

Quality of life among Primary Schools Children with Refractive Errors in Menoufia, Egypt

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Abstract:

Background: Refractive error is the powerlessness of the eye to light into focus on the retina resulting in nearsightedness (myopia), farsightedness (Hyperopia) or astigmatism. Uncorrected refractive error in children is connected with impaired quality of life, increased morbidity and reduced educational opportunities. **Objectives:** This study aims to assess the impact of refractive errors on the quality of life (QOL) of Primary Schools Children. **Methods:** This cross section study was conducted on 960 (6–12 years old) primary school children in the first, second and third grades attended Munshaat Sultan primary school, Menouf district, Menoufia, Egypt from 1st October 2016 to the end of December 2016. The participants were assessed through a questionnaire which includes (socio-demographic data and comprehensive history), general and visual examination. QOL of participants with refractive errors was assessed using semi structured questionnaire that consisted of 7 items. The reliability of questionnaires was tested using Cronbach's alpha which was 0.953. **Results:** Out of 960 students 232 (24.1%) had a significant refractive error of ± 0.50 in one or both eyes. There was a highly statistically significant difference between participated children with and without error of refraction regarding socioeconomic status and all parameters of QOL (p value < 0.001). Overall 45.5 % of students with error of refraction had poor QOL. **Conclusion:** Screening for refractive errors in primary school children is mandatory to start corrective measures at the early stage, and improve their quality of life.

Key words: PHC, Quality of life, Visual errors

Introduction: Refractive errors are the most common ocular problem affecting all age groups especially among school-age children. They are considered a public health challenge.⁽¹⁾ The WHO reports indicate that refractive errors are the first cause of visual impairment and the second cause of visual loss worldwide as 43% of visual impairments are attributed to refractive errors.^(2,3) The prevalence of error of refraction is increasing worldwide especially in children due to misuse of electronic devices. It is estimated to be 70–90% in some Asian countries⁽⁴⁾, 50% in England,⁽⁵⁾ 25% in North America and in Iran

is estimated to be 21 %.⁽⁶⁾ In addition to nationality sex and race affect the chance and prevalence of error of refraction. It is higher in females than males and in whites than black race.⁽⁷⁾

In Egypt 2007 A survey conducted in Cairo governorate among 5839 Egyptian school children aged 7–15 years found that the prevalence of refractive errors (visual acuity $\leq 6/12$) was 22.1%.⁽⁸⁾ Also a preliminary national survey done in the Helwan area of Cairo reported that 34% of the recorded disabilities were visual disability⁽⁹⁾. In 2015 study conducted in Menouf district,

Egypt to study prevalence of refractive errors among primary school children that was 24% had refractive errors. Of them, 22% patients had myopia and only 2% had hypermetropia.⁽¹⁰⁾

Uncorrected refractive errors impair the quality of life of millions of people with different ages, genders, and ethnicities and they impose heavy burdens on the families of the affected individuals as well as the society as a result of loss of manpower. Moreover, uncorrected refractive errors at young ages can lead to amblyopia which negatively affects their educational, occupational, and athletic performance.⁽¹¹⁾ In addition to social, economic and educational consequences it can lead to problems in a person's quality of life related to vision and makes it difficult for them to do tasks pertinent to it.⁽¹²⁾

A strong relationship is reported between refractive errors, reading problems in school age students; reduce their academic performance in schools. Later on it reduce employability and productivity.⁽¹³⁾ The importance of patient-based measurements for measuring their quality of life has nowadays been recognized and accordingly numerous quality of life questionnaires have been developed.⁽¹⁴⁾ Consequently evaluating the quality of life related to refractive error and vision performance based on patient views has

increased in recent decades. Measuring the quality of life might be a great help to us to reach a correct comprehension of needs, decisions, treating and elevating the personal and social level of a person's life.⁽¹⁵⁾

Methods: This case-controlled cross-sectional study was conducted in all primary schools (4 schools; New Fatah School, El Shahied Shaban School, El Refae El Azhare School and El Road schools) in Munshat Sultan village, Menouf district, Menoufia governorate, Egypt. The catchment area of family health center of Suzan Mubarak hospital which one of the main family health center in Menoufia governorate. One class from the first to the third grade was selected through systematic random sampling. The sample size for the study was estimated to be 960 students by using Epi Info (Clifton Road Atlanta, GA, USA) for windows with an error of 1% based on prevalence of error of refraction which was 30.1 %⁽¹⁰⁾ consider power of study 80% and 95% confidence interval.

The number of children in the primary schools was 1800 child aged 6-12 years. By systemic random sample every second name in the list was included in the study. The total numbers were 981 students but only 960 students were eligible and had participated in the study as: visual examination showed that

33 were excluded (31 wearing glasses and 2 had congenital cataract). All participant underwent interviewing and examination. All selected students with help of the social workers were interviewed using a semi structured questionnaire. The first part of the questionnaire aimed to assess the socioeconomic status as age, sex, ... according to El-Gilany et al.⁽¹⁶⁾ The second part of the questionnaire aimed to assess eye problems & daily activity such as (Lipoma, led drop, led Inversion and led Extroversion), Vision defect, family history of low vision, eye strain, see the way to bathroom, Watching clock and see the board writing. The third part of the questionnaire aimed to assess the quality of life.

It was developed by the research team in Arabic language based on information from literature review from the WHO (2006)⁽¹²⁾ and Centers for Disease Control (CDC)(2007)⁽¹⁷⁾. The questionnaire entails 7 items (Feeling happiness, Doing everything easily, Feeling angry when doing things, Stud. Work, Understanding, Achievement and Planning with friends). A score for each answer on questions of QOL was given (2= yes and 1= no). The QOL was considered good if percentage of the score equals 75- 100% and poor if percentage of score is less than 75%. The reliability of questionnaires was tested

using Cronbach's alpha which was 0.953 (Table 1). We develop this tools from WHO and CDC because it more practical and available for us. In addition to the questionnaires of refractive error and quality of life are too long to apply for children.

Statistical analysis: The results were analyzed statistically using Microsoft Excel and SPSS, version 17 software programs (SPSS Inc., Chicago, Illinois, USA). Data were described as range, mean, SD, frequencies (number of cases), and relative frequencies (percentages) when appropriate. A P value less than 0.05 was considered statistically significant.

Ethical consideration: The study was approved by the Ethical Committee of the Faculty of Medicine, Menoufia University. An official permission letter was obtained from the author and directed to the administrators of selected school. A written consent was obtained from the children guardians. The participants were ensured as to their anonymity and confidentiality of recorded data. They were also justified with regard to the purpose and its conduct method.

Results: Nine hundred and sixty students had participated in the study. Twenty- four (24%) had a significant refractive error of ± 0.50 or worse in one or both ([Figure 1](#)). About 28.8 % of the children families were very low

socioeconomic status (Table 2). Regarding eye status Most children (50.4%) complained of lipoma whereas about 74.2 % complain of eye strain when looking to sun. about 24.2 % has vision defect and 59.2% has family history of low vision with 64.3% of them with mother history of low vision. 16.9% of children cannot see the board from where they sit So they go to front near the board (Table 3).

Most children reported that they had limitation in performing day to day activities as feeling angry when doing things, planning with friends, achievement, doing everything easily. Study homework, understanding, feeling happiness with poor quality score in (86.9 %) of them (Table 4). There was a statistically significant difference between participated child with and without error of refraction regarding socioeconomic status and all parameters of QOL (p value <0.001). More than forty percent (45.5 %) of students with error of refraction had poor QOL (Table 5 and Table 6).

Discussion: An uncorrected refractive error remains a public health problem among different population groups. School children with uncorrected refractive errors have a considerable impact on learning and academic achievement especially in underserved and under resourced communities. Visual

impairment from uncorrected refractive errors might have immediate and long-term consequences education on educational and employment opportunities. And also affect the ability to earn for individuals, families and societies and impaired quality of life.⁽¹⁸⁾

In a review study, Naidoo et al.⁽³⁾ showed that uncorrected refractive errors were responsible for visual impairment in 101.2 million people and blindness in 6.8 million people in 2010 worldwide. In the present study the prevalence of refractive errors was found to be 24% in children aged 6 –12 years. This was in agreement with El-Bayoumy⁽⁸⁾ study that conducted in Cairo, Egypt, who found that the prevalence of refractive errors in school students aged 7–14 years to be nearly 22.1%. It also, agreement with Mohamed et al⁽¹⁰⁾ conducted study in Menoufia governorate found that the prevalence of refractive errors in school students aged 10-15 years was 24 .7%. Another cross-sectional analysis of 2070 healthy primary school children screened for refractive errors from 2009 through 2010 in the cities of South Sinai, Egypt and their surrounding Bedouin settlements found that the prevalence of refractive errors was 29.4%.⁽²⁰⁾

Most children reported that they had limitation in performing day to day activities

as Feeling angry when doing things , Planning with friends, Achievement, Doing everything easily. Study homework, Understanding, Feeling happiness with poor quality score in (86.9 %) of them. It is consistent with Kandel et al⁽²¹⁾ who founded that there is activity limitations (difficulties in performing day-to-day activities) as the result of refractive error have a huge impact on people's life. This is probably the major reason for people seeking refractive correction.

There was a statistically significant difference between children with refractive errors and normal children regarding age and socioeconomic status and family history of low vision ($p < 0.001$). This result is in disagreement with a Pakistani study⁽¹⁸⁾ showing that 61 out of 107 students who had refractive errors had a positive familial history of using glasses and this indicates a strong relationship between refractive errors and family factor. In other hand it contradicted to Farahata et al⁽¹⁹⁾ who reported insignificant statistical difference between children.

There was a statistically significant difference between children with refractive errors and normal children regarding daily activities and their quality of life in all parameters ($p < 0.001$). This was agreed with

Sturrock et al.⁽²²⁾ who study Vision-Related Quality of Life in Patients with Low Vision in a Prospective Longitudinal Study. Overall 45.5 % of students with error of refraction had poor QOL. This was in agreement with Pakpour et al.⁽²³⁾ that done in Iranian study, which studied the relationship between Psychometric properties and quality of life.

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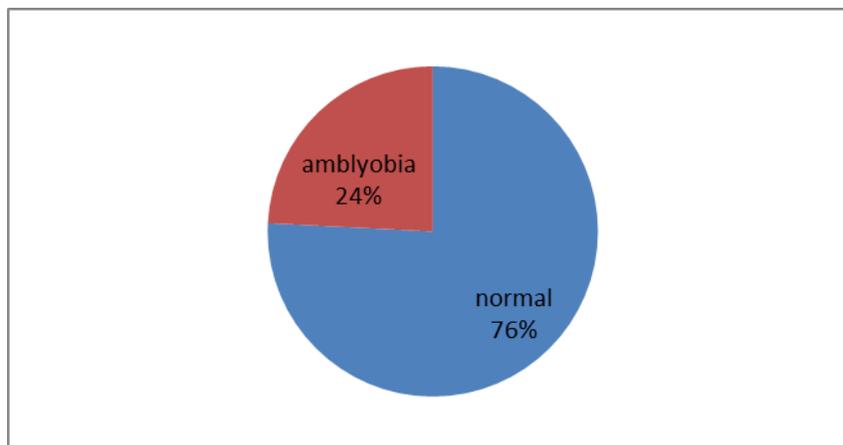


Fig (1): Percentage of refractive errors among studied children

Table (1): Validity of the questionnaire for quality of life and daily activity

Reliability Statistics		
Cronbach's Alpha	Cronbach's Alpha Based on Standardized Items	No. of Items
0.953	0.949	13

Table (2): Socio-demographic characteristics of the studied children

Socio-demographic Characteristics	(No=960)					
<ul style="list-style-type: none"> ▪ Child's Age (years) ▪ Mean \pmSD*/ Range 	10.49 \pm 1.62/7-12					
<ul style="list-style-type: none"> ▪ Father's Age (years) ▪ Mean \pmSD /Range 	42.79 \pm 6.11/24-62					
<ul style="list-style-type: none"> ▪ Mother's Age (years) ▪ Mean \pmSD/ Range 	37.45 \pm 5.70/23-51					
	No	%		No	%	
Mother's education			Father's education			
<ul style="list-style-type: none"> ▪ Illiterate ▪ Read & write ▪ Basic ▪ Secondary ▪ Middle institute ▪ University ▪ Postgraduate 	28	2.9	<ul style="list-style-type: none"> ▪ Illiterate ▪ Read & write ▪ Basic ▪ Secondary ▪ Middle institute ▪ University ▪ Postgraduate 	26	2.7	
	94	9.8		82	8.5	
	184	19.2		126	13.1	
	280	29.2		134	24.6	
	68	7.1		236	14.0	
	300	31.2		350	36.5	
	6	0.6		6	0.6	
Mother's occupation			Father's occupation			
<ul style="list-style-type: none"> ▪ Housewife ▪ Unskilled ▪ Employee ▪ Business ▪ Professional 	738	76.9	<ul style="list-style-type: none"> ▪ Worker ▪ Farmer ▪ Skilled ▪ Employee ▪ Business ▪ Professional 	152	15.8	
	8	0.8		30	3.1	
	62	6.5		76	7.9	
	4	0.4		264	27.5	
	148	15.4		146	15.2	
				292	30.4	
Income			SES**			
<ul style="list-style-type: none"> ▪ Not enough ▪ Enough ▪ More than enough 	136	14.2	<ul style="list-style-type: none"> ▪ Very low ▪ Low ▪ Moderate ▪ High 	276	28.8	
	676	70.4		284	29.6	
	148	15.4		218	22.7	
				182	19.0	

*SD: standard deviation

**SES: socioeconomic status

Table (3): Eye status and daily activities of the studied children

Studied variables	No(960)	%
Complaint		
▪ Lipoma	484	50.4
▪ Led drop	302	31.5
▪ Led Inversion	158	16.5
▪ Led Extroversion	16	1.7
Eye strain occurs when looking at the sun		
▪ No	248	25.8
▪ Yes	712	74.2
Vision defect		
▪ No	728	75.8
▪ Yes	232	24.2
Family history of low vision		
▪ Yes	392	40.8
▪ No	568	59.2
Who in family with low vision(n=392)		
▪ Mother	252	64.3
▪ Grand father	108	27.6
▪ Grand mother	32	8.2
Eye strain		
▪ Always	4	0.4
▪ Often	26	2.7
▪ Sometimes	206	21.5
▪ Rare	724	75.4
Can see the way to bathroom		
▪ No	22	2.3
▪ Yes	938	97.7
Watching clock		
▪ No	114	11.9
▪ Yes	846	88.1
Can see the board writing		
▪ No	162	16.9
▪ Yes	798	83.1

Table (4): Quality of life of the studied children

Quality of life	No.(960)			
	Yes		No	
	No	%	No	%
▪ Feeling happiness	204	21.2	756	78.7
▪ Doing everything easily	78	8.1	882	85.0
▪ Feeling angry when doing things	144	15.0	816	91.9
▪ Stud. Work	152	15.8	808	84.2
▪ Understanding	156	16.2	804	83.8
▪ Achievement	124	12.9	836	87.1
▪ Planning with friends	102	10.6	858	89.4
Total score	No		%	
▪ Poor	834		86.9	
▪ Good	126		13.1	

Table (5): Distribution of examined students with vision defect according to their personal characteristics and their daily activities

	Vision defect				χ^2 Test	P value
	Yes		No			
	No (232)	%	No (728)	%		
Age (years) Mean SD/ Range	10.9±1.6		11.7±1.8		5.2	<0.001*
SES					44.97	<0.001*
▪ Very low	36	13.0	240	87.0		
▪ Low	78	27.5	206	72.5		
▪ Moderate	46	21.1	172	78.9		
▪ High	72	39.6	110	60.4		
Family history of low vision					5.48	<0.001*
▪ Yes	110	28.1	282	71.9		
▪ No	122	21.5	446	78.5		
Eye strain					44.97	<0.001*
▪ Always	36	13.0	240	87.0		
▪ Often	78	27.5	206	72.5		
▪ Sometimes	46	21.1	172	78.9		
▪ Rare	72	39.6	110	60.4		
Eye strain occurs when looking at the sun					704.20	<0.001*
▪ No	214	92.2	34	4.7		
▪ Yes	18	7.8	694	95.3		
Can see the way to bathroom					70.65	<0.001*
▪ No	22	9.5	0	0.0		
▪ Yes	210	90.5	728	100.0		
Watching clock					405.90	<0.001*
▪ No	114	49.1	0	0.0		
▪ Yes	118	50.9	728	100.0		
Can see the board writing					611.5	<0.001*
▪ No	162	69.8	0	0.0		
▪ Yes	70	30.2	728	100.0		
Setting at TV					642.50	<0.001*
▪ Yes	200	86.2	32	13.8		
▪ No	32	4.4	696	95.6		

* Significant at a level of < 0.05

Table (6): Distribution of examined students with vision defect according to their quality of life

	Vision defect				χ^2 Test	P value
	Yes		No			
	No (232)	%	No (728)	%		
Feeling happiness						
▪ Yes	188	81.0	16	2.2	653.40	<0.001*
▪ No	44	19.0	712	97.8		
Doing everything easily						
▪ Yes	78	33.6	0	0.0	266.40	<0.001*
▪ No	154	66.4	728	100.0		
Feeling angry when doing things						
▪ Yes	138	59.5	6	0.8	474.80	<0.001*
▪ No	94	40.5	722	99.2		
Stud. Work						
▪ Yes	152	65.5	0	0.0	566.70	<0.001*
▪ No	80	34.5	728	100.0		
Understanding						
▪ Yes	156	67.2	0	0.0	584.50	<0.001*
▪ No	76	32.8	728	100.0		
Achievement						
▪ Yes	124	53.4	0	0.0	446.80	<0.001*
▪ No	108	46.6	728	100.0		
Planning with friends						
▪ Yes	102	44.0	0	0.0	358.10	<0.001*
▪ No	130	56.0	728	100.0		
Total score(No./%)						
▪ Poor	106	45.7	728	100.0	455.10	<0.001*
▪ Good	126	54.3	0	0.0		

* Significant at a level of < 0.05

الملخص العربي

جودة الحياة بين طلاب المدارس الابتدائية الذين يعانون من أخطاء انكسارية في المنوفية - مصر

نجوي نشات حجازي- نجوي فراج- زينب قاسمي

الخلفية: الأخطاء الانكسارية هو عجز العين في التركيز الضوء على الشبكية مما يؤدي إلى قصر النظر او طول النظر. ترتبط الأخطاء الانكسارية غير المصححة بضعف جودة الحياة وتقليل الفرص التعليمية لدى الأطفال الذين يعانون من ذلك. **الأهداف:** تهدف هذه الدراسة إلى تقييم أثر الأخطاء الانكسارية بين أطفال المدارس الابتدائية على جودة حياتهم. **المنهجية و طرق البحث:** تم تصميم دراسة مقطعية وصفية و أجريت الدراسة على 960 طالب من طلاب المرحلة الابتدائية في مدرسة منشأة سلطان الابتدائية، مركز منوف، المنوفية و الذين يتراوح اعمارهم بين 6 الي 12 عام في خلال الفترة من 1 أكتوبر 2016 حتى نهاية شهر ديسمبر عام 2016. و تم تقييم المشاركين من خلال استبيان يتضمن (البيانات الاجتماعية الديموغرافية والتاريخ الشامل) والفحص العام الاكلينيكي والبصري. و تم ايضا تقييم جودة الحياة للمشاركين باستخدام استبيان يتكون من 7 عنصراً. و تم اختبار موثوقية باستخدام ألفا كرونباخ. **النتائج:** ولقد أظهرت الدراسة ان أربعة وعشرون بالمائة (1و24%) كان لديهم خطأ انكساري في احدى أو كلتا العينين. وكان هناك فرق ذو دلالة إحصائية كبيرة بين الطلاب الذين يعانون والذين لا يعانون من اخطاء انكسارية فيما يتعلق الخصائص الديمجرافية وجميع دلالات جودة الحياة بشكل عام ومن بينهم 5و45% من الطلاب الذين لديهم اخطاء انكسارية كانوا يعانون من ضعف في جودة الحياة. **الخلاصة:** إن فحص الأخطاء الانكسارية في أطفال المدارس الابتدائية إلزامي لبدء التدابير التصحيحية في المرحلة المبكرة، وتقليل العجز البصري وتحسين نوعية الحياة.