level of education significantly affected the level of knowledge of participants.

A study conducted on Ethiopian adults showed that 52.3% had good knowledge about strabismus. A monthly income of more than 5000 birrs was negatively associated with good knowledge of strabismus, whereas being a student was positively associated with good knowledge of strabismus<sup>24</sup>. In our study, only 22.8% had good knowledge about strabismus, and monthly income didn't affect the level of knowledge which was in contrast to the previous study.

Another study from Ethiopia conducted on 420 individuals reported poor knowledge, attitude, and practice regarding the causes and

management of strabismus. There were 62.8% didn't know the causes of strabismus, and 53.6% believed that there is no treatment for strabismus. The major source of information was family members or neighbors. The study didn't report the total knowledge or attitude of participants. Also, the determinant factors weren't stated<sup>25</sup>.

## CONCLUSION

**There was an overall low level of knowledge among participants regarding strabismus, and there was a gap in the knowledge of participants regarding the causes of strabismus. Educational programs should be implemented to increase the level of knowledge regarding strabismus to increase the knowledge of individuals and, as a result, increase the rate of early detection, diagnosis, and management of strabismus to avoid further complications.**

## AUTHOR CONTRIBUTION

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**Potential Conflict of Interest:** None

**Competing Interest:** None

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