

Original Article

Association of Asthenopia, Pre-presbyopia and Refractive Errors in Workers Involved in Handcrafting.

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Purpose: To determine the impact of handcrafting on different types of refractive errors and to check is there any relationship of asthenopia and pre-presbyopia with this such work.

Materials and Methods: One hundred individuals were selected for this study between 16 and 35 years of age. Data were collected by stratified sampling technique. The study was completed in two areas namely Hussain Agahi Bazaar, Multan and a village named Kot Qaisrani,, Tehsil Taunsa, District Dera Ghazi Khan. Visual acuity,, Retinoscopy, Torch light examination, Ophthalmoscopy and Pencil push-up test were done for every person. A questionnaire was also filled with the information given by the person after an informed consent.

Results: Total 100 patients, 50 male and 50 female were selected in this study aging 16-35 years to check for any eye strain, headache, decrease in near vision before 35-40 years and presence of any other refractive error. 70% had near visual acuity of N6, 17% had N8 and 13% were between N10-N12. They had a mean of 0.433, with an SD=0.71428 and variance = 0.51. 74% participants in this study were emmetropes, 17% myopes and 9% hyperopes. Out of 70 which were N6, 40(57.1%) presented with eye strain and 44(62.8%) with headache. Out of 17 people reading upto N8, 15(88.2%) had eye strain and 16(94.1%) had headache and 13 people were N10-12, 9(69.2%) with eye strain and 12(92.3%) with headache.

Conclusions: There is a weak relationship of refractive errors and pre-presbyopia but strong association of asthenopia in workers of handcrafting.

Keywords: Asthenopia,, pre presbyopia, refractive errors.



Introduction

Accommodation is a naturally occurring phenomenon in the human eye defined as an increase in the dioptric power of the crystalline lens when we see from distance to some near object. This increase in power occurs because lens becomes more curved during accommodation as a result of contraction of ciliary muscles. This releases the tension on the zonular fibers of the crystalline lens and shape of the lens becomes more curved. This accommodative ability of the eye decreases with age and is called presbyopia.¹ (Glasser and Kaufman, 2013 When a person is young the lens of his eye is more elastic. With increasing age lens progressively loses its ability to accommodate. With increasing age blurring of vision at near or presbyopia is prevalent worldwide.^{Patel and West, 2007})² Asthenopia constitutes a combination of symptoms-headache, eye strain and sometimes nausea, commonly associated with near work. A person who does excessive near work will face asthenopia. It is also defined as stress on the eyes associated with headache due to extra use of eyes.^(Wajuhian, 2015)

Convergence Insufficiency is main cause of visual fatigue, eye strain and headache in which our eye converges less than it is required to see a near object as a result after sometime of near work the person feels strain on the eyes, or visual fatigue (Khurana, 2008).⁴

According to a study which was done by Amitabha and his group on jewelry workers who do near work, comparing them to VDT operators and graduate students, it was stated that excessive near work and extra usage of convergence can result in different type of visual disturbances which cause stress on the eyes. This study was done on 215 young males. The results showed that jewelry workers had more problems because they used their vision more than participants from the other two departments.⁵ (Amitabha, 2007).

Rafael did his research on 87 people/individuals aged 18 to 31 years. He performed his research both on students and office workers. The purpose of this study was to check the relationship between asthenopia and accommodation due to near work. Visual status of the sample was 6/9-6/6. Results of this study suggested that near work time had negative relation with accommodative facility but had positive relation with asthenopic symptoms and that most people/individuals suffered with condition of blurred vision and double vision due to near work with a reduction in

accommodative capacity. Rafael, 2001).⁶

Materials and Methods

Study subjects included males and females who were involved in handcrafting. We wanted to study the association of asthenopia, refractive errors, convergence insufficiency and pre-presbyopia with near work. People/Individuals involved in handcrafting do more near work and are therefore expected to develop such problems.

This was Cross sectional study and subjects were recruited from a village named Kot Qaisrani, tTehsil Taunsa, dDistrict Dera Ghazi Khan and a local bazar in Multan named HussainaGahiHussain Agahi Bazaar. Sample Size was 100. Fifty of them were males and fifty were females. Inclusion Criteria were age 16-35 years, patients with asthenopic symptoms, refractive errors, pre-presbyopia patients, spasm of accommodation, and either gender. People with amblyopia, cataract, low vision, nervous disorder, glaucoma, allergies and infections, or any disease which causes hazy media, were excluded.

First, informed consent from the participants was taken. Examination was started by taking personal history of patients in which they were asked about diabetes, hypertension, smoking or any other disease which may be affecting vision. After that drug history was taken, History of trauma, past medical surgeries was also taken and then there Visual acuity was measured with the help of LogMAR Chart at distance and near respectively at 4m and 25cm to check if the patients had any refractive error or they had developed pre presbyopia after doing near work. After that torch light examination was done to see the anterior segment of eye. Retinoscopy was performed to screen out the type of refractive error. Ophthalmoscopy was done to see the Bruckner's reflex. Patients were screened out digitally for glaucoma to exclude them from our study. A proforma was filled with the information given by patient. A questionnaire was filled at the end to see if the patients had any headache, eye strain or nausea. Patients with pre-presbyopia were prescribed glasses. Patients with asthenopia were asked to take short breaks during their work, convergence insufficiency was dealt with pencil push up exercises.

Results

Total 100 patients were included in this study aged 16-35 years. Out of 100 people individuals, 70% had near visual acuity of N6. 17% had N8 and 13% were lying in the range of N10-N12. Statistical studies 100 The people individuals who were selected in this study were mostly emmetropes (74%), 17% were myopic and 9% were hyperopic. Eye strain was main positive finding of this study; from 100 people individuals the percentage of people individuals having eye strain was 64%. 40% with visual acuity N6, 15% with acuity N8 and 9% having visual acuity 9% had eye strain whereas. 34% didn't have any eye strain. The percentage was 30%, 2% and 4% respectively with visual acuity N6, N8 and N10-12. So eye strain is not significantly associated with near work. Pearson Chi-Square Fisher's exact test showed ($p=0.052$). Headache was also associated with asthenopia. 44% had experienced headache during near work having visual acuity N6 and 26% didn't have any complain of headache. 16% people individuals were having visual acuity of N8 suffered from headache and only 12% were having range from N10-N12 suffering from headache. Pearson Chi-Square showed significant results ($p=0.008$).

Table 1: Refractive Status

	Frequency	Percent
Emmetropia	74	74.0
Myopia	17	17.0
Hyperopia	9	9.0
Total	100	100.0

Table 2: Eye strain during work

Eye strain during your work Near VA	Total	
	Yes	No
N6	40	30
N8	15	2
N10-N12	9	4
Total	64	36

Table 3: Headache associated with near work.

Eye strain during your work Near VA	Total	
	Yes	No
N6	40	30
N8	15	2
N10-N12	9	4
Total	64	36

Discussion

Excessive near work leads to some problems in our eyes for example refractive errors, pre-presbyopia, asthenopia, and convergence insufficiency. Purpose of our study was to evaluate the association of near work with these problems. According to this study near work has a strong association with asthenopia which includes eye strain, headache etc. More than 60% patients had eye strain due to near work and almost 70% people individuals were having headache problem due to near work. Refractive status was different. 20% people individuals were myopic and 10% people individuals were hyperopic. We considered the patients pre-presbyopic who were above the age of 30 years. Almost 26 people individuals were above 30 and 13 of them were pre-presbyopic which means that 50% of the people individuals were pre-presbyopic who were involved in near work. More than 48% people individuals were having convergence insufficiency. Above 45% people individuals were working in improper light illumination. Amitabha, studied asthenopia due to near work in jewelry workers. He described that the workers were working for long hours and they had low light illumination. Subjects of our study were people individuals who were involved in hand crafting and were doing near work for 12-14 hours consecutively. We also checked the environment in which they were working and almost 45% were working in low illumination. Amitabha studied the subjects on a follow-up. He earlier recommended them to increase the light illumination in which they were working. On follow-up they had improved asthenopic symptoms when increased. We recommended them to work in increased illumination.⁵(Amitabha, 2007).

Study by Unimanon describes that illumination, distance at which the worker is working and continuous near work causes eye strain. Our results are also similar regarding the effects of near work. We also



recommended the patients to keep a working distance of 25cm to 40cm, illuminate the work environment more and we asked them to not work continuously for 12-14 hours. We also prescribed them the 20-20 exercise (after every 20 minutes of near work look away for 20 seconds to relieve the eye strain). Unimanon in his study suggested a break for 10 minutes after every two hours of near work. His research had positive outcomes on follow-up. Improving the work environment illumination, decreasing the working time and taking short breaks improved the situation (Unimanon and et al, 2006).⁶

Wholffsohn in his study discussed that eyes which work more are more prone to develop eye strain and visual problems. Main purpose of our study was to address the problems that developed due to excessive near work. The participants of our study were working for 12-14 hours and had greater chances of developing eye problems due to near work and were positive for asthenopia, refractive errors, pre-presbyopia and convergence insufficiency (Wholffsohn, 2011).⁷

It was stated by Shrewin that near work increases the chances to develop immature presbyopia and people individuals in developing countries like Pakistan face cost issues. In our study we also inspected this aspect but people individuals who were doing near work of hand crafting were earning and hence not facing cost issues. Almost all of them could afford glasses. If someone cannot afford glasses it increases the risk to develop more eye problems.⁸ (Shrewin, J.C., et.al 2008).

Lee did his study on the effect of near work on the progression or development of myopia. He took some risk factors in general for example age, near work, work status and educational activities. He stated that people individuals spending more time on near work were having more myopic shifts or myopia and in our study 20% people individuals had developed myopia which means that there is a correlation between myopia and near work.⁹ (Lee, 2013).

In Karachi, Uzma studied 246 patients in the OPD to evaluate which factors are involved in the development of myopia. She studied patients below the age of 40 and we took the patients of 30-35 years for the criteria of pre-presbyopia. She concluded that risk factors for pre-presbyopia were financial crisis, social stress and sometimes profession. In our study we explain the near work as risk factor to develop pre-presbyopia.¹⁰ (Fasih, 2014).

Jeffery Cooper¹¹ studied convergence insufficiency due to excessive near work. In convergence insufficiency one cannot converge his/her eyes properly leading to visual discomfort. He said that convergence insufficiency can be related to accommodation. In our study 54% people individuals were having convergence insufficiency. In his study 72% people individuals were having asthenopia and convergence insufficiency. Our results were also positive but the percentage is less than his results because the working hours of some of our study groups were less and people individuals who were working less had less problems.

Overall outcome of our study was positive. We recommended the patients treatment for their problems for example refractive errors with prescribing glasses, pre-presbyopia with prescribing near add, we also asked them to improve the illumination. We dealt convergence insufficiency with Pencil push-up exercises. Some of the people individuals were using prednisolone because they had a concept that it cleanses the eye. We asked them to avoid using self-medication. They were not visiting any eye doctor. We recommended them to have regular check-ups.

Conclusion

Purpose of this study was to evaluate the association of near work with certain eye problems. This study concluded that near work has a strong association with asthenopia. Refractive errors were also present in those patients but to a limited extent. Patients above the age of 30 were considered pre-presbyopic. Almost 26 people individuals were above 30 and half of them were pre-presbyopic. People individuals were also having Convergence insufficiency.



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