

THE EFFECT OF OVER USE OF ELECTRONICS VISION DEVICE ON LOW VISION AMONG GIRL SCHOOL STUDENT



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Kullab

Publication Partner: IJSRP INC.

12/7/2018

Publication Partner:

International Journal of Scientific and Research Publications (ISSN: 2250-3153)

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www.ijsrp.org

ISSN 2250-3153



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Preface

Little is known about the effect of electronic vision device on vision and prevalence among school students in United Arab Emirates, the aim of the study was to examine effect of over use of electronic device on low vision, prevalence of low vision ,screen time for both students and parents .

Cross sectional study was done on large elementary girl governmental school at Dubai, April to June 2017, total students number 700 students, 348 students were invited to take part in the study , age group from 5-13 years old ,a questionnaire were filled by personal interview with students including socio demographic question ,time spent on electronic device on daily basis and weekend ,and digital eye strain signs that students had associated with over staring at screens ,in addition to vision assessment for both eyes ,and parents survey .of the school children (n=399),prevalence of low vision were 45.4%in right eye ,and

47.2 % in left eye, uncorrected visual acuity was 35.1%right eye, 36.9% left eye, student's wearing corrective lenses 10.3%,the most digital eye strains sign student had was eye pain 13.9%,and headache 5.6%,the highest rate for screen time were from 2 -3 hours daily ,while highest rate for parents was 5-6 hours daily .

The study confirmed that over use of electronic screen product will affect vision, measures and initiatives for wise use of electronic device, to minimize and prevent vision complication.

Key wards: low vision, screen time, digital eye strain signs.

Acknowledgment

First and foremost, I would like to show my heartfelt appreciation and thanks to the soul of my father, for the support I receive from my mother despite her age she still encouraging me to study and work hard.

My special thanks to my husband and kids who show understanding and endless patients for the time I spent away from them.

Finally appreciation to Swiss Business school team, "Al-Sadaa school" administration, and primary health care administration (MOH)

For Ali Zuhair Abdalmeneim who assist me in SPSS analysis.

All of these people have given me heartfelt support to my study.

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Publication Partner:

International Journal of Scientific and Research Publications (ISSN: 2250-3153)

Authors

Hedaya Mohyee Aldeen Kullab, Senior Nurse –School health at MOHAP – Dubai, Master in Health Care Management from Swiss Business School 2018, BSN from Palestine College for nursing.

hedayakullab@yahoo.com

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1. INTRODUCTION

Rapid development of technology, and invasion of our daily life, to be very important, now a days tablet, smart phone, TV and computers, other digital devices spread all parts of the world, [1] and available in the hand of everyone, especially children and school age who find it as meant of social interaction, playing, but on other hand it had serious physical and mental health problem, according to who 2014. [2], Its reported that Sitting for hours in front of screen stresses and strain child's eyes, put children for more risk than adults for developing symptoms of digital eye strain, over use of smart phone, tablet and others electronic will increase exposure of blue light which will damage vision [3], American Macular Degeneration warns from blue light that cause retinal damage, and loss of central vision (loss of sight).

"A child's eyes are still changing between the ages of 5 and 13 years old" said Dr. Horn. also distance between lens and retina still changing, which lead to occurrence of nearsightedness. [4].

Adversary group on health effects of using internet and electronic device agree that over use of these device will affect vision, and lead to digital eye symptoms, (eyestrain, dry eye, blurred vision, low vision), even 3 hours on screen has risk on vision [5]. Visual impairment is global health problem, defined as permanent loss of vision, can't be improved by glasses or surgery, visual aids help to carry daily task and improve quality of life, 13 million children at age(5_15)around the world are visually impaired due to refractive error that condition can easily diagnosed and corrected, 1.4 million get blindness for the rest of their life, and in need for rehabilitation and psychological support, female are more risk for visual impairment, this health problem will affect quality of student life, and affect school performance, measures should be taken to make control to reduce vision impairment, irreversible vision loss. Identification of vision problems as early as possible could help identify children who might benefit from early interventions to correct or improve vision. [6]. In Korea internet addiction has been identified as the largest health problem among kids (Ministry of Sciencethe year 1999, [2] World health organization create initiative Vision2020 :(the Right to Sight)., for eradication of preventable loss of sight by the year 2020, and public awareness about medical condition associated with blindness and vision impairment, and to support VISION 2020 program activities, we need to use digital device wisely, and to make control over it to reduce vision signs and symptoms, as it is recommended by the World Health Organization (WHO) to integrate vision screening and refractive services for school students within screening for other health issues, and to have control of blindness in children as one of the priority areas in "Vision 2020—the right to sight" program because failure to detect visual impairment early will affect vision out comes, the way how student perceive his own world, self-esteem and educational achievement.

Controlling the problem of visual impairment is a priority for every country because failure to detect visual impairment early may have a permanent effect on long-term vision outcomes, education achievement and self-esteem. Therefore, the American Academy of Ophthalmology and the American Association of Pediatric Ophthalmology and Strabismus has recommended that children be examined for eye problems at four stages: as newborns in the nursery, at 6 months, at 3 years, and 5 years of age and older.

1.1 Back Ground of the Study:

Studies about prevalence of visual impairment in the Arabian population was very few, and surveys about the adverse effects of electronic screen viewing on visual impairment of children was less, and no survey done in UAE targeting this problem for school age group ,other studies done on adult, in my study my target was children who are the future for every society ,study on large governmental girl school at Dubai, age group form 5to 13 years old, grade from 1-5 , population for the school is 700 student , cross section study was done ,339 student are included in the study , E chart eye test done by me for student at school clinic ,to test visual acuity on addition to survey for student to evaluate screen timing ,how many hour daily and on the weekend they are in front of TV ,smartphone and tablet ,which digital signs accompanied by using digital device ,also around 208 parents responded by quick survey on line to measure screen time for them on daily basis, parents invited to share in that survey because they are role model for their children , their behavior in dealing with electronic affect their children , the result support the effect of electronic devise on students vision.

2. LITERATURE REVIEW

2.1 Introduction:

The use of digital electronic device is climbing to be at the hand of everyone, especially children are vulnerable to visual risk from staring at screens for long period of time, in addition to other health, social and psychological problem, parents and society members, and decision maker must be aware of that risks, to find measures for facing this problem, as children are the future for every society, they supposed to live healthy and enjoying their sights.

The main aim of reviewing research literature is to explore what has been investigated, and what still is needed, to link theory and practice (Randolph 2009). [7]

In my literature I included studies regarding prevalence of vision impairment, screen time and study regarding the impact of electronic on eyes.

Study about Prevalence of Low Vision in the Region:

Study in Dubai, by Hussein HY et al, 2016, a qualitative and quantitative assessment about visual impairment and eye comorbidity among school children, cross sectional survey among 266343 student in privet school, age 5-18 years old, it was shown that there were 1008 cases of visual disorders in (3.8 per one thousand), the main cause of vision impairment is refractive error due to genetic and environmental factor. [8]

Study on visual impairment screening and early intervention among school kids in Dubai 2016, cross sectional study for 316 student age group from 6-11, grade 1 and 5 at al sadiq private school , The study showed about 38.9% of total sample visually assessed were having refraction error and about 42.3% of total students with error of refractions wearing glasses while about 16.5% of total students examined were being wearing glasses), the study revealed that the common error of refractions identified among the sample were (myopia (9.8%), hypermetropia (4.9%), astigmatism (43.9%). The study showed that there are number of eye morbidities detected during visual screening like nystagmus (0.3%), strabismus (0.6%), Cataract (0.3%) and Conjunctivitis [9]

Study of Prevalence and Pattern of Refractive Errors among Primary School Children in Al Hassa, Saudi Arabia, total of 2246 Saudi primary school children aged 6 to 14 years of both genders were selected using multistage sampling method form 30 primary schools located in the three different areas of Al Hassa. Of the screened school children (N=2002), the overall prevalence of refractive errors was 13.7%. [10]

Study in Qassim University, Saudi Arabia about prevalence of correctable visual impairment in primary school, A total of 5176 children (mean age 9.5 ± 1.8 years), 2573 boys (49.7%) and 2603 girls (50.3%), The overall prevalence of RE in the better eye was 18.6% (n=963), and the prevalence of uncorrected RE 16.3% (n=846), with only 2.3% (n=127) of children wearing spectacles during exam. [11]

Study about Effect of Digital Devise on Student's Vision:

Studies regarding the effect of electronic devise on vision among school students in UAE are few the only study done on university student in Ajman about computer use and vision related problem, 500 students studying in Gulf Medical University Ajman and Ajman University of Science and Technology were surveyed by validated questionnaire to assess pattern of using computers and associated visual symptoms, the result was high prevalence of vision related problems associated with unfiltered screen use for long time, 53.3% had headache, burning sensation in the eyes - 54.8%, tired eyes - 48%, Female students were found to be at a higher risk. [12]

As screen affect vision for adult and children but children had some unique aspect to be more affected than adult, self-awareness about how to protect their eyes, they are playing games and enjoying it for several hours without break which cause more eye irritation and blurred and vision, in addition to position and lights, and the nature of children eyes which is still growing. [17]

Study on Qatar about obesity and low vision as result of excessive internet use and television viewing, for 3000 school students, age group 6 to 18, agreed to participate, the survey done through face to face questionnaire, Forty-six (1.9%) children spent ≥ 3 hours/day on the Internet, and were either overweight/obese excessive time spent on the TV view and Internet use. And had low vision. The study findings confirmed a positive association between obesity and low vision as a result of excessive use of internet and television. [13]

Internet Use and Television Viewing in Children and its Association with Vision Loss. A Major Public Health Problem, The aim of the study was to examine the effects of excessive internet use and television viewing on low vision and its prevalence with socio-demographic characteristics. This is a cross-sectional Qatar from September 2009 to April 2010. A total of 3200 students aged 6-18 years were invited to take part of whom 2586 (80.8%) agreed. A questionnaire, that included questions about socio-demographic factors, internet use, and television viewing and computer games, co-morbid factors, of the school children studied (n=2586), 52.8% were girls and 47.2% boys. The overall prevalence of low vision was 15.2%. The prevalence of low vision was significantly higher in the age group 6-10 years (17.1%; P=0.05). Low vision was more prevalent among television viewers (17.2%) than in infrequent viewers (14.0%). The proportion of children wearing glasses was higher in frequent internet users and television viewers (21.3%). Also, low vision without aid was higher in frequent viewers. The study findings revealed a greater prevalence of low vision among frequent internet users and television viewers. The proportion of children wearing glasses was higher among frequent viewers. The prevalence of low vision decreased with increasing age. [14]

Study on harmful effect of common used electronic device on adolescent, and its safe guard at shebin el kom (Egypt), by Dr Najwa Zain Alden, (sept –October 2013) cross section

study of 59 boys and 67 girls age group 16 and 18, the result was moderate to severe hazards of back ache, carpal tunnel, itchy eyes, sleeping disorder which lead to lack of concentration and low school performance. [15]

Impact of computer technology on health (computer vision syndrome), areview of literature on computers vision syndrome, to determine prevalence in both adult and children, and most common symptoms headache, double, vision, and fatigue, the prevalence is varied among studies, [16]

Study done by Kozeis n, 2009 on the impact of computers use on children vision, approved that children can experience symptoms of over use of computers (eye discomfort, fatigue, blurred vision, headache and dry eyes) same as adult these symptoms may be caused by poor lighting, glare, and improper work station set up, children more susceptible than adult for having vision problem due to unique aspect of how children using computers. [17]

Literature review about Study on physical impacts of computers and electronic game use on children and adolescent, revealed that physical demands of overuse can lead to visual and neurological and physical changes in developing children, revision literature showed that computer is common among children, there is need for statistics, laboratory study on vision, and case reports. [18]

Study on reporting dry eye and blurred vision, the two main symptoms of computer vision syndrome between adult and children ,age group 6-17 ,result was children and adolescent are unable to report dry eye correctly but they are able to report blurred vision correctly which will affect diagnose of computer vision Syndrome [19]

Studies about Screen Time and Signs Associated With:

Study of 253 children between the ages of 6 and 10 at the University of California at Berkeley School of optometry found a strong correlation between the amount of time young children spend on the computer and their development of nearsightedness.(vision problem)[20]

Survey on Hong Kong primary school students, on the effect of electronic device (smart phone, tablet and computers) on eye health showed that 50% of students have unclear vision, and eye strain. [21]

*** Survey of 200 children between age 10 and 17 by American optometric association indicate 80% experience dry eyes, blurred vision in relation to over use of digital devices. [22]**

A survey on 2000 parents in UK with children aged between 2 and 16, to see how regularly children are using digital device, (computer, watching TV, playing games and smart phone), the answer was children used digital devise 1-2 hours daily, Half an hour each on their e-readers (MP3 player, and electronic learning device), and 2hours on TV, and total of 7 hours spending daily on screen. [23]

Survey done by *Penn, Schoen & Berland 2014*(Associates American Optometric Association's) age group 10 and 17 years, spending time was 3 and more hours using digital device, and 41 percent of parents approved same finding that their kids spent same time daily using digital devices, and 66 percent of kids have their own smartphone or tablet. An 80% of children who were surveyed by the AOA report burning, itching or tired eyes after long period of using digital devices. [24]

Survey done on school children using digital device in Abu Dhabi, 31,000 children from private and public schools participated in the online survey. Student ages ranged from 8 to 19 years old, and students were from Grade 6 to Grade 12. Forty-one per cent were boys participated in the online survey, networks Students spend an average of 5.2 h per day on social networking (with a median of 3 h, and mode of 1 h). [25]

Survey suggest that children in the UAE, Turkey and Saudi Arabia spend too much time. More than double the time recommended by experts, four and a half hours every day, a survey by Turner, a division of Time Warner, showed that on average children spend two hours watching television, 1.2 hours on a tablet or mobile phone and another 1.2 hours playing games online. [26]

2.2 Summary of Key Points:

Literature done about low vision in relation to over use of electronic device, is little especially in UAE, the only study done for university students in Ajman, most of studies done agree that electronic device

Have effect on children vision same as adult vision.

Screen time very between studies, more than four hours a day children are using digital screens which is very high, and alarming, the recommended time is one or two hours daily according to American academy of pediatrics.

Using screens too often and too long will affect eyes, child will get digital eye strain, which include headache, blurred vision itchy eyes, dry eyes, tearing and pain.

More than one study approved that female have more signs and symptoms of digital strain, more than males, also more prevalence of low vision among girls rather more boys, which is interesting subject for more researches of causes if its genetic, nutritional or cultural aspect.

Study about prevalence of low vision, two studies done in Dubai among school children reveal high prevalence rate, that mean there is need for national study in UAE among school student, to give accurate statistics, and causes, and height light the effect of technology on vision especially among students and young generation.

3 METHODOLOGY:

Quantitative ,descriptive cross sectional study ,done at largest governmental girl elementary school at Dubai , Al-Saada school , most of student are UAE nationality ,20% are other residents from Arab country and gulf region ,from grade 1-5 ,age group 5-13 years old ,total number are 700 students .

3.1 Research Design:

3.2. 1. Type of Research: Descriptive Cross Sectional Study.

3.2. 2. Design of the Research Instrument:

Primary data collected through form, it was two parts questionnaire and vision assessments.

Students questionnaire was in three parts, section (A) was demographic data for student, including students name, grade, class, date of birth, and sex which was fixed female, section (B) vision assessment, B1 if student wearing corrective lenses or not, B2 visual acuity with corrective lenses in both eyes, B3 visual acuity with uncorrected lenses, and reasons for not taking visual acuity, section (C) questions about frequency of using TV, computers, smart phone and tablet, the answer was from five ,always, usually, sometimes, rarely ,and never ,and second question how often students using the previous electronic devise daily and on the weekend from never to more than 4 hours ,the fourth question about the most sign student had after using electronic devise including headache ,eye pain ,itching ,tearing and blurred vision ,the questionnaire was filled by school nurse after taking approval from students and parents ,and explained in easy way to students , interview and vision test was done one by one by arrangement with school administration.

Assessment of visual acuity done by school nurse (me) ,at school clinic , the vision test is explained for the students , purpose and how to apply , E chart from the distance of six meter ,the student read the chart in both eyes , by covering left eye ,and read with right eye ,then right eye is covered and student read with left eye ,result recorded on the student form ,in both eyes ,also vision acuity is recorded with glasses for students who had ,reading 6/6 is normal vision ,6/9,6/12,6/24,6/36,6/60 are abnormal vision and need referral for more screening according to procedure manual of school health (ministry of health) , students who couldn't read the E chart from first time ,had other chance for assessment of vision.

The form were accepted by the adviser, and piloting done for 20 students from different grades to assess if the question is easy and understandable from students, to assess validity.

Parent's survey was designed in both language Arabic and English with cover letter about study, one question to measure how many hours parents spent on electronic devise, the answers rating from 2 hours to more than 8 hours, the link of quick survey sent to all parents through parents group on what's up and telegram, to be easy access for parents, and one question to be easy and enhance more response rate.

Variables recruited are dependent variable which is vision testing in both eyes, independent variables are age, sex, grade, how many hours student spent on TV, tablets, smart, phone.

3.2.3. Sample Selection:

Random selection from the list, from each grade 13-14 students were selected, the total number of grades was 25 grades, This resulted in the final selection of 339 students who were a true random sample of the study population; this is 48.4% of the total student population in the school. Exclusion criteria are student absence at time of doing test, in addition for student who

have known eye disease like sequent, cataract, blindness and student who have learning disability (who can't read E chart).

Sample size calculation:

The sample should be big enough to give accurate prevalence, if the estimated prevalence rate is 20% from previous study (P), corresponding to level of confidence is 95% (Z), and precision is 0.04 (d), so according to this formula for sample calculation $n = \frac{Z^2 P(1-P)}{d^2}$, sample size (n) will be 348.

3.3 Research Execution:

Data collection took place after taking ethical approval, from first week of May to second week of June 2017, daily one class assessed for vision both eyes, and student questionnaire filled through personal interview.

Parents survey filled on line through quick survey, 700 parents invited to participate in the survey, response were 208 parent, the questionnaire was one question about average time spent by parents on electronic device, the answers were 5, rating from 1-2 hours, to more than 8 hours.

All forms were ready, then data analysis was done by SPSS for student's survey and parents through quick survey, review literatures of previous study about effect of technology in UAE, and other region.

3.4 Analysis of Data:

3.4.1. Profile of Respondent:

Most of respondent are UAE resident, age group from 5 to 13 years old, they came from middle class families, because high class families they admit their kids in private schools, middle class family had the ability to offer tablets or smart phones to their kids, TV available at every home, students who didn't have their own tablet or smart phone, they used their mothers or eldest brothers or sisters phone, the other 19.2% of students who are residents they came from middle and below middle class they had tablet, or they used other family member tablet and phones.

3.4.2. Analysis of Responses:

According to sample calculation, sample size should be 348 students, 339 students recruited in the study, response rate is 97.4%, which consider high response rate and representative of school population, parent's response rate was 29.4% 206 from 700, data was fed into Excel spread sheet and transferred to predictive analytics software 19 version software for statistical analysis (IBM, SPSS Inc., version 23, United States). The prevalence of electronic vision related disorder was expressed as percentage. Chi-square test was used to determine association between the variables.

I. Socio-Demographic Characteristics:

Sample recruited was girls, 274 UAE nationality around 80.8%, and 65 resident around 19.2 %, age group from five years to more than 10 years, mean age was 7.91, median 8:00, slandered deviation 1.411 the highest rate of student’s age group 9and 7 years, 24.5% and 22.1%and the lowest age group 5 and more than 10 years 0.9%and 2.1%, grade from grade 1to grade 5, the percentage of students in each grades were near.

UAE OR RESIDANT

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	UAE	274	80.8	80.8	80.8
	RESIDANT	65	19.2	19.2	100.0
	Total	339	100.0	100.0	

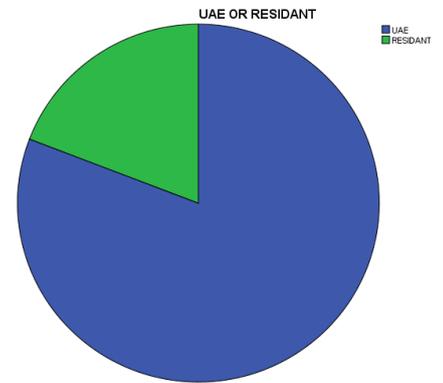


Table .1.a. (nationality description)

AGE

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	5 years 01/01/2011 to 31/12/2011	3	0.9	0.9	0.9
	6 years 01/01/2010 to 31/12/2010	66	19.5	19.5	20.4
	7 years 01/01/2009 to 31/12/2009	75	22.1	22.1	42.5
	8 years 01/01/2008 to 31/12/2008	64	18.9	18.9	61.4
	9 years 01/01/2007 to 31/12/2007	83	24.5	24.5	85.8
	10 years 01/01/2006 to 31/12/2006	41	12.1	12.1	97.9
	More than 10 years	7	2.1	2.1	100.0
Total	339	100.0	100.0		

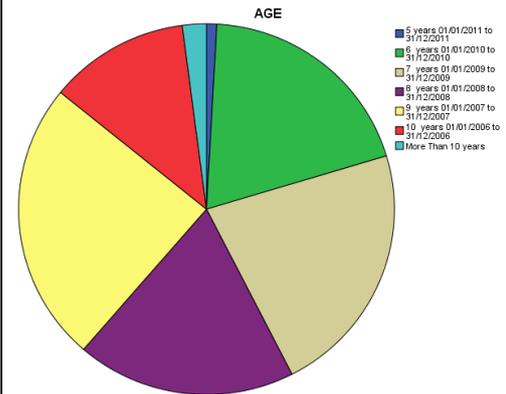


Table 1.b. (age description)

Grade

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Grade 1	58	17.1	17.1	17.1
	Grade 2	66	19.5	19.5	36.6
	Grade 3	69	20.4	20.4	56.9
	Grade 4	74	21.8	21.8	78.8
	Grade 5	72	21.2	21.2	100.0
	Total	339	100.0	100.0	

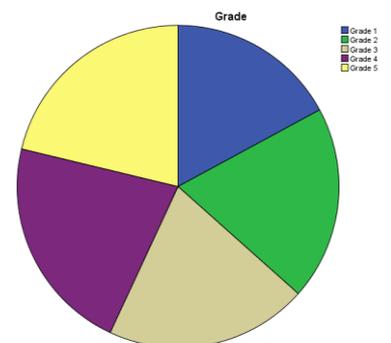


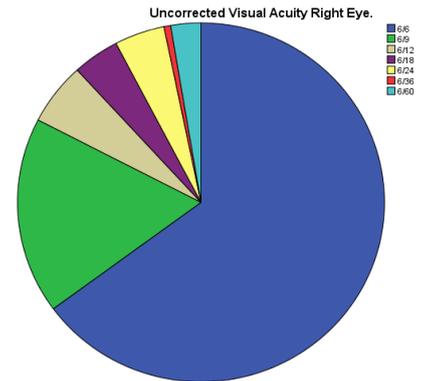
Table 1.c (grade description)

II. Prevalence of Low Vision:

Prevalence of low vision among school students was right eye 45.4 %, and left eye 47.2 %, uncorrected visual acuity right eye were 35.1%, the highest rate were students with vision 6/9-17.7% then 6/12-5.6% , and left eye 36.9,the highest rate were students with vision 6/9-18.9% then 6/12 -6.5%, Children wearing corrective lenses were, 10.3% [35] students, 2.1% wearing corrective lenses had visual acuity 6/9 which is the highest in right eye, and 1.5 wearing corrective lenses had visual acuity 6/9 was the highest in left the eye.

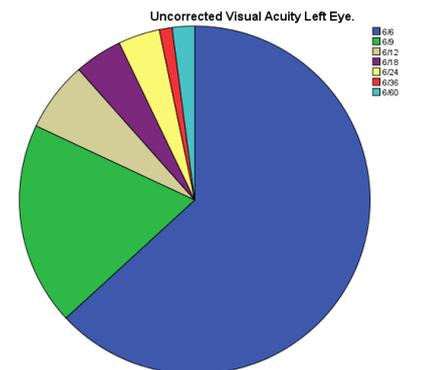
Uncorrected Visual Acuity Right Eye.

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	6/6	220	64.9	64.9	64.9
	6/9	60	17.7	17.7	82.6
	6/12	19	5.6	5.6	88.2
	6/18	14	4.1	4.1	92.3
	6/24	15	4.4	4.4	96.8
	6/36	2	0.6	0.6	97.3
	6/60	9	2.7	2.7	100.0
	Total	339	100.0	100.0	



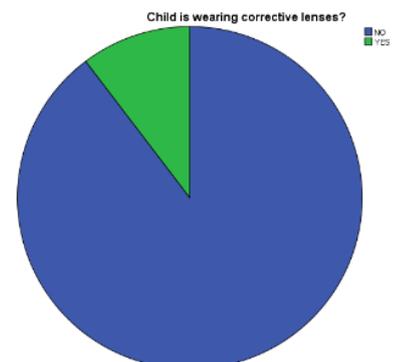
Uncorrected Visual Acuity Left Eye

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	6/6	214	63.1	63.1	63.1
	6/9	64	18.9	18.9	82.0
	6/12	22	6.5	6.5	88.5
	6/18	15	4.4	4.4	92.9
	6/24	13	3.8	3.8	96.8
	6/36	4	1.2	1.2	97.9
	6/60	7	2.1	2.1	100.0
	Total	339	100.0	100.0	



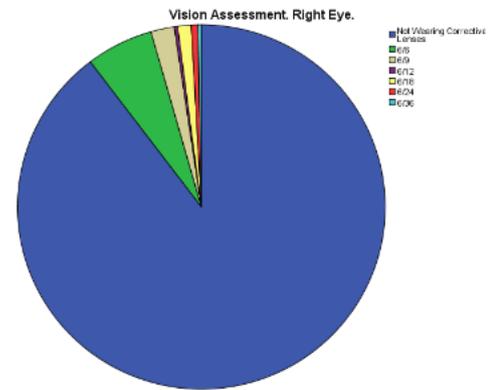
Child is wearing corrective lenses?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	NO	304	89.7	89.7	89.7
	YES	35	10.3	10.3	100.0
	Total	339	100.0	100.0	



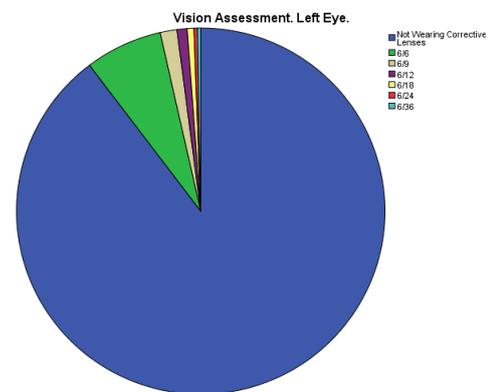
Vision Assessment corrective right Eye (wearing corrective lenses).

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Not Wearing Corrective Lenses	304	89.7	89.7	89.7
	6/6	20	5.9	5.9	95.6
	6/9	7	2.1	2.1	97.6
	6/12	1	0.3	0.3	97.9
	6/18	4	1.2	1.2	99.1
	6/24	2	0.6	0.6	99.7
	6/36	1	0.3	0.3	100.0
	Total	339	100.0	100.0	



Vision assessment corrected Left Eye (wearing corrective lenses).

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Not Wearing Corrective Lenses	304	89.7	89.7	89.7
	6/6	23	6.8	6.8	96.5
	6/9	5	1.5	1.5	97.9
	6/12	3	0.9	0.9	98.8
	6/18	2	0.6	0.6	99.4
	6/24	1	0.3	0.3	99.7
	6/36	1	0.3	0.3	100.0
	Total	339	100.0	100.0	

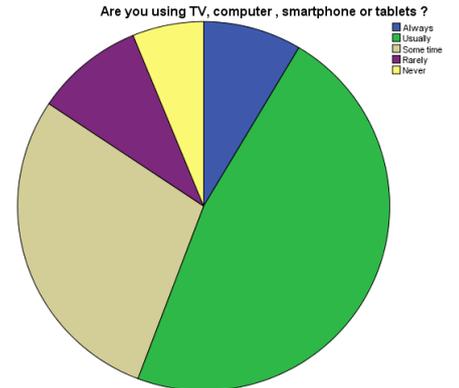


III. Frequency of using television, computers, smart phone and tablets:

Students answered about using television, computers, smart phones and tablet were always 8.6%, usually 47.2%, sometimes 28.6%, rarely 9.4%, and never 6.2%, the highest rate was usually and the lowest was never.

Are you using TV, computer, smartphone or tablets?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Always	29	8.6	8.6	8.6
	Usually	160	47.2	47.2	55.8
	Some time	97	28.6	28.6	84.4
	Rarely	32	9.4	9.4	93.8
	Never	21	6.2	6.2	100.0
	Total	339	100.0	100.0	

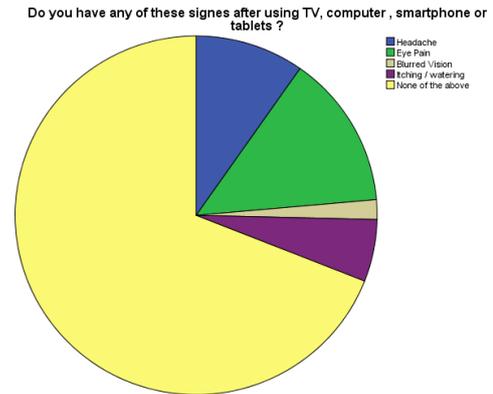


IV. Frequency Of Occurrence Of Digital Eye Straining Signs After Using Digital Devises:

The most Common signs student had was eye pain 13.9%, secondheadache9.7%, itchy eye and watering 5.6%, then blurred vision 1.8%, and 69% they didn't had any signs.

Do you have any of these signes after using TV, computer, smartphone or tablets?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Headache	33	9.7	9.7	9.7
	Eye Pain	47	13.9	13.9	23.6
	Blurred Vision	6	1.8	1.8	25.4
	Itching / watering	19	5.6	5.6	31.0
	None of the above	234	69.0	69.0	100.0
	Total	339	100.0	100.0	

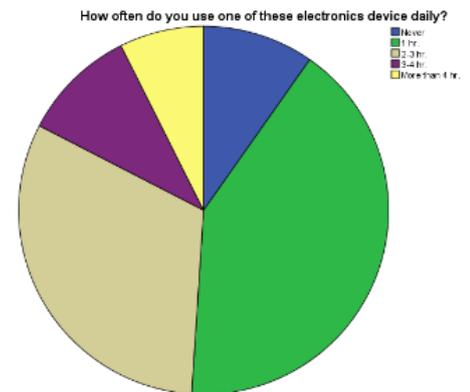


V. Frequency Of Screen Time Daily And On The Weekend:

Screen time spent by student s daily, 1 hour 41.3%, 2-3 hours 31.6%, 3-4 hours 10%, more than 4 hours 7.4%, never 9.7%, that’s mean most of students spent time on screen from 1-3 hours, in the weekend students who spent one hour26.5 %,2-3 hours 26.3%,3-4 hours 15.3%, more than 4 hours 16.8%, never 15%, there was variation in the percentage between screen time on the daily basis and weekend ,never using digital devise on the weekend was more, and 1-3 hours was less ,by asking students the answer was outdoor activities and family time , but 3-4 hours and more than four hours the percentage was more in the weekend ,this results according to family control on screen time who allow more time in the weekend .

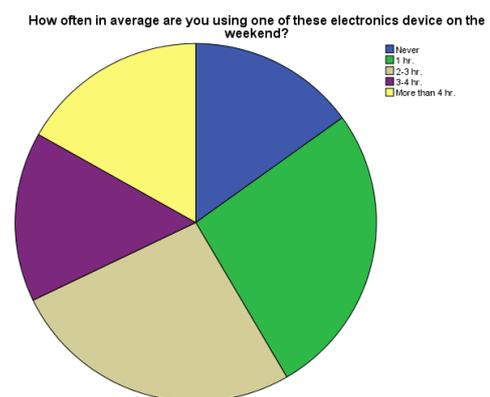
How often do you use one of these electronics device daily?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Never	33	9.7	9.7	9.7
	1 hr.	140	41.3	41.3	51.0
	2-3 hr.	107	31.6	31.6	82.6
	3-4 hr.	34	10.0	10.0	92.6
	More than 4 hr.	25	7.4	7.4	100.0
	Total	339	100.0	100.0	



How often in average are you using one of these electronics device on the weekend?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Never	51	15.0	15.0	15.0
	1 hr.	90	26.5	26.5	41.6
	2-3 hr.	89	26.3	26.3	67.8
	3-4 hr.	52	15.3	15.3	83.2
	More than 4 hr.	57	16.8	16.8	100.0
	Total	339	100.0	100.0	



VI. Frequency For Screen Time For Parents:

Parents who respond to quick survey were 208, the answer was for 1-2 hours on daily bases 32%, 3-4 hour was 25%, 5-6 hours was 20%, 7-8 hours was 10%, more than 8 hours 14 %, with stander deviation 16.18, parents spent most of the time on screens from 3-6 hours, and also more than 8 hours was high percentage.



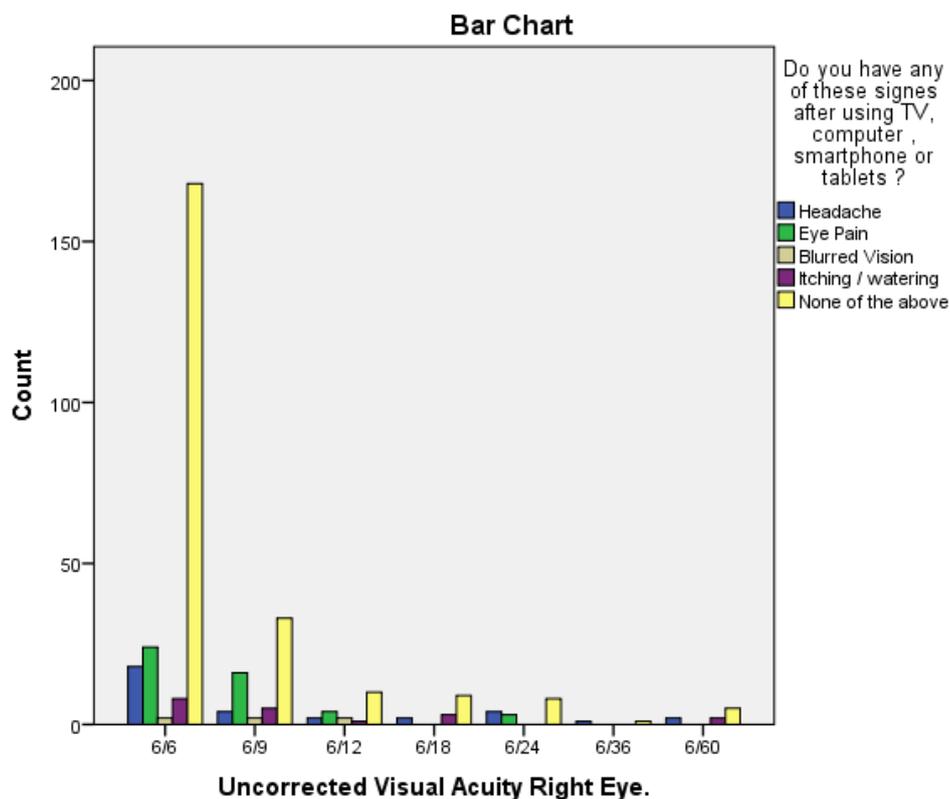
VII. Relation Between Vision Assessment And Digital Eye Strain Symptoms Right Eye :

			Do you have any of these signs after using TV, computer, smartphone or tablets?					Total
			Headache	Eye Pain	Blurred Vision	Itching / watering	None of the above	
Uncorrected Visual Acuity Right Eye.	6/6	Count	18	24	2	8	168	220
		% within Uncorrected Visual Acuity Right Eye.	8.2%	10.9%	0.9%	3.6%	76.4%	100.0%
	6/9	Count	4	16	2	5	33	60
		% within Uncorrected Visual Acuity Right Eye.	6.7%	26.7%	3.3%	8.3%	55.0%	100.0%
	6/12	Count	2	4	2	1	10	19
		% within Uncorrected Visual Acuity Right Eye.	10.5%	21.1%	10.5%	5.3%	52.6%	100.0%
	6/18	Count	2	0	0	3	9	14
		% within Uncorrected Visual Acuity Right Eye.	14.3%	0.0%	0.0%	21.4%	64.3%	100.0%
	6/24	Count	4	3	0	0	8	15
		% within Uncorrected Visual Acuity Right Eye.	26.7%	20.0%	0.0%	0.0%	53.3%	100.0%
	6/36	Count	1	0	0	0	1	2
		% within Uncorrected Visual Acuity Right Eye.	50.0%	0.0%	0.0%	0.0%	50.0%	100.0%
	6/60	Count	2	0	0	2	5	9
		% within Uncorrected Visual Acuity Right Eye.	22.2%	0.0%	0.0%	22.2%	55.6%	100.0%
Total	Count	33	47	6	19	234	339	
	% within Uncorrected Visual Acuity Right Eye.	9.7%	13.9%	1.8%	5.6%	69.0%	100.0%	

Chi-Square Tests

	Value	df	Asymptotic Significance (2-sided)
Pearson Chi-Square	53.426a	24	0.001
Likelihood Ratio	44.940	24	0.006
Linear-by-Linear Association	6.885	1	0.009
N of Valid Cases	339		

a. 24 cells (68.6%) have expected count less than 5. The minimum expected count is .04.



From the previous tablet, relationship between digital signs and vision assessment, students vision 6/6 in the right eye they had eye pain 10.9%, headache 8.2%, that's means even normal eyes its affected with screens, students who had 6/9 they complained more from eye pain 26.7%and headache 6.7%, students with vision 6/12 had eye pain 21.1%, and 10.5%headache and blurred vision, students with vision 6/18hadheadache 14.3%, and 10.5%blurred vision, students with vision 6/24 had 26.7%headache,and20% eye pain ,students with vision 6/36 had 50% headache ,students with vision 6/60 had 22.2%headache ,and itchy eyes ,the most common sign was eye pain 13.9% then headache ,then headache 9.7%,with P value 0.001 .

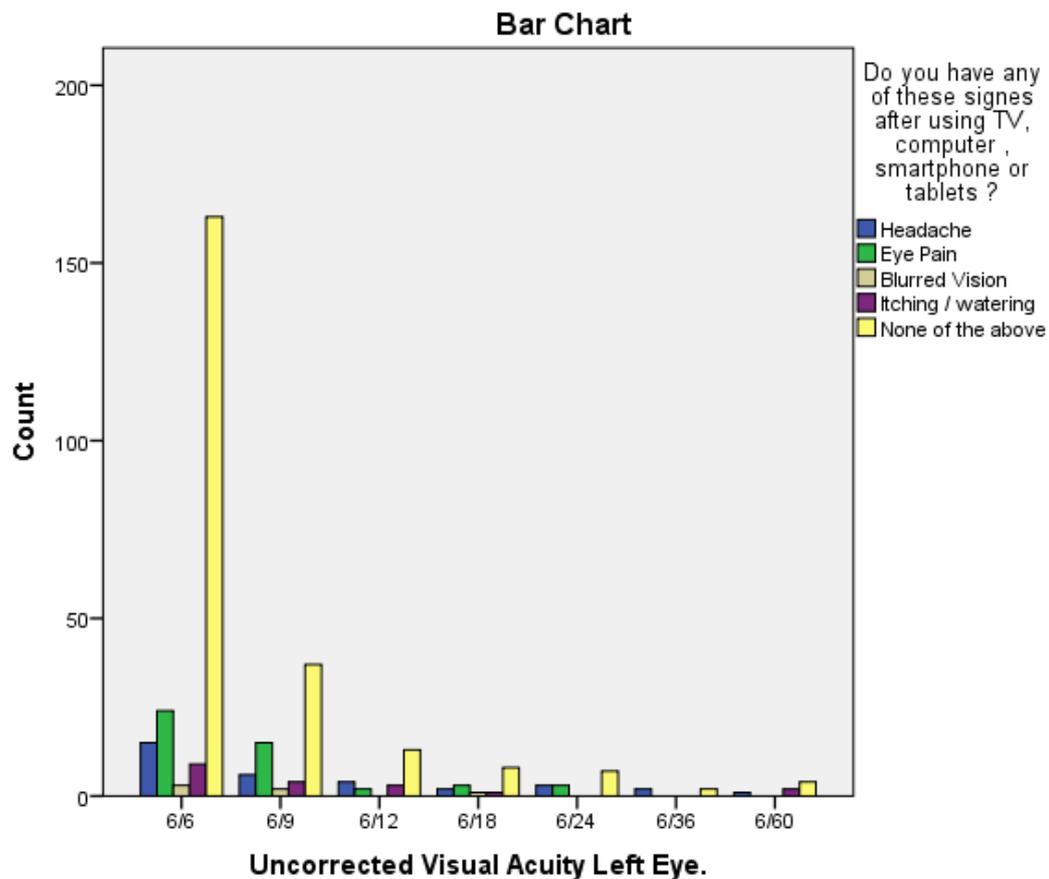
VIII. Relation between Vision Assessment and Digital Eye Strain Symptoms Left Eye:

			Do you have any of these signs after using TV, computer, smartphone or tablets?					Total
			Headache	Eye Pain	Blurred Vision	Itching / watering	None of the above	
Uncorrected Visual Acuity Left Eye.	6/6	Count	15	24	3	9	163	214
		% within Uncorrected Visual Acuity Left Eye.	7.0%	11.2%	1.4%	4.2%	76.2%	100.0%
	6/9	Count	6	15	2	4	37	64
		% within Uncorrected Visual Acuity Left Eye.	9.4%	23.4%	3.1%	6.3%	57.8%	100.0%
	6/12	Count	4	2	0	3	13	22
		% within Uncorrected Visual Acuity Left Eye.	18.2%	9.1%	0.0%	13.6%	59.1%	100.0%
	6/18	Count	2	3	1	1	8	15
		% within Uncorrected Visual Acuity Left Eye.	13.3%	20.0%	6.7%	6.7%	53.3%	100.0%
	6/24	Count	3	3	0	0	7	13
		% within Uncorrected Visual Acuity Left Eye.	23.1%	23.1%	0.0%	0.0%	53.8%	100.0%
	6/36	Count	2	0	0	0	2	4
		% within Uncorrected Visual Acuity Left Eye.	50.0%	0.0%	0.0%	0.0%	50.0%	100.0%
	6/60	Count	1	0	0	2	4	7
		% within Uncorrected Visual Acuity Left Eye.	14.3%	0.0%	0.0%	28.6%	57.1%	100.0%
Total	Count	33	47	6	19	234	339	
	% within Uncorrected Visual Acuity Left Eye.	9.7%	13.9%	1.8%	5.6%	69.0%	100.0%	

Chi-Square Tests

	Value	df	Asymptotic Significance (2-sided)
Pearson Chi-Square	40.001 ^a	24	0.021
Likelihood Ratio	33.539	24	0.093
Linear-by-Linear Association	8.515	1	0.004
N of Valid Cases	339		

a. 25 cells (71.4%) have expected count less than 5. The minimum expected count is .07.



Study for the relationship between vision assessment left eye and digital screen signs, student with vision 6/6 had 11.2% eye pain and headache 7.0%, student with vision 6/9 had 23.4% eye pain, 9.4% headache, in students with vision 6/12 had 18.2% headache and 13.6% itching and watery eyes and 9.1% eye pain, students with vision 6/18 had 20% eye pain, 13.3% headache, 6.7% blurred vision and itchy eyes, students with vision 6/24 had 23.1% headache and eye pain, students with vision 6/36 had 50% headache, students with vision 6/60 had 14.3% headache, 28.6% itchy and watery eyes, with P value 0.021.

IX. Relation between Vision Assessment and Digital Eye Strain Symptoms for Corrected and Uncorrected Visual Acuity:

Crosstab

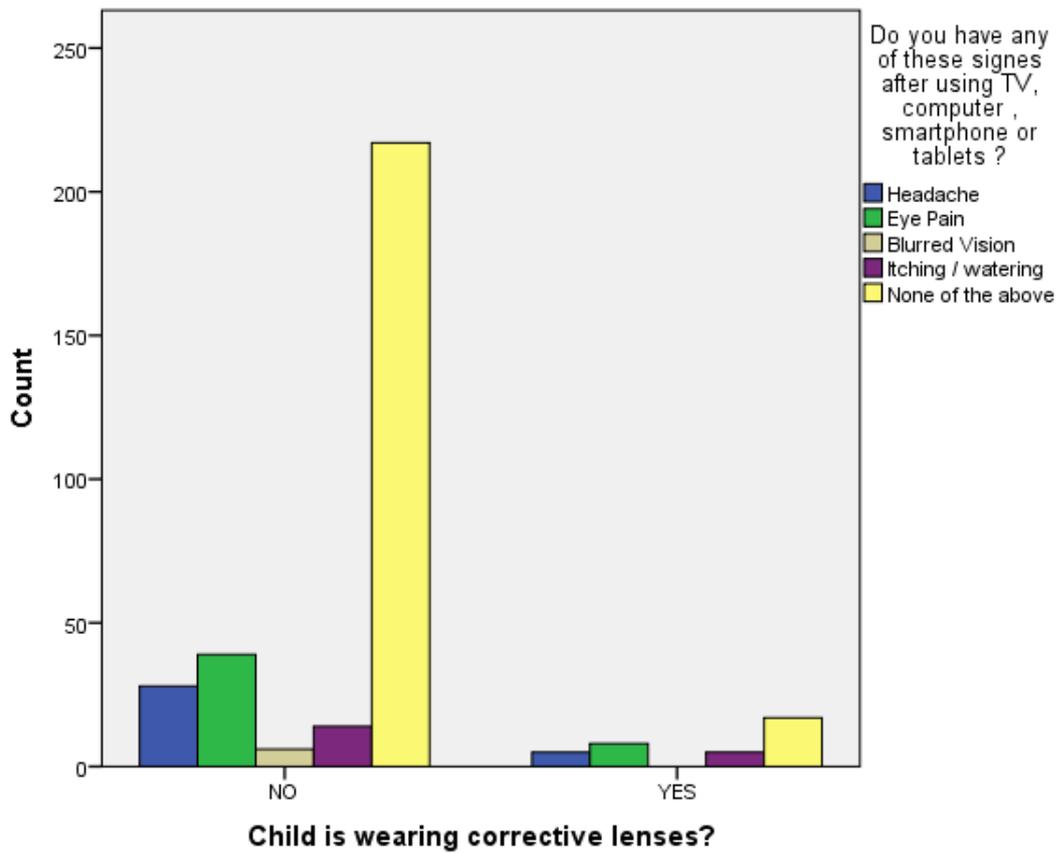
			Do you have any of these sings after using TV, computer, smartphone or tablets?					Total
			Headache	Eye Pain	Blurred Vision	Itching / watering	None of the above	
Child is wearing corrective lenses?	NO	Count	28	39	6	14	217	304
		% within Child is wearing corrective lenses?	9.2%	12.8%	2.0%	4.6%	71.4%	100.0%
	YES	Count	5	8	0	5	17	35
		% within Child is wearing corrective lenses?	14.3%	22.9%	0.0%	14.3%	48.6%	100.0%
Total	Count	33	47	6	19	234	339	
	% within Child is wearing corrective lenses?	9.7%	13.9%	1.8%	5.6%	69.0%	100.0%	

Chi-Square Tests

	Value	df	Asymptotic Significance (2-sided)
Pearson Chi-Square	11.412 ^a	4	0.022
Likelihood Ratio	10.458	4	0.033
Linear-by-Linear Association	4.631	1	0.031
N of Valid Cases	339		

a. 14 cells (40.0%) have expected count less than 5. The minimum expected count is .62

Bar Chart



X. Relation Between Digital Signs And Screen Time:

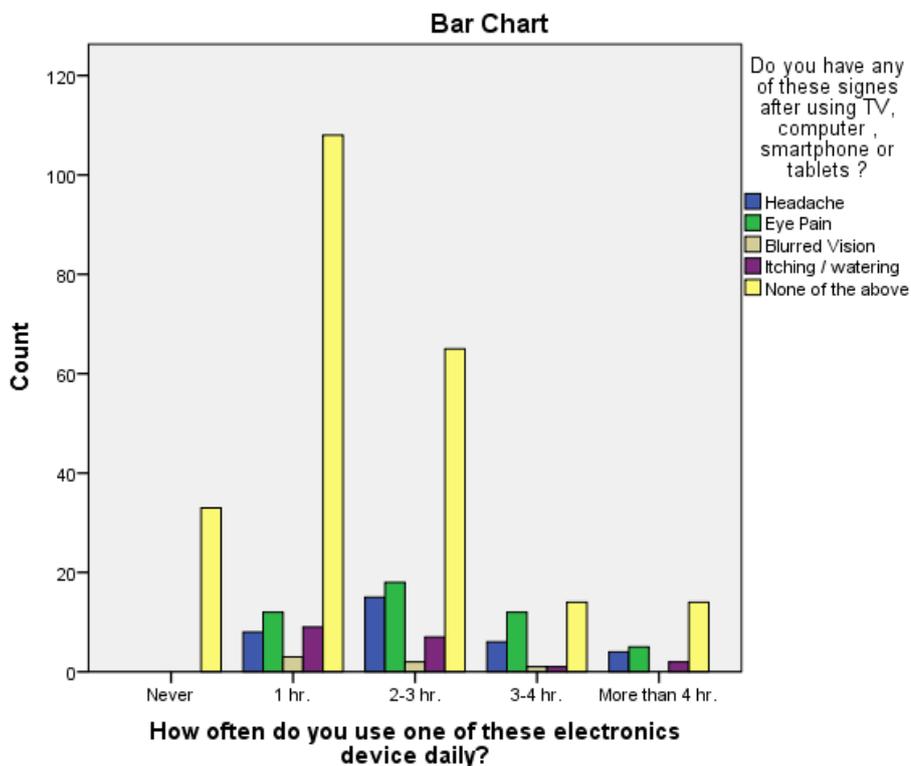
Crosstab

		Do you have any of these signs after using TV, computer, smartphone or tablets?					Total	
		Headache	Eye Pain	Blurred Vision	Itching / watering	None of the above		
How often do you use one of these electronics device daily?	Never	Count	0	0	0	0	33	33
		% within How often do you use one of these electronics device daily?	0.0%	0.0%	0.0%	0.0%	100.0%	100.0%
	1 hr.	Count	8	12	3	9	108	140
		% within How often do you use one of these electronics device daily?	5.7%	8.6%	2.1%	6.4%	77.1%	100.0%
	2-3 hr.	Count	15	18	2	7	65	107
		% within How often do you use one of these electronics device daily?	14.0%	16.8%	1.9%	6.5%	60.7%	100.0%
	3-4 hr.	Count	6	12	1	1	14	34
		% within How often do you use one of these electronics device daily?	17.6%	35.3%	2.9%	2.9%	41.2%	100.0%
	More than 4 hr.	Count	4	5	0	2	14	25
		% within How often do you use one of these electronics device daily?	16.0%	20.0%	0.0%	8.0%	56.0%	100.0%
	Total	Count	33	47	6	19	234	339
		% within How often do you use one of these electronics device daily?	9.7%	13.9%	1.8%	5.6%	69.0%	100.0%

Chi-Square Tests

	Value	df	Asymptotic Significance (2-sided)
Pearson Chi-Square	46.469 ^a	16	0.000
Likelihood Ratio	53.738	16	0.000
Linear-by-Linear Association	31.250	1	0.000
N of Valid Cases	339		

a. 14 cells (56.0%) have expected count less than 5. The minimum expected count is .44.



Study for relationship between screen time by hours and digital signs, students who were on screens for one hour had headache 5.7 %, 8.6% eye pain ,2.1% blurred vision ,6.4% itchy and watery eyes ,students with two to three hours using screens 14.1% had headache ,16.8% had eye pain ,1.9% blurred vision ,6.5% itchy and watery eyes ,students with three to four hour on screen 17.6% had headache ,35.3 % had eye pain ,2.9 % had blurred vision and itchy – watery eyes ,students with more than four hours had headache 16% ,20 % eye pain ,0 % had blurred vision and 8 % had itchy and watery eyes ,percentage of signs increased by increasing screen time ,students with more than four hours had the highest percentage of itchy and watery eyes among the other screen time ,P value was 0.00 that strength the effect of electronic devise on vision.

4. ANALYSIS AND CONCLUSION

4.1. Hypothesis Testing:

Hypothesis statement:

Null hypothesis: over use of electronic device among primary school student has no effect on vision.

Alternative hypothesis: over use of electronic device among primary school student has an effect on vision and increase the prevalence of low vision.

Level of significance used is 0.05, SPSS analysis for quantitative data were used, the finding was P value for assessment for uncorrected right eye in relation to digital screening signs was 0.001, and left eye 0.021, p value for the relationship between children wearing glasses and non-wearing glasses and digital signs 0.022, p value for relationship between screen time and digital signs 0.00, all value less than 0.05, according to that null hypothesis was rejected and accept the alternative hypothesis, that over use of electronic device had an effect on vision.

4.2. Intermediate Conclusion:

From SPSS analysis, and level of, the significance the null hypothesis is rejected and alternative hypothesis is accepted, over use of electronic device affect student vision, they got

5. Conclusion and Recommendation

5.1. Summary Of Finding:

Low vision is important public health problem, this is first survey done at UAE to examine the impact of electronic vision device among school children on vision and prevalence, the prevalence in RT eye 45.4% and left eye was 47.2%, and uncorrected visual acuity 35.1 % in right eye and 36.9 in the left eye, children wearing glasses 35.1 %, its near Result in study about prevalence in Dubai 2016 were prevalence of refractive error, was 38.9% [9], its more than the study on Saudi Arabia were prevalence was 13.7% , [10] and other study in Saudi Arabia were prevalence in right eye 34.9% with and without glasses .

In this study screen time for one hour 41.3%, two –three hours 31.6%, three –four hours 10%, its same as study on Qatar where screen time for three hours and more was 46%, [13], and survey on UAE , Turkey , and Saudi Arabia about screen time its above recommended time four hours and half [26] , and other survey on Abu Dhabi screen time were 3 hours on the internet [25], and survey on Uk for children , screen time on digital device 1-2 hours and on TV 2 hours [23], other survey done by Penn and schosen and Berland screen time 3 hours and more. [24]

Survey on Hong Kong showed that 50% of students had unclear vision and eye strains [21], and study on Ajman showed that 53.3% had headache and burning sensation, and 54.8% had tired eyes due to effect of computer [12] , study on Egypt showed that uses of electronic

device had effect on vision and cause itchy eyes [15], study on impact of computer on children supported that computer had effect on vision and common signs occur which are headache and double vision [16][17], in my study students who had headache 9.7%, 13.9% had eye pain, blurred vision 1.8%, itchy and watery eyes 5.6%, in which percentage is less than the previous studies.

Study on Qatar confirm that strong relationship between internet and TV viewer and low vision, [14] in comparison to my study that support relationship between low vision and over use of electronic device

5.2. Over All Conclusion:

The study finding revealed that electronic vision device had an effect on vision, over use of electronic device lead to digital signs including eye pains 13.9%, headache 5.6%, blurred vision a, itchy and watery eyes, prevalence of low vision is high among girl students, and screen time is above the recommended time for children which was three hours and more, health education program needed to raise awareness about prevention and control measures of using electronic device as it become an integral part in our life.

5.3. Recommendation:

As use of digital device service has negative impact on students, students should minimize its use and be aware how to use. (Walsh 2012). [27]

5.3.1. Recommendation For Parents And Children

With the increasing use of and dependence upon digital devices it is important to teach children good habits to protect their eyes while they are young. Understanding the risks and dangers of prolonged screen time should be taught at an early age. Here are suggestion for safe digital device used to reduce digital eye strain and prevent the negative effects children's eyes and vision.

1. Limit Screen Time: When possible limit screen time to one or two hours a day.
2. Optimize Children's Work Station: Ensure that children are positioned properly and that lighting is appropriate so that they do not have to bend or stretch in unnatural ways to see the screen adequately. The monitor should be slightly below the child's eye line and about 18 – 28 inches away. The chair should also be adjusted so that the child's arms comfortably rest on the desk and feet touch the floor (when possible).
3. Choose to view bigger text size to reduce eye strains.
4. Follow the 20-20-20 Rule: Every 20 minutes, take 20 seconds to look at something at least 20 feet away, importance of blinking
5. Get in the Habit of Stretching: At regular intervals stretch the back, arms, shoulders and neck to relieve tension and reduce strain or soreness.
6. Consider Computer Glasses: Computer glasses are made to help the eyes focus more easily on the computer screen. If child already wears prescription eyewear, prescription computer glasses are available as well.
7. Anti-glare: Anti-glare screens or coatings on eyeglasses can reduce glare and eye strain.
8. Look for signs of eye or vision problems such as blurred vision or eye rubbing, redness or a stiff your eye doctor for an examination.
9. Encourage outdoor activity, healthy diet
10. Regular eye test for children on annual base.
11. Increase awareness of the benefit of visual aids like eye glasses.

5.3.2. Recommendation For Stallholder, And School Health

- 1-Strategies should be done on national agenda for schools, vision assessment with high quality, sustainable refraction and optical services, and follow up for positive cases, counselling clinics.
- 2-Increase health worker obligation to the importance of vision impairment, and the risk of electronics on vision for long term on individuals and community.
- 3-Awareness program for students and parents about over use of digital devices.
- 4-Policy and regulation for hazardous use of electronics especially among children
- 5-School eye program to be apart from curriculum, create supportive environment at school Student's summer camp.
- 6-future research about vision impairment, and electronics and digital devise on different school age group.

6. Lessons Learned:

Conducting this research has been fulfilling and inspiring, I had the opportunity to learn new aspects in research ,and the value of vision which is a privilege for everyone to enjoy seeing the color of life, to have insight of the invasion of electronic devise in our life ,in spite it has great benefits in learning ,enjoyment but on other hand it has the bad impact on vision and physical and mental health , and adopt methods to take care of our vision, and not to underestimate the importance of vision assessment and referral for students by health care worker on long term impact for children and community, wise use of electronic and digital devise especially for children and to be under parents, schools, policy maker control.

Art of dealing with children in collecting data, and vision assessment, which need patients 'and its enjoyable experience.

The importance of researches, in detecting health problem, also the importance of science of statistics in strategic plans and policy making, I hope the result s, conclusion and recommendation reached in this thesis will make difference in the future of school heath strategy toward eye care for students ,and use electronics in wise way to get benefit and reduce risk .

7. Ethical Consideration:

Ethical considerations focus on using safeguards to protect the participants' rights by ensuring their confidentiality and preventing them from any expected discrimination (Bloomberg & Volpe, 2008).

There are a number of ethical obligations that researchers need to meet in all research involving humans and animals. In human research, these issues pertain to:

1. Obtaining informed consent from participants;
2. Protection from physical and psychological harm.
3. The protection of participants' identities.
4. The confidentiality and anonymity of participants' contributions (Orb, Eisenhauer & Wynaden, 2001).

Considering these issues, approval for this research project to be conducted was gained from ministry of health as they are accountable for health services in governmental schools, (The research participants gave their informed consent to participate in the survey and vision

assessment, also parents give their consent to their children participation through the distribution and return of the participants' signed consent forms. Through the. Before conducting any interview or observation in this study, a clear explanation of the research purpose, benefits, and methods was given to each participant in simple language

Participation in this research was completely voluntary. Respecting children right in making decision to participate, avoid making pressure on student during assessment, the confidentiality of participants' data, a numbering system was implemented to refer to each participant. Additionally, a thesis. 'Treating participants with dignity.

Finally, to ensure the security of the data collected, observations were stored as hard copy, and soft copy.

Appendixes

EYE TEST FORM

School Name: _____

Test Date: / /

SECTION A: Demographic Data for Student.

Student Name: _____

Grade: Class:

Age : Sex:

SECTION B: Vision Assessment.

B1. Child is wearing corrective lenses? 0-1

NO; Go to B3 YES

B2. Visual Acuity with corrective lenses:

	VA
RE	/
LE	/

B3. Uncorrected Visual Acuity (UCVA):

	UCVA
RE	/
LE	/

Visual Acuity cannot be determined (reason):

SECTION C: Student Survey.

I understand the purpose of this study and I agree to participate in this survey.

Yes

No

C1. Are you using TV, computer, smartphone or tablets?

Always Usually Some time Rarely Never

C2. Do you have any of these signs after using TV, computer, smartphone or tablets?

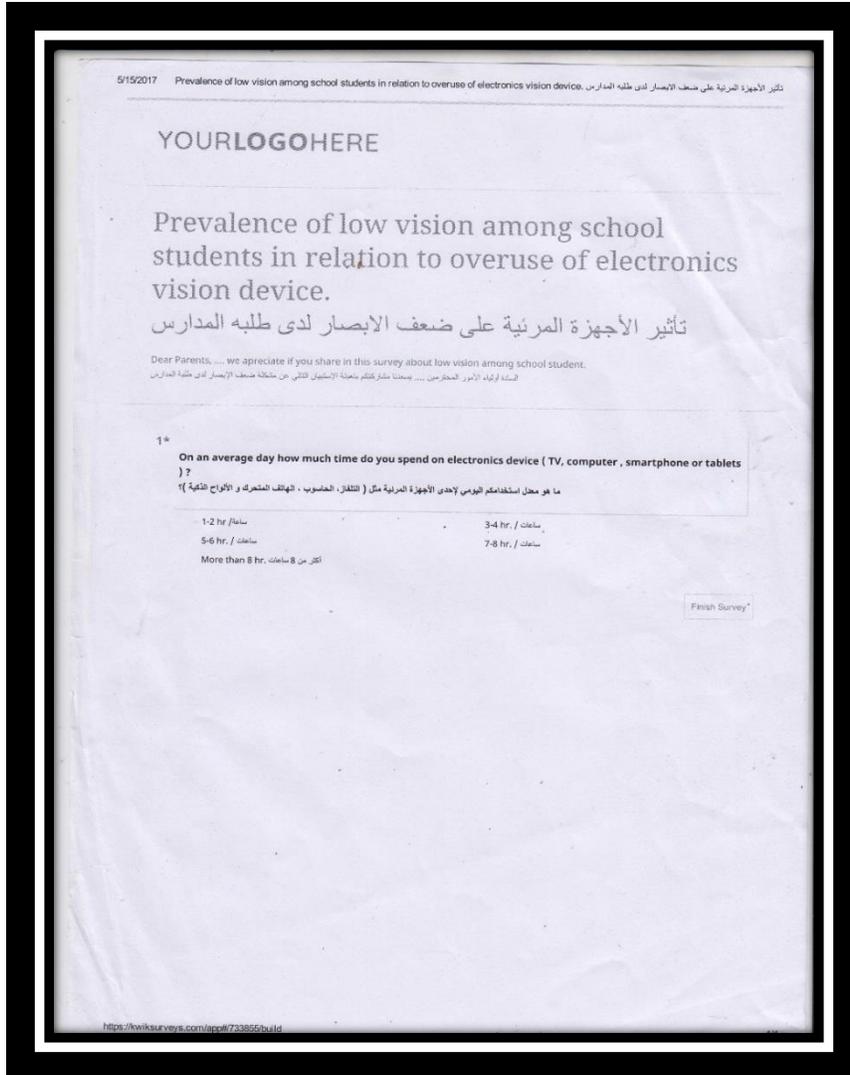
Headache Eye Pain Blurred Vision Itching / watering None of the above

C3. How often do you use one of these electronics device daily?

Never 1 hr. 2-3 hr. 3-4 hr. More than 4 hr.

C4. How often in average are you using one of these electronics device on the weekend?

Never 1 hr. 2-3 hr. 3-4 hr. More than 4 hr.



Glossary

- ucva: uncorrected visual acuity
- cva: corrected visual acuity (students wearing glasses)
- digital eye strain :group of symptoms associated with over use of digital devise ,including eye strain ,headache , blurred vision ,itchy eyes
- Computer vision syndrome; its group of eye and vision problem related to over use of computer and other digital and electronic devise.
- vision impairment: irreversible loss of vision, in which visual aid is used for carrying daily tasks
- prevalence : its measurement of all individuals affected by particular disease at same period of time
- Electronic vision devise; including tablet, smart phone, computers and TV.

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