Journal of Health, Medicine and Nursing
ISSN 2422-8419 An International Peer-reviewed Journal
Vol.54, 2018

Squint Among Adult Population in Hail City, Saudi Arabia

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Abstract
Background: Strabismus, also known as crossed eyes, is a condition in which the eyes do not properly align with each other when looking at an object. If present during a large part of childhood, it may result in amblyopia. If onset is during adulthood, it is more likely to result in double vision. **Objective:** The aim of the study was to estimate the prevalence of squint, types and treatment characteristics in the studied adults in Hail city, Saudi Arabia. **Methods:** A cross-sectional study conducted in Hail city, Saudi Arabia. The study included 294 participants; 95 male and 199 female adults aged >20 years. The study period was from 1 January to 30 April 2018. Data collected by personal interview using a pre-designed questionnaire, which distributed among the participants to be self-reported. **Results:** The prevalence of squint among the studied population was 9.9%. it was more common in females than males. Squint was right sided in 24.1% of the cases, left sided in 51.7% and in both eyes in 24.1% of the studied cases. About half (44.8%) of cases had inward squint (esotropia) and 10.3% outward squint (exsotropia), 24.1% of the cases had Intermittent squint and 6.9% had permanent squint. Most (55.2%) of squint cases use glasses and 34.5% of cases squint affected their visual acuity. In 6.9%, squint causes psychological troubles. As regards treatment, 20.7% received medical treatment and 17.2% received surgical treatment but 62.1% do not seek medical care. Only 10.3% of cases completely cured and 13.8% had recurrence. There was insignificant relation with age, sex, education, squint in parents, chronic diseases, consanguinity or hereditary diseases (P>0.05). **Conclusion:** in this study, the prevalence of squint in the adult participants in Hail city, Saudi Arabia was 9.9% but 62.1% do not seek medical care. After treatment, only 10.3% of cases completely cured and 13.8% had recurrence. Health education of the public about importance of early treatment is highly recommended.
Keywords: Squint; strabismus; adult population; prevalence; types; Hail; Saudi Arabia.

Introduction

Squint is one of the most challenging subspecialties encountered in the field of ophthalmology. The concept of etiology of squint is being advanced with the development of newer imaging modalities and increased understanding of the genetics of squint [1].

The cause of strabismus is not well established. Various factors have been postulated to be associated with strabismus: ocular factors such as hyperopia, myopia, astigmatism, anisometropia, and amblyopia, family history of strabismus and amblyopia, maternal factors such as smoking or alcohol use during pregnancy, and perinatal factors such as intrauterine growth retardation, prematurity, and low birth weight [2].

Symptoms of strabismus include double vision and/or eyestrain. To avoid double vision, the brain may adapt by ignoring one eye. However, a constant unilateral strabismus causing constant suppression of one eye is a risk for amblyopia in children. Small-angle and intermittent strabismus are more likely to cause disruptive visual symptoms. In addition to headaches and eyestrain, symptoms may include an inability to read comfortably, fatigue when reading, and unstable vision [3].

Binocular vision disorders (BVD) such as strabismus have high prevalence and effects people's quality of life [4].

Exotropia is more frequent in the middle-east and east of Asia while esotropia is more frequent in England, Canada, Australia, Finland, and the US [5].

Significant strabismus left untreated can result in decreased binocularity and amblyopia, and could eventually lead to psychosocial problems, including low self-confidence, depressive mood disorder, reduced inter-personal relationships, and reduced employment [6, 7].

A study on prevalence of amblyopia and strabismus among school children in northeastern Iran [8] found that; of 2,020 selected students, 1,551 participated in the study (response rate: 76.7%). The prevalence of strabismus in the students was 2%. Of female and male students, 2.4% and 1.4% had strabismus, respectively (P=0.160). Of the students with strabismus, 67.7%, 25.8% and 6% had exotropia, esotropia and vertical deviations, respectively.

The aim of the study was to estimate the prevalence of squint, types and treatment characteristics in the studied adults in Hail city, Saudi Arabia.

Participants and Methods:

A cross-sectional study conducted in Hail city, Saudi Arabia. The study included 294 participants; 95 male and 199 female adults aged >20 years. The study period was from 1 January to 30 April 2018.

Sampling: The sample size calculated using the sample size equation: $n=Z^2P\ (1-P)/e^2$. Considering target population less than 1000, and study power 95%. A systematic random sampling technique was used. The sample included adult population of every eighth family.

Data collection: Data collected by personal interview using a pre-designed questionnaire, which distributed among the participants to be self-reported.

The questionnaire had brief introduction or explanation of the idea of the research to the participants.

The collected data included; socio-demographic characteristics of the participants including age, sex and educational status, if the patient has squint or other associated diseases, and questions about squint including cause, type, side, treatment and recurrence.

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 age, sex, education, hereditary diseases, consanguinity, squint in parents and prevalence of squint among the studied patients. The table showed that 51.4% of the studied population aged between 20-25 years and 48.6% above 25 year. Females constituted 67.7%. University or more education constituted 69.7%, 22.8% had had secondary education and 6.1% were just read and write. As regards consanguinity between parents, it found in 50.0% of the studied population. Squint in one parents found in 94.6% and in both of them in 2.4%. Other chronic diseases was found in 10.9% and only 8.2% of them had other hereditary disease. The prevalence of squint among the studied population was 9.9%.

Table (2): illustrate the 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. Squint was right sided in 24.1% of the cases, left sided in 51.7% and in both eyes in 24.1% of the studied cases. About half (44.8%) of cases had inward squint (esotropia) and 10.3% outward squint (exsotropia), 24.1% of the cases had Intermittent squint and 6.9% had permanent squint. Most (55.2%) of squint cases use glasses and 34.5% of cases squint affected their visual acuity. In 6.9%, squint causes psychological troubles. As regards treatment, 20.7% received medical treatment and 17.2% received surgical treatment but 62.1% do not seek medical care. Only 10.3% of cases completely cured and 13.8% 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 population. There was insignificant relation with age, sex, education, squint in parents, chronic diseases, consanguinity or hereditary diseases ($P>0.05$).

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

Sex	**Frequency (N=294)**	**Percent**
– Female	199	67.7
– Male	95	32.3
Age		
– 20-25	151	51.4
– > 25	143	48.6
Education		
– Read and write	18	6.1
– Preparatory	4	1.4
– Secondary	67	22.8
– University or more	205	69.7
Hereditary diseases	24	8.2
Consanguinity	147	50.0
Chronic diseases	32	10.9
Squint in parents		
– Both	7	2.4
– One of them	278	94.6
– No	9	3.1
Squint		
– Yes	29	9.9
– No	265	90.1

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

Which eye	**No. (N=29)**	**%**
– Left eye	15	51.7
– Right eye	7	24.1
– Both eyes	7	24.1
Type of squint (Strabismus)		
– Outward (exotropia)	3	10.3
– Inward (esotropia)	13	44.8
– Intermittent	7	24.1
– Permanent	2	6.9
Wearing glasses		
– Sometimes	2	6.9
– No	11	38.9
– Yes	16	55.2
Effect of squint on visual acuity	10	34.5
Squint due to psychic troubles	2	6.9
Previous treatment trials		
– Surgical treatment	5	17.2
– Medical treatment by visual training and glasses	6	20.7
– No previous treatment	18	62.1
Success of treatment	3	10.3
Recurrence of squint after treatment	4	13.8
Side effect of treatment	1	3.4

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

Variables		Squint		Total (N=294)	P value
		Yes (N=29)	No (N=265)		
Age (in years)	**>25**	10	133	143	0.078
		34.5%	50.2%	48.6%	
	19-25	19	132	151	
		65.5%	49.8%	51.4%	
Sex	**Female**	21	178	199	0.365
		72.4%	67.2%	67.7%	
	Male	8	87	95	
		27.6%	32.8%	32.3%	
Education	**Secondary**	11	56	67	0.196
		37.9%	21.1%	22.8%	
	University	16	189	205	
		55.2%	71.3%	69.7%	
	Preparatory	0	4	4	
		.0%	1.5%	1.4%	
	Read and write	2	16	18	
		6.9%	6.0%	6.1%	
Squint in parents	**Both have squint**	1	6	7	0.915
		3.4%	2.3%	2.4%	
	No	27	251	278	
		93.1%	94.7%	94.6%	
	One of them	1	8	9	
		3.4%	3.0%	3.1%	
Chronic diseases	**No**	25	237	262	0.390
		86.2%	89.4%	89.1%	
	Yes	4	28	32	
		13.8%	10.6%	10.9%	
Consanguinity	**No**	18	129	147	0.120
		62.1%	48.7%	50.0%	
	Yes	11	136	147	
		37.9%	51.3%	50.0%	
Hereditary diseases	**No**	26	244	270	0.430
		89.7%	92.1%	91.8%	
	Yes	3	21	24	
		10.3%	7.9%	8.2%	

Discussion

Strabismus, also known as crossed eyes, is a condition in which the eyes do not properly align with each other when looking at an object. The eye, which focused on an object, can alternate; the condition may be present occasionally or constantly. If present during a large part of childhood, it may result in amblyopia. If onset is during adulthood, it is more likely to result in double vision [9]. Worldwide prevalence of strabismus in the general population is about 3-5% [10].

This is a cross sectional study conducted among 294 of adult population > 20 years, Hail, KSA. The aim of the study was to estimate the prevalence of squint, types and treatment characteristics in the studied adults in Hail city, Saudi Arabia.

In our study, the prevalence of squint among adult was 9.9%, it was more prevalent in female than male. 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]. In the upper Midwest region of the United States a population based study found that the incidence rate for adult-onset strabismus was 54.1 cases per 100,000 [12]. In Brazil a retrospective cross-sectional study was conducted among 531 subjects from, the prevalence of strabismus among cases > 20 years of them was 17.5% [13]. In Ghana, a descriptive cross sectional study conducted among 67 First Year Optometry Students(from 17 to 25 years) found that the prevalence of strabismus in was 1.49%; only one male student out of the study population had strabismus [14]. Another study reported prevalence of strabismus in patients with 16 to 20) years was 1.3% and no case of

strabismus was observed after 21 years [15].Another study reported strabismus among 18-19 years male by 18.7% [16].

Regards type of squint among our study population, inward (esotropia) present by 44.8% and outward (exotropia) by 10.3%.

Another study reported esotropia was the primary deviation for (34.7%) of cases with squint and exotropia for (33.3%) of them [14].Another study reported esotropia by 10.7% and exotropia 39.7% [13]. In Nigeria another study reported that esotropia cases having higher prevalence of 68.75% as compared to exotropia with prevalence of 31.25% [17].

In the United Kingdom selected 3075 subjects with strabismus, the study included adults about half of them, 1562 subjects (50.8%) had esotropia and 464 subjects (29.7%) had exotropia; the XT:ET ratio was 1:3.7 [18].

In our study, squint was right sided in 24.1% of the cases, left sided in 51.7% and in both eyes in 24.1% of the studied cases.

Our results were close to results reported in the study conducted Arar city in [11], which found that, 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.

As regards treatment among our study population, 20.7% received medical treatment and 17.2% received surgical treatment but 62.1% do not seek medical care. Only 10.3% of cases completely cured and 13.8% had recurrence. Our results were close to results reported in the study conducted Arar city in [11], which found that, all cases received treatment (69.9% medical and 30.4% surgical) but only 52.2% were cured and 43.5% had recurrence.

Conclusion and recommendations

In this study, the prevalence of squint in the adult participants in Hail city, Saudi Arabia was 9.9% but 62.1% do not seek medical care. After treatment, only 10.3% of cases completely cured and 13.8% had recurrence. Health education of the public about importance of early treatment is highly recommended.

Acknowledgment

The success and final outcome of this research paper required assistance from many people for completion of this work. Our thanks go to Manal Abdullah Flaywi Alhamazani (Student at Medicine College of Hail University) for her help as data Collector for the research.

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