

Screening of Visual Disorders in a Schooled Population in South Lebanon

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Received: May 15, 2024

Accepted: Jun 19, 2024

Published: Jun 26, 2024

Epidemiology & Public Health - www.jpublichealth.org

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Citation: Kassir M, Kassir H, Kassir R. Screening of Visual Disorders in a Schooled Population in South Lebanon. *Epidemiol Public Health*. 2024; 2(3): 1054.

Introduction

Screening of visual disorders in school population has always been of utmost importance knowing the severe consequences of poor vision on learning capabilities. Many studies have been conducted worldwide, some in Lebanon [1], in which living conditions are, since 2019, particularly dramatic, adding to state administration failure, economic and financial crash, hyperinflation money crisis (Lebanese pound has lost more than 95% of its value in 3 years), Covid-19 pandemic, the 3rd most important civilian explosion in modern history (2020, august 4th, Port of Beirut blast). All these factors increased dramatically the percentage of poor population (78% live with less than 6 US \$/day) [2] and impacted the global health directly with shortage in medications and extreme increase of medical costs.

Under the patronage of Rotary club of Sidon, we suggested and conducted a study which main goal was to detect and treat the refractive errors in public schooled children of the city.

Material and methods

Materials

In coordination with a local welfare association "AHLOUNA", the ROTARY club of Sidon ("Capital" of South Lebanon) has recruited 108 children, school boys and girls, aged from 4 to 21 years of age. Due to the dire economic crisis, transportation of those unable to reach the ophthalmic clinic has been organized by the initiators of the project with the help of "AL ASSAAD Travel and Tourism agency".

Recruitment has been made by "AHLOUNA" team, which contacted public schools of Sidon in which schoolmates are almost unprivileged of from low socioeconomic status.

An optical shop managed by Mohamed ABBASS, Optician, optometrist, was present during the test in order to perform the frame trials for the children and execute the prescription for those needing optical treatments. Financial contributions helped in paying all the optical equipment needed.

Methods

The ophthalmological team was composed of a 3rd year medical student (R.K.) helping in collecting the patient's history, a 6th year medical student (H.K.) performing a one-month rotation in an ophthalmology department in Sidon, and a senior ophthalmologist (M.K.) having more than 30 years of experience in medical and surgical ophthalmology.

At their arrival, children were admitted in examination room number 1 where a subjective refraction was conducted by H.K. without any dilation of pupils in a photopic ambience (daylight conditions). In some rare cases of myosis, the child had pupils dilated by 1 drop of cyclopentolate (CICLOGYL®) eye drops in order to obtain a slightly dilated pupil, sufficient for a new refraction test, exceptionally conducted in a scotopic ambience (darkness).

An automatic refractometer NIKON® Speedy-1 model (NIKON-Japan) was used for the test, which result is validated after a minimum of 25 measurements per eye with a minimal

confidence index of 9/10. The result was printed out on a paper given to R.K. who had to fill a clinical file including the identity of the patient, his full birthdate and details of his eye condition history. These elements were: age of the first optical correction, first eye complaint, first eye examination and last examination dates. The power of the last optical correction was controlled with a manual focometer TAKAGI® (TAKAGI-Japan), double checked by M.K.

Then, the patient was tested by M.K. using an automatic phoropter TOMEY® Model 1 (TOMEY-Germany) using the blurring method, monocular first then binocular. If needed patient was sent back to R.K. for pupil dilation and checked again. Visual Acuity (V.A.) was expressed in an /10 scale using the SNELLEN eye chart at a 20 feet standardized distance.

A prescription of optical correction was then delivered to the parent(s) with a clear explanation of the child's eye condition and the recommended measures to take in order to keep his visual status under good control.

Subjects in need of corrective glasses were sponsored with some by optician M.A.

The whole medical process time was estimated around 15 minutes for each child except if amblyopia was noted, which required more clinical examination by slit lamp (TAKAGI® VSM 303) sometimes using fundus examination using VOLK® 90 diopters lens (VOLK-USA).

There was no abnormal control testing during our study because if any was suspicious, help was asked from the senior professional in order to redo the examination.

Age (y)	4	5	6	7	8	9	10	11	12	13	14	15	16	17	21
Number	1	2	3	8	11	11	20	14	10	13	8	3	2	1	1
%	0.9	1.8	2.8	7.4	10.5	10.5	18.1	12.9	9.3	12	7.4	2.8	1.8	0.9	0.9

Results

a. Sex ratio: 61 Male (56.5%) – 47 Female (43.5%) Male to female ratio = 1.29.

b. Age: from 4 y.o.(2019) to 21 y.o.(2002). Mean: 10.6 years
c. Corrected patients: 36 already had correcting glasses (33.3%), 72 had never been examined (66.6%).

Among those who already wore glasses, follow-up intervals were as follows: 1(0.9%) in the past 3 months ago, another 1 (0.9%) in the last 6 months ago and 7(7.4%) in the past 2 years. Moreover, 2(1.8%) had follow-up in the last 3 years and 1(0.9%) neglected the wear of corrective glasses.

d. Comorbidities include 1 case of autism (0.9%), 1 case of deafness (0.9%), 2 cases of congenital encephalopathy (1.8%) and 3 cases of strabismus (2.7%).

e. Difficult examination: It is noteworthy that the study while performed with low to no risk of bias was hindered due to illiteracy in 3 cases (2.7%), Young age (pre-verbal age: 1-3 y.o.) in 1 case (0.9%) and autism in 1 case: (0.9%).

f. Complaints (Functional signs): The biggest subgroup was loss of vision (from blurred vision to blindness), either unilaterally or bilaterally and concerned 52 cases (48%); School complaints were reported in 36 cases: (33.3%) including poor academic performance, difficult concentration and disruptive behavior or impulsive tendencies, while headaches were noted in 3 cases: (2.7%),

g. Clinical results: Fully normal exam: 28 cases (25.9%). Atopic conjunctivitis (4 cases: 3.6%), STILLING DUANE Syndrome: 1 case (0.9%), Epicanthus: 1 case (0.9%), Blepharoptosis: 1 case (0.9%),

h. Ametropia: It concerned 65 cases (60%) composed of:

- Myopia alone (0 case)
- Myopia with astigmatism (15 cases: 23.1%)
- Astigmatism alone (17 cases: 26.1%)
- Hyperopia alone (6 cases: 9.3%)
- Astigmatism + hyperopia (27 cases: 41.5%)

There was a clear predominance of astigmatism at 90.8% (59 cases)

i. Anisometropia (different correction powers in both eyes): Slight (between 0.25 D and 0.75 D), moderate (between 1-2 D), severe (>2.25 D).

Anisometropia	slight	moderate	severe
Number of cases	27	8	7
Percentage (%)	41.5	12.3	10.75

j. Isometropia (same correction powers in both eyes): 23 cases (35.4%)

k. Amblyopia: Mild (10-30%): 10 cases Moderate (30-60%): 14 cases Severe (60-100%): 18 cases.

Discussion

During the early stages of development, the eye length exhibits a consistent growth rate of 2 mm every 3 months up to 1 year of age. For toddlers aged 3 years and older, the change in eye length becomes less steep with a negligible to 0.5 mm increase every 6 months. The length of the eye then stabilizes at 23 mm starting at 5 years with a very little increase of 0.8 mm seen from 8 years old until puberty.

Relation between age, length of the eye and refraction is approximately as follows:

Age (m,y)	3m	6m	1y 6m	3 y	3y 6m	4y	5y	6y 6m	8y	10y	adult
Length (mm)	15	17	20	21	22	22.5	23	23	23	23.8	23.8

Stereoscopic vision is a cerebral function that makes both images synthesized in a three-dimension unique image. This function develops since 4 months until 8-10 years of age. During this period, the brain capacity to recover from anisometropia is remarkable. Any defect in the process leads to amblyopia which intensity depends on time of diagnosis. Once this phase is concluded, the potential improvement for amblyopia treatment is significantly diminished. This is why early treatment is paramount for optimal restoration of binocular visual function.

Anisometropia is the main catalyst for strabismus and consequently amblyopia, especially when the interocular difference is over 1.5 diopters.

In 2021, WHO recognized that almost 20 million children suffered from visual disorders in the world. In France, 0.5 to 1.1/1000 children might be concerned [3] while the eye examination is mandatory only during the first week after birth and during the 6th year of age [5]. The scale of our study is relatively

limited but it appears that one third of the examined population had already been consulted and had an optical prescription but the financial collapse of the country obliged parents to postpone the yearly mandatory regular check-ups. In comparison with a study we conducted in Lebanon in 1996 at a much larger scale (935 children), we find almost the same rate of children ignoring their ametropia (70% in 1996 against 66.6% actually) which means that no improvement has been noticed in the public health policies concerning the visual problems detection. The sex ratio of our study is almost equal.

Many corrected children had their glasses in very bad condition (65%), including cracks and scratches, poor antireflection coating compromising directly the visual acuity, mainly when these defects were located in the visual axis, centrally.

Normal visual acuity was reached in 33% of corrected patients. Among those suffering from amblyopia, a 3-month follow-up post prescription has been performed showing full recovery of normal V.A. in cases of light and moderate amblyopia. This proves that an early and adequate correction is capable of switching easily a patient from the danger to the normal zone. In the severe cases, it will be impossible to reach a normal corrected V.A. but improvement might be sufficient to reduce significantly complaints of headaches, blurred vision and difficulty of visual concentration.

While only 15.7% of children had ametropia in 1996, 65% were concerned in the present study. Many facts explain this huge difference. First of all, the AHLOUNA team selected most suspect children for the test. That said, there is evidence in dramatic increase of the frequency of visual disorders worldwide mainly related to the phenomenal increase of small screens availability and daily use (smartphones, portable games, tablets, connected watches,...). Old recommendations in reducing television watching time have become obsolete in comparison with the small screens addiction, which affects accommodative properties of the eye in a way that increases the risk of myopia worldwide [6].

In terms of ametropia, cases of astigmatism are the most frequent (90.8%), followed by hyperopia (alone or combined with astigmatism) (50.8%), then astigmatism alone (26.1%) and finally myopia associated with astigmatism (23.1%). A similarity with other populations is noted [4]. This confirms the importance of consanguinity in the transmission of visual disorders in eastern populations.

Another outline must be the percentage of analphabetism that we noted in our study. 4.5% of the sample was unable to read letters or numbers. That situation results from many factors such as economical poverty. Our opinion is that major responsibility might be assumed by the parents whose weak educational level explains such situations. Of course, pandemic and its consequent on-line learning has to be incriminated, mainly because at the same period, whole Lebanon was diving deep down in a financial and economic crisis with hyperinflation, total power cuts, etc., all conditions resulting in adoption of a survival mode process in the great majority of the population.

One major difficulty we faced is the degree of acceptance of the optical (+/- orthoptic) treatment by the children and the parents because there still is a print of shame in some populations concerning the fact of needing glasses, as if it was a tare. We had to deal with one parent incriminating the conjunct and

his/her family for being responsible of the ametropia. Except of feeling shameful for transmitting their inherited visual defect, all parents expressed their fear of the teasing that happens systematically between schoolmates, especially when a strabismus situation coexists with a refractive problem. Some parents were personally recommending their children not to wear the glasses constantly!

In cases of strabismus and if optical sectors were to be stuck on the glasses, it was recommended not to install them during school time but exclusively home. The same recommendation was given for those needing a one-eye occlusion for treating amblyopia.

National official campaigns are supposed to implement practical measures but the high level of laxity and corruption in the political corpses in Lebanon is tragic and in our opinion, only NGOs could help in solving that particular problem. Stress must be made in explaining the importance of vision in learning and in the social behavior of a young population which very often totally unable to complain precisely about its visual status and defects. A special focus must also be made in explaining the major role of heredity in visual disorders transmission and role of sedentary lifestyle in the spectacular increase of myopia frequency [6].

Conclusion

In general, full and thorough eye examination must be absolutely mandatory from age of 5 years old because from then, visual activity will include far (board) and near (book) focus (accommodation process helps in revealing almost all the visual disturbances). The earlier the treatment the higher chances of functional recovery and lower risks of amblyopia. In all children integrating the school system (from 3 years old), eye examination should be recommended as soon as there is clinical evidence of strabismus, torticollis, side view or any suspicion of eye disorder.

Cost of bad sight for the society is much higher than we can imagine. A simple test conducted at the right time by the right team may change a whole life.

Particularity of our study is that it has been conducted in a country in which, since 2019, and extraordinary and historical economic crisis was affecting all sectors and the greatest majority of the population. It appears that parents' education is of utmost importance in our countries. Right information should be given at the right time and we consider that the increasing role of NGO's in developing countries should include campaigns of eye defects detection and ideally provide optical equipment at the same time.

Acknowledgements

We would like to thank: P.U.M.S. for giving the opportunity of performing a clinical rotation in Lebanon to H.K.

All members of ROTARY Club of Sidon, AHLOUNA welfare association, AL ASSAAD Travel and Tourism Company, ABBASS OPTIC company, for the initiative and the logistics.

Disclosures: No grant has been received for this study.

References

1. Kassir M. Etude de la fréquence des troubles visuels dans un collège libanais. *Cahiers Santé*. 1996; 5: 232-6.

2. Human Rights Watch Report about Lebanon. 2022. www.hrw.org
3. DiFoggia E, Speeg-Schatz C. Dépistage des troubles visuels chez l'enfant. *La revue du Praticien Médecine Générale*. 2021; 71(3): 299-304.
4. Kouassi FX, et al. Aspects épidémiologiques, cliniques et thérapeutiques des amétropies de l'enfant. *Revue SOAO*. 2016; 2: 51-7.
5. Speeg-Schatz. Dépistage des troubles visuels chez l'enfant. *La revue du Praticien Médecine Générale*. 2023; 37(1078): 295-8
6. Soler V, et al. Epidémie de myopie en Asie et ailleurs: Pourquoi ? *La revue du Praticien Médecine Générale*. 2021; 35(1053): 40-2.