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Pattern of Strabismus in Children and Adolescents in Hail, KSA

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Abstract
Background: Strabismus (Squint), abnormal ocular alignment could occur constantly or intermittently. Double vision, poor vision or abnormal head positioning may accompany it. A child with squint may stop using the affected eye. This can lead to visual loss, which can become permanent unless treated early in childhood. **Objective:** to estimate the prevalence of squint, types and treatment characteristics in the studied children and adolescents in Hail city, Saudi Arabia. **Methods:** A cross-sectional study conducted in Hail city, Saudi Arabia. The study included 299 participants; 148 male and 151 female children and adolescents from 6 months to 19 years. The study period was from 1 January to 30 May 2018. Data collected by personal interview using a pre-designed questionnaire, which distributed among mothers of children and adolescents to be self-reported. **Results:** Squint found in 17.1% of the studied sample. Squint was right sided in 37.3% of the cases, left sided in also 37.3% and in both eyes in 25.5% of the studied cases. About half (47.1%) of cases had inward squint (esotropia) and 15.7% outward squint (exsotropia), 21.6% of the cases had Intermittent squint and 52.2% had permanent squint. In most (70.7%) of cases, squint affected the visual acuity. As regards treatment, 45.1% received medical treatment and 13.7% received surgical treatment. Only 19.6% of cases completely cured and 39.2% had recurrence. There was insignificant relation with sex, squint in parents, other hereditary diseases and consanguinity between parents (P>0.05). **Conclusion:** in this study, the prevalence of squint in the studied children and adolescents in Hail city, Saudi Arabia was 17.1%. No significant difference between males and females. After treatment, only 19.6% of cases completely cured and 39.2% had recurrence. Health education of the public about importance of early treatment is mandatory.
Keywords: Squint; strabismus; prevalence; types; Hail; Saudi Arabia.

INTRODUCTION

Squint is the medical term for an eye condition commonly called by various names: Strabismus, eye turns, crossed eyes, wall-eyes, wandering eyes, swivel eyes, goggle eyes and deviating eyes [1]. This abnormal ocular alignment could occur constantly or intermittently and may be accompanied by abnormal ocular motility, double vision, poor vision or abnormal head positioning [2]. The prevalence of squint ranges from 0.8% to 5.65% [3, 4]. Children with strabismus may have psychosocial difficulties later in life, and this may preclude such individual from particular occupations and will lack the ability to fully develop binocular single vision if left untreated and may have an impaired reading performance when the child starts school [5]. Strabismus detection, classification, and treatment are especially important in pediatric populations as strabismus is a leading factor in the development of amblyopia, or a loss in visual function resulting from inadequate or abnormal visual system stimulation and treatment should be initiated as soon as it is diagnosed, in order to achieve the best binocular vision possible, as well as for esthetic purposes, thus preventing or diminishing psychological disorders [6].

A previous study on squint in children and adolescents in Arar, Northern Saudi Arabia [7] reported squint in14.7% of the studied sample, There was no significant relation between squint and age, other hereditary diseases or other chronic diseases but there was relation with consanguinity between parents (P=0.03).The cause of squint was eye trauma in 17.4%, surgical operation in 4.3% and neurological disease in 4.3%. Squint was right sided in 47.8% of cases, left sided in 34.8% and in both eyes in 17.4% of the studied cases. 78.3% of the cases had in ward squint and 17.4% out ward squint. In all cases squint affect visual acuity. All cases received treatment (69.9% medical and 30.4% surgical) but only 52.2% cured and 43.5% had recurrence.

Another study on prevalence and risk factors of strabismus in children and adolescents in South Korea [8] reported that; among 5,935 eligible subjects, 84 subjects had clinically significant exodeviation and 13 had

clinically significant esodeviation. The overall prevalence of clinically significant horizontal strabismus was 1.6%, 1.3% for clinically significant exodeviation and 0.3% for clinically significant esodeviation. Clinically significant exodeviation was associated with family history of strabismus and astigmatism ≥1.0 D. Other demographic, socioeconomic, and clinical variables were not associated with strabismus.

The aim of the study was to estimate the prevalence of squint, some clinical manifestations and treatment characteristics in the studied children and adolescents in Hail city, Saudi Arabia.

METHODS

Type and period of the study:

A cross-sectional study conducted in Hail city, Saudi Arabia. The study included 299 participants; 148 male and 151 female children and adolescents from 6 months to 19 years. The study period was from 1 January to 30 May 2018.

Sampling:

The sample size will be calculated using the sample size equation: n=z2p (1-p)/e2. Considering target population less than 1000, and study power 95%. A systematic random sampling technique was used. The sample included children and adolescents of every eighth family.

Data collection:

Data collected by personal interview using a pre-designed questionnaire, which distributed among mothers of children and adolescents to be self-reported.

The questionnaire had brief introduction or explanation of the idea of the research to children's' mothers. Mothers filled out the questionnaire.

The collected data included:

- Socio-demographic characteristics of the participants including age, sex and educational status
- If the patient has squint or other hereditary diseases
- Questions about squint (cause, type, duration, side, treatment and recurrence of squint)

Statistical analysis:

Collected data coded and analyzed using statistical package for the social sciences (SPSS, version 15). Descriptive statistics used for the prevalence and quantitative variables. Relation between squint and sociodemographic characters was determined using X^2 test. P value of less than 0 .05 considered statistically significant.

Ethical considerations:

Participants informed that participation is voluntary and data collectors introduced and explained the research to participants. No names recorded on the questionnaires and all questionnaires kept safe.

RESULTS

Table (1): illustrates the Socio-demographic characteristics, percentage of squint, other hereditary diseases, consanguinity between parents, and presence of other chronic diseases among the studied children and adolescents. The table showed that 56.2% of the studied children aged between 7-19 years, 40.8% between 1-7 years and only 3.0% aged less than one year. Male to female was 49.5% to 50.5%. Primary education constitutes 10.4%, 20.1% had preparatory education, 29.8% had secondary education, and 39.8% were preschool age. As regards consanguinity between parents, it found in 53.5% of the studied children. Squint in one parents found in 5.7% and in both of them in 0.7%. Only 4.7% of children had other hereditary disease. Squint was positive in 17.1% of the studied sample.

Table (2): illustrate affected eye, type of squint (strabismus), wearing glasses, effect of squint on vision, if squint due to psychic troubles and treatment characteristics of the studied cases of children and adolescents. Squint was right sided in 37.3% of the cases, left sided in also 37.3% and in both eyes in 25.5% of the studied cases. About half (47.1%) of cases had inward squint (esotropia) and 15.7% outward squint (exsotropia), 21.6% of the cases had Intermittent squint and 52.2% had permanent squint. Most (52.9%) of squint cases use glasses and in 70.7% of cases squint affected their visual acuity but in 21.6% squint causes psychological troubles. As regards treatment, 45.1% received medical treatment and 13.7% received surgical treatment. Only 19.6% of cases completely cured and 39.2% had recurrence.

Table (3): illustrate the relationship between squint and age, sex, education, squint in parents, chronic diseases, consanguinity and hereditary diseases among squint cases of the studied children and adolescents. There was a significant relation between squint and age and presence of chronic diseases (P<05), but there was insignificant relation with sex, squint in parents, other hereditary diseases and consanguinity between parents (P>0.05).

Table (1): age, sex, education, hereditary diseases, consanguinity, squint in parents and prevalence of squint among the studied children, Hail, 2018

Sex	**Frequency (N=299)**	**Percent**
– Female	151	50.5
– Male	148	49.5
Age (in years)		
– < 1	9	3.0
– 1-7	122	40.8
– 7-19	168	56.2
Education		
– Preschool age	119	39.8
– Primary	31	10.4
– Preparatory	60	20.1
– Secondary	89	29.8
Hereditary diseases	14	4.7
Consanguinity in parents	160	53.5
Squint in parents		
– Both	2	.7
– One of them	17	5.7
– No	280	93.6
Squint		
– Yes	51	17.1
– No	248	82.9

Table (2): affected eye, type of squint (strabismus), wearing glasses, effect of squint on vision, if squint due to psychic troubles and treatment characteristics of the studied cases, Hail, 2018

Variable	**Frequency (N=51)**	**Percent**
Affected eye		
– Left eye	19	37.3
– Right eye	19	37.3
– Both eyes	13	25.5
Type of squint (Strabismus)		
– Outward (exotropia)	8	15.7
– Inward (esotropia)	24	47.1
– Intermittent	11	21.6
– Permanent	8	15.7
Wearing glasses		
– Sometimes	12	23.5
– No	12	23.5
– Yes	27	52.9
Effect of squint on vision	36	70.6
Squint causes psychic troubles	11	21.6
Previous treatment trials		
– Surgical treatment	7	13.7
– Medical treatment by visual training and glasses	23	45.1
– No treatment	21	41.2
Success of treatment (completely cured)	10	19.6
Recurrence of squint after treatment	20	39.2
Sid effect of treatment	6	11.8

Table (3): relationship between Squint and age, sex, education, squint in parents, chronic diseases, consanguinity and hereditary diseases among squint cases, Hail, 2018

Variables		Squint		Total (N=299)	P value
		Yes (N=51)	No (N=248)		
Age (in years)	**< 1**	4	5	9	0.000
		7.8%	2.0%	3.0%	
	7-19	47	121	168	
		92.2%	48.8%	56.2%	
	1-7	0	122	122	
		.0%	49.2%	40.8%	
Sex	**Female**	27	124	151	0.410
		52.9%	50.0%	50.5%	
	Male	24	124	148	
		47.1%	50.0%	49.5%	
Education	**Primary**	11	20	31	0.000
		21.6%	8.1%	10.4%	
	Secondary	21	68	89	
		41.2%	27.4%	29.8%	
	Preparatory y	15	45	60	
		29.4%	18.1%	20.1%	
	Preschool age.	4	115	119	
		7.8%	46.4%	39.8%	
Squint in parents	**Both have squint**	0	2	2	0.313
		.0%	.8%	.7%	
	No	46	234	280	
		90.2%	94.4%	93.6%	
	One of them	5	12	17	
		9.8%	4.8%	5.7%	
Chronic diseases	**No**	43	244	287	0.000
		84.3%	98.4%	96.0%	
	Yes	8	4	12	
		15.7%	1.6%	4.0%	
Consanguinity	**No**	26	113	139	0.290
		51.0%	45.6%	46.5%	
	Yes	25	135	160	
		49.0%	54.4%	53.5%	
Hereditary diseases	**No**	46	239	285	0.070
		90.2%	96.4%	95.3%	
	Yes	5	9	14	
		9.8%	3.6%	4.7%	

Discussion

Strabismus is a clinical condition in which the eyes not aligned with each other properly. It is characterized by a horizontal, vertical, and/or torsional deviation of one eye relative to the other. The medical name for squint is strabismus, although commonly recognized among children; adults also develop strabismus secondary to a variety of conditions including trauma, surgical procedures, thyroid dysfunction, cranial nerve palsies, or other neurologic diseases [9]. Worldwide prevalence of strabismus in the general population is about 3-5% [10]. Most squints occur in young children, with an increased prevalence associated with assisted delivery, low birth weight (including premature infants) and neurodevelopment disorders.

This is a cross sectional study conducted among 299 children and adolescent in Hail, KSA. The study aim to estimate the prevalence of squint, some clinical manifestations and treatment characteristics in the studied children and adolescents in Hail city, Saudi Arabia.

In this study the prevalence of squint among children was 17.1% , it was more prevalent in female 52.9% than male 47.1%.

Our results were close to reported in Arar city in study conducted among 156 subjects which found that squint in 14.7% of the studied sample, 26.1% was female and 73.9% was male [11]. A previous study in KSA [12] reviewed the files of 385 children; strabismus was prevalent with a percentage of (36.9%). In Dammam,

Kingdom of Saudi Arabia, another study conducted among 1350 children, aged 1-15 years strabismus was seen in 38% (228) of the children [13]. In northern Iran, anther study carried out among 1551 schoolchildren found that the prevalence of strabismus in the students was 2% [18]. The overall prevalence of strabismus in Young Singaporean Children aged 6 to 72 months was 0.80%, there was no difference in strabismus prevalence between the boys and the girls [20].

As regards the type of squint among children our study reported; inward (esotropia) by 47.1%, outward (exotropia) 15.7% with the same percent for constant type and intermittent type was 21.6%. In King Abdul-Aziz University Hospital, in Jeddah-Saudi Arabia, across sectional survey conducted at pediatrics ophthalmology clinic among 113 patients with squint found that 58.4% of patients were diagnosed with esotropia and 28.3% with exotropia [14]. At the King Khalid Eye Specialist Hospital in Riyadh, Saudi Arabia, another study reported that esotropia was the most common type of strabismus (69.3%), while exotropia was less common (26.9%) [15].These findings also agreed with other regional studies conducted in Oman [16], and Egypt [17] as the first reported (2.67:1) esotropia to exotropia ratio in their Omani population [16], and the second estimated a (5:1) esotropia to exotropia ratio among Egyptian patients [17]. In Dammam another study reported less results; (2.5%) of children had esotropia and (20%) had exotropia [13]. In Iran another study reported; of the students with strabismus, 67.7%, 25.8% had exotropia, esotropia respectively [18]. A retrospective cross sectional study conducted among 148 pediatric patients having strabismus; (55%) had od cases esotropia and (38%) had exotropia [19]. In Nigeria another study reported that esotropia cases having higher prevalence of 68.75% as compared to exotropia with prevalence of 31.25% [21].

In a study done in 768 children aged between five and fourteen years by Taha and Ibram in Khartoum city, Sudan, esotropia constituted 81.82% cases and exotropia 18.81% cases [22].

Conclusion and recommendations

In this study, the prevalence of squint in the studied children and adolescents in Hail city, Saudi Arabia was 17.1%. No significant difference between males and females. After treatment, only 19.6% of cases completely cured and 39.2% had recurrence. Health education of the public about importance of early treatment is mandatory.

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