ORIGINAL ARTICLE

Low vision rehabilitation and ocular problems among industrial workers in a developing country

Omar R, Knight VF, Aziz Mohammed MA

Omar R, Knight VF, Aziz Mohammed MA. Low vision rehabilitation and ocular problems among industrial workers in developing country. *Malays Fam Physician.* 2014;9(3):27-33.

Keywords:
Ocular injury, ocular illness, visual impairment, low vision rehabilitation, industrial workers

Authors:

Rokiah Omar
(Corresponding author)
BOptom, PhD
Optometry & Vision Sciences Programme, Schol of Healthcare Sciences, Faculty of Health Sciences, Universiti Kebangsaan Malaysia, Jalan Raja Muda Abdul Aziz, 50300 Kuala Lumpur Malaysia
Email: r_omar@ukm.edu.my

Victor Feizal Knight
MBBS, MHP
Faculty of Medicine and Health Defence, National Defence University, Kem Sg Besi, Kuala Lumpur, Malaysia

Mohammed Azman Aziz Mohammed
MBBS (UM), LFOM (Ireland), C.I.M.W (ABIME USA), FFOM (Ireland), MBA (OXEL)
Social Security Organisations (SOCSO), Menara PERKESO, Jalan Ampang, Kuala Lumpur, Malaysia

Abstract

Aim: Work-related ocular injuries and illnesses were among the major causes of job absenteeism. This study was conducted to determine if low vision rehabilitation was provided following work-related ocular problems among industrial workers in a developing country. This was a retrospective analysis of case records.

Method: Randomly selected records of all employees from the Social Security Organization (SOCSO) Medical Board for 2004 who suffered from ocular injuries and illnesses were selected. Rates of ocular injuries and illnesses according to age, gender, races, types of injuries, types of industries, visual rehabilitation and types of medical interventions were tabulated and analysed.

Results: A total of 26 cases of ocular injuries and illnesses were identified where 46.2% suffered from ocular injuries. The remaining 53.8% had ocular and/or systemic diseases. The 40–49-year-old age group suffered the greatest number of injuries (26.92%). Ocular perforating injuries (66.67%) and ocular contusions (33.33%) were the most common types of ocular injury among industrial workers in Kuala Lumpur. Most injuries occurred among workers in the service industry (50%). Almost 60% of these injured workers did not receive any low vision rehabilitation after medical intervention while 25% were given contact lenses or spectacles as rehabilitation and remaining had surgery.

Conclusion: The low vision rehabilitation is still unexplored in the management of ocular injuries and illnesses among industrial workers. Introducing low vision rehabilitation can benefit both workers and employers as it provides care beyond spectacles or contact lens prescriptions.

Introduction

Work-related ocular injuries and illnesses can cause job absenteeism.[1,2] These ocular problems can be avoided with proper management and suitable preventive measures.[3–6] However, when ocular problems happen, the individual may suffer from permanent visual impairment or even blindness.[7] As a result of these ocular problems, the workers will be absent from work and have an impact not only on the individual but also on the industry, healthcare system and community as a whole.[6,8] The individual will be affected in terms of being not able to perform effectively because of the ocular injury. For the industry, the productivity of the industry can be affected while for the healthcare system more resources have to be allocated such as rehabilitation to injured worker. Large amounts of money have been allocated to provide compensation to the injured worker.[4] Previous studies have shown that medical, functional and socio-economic aspects of eye injuries pose a large burden on the patient and the country.[4,9–11] There are many ways to describe the severity of a worker's vision impairment. In Malaysia, we follow the World Health Organization: International Statistical Classification of Diseases and Related Health Problems—ICD-10 where "Low vision" is defined as visual acuity worse than 6/18 but equal to or better than 3/60, with the best possible correction being used or a visual field of 20° or less. While "Blindness" is defined as a visual acuity that is worse than 3/60, with the best possible correction being used, or a visual field of 10° or less.[12]

Malaysia, as a developing country, relies on industries for its economic growth. Hence, getting the injured workers return to work as early as possible is very important. Studies had shown that the length of stay, type of injury, level of education and intensive care unit admission are predictors of absence duration and return to work.[13] A comprehensive multidisciplinary approach of rehabilitation had been shown to be effective in getting the worker back on his feet. However, most of these studies looked into non-visual rehabilitation. Low vision is a collective term for vision loss that cannot be reversed by spectacles, medication or surgery. Through

a low vision rehabilitation plan, the patients learn to build compensatory visual skills, develop new ways to perform daily living activities, use low vision aids and adjust psychologically to their new circumstances. As such, low vision rehabilitation should be offered to the workers after suffering ocular injuries or illnesses. Low vision rehabilitation was able to improve the quality of life by improving the ability of the workers to see and do work by using optical and non-optical devices. The objective of this study was to determine if low vision rehabilitation was provided following work-related ocular problems among industrial workers in a developing country.

Methods

This was a retrospective analysis of case records of ocular injuries and illnesses among the industrial workers. Permission to conduct this research was granted by the Medical Division of SOCSO headquarters. A total of 265 cases of ocular injuries, illnesses and systemic diseases related to ocular disease records were obtained from the SOCSO records department, which were referred to SOCSO board for permanent disability assessment between January and December 2004. Out of these records, only 26 cases that had completed their medical board review for permanent disability assessment were randomly selected. All personal identification details of each worker record selected for this study was kept confidential and anonymous. The information extracted was demographic data such as date of first consultation, age and gender, cause of the ocular problem, location of the ocular injury, level of vision and low vision rehabilitation prescribed. The data were analysed using SPSS version 19. This research project was approved by the Universiti Kebangsaan Malaysia (UKM) Human Subject Ethics Committee and followed the tenets of the Declaration of Helsinki.

Results

Twenty-six cases of industrial workers had ocular injuries or illnesses. The mean age of the industrial workers was 44.8±10.3 years (ranging from 20 to 59 years). The work-related ocular problems were classified as ocular injuries, ocular diseases or systemic diseases (related to ocular diseases) and were 46.2%, 34.6% and 19.2%, respectively (Table 1). Most of the workers did not report wearing any protective devices at the time of injury. The highest percentage (26.9%) of ocular injuries was found in the 40–49-year-old age group, followed by the 20–29-year-old age group (15.4%) and no injuries were found in the 50–59-year-old age group. However, 50–59-year-old age group had the highest percentage of ocular diseases (26.9%) and 40–49-year-old age group had the highest percentage of systemic diseases (11.5%).

Table 1. Classification of ocular injuries, ocular illnesses and systemic diseases among industrial workers according to age

Category	Age (years)	No.	Percentage (%)
Ocular injuries (*n* = 12, 46.2%)	20–29	4	15.4
	30–39	1	3.9
	40–49	7	26.9
	50–59	–	–
Ocular diseases (*n* = 9, 34.6%)	20–29	–	–
	30–39	–	–
	40–49	2	7.7
	50–59	7	26.9
Systemic diseases (related to ocular diseases) (*n* = 5, 19.2%)	20–29	–	–
	30–39	2	7.7
	40–49	3	11.5
	50–59	–	–

The analysis also showed that the majority of work-related ocular injuries or ocular illnesses was found in male workers [23 cases (88.5%)] compared to female workers [3 cases (11.5%)]. Indians (23%) were noted to have the lowest percentage of ocular injuries compared to Malays (38.5%) and Chinese (38.5%) workers (Figure 1).

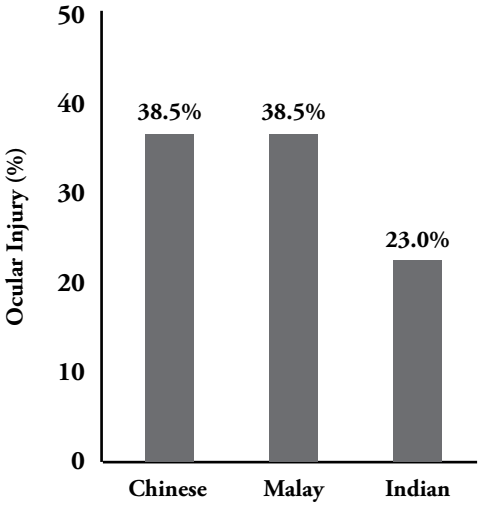

Figure 1. Ocular injuries among industrial workers according to ethnicity

The ocular injuries can be divided either into contusion or perforating injuries. From the analysis, it was found that all the ocular injuries (*n* =12) occurred among male workers. A total of 66.7% of the ocular injuries involved perforating injuries while 33.3% involved contusion injuries. When the work-related ocular injury or accident happened on the eye, it can involve either a single anatomical site/structure or multiple anatomical sites/structures. In this study, it was found that 50% of the workers had multiple anatomical site/structure injuries. Other single anatomical site/structure injuries involved the orbit, choroids and eyelids (Table 2).

Table 2. Anatomical sites involved in the ocular injuries among industrial workers

Anatomical sites involved in ocular injuries	No. (*n* = 12)	Percentage (%)
Orbit	1	8.3
Choroids	1	8.3
Eye lids	2	16.8
Cornea	2	16.8
Multiple injuries	6	50.0

All the workers were recorded having received medical and surgical treatment as reported by the treating physician after the work-related ocular injuries or accidents. However, almost 40% of the workers were not provided any form of low vision rehabilitation. Table 3 describes the treatment and rehabilitation provided to the workers according to the type of ocular injuries and disorders sustained at work.

Table 3. Medical treatment and vision rehabilitation received by the industrial workers according to the type of ocular injures and disorders sustained at work

	Contusion injury	(%)	Perforating injury	(%)	Ocular illness	(%)	Total	(%)
Medical treatment								
Surgery	–	–	2	7.7	1	3.8	3	11.5
Medication	–	–	–	–	2	7.7	2	7.7
Follow-up treatment	–	–	–	–	7	26.9	7	26.9
Vision rehabilitation								
Spectacles/contact lenses	1	3.8	2	7.7	–	–	3	11.5
Low vision aids	–	–	–	–	1	3.8	1	3.8
No rehabilitation	3	11.5	4	15.4	3	11.5	10	38.6

Figure 2 describes the types of industries where work-related ocular injuries occurred among the SOCSO workers in 2004. These industries were the services and construction industries (50%), manufacturing industries (25%), financial and insurance industries (16.7%) and commercial industries (8.3%).

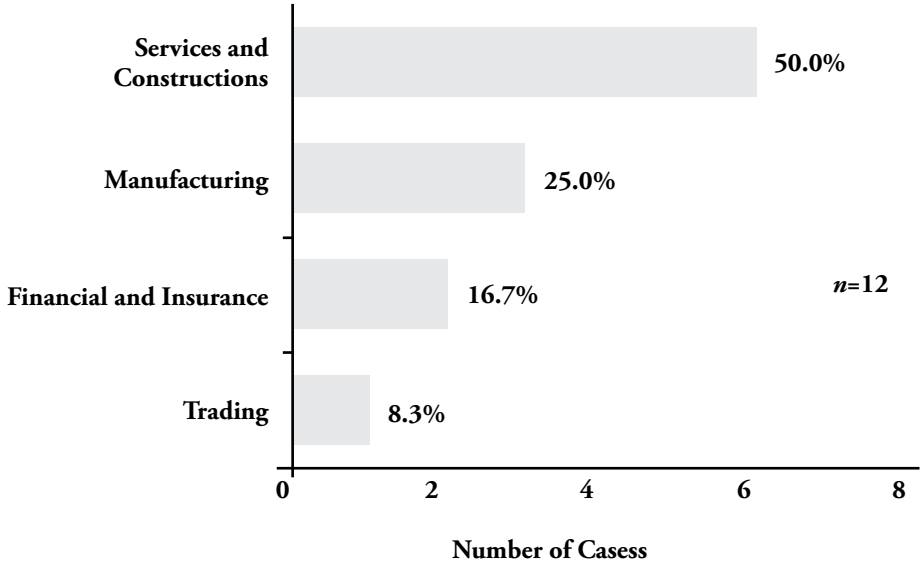

Figure 2. Types of ocular injuries according to industries

Discussion

Out of 26 cases reviewed, 46.2% of the cases involved ocular injuries and the gender of all cases was male. It was due to the relatively higher tendency for risk-taking behaviour. Apart from that, there is a significant male predominance in the industrial sector.[5] Other studies have also noted that most of the work-related ocular injuries were reported among male workers[5,6] with percentages ranging from 70% to 87% of all ocular injuries. The risk of male workers sustaining ocular injuries was as much as 3.0–5.3 times than that of female workers.[6,13] Recent studies have also found that male workers were more prone to ocular injuries.[14,15] The current study reported that 100% of the injured were male workers. However, due to selection of small number of case records, more data is needed to look at the risk of male workers sustaining ocular injuries compared to female workers. The type of industries found at SOCSO headquarters is not representative of industrial distribution in Malaysia and therefore not representative of the situation nationally. A more comprehensive study is required in the future for better planning in the management of ocular injuries and illnesses among industrial workers. The mean age of the injured workers in this study was 44.8±10.3 years. However, most of the studies reported that the mean age of the ocular injured workers was about 30 years.[14] This was probably due to the small sample size in the study. The 40–49-year-old age group suffered the greatest number of injuries (26.9%), followed by 20–29-year-old age group (15.4%) and the 30–39-year-old age group (3.9%). Since majority of the injured workers were young healthy males, who still have a long professional, social and family life ahead of them, it is important to determine and consider the management of visual impairment in order to mitigate the effect of permanent disability on their quality of life.

Ethnic variation in eye injuries has been well documented.[6,16–19] In our study, Malays (38.5%) and Chinese (38.5%) showed the highest percentage of work-related eye injuries followed by the Indians (23%). This was in contrast with the findings of Wong and Tielsch[20] where Indian workers had twice the risk of ocular injuries when compared to either Chinese or Malays. However, a study by Woo and Sundar[6] in Singapore found that 47.4% of the subjects were Chinese, followed by Indians and Malays. Hence, it can be suggested that there may be demographic-specific differences in exposure to high risk injury settings among the industrial workers registered with SOCSO headquarters.

This study also showed that work-related ocular injuries, that is, perforating injury and contusion were the most common types of ocular injuries suffered by the industrial workers registered with SOCSO headquarters. Past studies have shown that most eye injuries happened at work place.[5,14,15,21] The anatomical site/structure of the ocular injury among these workers was noted as multiple anatomical site/structure injuries (50%) followed by corneal injury (16.7%) and injuries of the eyelid, orbit, choroids and epiretinal membrane, each involving 8.3% of the workers. However, Woo and Sundar[6] in their study found that the most common anatomical site of injury was the cornea (33.1%, *n* = 81), followed by the eyelids (13.1%, *n* = 32). Multiple anatomical site/structure injuries were not reported by them. Thevi et al.[15] in a study on ocular trauma injuries reported that corneal laceration (61.5% n = 32) was the most common cause of ocular injuries. In an earlier study by Ligette et al.[22], it was found that contusion was the most common cause of ocular injury.

In this study, we found that most of these injuries occurred among workers in the service and construction industry (50%) such as building, repair and maintenance work, followed by the manufacturing industry (25%), financial and insurance industry (16.67%) and the trading industry (8.33%). Most of the workers did not use any eye protection when the accident occurred. A previous study by Baker et al.[23] in a population-based survey of severe work-related ocular injury, conducted using hospital discharge data, reported that the annual incidence of severe work-related ocular injury was 1.76 per 100,000 employed persons when ocular trauma was the principal diagnosis. Another study reported that in a hospital-based study of 3184 patients, 48% of the ocular injuries were work-related, out of which 62% could be attributed to the construction industries.[19] In another study, Schein et al.[24] also found that 66% of all patients injured at work were provided with protective eyewear. Only 10% of patients reported that they had been wearing protective eyewear at the time of injury, though none were severely injured. Past studies also showed that the majority of work-related ocular injuries occurred among workers in the services and construction industry. Workers were supplied with eye protection but it was found that the majority did not use the devices when the accident occurred.[6,14,15] The common sources of eye trauma include the use of high-powered tools (30.8%), motor vehicle accident (23.1%) and domestic accidents (17.7%). Only six patients (2.5%) reported having used eye protective device at time of their work-related injuries. These findings suggested that workers must not only be issued with proper eye protection when carrying out potentially hazardous tasks but also made to use them while performing their job. While the devices may not prevent an injury from occurring, these devices would reduce the severity of injuries resulting from the accidents. Despite the continuing occurrence of work-related eye injuries locally, there are an increasing number of studies among western populations showing that work-related injuries are becoming less common and significant[21,24] because of better education in the workplace and effective preventive strategies reinforced by legislation.

This study showed that all the workers registered with SOCSO headquarters in 2004 received medical treatment when the work-related ocular injuries or ocular diseases occurred. However, only 46.1% of the workers received further medical treatment such as surgery, medication and follow-up. A total of 11.5% of the injured workers were given contact lens and/or spectacles as rehabilitation and the remaining 3.8% of injured workers were prescribed low vision aids (magnifier). However, almost 40% of these workers did not receive any form of visual rehabilitation (Table 3). The impact of ocular injuries extends beyond the afflicted individual to a societal level comprising the loss of productivity and added costs to the healthcare system. Furthermore, the realisation of the trauma a patient bears has an immense effect on his personal life; not only the quality of life of patient but also his/her family and friends', is also affected. It is perhaps a worthy reminder that the serious consequences of the eye injuries, such as visual impairment and physical disfiguration, can also alienate the patient by imposing a barrier to social interaction, both physically and psychologically. These repercussions have particularly serious consequences among young people. Hence, low vision rehabilitation can be offered to reduce the visual disability.

Low vision rehabilitation would involve training the visually impaired (low vision and blind) patient to mobilise safely in their daily environment. The training also involves adapting to the use of visual low vision devices, such as special lenses for reading, Fresnel prisms etc., not only to read but to perform other visual tasks, which are work related. Low vision rehabilitation also involves assessment industrial retraining in jobs that matches the visual dysfunction. Proper advices are provided to each patient regarding their ability to do work with the use of low

vision devices. Low vision rehabilitation can maximise the residual vision using optical and non-optical devices, environmental changes, additive technologies etc. Optical devices such as magnifiers, telescopes have been shown to be able to assist patients with reading and looking at distance respectively. Additive technologies such as CCTV, computers with voice synthesiser and screen enlargement effect will be able to assist the workers with their activities of daily life. Contact lenses and tinted sunglasses with different tone of darkness or filters can be used as alternative to reduce the visual impairment and glare problems respectively. Iris printed contact lenses can be used to reduce the physical disfiguration of injured eyes so that the eyes will look normal. Modification of environment can be suggested so that the worker can continue with their daily routine.

Non-visual rehabilitation 'return to work' programmes such as the back pain management programme has demonstrated that rehabilitation can benefit injured workers and the number of days absent from work can be reduced. Hence, it is also important to introduce vision rehabilitation as part of 'return to work' programme. The rehabilitation undergone by all the injured workers in this study was rather limited and in certain cases earlier low vision intervention or rehabilitation could have been useful to reduce the magnitude of visual loss or to allow the worker to continue to be employed in suitable occupations. Most of these workers were not referred for vision rehabilitation post injury and by the time they presented at the medical board, their ocular disabilities had matured and become permanent. With the availability of low vision services in Malaysia, these injured workers should be assessed for visual rehabilitation while they are undergoing medical management of their ocular injury and a suitable rehabilitation plan be implemented with the involvement of all members of the visual care team.

Conclusion

From this study, we can conclude that visual disabilities were identified among industrial workers suffering from ocular injury or illness. The findings also showed that perforating and contusion injuries were the most common type of ocular injury seen in industrial workers studied. The low vision rehabilitation is still unexplored in the management of ocular injury and illness among industrial workers. Introducing low vision rehabilitation can benefit both workers and employers as low vision rehabilitation provides care beyond spectacles or contact lens prescriptions. There is a need for greater collaboration between healthcare professionals such as occupational health doctors, ophthalmologists, optometrists and occupational therapists to ensure that injured industrial workers are managed not just to heal the injury but also for them to return to gainful employment and to remain as an active member of society.

Acknowledgement

I would like to thank Ms. Siti Noor Azimah Abdullah for her assistance during data collection.

Conflict of interest

All authors declared that we do not have any conflict of interest in this study.

Funding

None

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