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Efficacy of Optical Correction on the Job Performance of a worker at his work place in Pune District

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Abstract

Background: Vision is a great sensory gift of God which if gets enhanced due to a pair of spectacles, can improve our interaction with the family, workplace, surroundings and the society as a whole. In this study, we are trying to assess the effect of spectacle correction on the job performance of a worker. The purpose is to try and obtain an evident relation which can easily motivate working population to improve the spectacle acceptability and to decrease the social stigma of not wearing a spectacle in their workplace and in society.

Methods: This questionnaire based, multi-centered, interventional clinical study screened 341 workers out of which 244 are from a factory and 97 from a construction company who were not using any glasses were selected and dispensed with suitable spectacles for required refractive error and presbyopia correction. Their Base line performance was noted and adaptation time of two weeks was given to them. The same questionnaire was again administered and the change in the performance was noted by their supervisor without their notice. The performance data report was entered into Microsoft excels and analyzed by statistical package for social science software of 20 versions by using Wilcoxon sign rank test.

Results: In this study, 95 workers (56+39) 27.8% of them have a refractive error and we have identified 24 male workers who are not using glasses before. The age of included workers were ranging from 22 to 55 years with a median of 39.5 years. There was a statistically significant improvement noted in their performance after spectacle administration in their supervisor rankings in quality of production, motivation to attend the work place and confidence level of the worker with p value of 0.014, 0.025 and 0.034 respectively. The effect of spectacle correction was not found to be statistically significant for the parameters like willingness to use personal protective equipment, ability to achieve target and quantity of products made.

Keywords: Refractive error; Presbyopia; Performance; Safety; Productivity; Factory worker; Construction site

Introduction

The sense of vision is the most important in human beings who help in performing various activities like daily tasks, job and recreational activities. Eighty percent of the sensory information provided to the brain is through the sense of vision. Our eyes interact with the surrounding environment in more than a million ways each second establishing a strong association between brain and the surrounding environment [1]. If vision gets impaired due to uncorrected refractive error which can result in potentially deliberating and can affect the individuals' opportunities in education and employment which can be easily corrected by a pair of spectacles [2]? Recent studies indicate that only 20% of the developing country population has access to spectacles [3-5]. An estimate reveals that globally 153 million people are blind or visually impaired due to uncorrected distance refractive error [6]. Indian study conducted in Meerut shows that 45.8% of morbidity is due to uncorrected refractive error out of which 66.7%, 59.8% and 61.3% morbidity was found in non-skilled, semi-skilled and skilled workers respectively [7].

After refractive error, World Health Organization recognized that presbyopia had a negative consequence on productivity and quality of life of affected individuals with an estimate of 1.04 billion people worldwide who needs correction and 49% of them have either no or inadequate correction due to which 410 million of them are prevented from performing near tasks

[8-10]. The quality of life of a presbyopic patient improves with reading glasses in daily activities like reading, writing, counting money, threading needles, embroidery, cooking in a significant way which could increase in working hours and hence income of the workers with greater ease of performing and procuring higher return from economic activities [11]. So, there is a need of active involvement of optometrists in the field of occupational optometry focusing to improve the visual and job performance of an average worker in the developing countries like India where the high incidence of eye injuries and prevalent vision problems in adults are observed out of which most of them are unaccounted or not reported. Optometrist working in this field can help improve the performance, remove workplace hazards or recommend a suitable protection and can train the workers [12-15]. The efficient an employee see, is directly related to how efficient or productive and safe they perform the job. The success of the individuals in the workplace ultimately translates to the success of the society we live in [16-17].

Materials and Methods

This questionnaire based multi centered interventional study aims at finding out the efficacy of optical correction on the job performance of a worker which was assessed with the help of their supervisor, quality control personal and human resource executive for a duration of seven months. The study was conducted in a factory and in a construction site which located in the same district of Central India. The workers were assessed by their supervisors' feedback given on a scale of 0 to 4 on diverse parameters like quantity, quality, time taken, ability to do a task, motivation to attend the work, level of confidence a worker works with, ability to achieve target.

The study conducted by Raw et al. [18] shows a number of symptoms like dry eyes, itchy eyes, headache which can affect their job performance [18]. Hence, demographic data, a detailed ocular and systemic history was collected along with distance and near visual acuity, slit lamp examination and near point of convergence using a millimeter ruler were measured. Patient who found to have distance visual acuity of less than 20/25 or 6/9 and/or a near vision of less than N8 at their usual working distance were performed objective and subjective refraction to improve their corrected visual acuity.

In our study, we have screened 341 workers out of which 244 are from a factory and 97 from a construction company. As per our inclusion criteria, 17 Factory and 8 construction workers were included in the study. One of the construction workers was excluded from the study as he migrated from the work place before performance questionnaire was administered.

Consent was taken from all the patients who were improving their visual acuity and who were not using any vision correction since last two years were included in the study. Subjects who found to have any systemic illness, amblyopic after corrected visual acuity, anisometropia were excluded from participating in the study. Workers who were using any type of personal protective equipment were identified and various ways of incorporating the optical correction in to their protective devices were explored.

The consent given workers' regular performance of six consecutive days was observed without giving the refractive correction was noted on a productivity assessment report which could help us to estimate their baseline performance. Glasses of single vision for distance or near, bifocal spectacles were made according to their working distance requirement (distance or intermediate or near) and an adaptation of two weeks was given to all the workers before estimating the productivity assessment report again by their supervisor for a duration of 6 consecutive days. During the adaptation period, two visits were made to facilitate the workers to use new glasses and to troubleshoot their personal protection equipment incorporation with the required spectacle correction.

Results

A total of 341 workers were screened and 46% of them have some ocular complaints. Out of these complaints, 28% were about distance or near vision problem for which they didn't seek any eye care services which clearly indicates their attitude towards eyes and vision. 15% of them were found not wearing any mode of glasses till now. There are 157 workers who were having some ocular complains which were depicted in the below pie chart. A total of 25 male workers were included in the performance assessment part of the study with age ranging from 22 years to 55 years with a median age of 39.5 years Figures 1- 4, Table 1- 3.

Table 1: Quality of production.

Rank	Number of patients	p-value
Negative rank	0	0.014
Positive rank	6	
Ties	18	

Table 2: Motivation to do work.

Rank	Number of patients	p-value
Negative rank	2	0.025
Positive rank	7	
Ties	15	

Table 3: Level of confidence.

Rank	Number of patients	p-value
Negative rank	1	0.034
Positive rank	7	
Ties	16	

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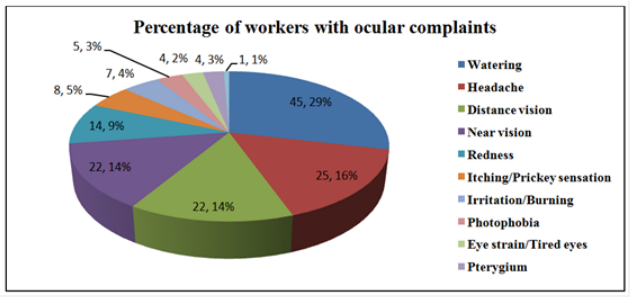

Figure 1: Percentage of workers with ocular complaints.

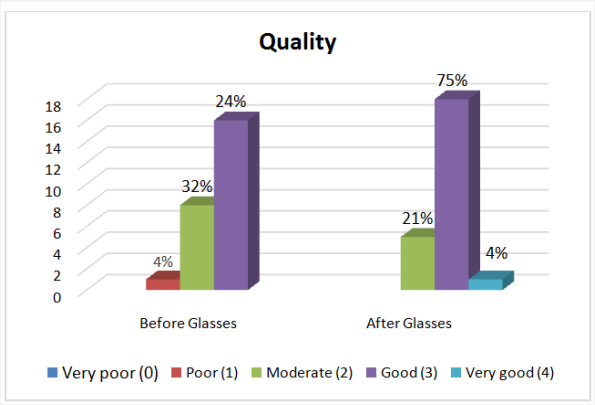

Figure 2: Quality of production.

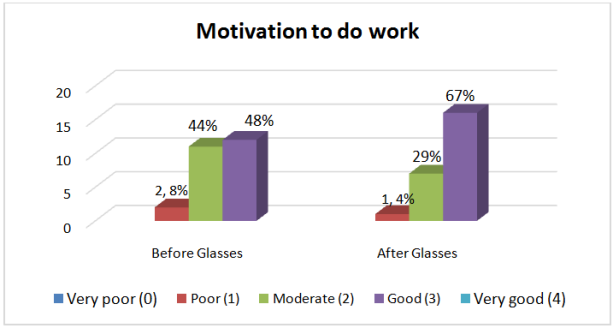

Figure 3: Motivation to do work.

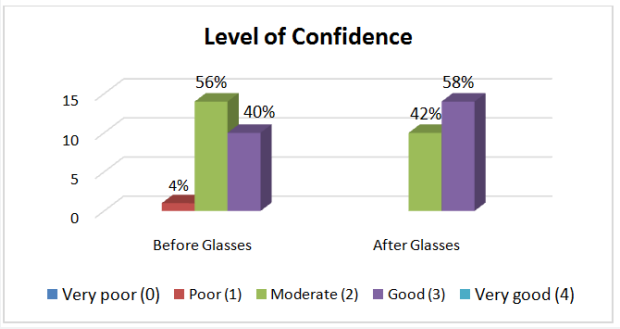

Figure 4: Level of confidence.

By using wilcoxon sign rank test we found quality of production, motivation to attend the work place and confidence level of the worker has improved significantly with p value of 0.014, 0.025 and 0.034 respectively. The details of the results were tabulated below. The effect of spectacle correction was not found to be statistically significant for the parameters like willingness to use personal protective equipment, ability to achieve target and quantity of products made.

Discussion

In our study, the prevalence of refractive error in factory is found to be 11.88% and presbyopia is of 10.24% which is in agreement with 9.4% and 9.7% of the study conducted by Omoti et al. [19] from delta state, Nigeria [19]. In our study, with optical correction we also found a positive shift in the motivation to attend the work which is in agreement to the recent study done in Singapore which concluded that correcting myopia leads to improved participation in visual functioning and daily living of an individual [20]. After statistical analysis we could not found any change in the performance parameters if hyperopia is corrected which is again in agreement with Ecosse et al study.

Raw et al. [18] study shows that Symptoms like watery, itchy eyes and headache are common in factory environments which are found to be prevalent at the rates of 18.4%, 3.3% and 10.2% respectively in our study [18]. There is a positive correlation to the near correction and time taken which is in agreement to the results of Syed et al. [11] study done in Bangladesh and to the study done by Patel et al. [21] in India. Level of confidence of the workers in work increased after presbyopia correction which is completely in agreement with a study conducted by Laviers et al. [22] where they found a significant improvement in quality of life scores for "level of confidence" improved statistically significant from before correction with a p value of 0.001.

Conclusion

There is a lack of awareness about the eye care services in India especially in industrial, construction and other unorganized sectors. By making the worker aware of, the importance of frequently consulting an eye care professional ensures he has an optimum vision at all the times which can help improvement of the outcome of the individual thus, the factory as a whole. Our study also revealed that there is a need for an optometrist to do visual task analysis and suggesting the workers to use appropriate spectacle prescription along with personal protective equipment which can enhance the confidence of the worker to do a task and can support him to achieve Excellency in his work by improving and increasing the quality of the work a worker can do. This in turn can enhance the gross domestic product of a country and can help the developing counties like India to further step ahead.

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Further recommendation to the employers is that to organize a yearly eye screening camp to ensure vision is up to the mark for the task the worker is given to. This also gives all the workers an equal opportunity to see well so that they can perform better.

Limitations

Low magnitude of refractive error for distance and near, intermittent non-compliance in usage of spectacle correction are a few limitations we can note. As per the environmental and occupational optometry, there are several other parameters like temperature, humidity, ambient room illumination, task distance and other psychological factors which can influence the workers' performance which are considered stable and normal in our study as it is out of our control to regulate the required conditions. As the questionnaires are given to the respective supervisors who have some formal education, there is a chance of imparting the personal impression of the supervisor on the performance assessment report of each worker. As the sample size is relatively small, it may not be sufficient to generalize the results to general population and the entire participants were male.

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