

A MEDICAL RESEARCH ABOUT THE ANISOMETROPIA OF SCHOOL AGE PATIENTS AT THE DEPARTMENT OF REFRACTION OF HO CHI MINH CITY EYE HOSPITAL

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ABSTRACT

Anisometropia is one of the factors causing amblyopia. There are a lot of studies about anisometropia all over the world. However, there are no researches about this topic in Vietnam. Therefore, we hereby conducted the research on anisometropia. The purpose of this study to determines the ratio of anisometropia and anisometric amblyopia on patients who admitted to Ho Chi Minh City Eye Hospital. The ratio of anisometropia between male and female patients is equal, but in the rate of amblyopia of male patients is 1.4 times more than that of female. However, the anisometropia mainly appears in class 4 (18-24 years old) while the amblyopia mainly appears in class 1. The relation about wearing glasses between anisometropia patients and amblyopia patients shows that having refractive error without wearing glasses causes amblyopia (OR= 3.6, $p < 0.05$); a severe anisometropia is one of the factors which raises amblyopia (OR = 23.96, $p < 0.05$). The analysis also shows that not wearing glasses do not cause anisometropia which leads amblyopia.

Key words: refractive error, refractive degree, anisometropia, amblyopia, spherical equivalent.

TÓM TẮT

Bất đồng khúc xạ (BĐKX) là một trong các nguyên nhân hàng đầu gây nhược thị cho bệnh nhân mắc tật khúc xạ. Trên thế giới đã có rất nhiều nghiên cứu về vấn đề này, nhưng ở Việt Nam thì chưa. Nghiên cứu này nhằm mục đích xác định tỉ lệ bất đồng khúc xạ và nhược thị do bất đồng khúc xạ ở bệnh nhân đến khám tại Bệnh viện Mắt Tp.HCM. Đối tượng nghiên cứu là bệnh nhân trong độ tuổi đi học (6-24 tuổi) đến khám khúc xạ. Các dữ liệu thu thập là tuổi, giới, nghề nghiệp, thị lực trước và sau kính, độ của tật khúc xạ. Mô tả các đặc điểm của tật khúc xạ, bất đồng khúc xạ, và nhược thị do bất đồng khúc xạ. Tổng số mẫu đã thu thập là 1572, trong đó đa số thuộc lớp tuổi 1 (6-10 tuổi). Tỉ lệ BĐKX ($\geq 2D$ theo độ cầu tương đương) là 8,78%, tỉ lệ bị nhược thị (chênh lệch thị lực sau kính của 2 mắt ≥ 2 hàng hay thị lực sau kính $\leq 6/10$) là 12,21%. Tỉ lệ nhược thị do BĐKX là 49,28%. Không có sự khác biệt về tỉ lệ BĐKX giữa nam và nữ, BĐKX tập trung nhiều nhất là lớp tuổi 4 (18-24 tuổi). Về nhược thị, tập trung nhiều nhất ở lớp tuổi 1. Có sự khác biệt về tỉ lệ nhược thị giữa nam và nữ, nam có khả năng bị nhược thị cao gấp 1,4 lần. Khi xét mối tương quan giữa đeo kính ở người có tật khúc xạ với BĐKX và nhược thị: có tật khúc xạ mà không đeo kính có nguy bị nhược thị gấp 3,6 lần so với người có đeo kính (OR=3,63, $p<0,05$); BĐKX nặng ($\geq 4D$) có nguy cơ gây nhược thị gấp 24 lần so với bình thường (OR=23,96, $p<0,05$).

INTRODUCTION

Anisometropia is a situation having the differences in refraction capacity between two eyes, this is one of the main reasons which causes amblyopia by not wearing glasses or wearing incorrect degrees of glasses. Also, the period for wearing glasses is also an important factor.

All over the world, there are a lot of studies about different aspects of anisometropia like: spherical-anisometropia, anisometropia or spherical equivalent; from all ages to only those in school age; people from urban to rural, etc. However, Vietnam has had no formal studies about this problem yet. Although in some previous studies of Vietnamese authors about refractive error have mentioned about anisometropia as well as amblyopia, they are not in-depth studies on this problem and cannot give readers an overview of this issue, they just focus on

the ratio of refractive errors of those who are studied or concentrate on the effectiveness of available treatment methods today.

Understand the importance of and the complication of amblyopia, we carry out this study to survey the anisometropia situations and its complications as well as equivalent factors in order to have an overview about this problem, then we suggest a plan to reduce the rate of refractive errors, to control the patient's refractive errors, especially those who are still in school and detect and to treat timely for patients because of anisometropia.

General objective: Survey the anisometropia situations of school age people when they have medical check at the department of refraction of Ho Chi Minh City Eye Hospital from July 2009 to December 2009.

OBJECTIVE AND METHOD

Objective

Patients who have medical check at the department of refraction of Ho Chi Minh City Eye Hospital from July 2009 to December 2009.

Criteria:

- Age: 6-24 years old (from Grade 01 to University students).
- There are refractive errors: myopic, hypermetropic, astigmatism, on one eye or both eyes.

Exclusion criteria:

- Patients do not have the refractive errors on eyes.
- Patients have the injury on eyes which is unrelated to refractive errors like blindness, cataract, ocular trauma...

Method

The study is carried out on school age patients (6-24 years old). Selected data is based on age, gender, occupation as well as the vision before and after wearing glasses, the degree of refractive error. The descriptions are about the specification of refractive error, anisometropia, and anisometropic amblyopia.

Survey conduction

Time: from July 2009 to December 2009.

Process as follows: (follow the process of the hospital)

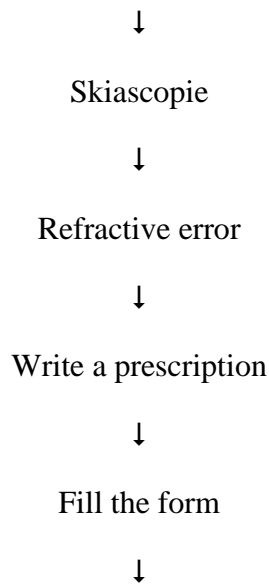
Receive medical records.

↓

Examine by autorefractometer

↓

VA& PD with long distance



Consult refractive errors, visual hygiene.
 Make other appointments.

Data analysis and research results

- Data analysis: Stata 10.
- The quantitative variables such as age, number of people in group... are presented with the average and standard deviation.
- The qualitative variables such as whether or not amblyopia, with or without glasses... are presented in percentage form.
- The permit test which were used is chi-squared test.

RESULTS

The population of the study

Total obtained samples are 1572 patients, aged from 6 to 24 years old, and 12.79 ± 0.10 in average. Percentage of distribution among ages is shown in Table 1, in which the population of age 1 and age 2 takes majority.

Table 1: characteristics about distributing classes

	Total N = 1572		Male N = 727		Female N = 845	
	N	%	N	%	N	%
6-10 yo	536	34.10	285	39.20	251	29.70
11-14 yo	526	33.46	249	34.25	277	32.78
15-17 yo	308	19.59	119	16.37	189	22.37
18-24 yo	202	12.85	74	10.18	128	15.15

- The variables need to be analyzed: population's distribution between men and women and between grade levels; the rate of anisometropia and of amblyopia; the correlation between wearing glasses and anisometropia; anisometropia and amblyopia, anisometropia and amblyopia related to the factor of wearing glasses.

Conventions

- VA:
 - Measured by Snellen 5m.
 - Scale of vision: decimal scale (from 1/10 to 10/10)
 - For fingers counting vision (FCV)
 $FCV\ 5m = 1/10 \rightarrow FCV\ 0.5m = 0.01$
- Astigmatism formula is stated $A^{DS} (X^{DC} + axis\ A)$ with $X < 0$
- Spherical equivalent (SE) = Spherical + $\frac{1}{2}$ Astigmatism (X)
- Anisometropia appears when refraction capacity of 2 eyes is different ($\geq 2D$), is counted by spherical equivalent (SE)
- Amblyopia: vision after wearing glasses of 2 eyes is difference (≥ 2), or one or two eyes have vision after wearing glasses $\leq 6/10$.
- The age classes are classified as follows: age 1: 6-10 years old; age 2: 11-14 years old; age 3: 15-17 years old; age 4: 18-24 years old.

Because of the limitation of the report, we just mentions about the anisometropia counted by spherical equivalent (SE), refraction capacity of 2 eyes is different ($\geq 2D$)

Table 2: the relationship between anisometropia and gender

	ANISOMETROPIA $\geq 2D$		Total
	Yes	No	
Male	64	663	727
Female	74	771	845
Total	138	1434	1572
Chi-squared test		p = 0.9744	

Comment: There are no differences in the rate of anisometropia between men and women ($p > 0.05$).

Table 3: the relationship between amblyopia and gender

		Amblyopia		Total
		Yes	No	
Gender	Male	105	622	727
	Female	87	758	845
	Total	192	1380	1572
OR = 1.47, 95%CI from 1.073 to 2.017				
<i>Chi-squared test</i>		p = 0.0123		

Comment: There are differences in the rate of amblyopia between men and women, the rate of amblyopia among men are likely to be 1.4 times higher than that of women

Table 4: Distribution of amblyopia according to ages

	N	Amblyopia %	Total
6-10 yo	100	18.66	536
11-14 yo	42	7.98	526
15-17 yo	22	7.14	308
18-24 yo	28	13.86	202

Comment: The ratio of amblyopia at age 1 and age 4 are the highest.

Next, we analyze the reasons which cause anisometropia and amblyopia. Not wearing glasses or wearing unsuitable glasses is one of the reasons of anisometropia and amblyopia. In this research, we only consider the relevant factors are wearing no glasses, do not consider the case of wearing incorrect glasses. Wearing no glasses means the patients have not worn the glasses until this visit; glasses including glasses and contact lenses.

Table 5: Wearing glasses with amblyopia

		Wearing glasses		Total
		No	Yes	
Amblyopia	Yes	77	115	192
	No	215	1165	1380
	Total	292	1280	1572

OR = 3.628, 95%CI from 2.585 to 5.068

Chi-squared test: $p < 0.0001$

Comment: There is significant correlation between wearing no glasses and amblyopia ($p < 0.05$), people who have refractive errors without wearing glasses have 3.6 times higher risk in amblyopia compared with that of people with glasses.

Table 6: The relationship between anisometropia and amblyopia

		ANISOMETROPIA ≥ 2D		
		Yes	No	Total
Amblyopia	Yes	68	124	192
	No	70	1310	1380
	Total	138	1434	1572

OR = 10.263, 95%CI from 6.870 to 15.276
Chi-squared test: $p < 0.0001$

Comment: the rate of amblyopia caused by anisometropia is 49.28%, people who have anisometropia tend to have amblyopia 10.3 times higher when comparing with that of normal people.

Table 7: The relationship between high anisometropia and amblyopia

		ANISOMETROPIA ≥ 4D		
		Yes	No	Total
Amblyopia	Yes	31	161	192
	No	11	1369	1380
	Total	42	1530	1572

OR = 23.96, 95% CI from 11.411 to 53.683
Chi-squared test $p < 0.0001$

Comment: the rate of amblyopia caused by high anisometropia is 73.81%, people who have high anisometropia tend to have amblyopia 24 times higher when comparing with that of normal people.

We use "proof-test $OR \neq 1$ " to prove that people with anisometropia and wearing no glasses will have the amblyopia The results are presented in Table 7.

Table 8: The relationship among wearing classes, anisometropia and amblyopia

Wear glasses	OR	[95% CI]	M-H Weight
No	10.32	6.38 - 16.54	3.66
Yes	23.89	7.64 - 97.37	0.73
Crude	10.26	6.87 - 15.28	
M-H combined	12.56	8.28 - 19.04	

Test of homogeneity (M-H) $p = 0.153$

"Proof-test $OR \neq 1$ " shows no difference 1 ($p = 0.1530 > 0.05$). This means wearing glasses or not is not the main factor in which anisometropia causes amblyopia. In terms of confounders: (MH-Crude) / MH = 18.32% > 10% should wear glasses as confounders.

DISCUSSION

The population of our study does not include the amblyopia cases which are being treated, just including new cases of refractive check and recheck cases within 06 months, or unexpected recheck cases because they want to replace the glasses.

The distribution of population does not differ between men and women with age from 06 to 14 years old.

The rate of anisometropia in the study is 8.78%, higher than that of the study of Amorim Garcia⁽²⁾ (2.1%) and Shih YF et al.⁽⁵⁾ (3.0 %) because our cases focus on people who have the medical check. However, cases in the studies conducted by other authors are investigated on a large population and broader, comparing with study of CO and Egbewale Adeoti BE ⁽¹⁾ (the rate of anisometropia is 44.51%), the rate of anisometropia in our study is lower than that.

As a result, according to our study, the percentage of men and women in anisometropia is equal.

Percentage of people with amblyopia is 12.21%, higher than that of the study of Karki⁽⁴⁾ is 5.97%, men are likely to be amblyopia 1.4 times higher than that of women. It concentrates the most in ages 1, this ratio is also higher than that of the study of Jamali et al.⁽³⁾ (6.4%).

When considering relevant factors, we found that people with refractive errors and not wearing glasses will have a chance to be amblyopia (3.6 times higher).

The study also shows that people who have anisometropia tend to 10.3 times higher

CONCLUSIONS

This study shows that both the rate of anisometropia and amblyopia are still high 8.78% and 12.21%. This is a warning about not paying attention to eyes-caring for children. We have to care more about

having amblyopia, especially those with high anisometropia, it is 24 times higher. The percentage of amblyopia caused anisometropia is 49.28%. Because other studies did not mention this rate, we cannot make any comparison on it. However, in our viewpoint, this rate is quite high.

Regarding to the relationship of anisometropia, wearing glasses and amblyopia, it shows that wearing no glasses of people who have refractive errors will increase the risk of amblyopia. And we also point out that anisometropia causes amblyopia.

However, the equivalence of wearing glasses in relation to the relationship of anisometropia and amblyopia are not as expected. Before processing the research, we expect that wearing no glasses in the patients who have anisometropia will promote amblyopia. However, the results show the opposite: without glasses are not push factors making the patients who have anisometropia will have amblyopia. It is not logical but we can also explain that by the conditions of this research is not enough time to keep track of anisometropia patients with no glasses will have amblyopia or not in future. Besides, anisometropia patients are consulted very clearly about necessary knowledge, about what they should and should not do in the visual hygiene in order to avoid amblyopia; patients and their family are also very cooperative in treatment; if patients have amblyopia, they will be sent immediately to the amblyopia room for monitoring, treating and re-examining.

the eyes of children in order to detect as well as to treat the refractive error.

Although this study still has some limitation, it shows that the rate of anisometropia as well as of amblyopia at

patients who have refractive errors is quite high. Although we cannot compare this study with other studies in Vietnam or abroad (for age, number of samples, different sampling), research also give an overall picture of refractive errors in school age patients.

This is the formal warning about "visual hygiene in schools" on which we have not paid adequate consideration until now. To have a healthy future generation in all aspects, we must have an eye-caring program for school age children to prevent refractive errors. If having refractive errors, they must be timely treated, closely monitored for necessary adjustments.

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