

Awareness of amblyopia among the adult population in Arar city of Saudi Arabia

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ABSTRACT

Purpose: To assess the amblyopia awareness among Saudi adults in Arar, Saudi Arabia. *Methods:* A total number of 368 participants aged between 18-59 years were involved in this questionnaire-based survey. *Results:* Nearly two thirds (63.3%) of all participants belonged to the age group 18 to 29 years. Male participants made up more than half of the study population (57.3%) and 56.8% were related to the health sector. Nearly one third (31%) of the participants had a wrong opinion that amblyopia could be detected with the naked eye while as 47.8% thought that proper eye checkup was not necessary. Around 61% participants had no idea about the treatment, 34.2% had chosen the incorrect option that amblyopia can be treated in any age and 49.5% the incorrect option of covering the healthy eye. However, more than forty percent participants had correctly acknowledged the risk factors as squint and decreased vision in one eye. Regarding the complications 66.3% reported decreased vision, 32.9% blindness and 40% loss of 3D perception. Eye screening and public awareness were stated as main preventive measures and Ministry of Health was suggested as the most effective platform to raise the amblyopia awareness. The participants' main source of information pertaining to amblyopia was the internet. *Conclusion:* This study shows that the amblyopia awareness is unsatisfactory among Saudi adults living in Arar city and highlights the need for raising this awareness through reliable platforms to overcome the unwanted consequences associated with this health issue.

Keywords: Amblyopia, awareness, perception, Northern Border University, Saudi Arabia

1. INTRODUCTION

Amblyopia, commonly referred to as a lazy, comes originally from the Greek *amblyos* (dull) and *ops* (eye), which means dullness of vision. Amblyopia is defined as unilateral or (rarely), bilateral reduction of the best corrected visual acuity that cannot be attributed directly to the effect of any structural abnormality of the eye or the visual pathways. Amblyopia is considered as the

most common cause of unilateral visual impairment in children (Adhikari et al., 2015; Bashir et al., 2021; Makhdoum et al., 2022).

These children are at a higher risk of becoming blind than the general population because of potential loss to the sound eye from other causes. Besides, poor vision in one eye means loss of stereo acuity which can put limitation on their future job opportunities. That is why; the American Association of Pediatric Ophthalmology and Strabismus, American Academy of Pediatrics and American Academy of Ophthalmology advocate pre-kindergarten vision screening for all children (Earley and Fashner, 2019).

Amblyopia should not be viewed as eye problem alone, but also as brain damage caused by abnormal visual stimulation during the sensitive period of visual development (Dandona et al., 2002). The important risk factors for amblyopia include strabismus, anisometropia and any obstacle in the visual pathway like cataract, corneal opacity that will lead to visual deprivation (Keech and Kutschke, 1995; Von-Noorden, 1974). Amblyopia can be prevented and effectively treated if its risk factors are identified at an early age. If amblyopia is not detected and treated early in young children, the loss of vision may be irreversible (Harwerth et al., 1986; Neumann et al., 1987). Currently no treatment is available if amblyopia is discovered after the age of nine years and some report this period to be even as early as seven years (Quah et al., 1991; Epelbaum et al., 1993; Flynn et al., 1998).

Amblyopia is a global health problem (Rahi et al., 1995; Alruwaili and Alzarea, 2021; Fayi et al., 2018). Alongside the ophthalmologists, primary care physicians and pediatricians a vital role in decreasing the visual impairment caused by amblyopia can be played by teachers, parents and any person having good amblyopia awareness. The awareness is thus critically important for the prevention of this disease and its associated impact on the quality of life. Although some studies on this health issue have been conducted in Saudi Arabia, limited data is available from Northern Border Region (Alsaqr and Masmali, 2019; Basheikh et al., 2021; Alamri et al., 2021; Alhaddab et al., 2019; Alshaheen and Al-Owaiifeer, 2018). Hence, we aimed to assess the level of amblyopia awareness among Saudi adults in Arar city through a predesigned questionnaire.

2. SUBJECTS AND METHODS

Study setting and design

Between the 5th of June and the 6th of December 2022, a cross-sectional descriptive survey was conducted in Arar, Saudi Arabia.

Sample size and sampling method

The sample size was calculated by the following formula $N = Z^2 \times p \times (1-p) / d^2$

N= sample size

Z= The statistic corresponding to confidence level (1.96)

P = The Expected prevalence of awareness (40%)

d= precision (0.05)

The expected sample size was calculated to be 368. Participants recruited electronically via a Google form using various social media sites, including Twitter, Facebook and WhatsApp. The questionnaire's opening paragraph included a statement of the study's aims and before participation; the respondents supplied written informed consent. Participants aged below 18 years and those not willing to participate were excluded.

Research tool

A predesigned questionnaire containing four parts was used. The first part covered the socio-demographic data of the participants. The second part contained five questions to evaluate the participants' amblyopia awareness. The third part was related to the risk factors, consequences, treatment and the preventive measures for amblyopia. The fourth part was about the source of information and perception about the platforms that could be more effective in promoting amblyopia awareness and in this part the participants could choose more than one option. The questionnaire was validated by the Ophthalmology faculty members of the Surgery Department of Northern Border University.

Data Analysis

The collected data were entered and analyzed using SPSS (statistical package for social sciences) version 20.0 (IBM Corporation, Armonk, NY, USA). Data are presented as frequency and percentage.

3. RESULTS

A total number of 368 participants were involved in the study, with nearly two thirds (63.3%) falling into the age group 18 to 29 years. Male participants made up more than half of the study population (57.3%), more than two thirds (70.2%), had their education at the university level and 56.8% were related to the health sector (Table 1).

Table 1 Socio-demographic characteristics of the of the studied participants

Item	Number	Percent
Age		
18-29	233	63.3
30-39	60	16.3
40-49	50	13.6
50-59	25	6.8
Gender		
Male	211	57.3
Female	157	42.7
Marital status		
Married	158	42.9
Unmarried	210	57.1
Education level		
Secondary	55	14.9
University	258	70.2
Postgraduate	55	14.9
No of children		
None	230	62.5
1-3	79	21.5
More than 3	59	16.0
Related to health sector		
Yes	209	56.8
No	159	43.2
History of eye disease		
Yes	99	26.9
No	269	73.1
Family history of eye disease		
Yes	134	36.4
No	234	63.6

Regarding amblyopia awareness, slightly more than forty percent had no idea whether amblyopia could be detected with the naked eye or not. As many as 47.8% thought that proper eye checkup was not needed to diagnose amblyopia, while as 48.4% of the participants did not know that children are more prone to develop amblyopia. More than sixty percent (60.9%) stated that amblyopia was not treatable and 34.2% thought that amblyopia could be treated in any age (Table 2).

Concerning the risk factors, 41% participants believed that squint was a risk factor and nearly two thirds (63%) stated that having less vision in one eye than the other can cause amblyopia. Disease like cataract, ptosis or corneal opacity was acknowledged as risk factor by 48.6% participants. Less than half (47.8%) and slightly more than half (51.6%) reported an inherited or family history respectively. A little less than quarter (23.9%) mentioned that prematurity increases the likelihood of amblyopia, while slightly more than 40% mentioned electronic devices use or nutritional deficiency as the risk factors (Table 3).

About the amblyopia complications, only a small percentage (15.2%) of the participants responded that amblyopia has no consequences. Two thirds (66.3%) believed that amblyopia can cause decreased vision and 32.9% though it can lead to blindness. Loss of ability to perceive three dimensional images was mentioned by 45.7%, while as 48.6% stated that psychological problems and impaired quality of life were the complications of amblyopia (Table 4).

Table 2 Awareness of amblyopia among the studied participants

Item	Number	%
Amblyopia can be detected with the naked eye.		
Yes	114	31
I don't know	152	41.3
No	102	27.7
Amblyopia can be detected only by proper eye check-up		
Yes	69	18.8
I don't know	123	33.4
No	176	47.8
Children are more prone to develop amblyopia		
Yes	49	13.3
I don't know	141	38.3
No	178	48.4
Amblyopia is a treatable disease		
Yes	26	7.1
I don't know	118	32.1
No	224	60.9
Amblyopia can be treated in any age		
Yes	126	34.2
I don't know	152	41.3
No	90	24.5

Table 3 Awareness of amblyopia risk factors

Item	Number	Percent
Misalignment of eyes (inward or outward deviation)		
Yes	151	41.0
No	46	12.5
I don't know	171	46.5
Decreased vision in one eye more than in other eye		
Yes	232	63.0
No	21	5.7
I don't know	115	31.3
Eye disease like congenital cataract/droopy eyelid (ptosis)/corneal opacity		
Yes	179	48.6
No	49	13.3
I don't know	140	38.0
Hereditary		
Yes	176	47.8
No	56	15.2
I don't know	136	37.0

Family history		
Yes	190	51.6
No	44	12.0
I don't know	134	36.4
Premature birth		
Yes	88	23.9
No	80	21.7
I don't know	200	54.3
Electronic devices use		
Yes	160	43.5
No	68	18.5
I don't know	140	38.0
Nutrition deficiency		
Yes	151	41.0
No	52	14.1
I don't know	165	44.8

Table 4 Awareness of amblyopia consequences

Item	Number	Percent
It causes no complication		
Yes	56	15.2
No	127	34.5
I don't know	185	50.3
Decreased vision		
Yes	244	66.3
No	17	4.6
I don't know	107	29.1
Blindness		
Yes	121	32.9
No	77	20.9
I don't know	170	46.2
Loss of 3D perception		
Yes	168	45.7
No	44	12.0
I don't know	156	42.4
Psychological		
Yes	179	48.6
No	54	14.7
I don't know	135	36.7
Impaired quality of life		
Yes	179	48.6
No	49	13.3
I don't know	140	38.0

Regarding amblyopia treatment, more than half (56.3%) of the studied respondents stated that amblyopia required treatment, 49.5% stated covering the healthy eye and around one third reported that amblyopia required surgical intervention. Glasses and eye exercise were mentioned as treatment options by 51.9% and 58.2% participants respectively (Table 5).

Table 5 Awareness of amblyopia treatment

Item	Number	Percent
Treatment is not required		
Yes	33	9.0
No	207	56.3
I don't know	128	34.8
Patching (covering the healthy eye)		
Yes	182	49.5
No	54	14.7
I don't know	132	35.9
Surgery		
Yes	121	32.9
No	77	20.9
I don't know	170	46.2
Glasses		
Yes	191	51.9
No	32	8.7
I don't know	145	39.4
Eye exercise		
Yes	214	58.2
No	27	7.3
I don't know	127	34.5

Pertaining to amblyopia prevention, eye screening followed by public awareness (74.5% and 74.2% respectively) was indicated as the main preventive measures (Figure 1).

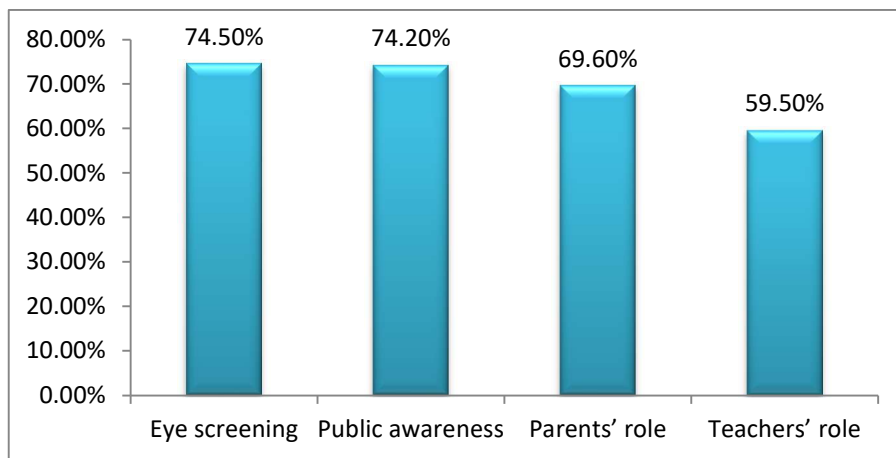


Figure 1 Perception about the amblyopia prevention strategies

Internet was the main source of information as reported by 57.9% of the participants, while as a visit to a doctor was quoted by 51.6% (Figure 2).

Most frequently reported effective platform for raising public awareness about amblyopia was the Ministry of Health (75.5%) followed by the social media (Figure 3).

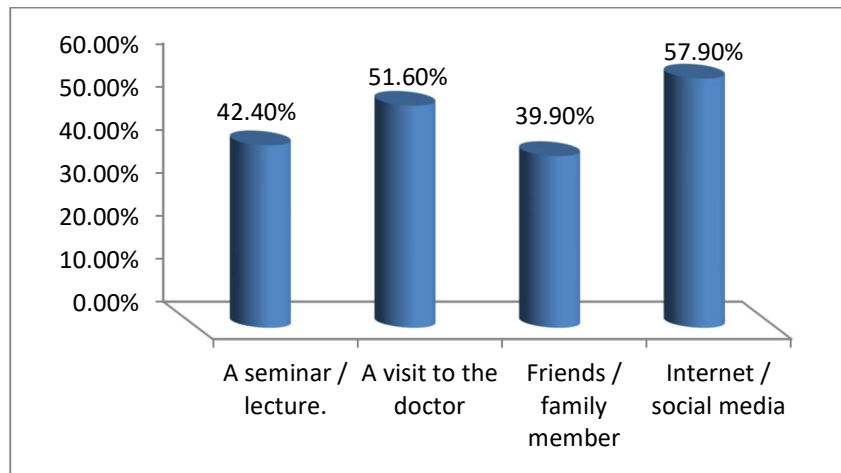


Figure 2 Source of information about amblyopia

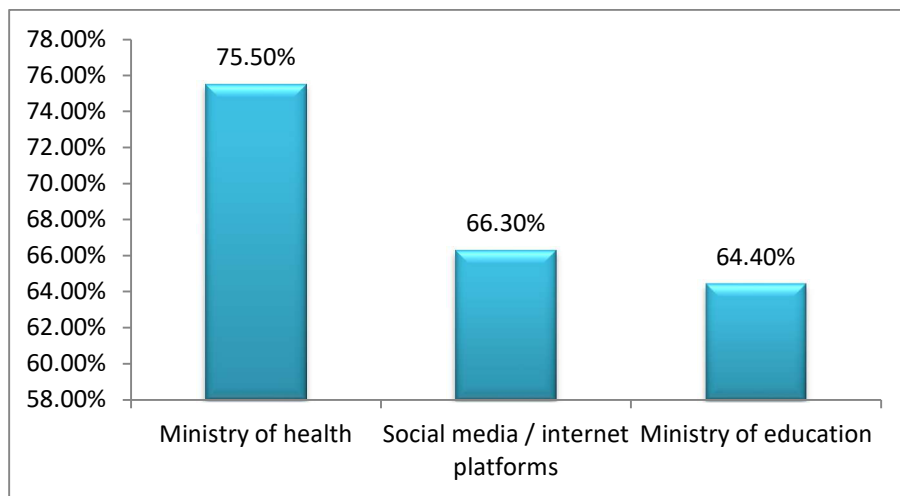


Figure 3 Perception about effective platforms to promote amblyopia awareness

4. DISCUSSION

To our knowledge, the current study is the first to measure the degree of amblyopia awareness among Saudi adults living in Arar city. In the current study 31% participants had a wrong opinion that amblyopia could be detected with the naked eye while as 47.8% thought that proper eye checkup was not necessary to diagnose amblyopia. In Riyadh, Saudi Arabia Alhaddab et al., (2019) found 26.3% and 39.9% participants respectively had a similar opinion. These differences could be justified as the study in Riyadh was conducted in a clinical setting.

Notably, regarding the treatment options our participants (60.9%) had either no idea about the treatment or had chosen (34.2%) the incorrect option that amblyopia could be treated in any age. Besides, the incorrect option of covering the healthy eye was chosen by 49.5% our participants. These figures are higher than what was found in a study conducted in Jeddah Saudi Arabia (Basheikh et al., 2021). This may be owing to the fact that their sample included parents some of whose children had a history of amblyopia.

More than forty percent of our participants had correctly acknowledged the risk factors as squint, decreased vision in one eye, cataract, ptosis or corneal opacity as risk factors for amblyopia. This is in line with the study conducted in Alhassa region of Saudi Arabia (Alshaheen and Al-Owaifeer, 2018).

Regarding the complications of amblyopia only a small percentage (15.2%) of the participants responded that amblyopia has no consequences, while as 66.3% believed that amblyopia can cause decreased vision, 32.9% thought that blindness was the consequence. Loss of ability to perceive three dimensional images was mentioned by more than 40%. Similarly, loss of vision, blindness and loss of 3D perception were also mentioned in a study from Aseer region of Saudi Arabia (Alamri et al., 2021). Eye screening, public awareness, parents' or teachers' role were stated as preventive measures by 74.5%, 74.2%, 69.6% and 59.5% participants respectively.

Regarding the opinion about the more effective platforms for raising public awareness of amblyopia the most frequently reported platform was the Ministry of Health (75.5%) followed by the social media (66.3%). This is consistent with a study from Saudi Arabia (Alsaqr and Masmali, 2019). The participants' main source of information about amblyopia was internet as reported by 57.9% followed by as a visit to a doctor as quoted by 51.6%. Therefore, the misinformation obtained by the participants from non-reliable search engines might have also contributed to the unsatisfactory awareness in our study.

5. CONCLUSION

The level of awareness on amblyopia in Arar city is unsatisfactory. It is especially so in relation to the misinformation about the detection of this disease and its treatment concerns. The awareness needs to be promoted through reliable platforms like professionals from Ministry of health and Ministry of education. This shall in turn help to overcome the consequences associated with this health issue, which could otherwise be prevented and/or timely treated.

Author Contributions

Mujeeb Ur Rehman Parrey contributed to research conception and design, data interpretation, writing and reviewing of the manuscript. Maha M Abdul-Latif shared the proposal and introduction writing. Mohamed M Abd El-Mawgod, conducted statistical analysis. Dhari Atallah S Alshammari, Talal Ahmed A Albalawi and Hussam Mohammed M Alanazi were responsible for data collection. All researchers reviewed and approved the final manuscript.

Ethical approval

The study was approved by the Medical Ethics Committee of Bioethics, Northern Border University (Ethical approval code: 38/43/H).

Informed consent

Informed consent was obtained from all individual participants included in the study.

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Conflict of interest

The authors declare that there is no conflict of interests.

Data and materials availability

All data sets collected during this study are available upon reasonable request from the corresponding author.

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