

## ORIGINAL ARTICLE

## VISUAL IMPAIRMENT; AN OCCUPATIONAL HAZARD

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**Background:** The incidence and prevalence of many diseases are highly influenced by occupation. Tailoring and welding are very important and common occupation in both developed and developing countries. Both occupations can cause injuries if adequate safety measures are not taken. Unfortunately safety standards which guide such occupations are lacking in many developing countries including Pakistan. This study was conducted to know the prevalence of visual impairment among tailors and welders and the degree of safety measures taken. **Methodology:** It was a descriptive cross sectional study done in different areas of Peshawar from June to August 2015. A pre designed questionnaire was distributed among welders and tailors aged between 12–60 years. Data was collected and analysed through SPSS-21. **Results:** Out of 124 welders in Peshawar, 7.3% had visual impairment. Out of total respondent among welders 89.7% reported using protective eye devices while 10.3% did not use any protective devices. There was significant association between visual impairment and use of protective eye devices ( $p < 0.05$ ). Among tailors a prevalence rate of 5.1% for visual impairment was noted. Out of total 77 tailors, 64.9% did not consider tailoring as hazardous to vision. It was also found that a good proportion (19.5%) of tailors didn't have proper illumination at their work place required to prevent visual impairment. **Conclusion:** Welding and tailoring among many other occupations are associated with visual impairment at workplace. Awareness among the affected population is lacking and this needs to be targeted.

**Keywords:** Welders, tailors, Peshawar, visual impairment

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## INTRODUCTION

Occupational health is an important aspect of medicine.<sup>1</sup> The incidence and prevalence of many diseases are highly influenced by occupation.<sup>2</sup> In modern era the harmful effects due to chronic exposure to low level of harmful factors at work place is an important issue.<sup>3</sup> In Pakistan a lot of people are associated with tailoring and welding work among other who are vulnerable to visual impairment. Rules are made regarding exposure to damaging substance in industries but still a lot of work is needed to prevent these effects in population at risk in third world countries like Pakistan. In work place worker interacts with physical, chemical, biological agents and machines.<sup>4</sup> Regular studies are conducted in order to know the present and forthcoming problems in work place and improve and maintain the highest level of wellbeing in workers of all occupations and to protect the workers in their working environment from the hazardous effects of many substances.<sup>5</sup>

Ocular injuries an important cause of impaired vision and blindness.<sup>6</sup> Trauma at working place is responsible for a high percentage of ocular injuries.<sup>7–10</sup> More than half of ocular injuries in

working place occur in manufacturing, service and construction industries.<sup>11</sup> 81% of work related ocular injuries occur in men aged 25 to 44 years.<sup>12</sup> Studies from Nigeria reported work related ocular injuries in which 6.6–44% cases were due to exposure to chemical burns, welder's arc burn and corneal foreign body<sup>13–15</sup> and most of them were because of lack of safety measures. Welding is a useful process and it contains ultraviolet B as main source. It is also a source of intense optical radiations.<sup>16–19</sup> In countries like Pakistan electric and gas welding are mostly practiced.<sup>20</sup> Long term exposure to ultraviolet radiation is associated with ill effects like pterygium, pingueculae, band-shaped keratopathy and climatic droplet keratopathy.<sup>21</sup> Thermal burns can also occur during welding and can cause skin and ocular injuries.<sup>22</sup> Mainstay of ocular protection from welding arc radiation is filter being placed in welder's helmet, made from infrared absorbing green glass.<sup>23</sup>

Tailoring, in Pakistan, is a way of livelihood for a lot of people and unfortunately very little research has been done in this field and no appropriate attention has given regarding safety. Here we have made an attempt to improve the

wellbeing of tailors and welders, by assessing their occupational exposure and related risk, who need special attention because they are mostly uneducated and poor people and know very little about their safety in working place.

## MATERIAL AND METHODS

A cross sectional study was conducted in which target population was welders and tailors of Peshawar including all those who were self-employed and those working as employees in shops. Only males between 12–60 years of age were considered. All welders and tailors whose visual acuity was less than 6/18 with available correction were termed as visually impaired, those whose visual acuity was less than 6/60 were termed as having severe visual impairment, and those whose visual acuity was less than 3/60 were termed as blind. Welders using welding helmets and goggles during their work were considered as taking proper safety measures. For tailors an illumination level of 300–500 lux and maximum 9 hours of work was considered as safe.

Visual acuity assessment was done for each eye using Snellen chart placed at 6 meter distance outdoor in day light. Illiterate E chart was used for uneducated workers. Each eye was tested separately. Data was collected with aid of questionnaire which included bio data, questions regarding type of welding, safety knowledge, history of ocular injury, use and type of protective device and reason for not using protective device were asked. A random sample of 201 male workers was taken including 124 welders and 77 tailors from different areas of Peshawar. Data was analysed by using SPSS-21.

## RESULTS

A total of 124 welders were examined, out of which 112 (90.3%) were electric welders and 12 (9.7%) were gas welders (panel beaters). Out of these, 4 welders were those who used both electric and gas welding in their life time. All the welders were males. The age range of the welders was between 12 to 60 years with a mean age of 31 years+SD12.9 years (Table-1)

A total of 7.3% for visual impairment was noted among welders of Peshawar at the time of examination with available correction. The age group mostly affected was between 45–60 years. Visual equity assessment showed that number of welders with visual equity >6/18 with available correction (normal) were 115 (92.7%) while those

with <6/18 with available correction (visually impaired) were 9 (7.3%). Age wise distribution is given in following figure.

Results also showed that about 27.4% welders were not aware about safety measure regarding their occupation hazard while about 23.3% welders didn't consider welding being hazardous to vision. From the total respondents, 109 (89.7 %) welders reported using protective eye devices, while 15 (10.3%) did not use any protective eye devices. Majority of welders 88% wore sunglasses at work while a small 3% proportion was wearing goggle and rest of welders 9% used helmet or shields.

In our total sample of 124 welders, 112 (90.3%) were electric welders while 12 (9.7%) were gas welders. Among total electric welders, 106 (94.7%) wore protective devices while 6(5.3%) did not. While among gas welders 3 (25%) use protective measures while 9(75%) did not. It means that use of protective measures is high among electric welders. Majority reasons of not using protective measures were that they were not perceived as useful 47.5% (59) and not remembering to wear them during work 22.5 (28) among other

About 56 (45.1%) welders were illiterate 38 (30.6%) had primary education, 23 (18.5 %) had passed there matriculation exam while 6 (4.8%) had cleared intermediate level while only 1 (0.8%) welder was graduate.

Work experience of the welders ranged from 1–2 years up to more than 35 years. Majority of welders had work experience of 5–15 years with a mean of 14 years+SD10.2 years. Detail of which is given in table-3.

Chi square test was done to find out association between visual impairment and use of protective eye devices. The p-value came out to be less than 0.05 and hence we concluded that association between visual impairment and use of protective eye devices is significant.

The age range of the tailors was between 12 to 60 years with a mean age of 32.7 years+SD 11.63 years. Table-4 shows age wise distribution of tailors.

A total of 5.1% for visual impairment was noted among tailors of Peshawar at the time of examination with available correction. The age group most affected was between 50–60 years. Visual equity assessment shows that number of tailors with visual equity >6/18 with available correction (normal) were 73(94.8%) while those

with <6/18 with available correction (visually impaired) were 4 (5.2%). Age wise distribution is given in figures.

Out of total 77 tailors, 64.9% did not consider tailoring as hazardous to vision. While about 59.7% tailors were not aware about safety measures regarding their occupation. It was also found that a pretty good proportion (19.4%) of tailors did not have proper illumination at their work places required to prevent visual impairment.

Long working hours constantly focusing on tiny objects is another risk factor in visual impairment in tailors. According to our study majority of tailors works for 6–12 hours in a day while a maximum work of 9 hours is considered as safe.

Our study shows that about 30 (39.1%) tailors were illiterate, 31 (40.2%) had primary education, 15 (19.4%) had passed their matriculation while only 1 (1.2%) had studied up to intermediate level.

Working experience of tailors ranged from 1–2 years up to more than 35 years. Majority of tailors had working experience of 5–15 years with a mean of 12.72 years with +SD8.25 years.

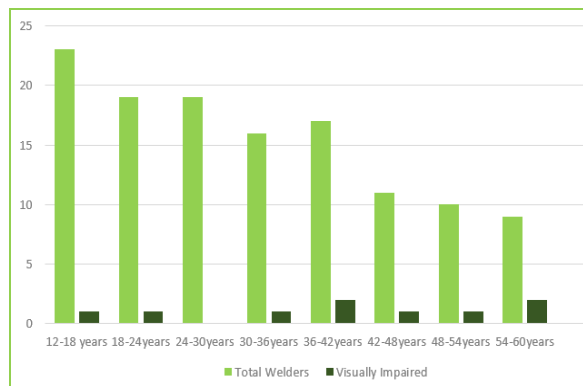


Figure-1: Age group mostly affected

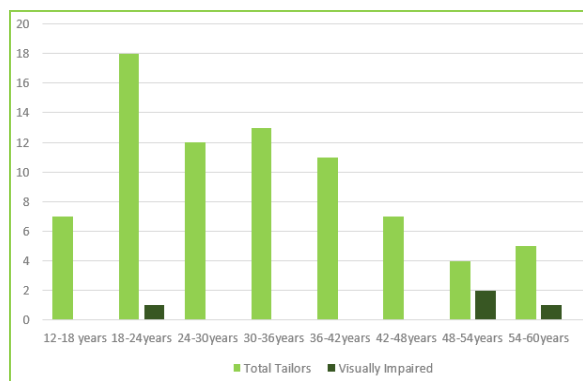


Figure-2: Age group mostly affected

Table-1: Age wise distribution of welders

Age group	Frequency	Percentage (%)	Cumulative percentage (%)
12–18	23	18.5	18.5
18–24	19	15.3	33.8
24–30	19	15.3	49.1
30–36	16	12.9	62
36–42	17	13.7	75.7
42–48	11	8.8	84.5
48–54	10	8.1	92.6
54–60	9	7.3	100

Table-2: Reasons of non-use of protective measures

Reasons	No. of welders	Percentage (%)	Cumulative percentage (%)
Forgetfulness	28	22.5	22.5
Do not think it is useful	59	47.5	70
Inability to see clearly	20	16.1	86.1
Discomfort	14	11.2	97.3
Cannot afford it	2	1.8	99.1
Other reasons	1	0.9	100

Table-3: Distribution of workers according to working experience

Work experience (years)	No. of welders	Percentage %	Cumulative percentage (%)
0–5	35	28.2	28.2
5–10	12	9.6	37.8
10–15	29	23.3	61.1
15–20	16	12.9	74
20–25	14	11.5	85.5
25–30	8	6.4	92
30–35	6	4.8	96.8
>35	4	3.2	100

Table-4: Age wise distribution of tailors

Age group	Frequency	Percentage %	Cumulative percentage (%)
12–18	7	9.0	9.0
18–24	18	23.3	23.3
24–30	12	15.5	48.8
30–36	13	16.9	65.7
36–42	11	14.2	79.9
42–48	7	9	88.9
48–54	4	5.1	94
54–60	5	6.0	100

Table-5: Working hour’s detail

No. of working hours	No. of tailors
<3	1
3–6	4
6–9	32
9–12	38
12–15	2

Table-6: Detail of working experience of tailors

Work experience (in years)	No. of tailors	Percentage %	Cumulative percentage (%)
0–5	14	18.1	18.1
5–10	20	26	44.1
10–15	21	27.2	71.3
15–20	8	10.3	81.6
20–25	6	7.7	89.3
25–30	4	5.1	94.4
30–35	3	3.8	98.7
>35	1	1.3	100

## DISCUSSION

The prevalence of visual impairment in our study was 7.3% among welders of Peshawar. The age group most affected was between 45–60 years. Most of welders were illiterate. Majority of our welders were having experience of 5–15 years. Chi square test was done to find out association between visual impairment and use of protective eye devices and was found out to be significant with a p value of less than 0.05.

The study also reveals that a small proportion of welders in Peshawar did not take adequate precautions to protect their eyes from hazards associated with welding. This finding is attributed to absence of ocular health safety standards in the country and inadequate knowledge of the potential occupational hazards by the welders. These results will be a strong tool in persuading the health authorities of the need to establish a committee to set safety standards, monitor compliance and to educate the welders and allied workers about the occupational hazards associated with profession and the need to take adequate safety precautions.

In our study various reasons were given for not wearing protective eye devices. These included that the goggles are too thick and interfere with visibility therefore impairing the welder's ability to do their work effectively. This reason was given by those who preferred sunglasses, and those who were gas welders and not using any protective eye devices. Main reasons of not wearing protective eye devices are: Do not think it is useful (47.5%), Forgetfulness (22.5%), Inability to see clearly (16.1%), Discomfort (11.2%), Cannot afford it (1.8%), other reasons (0.9%). The gas welders were either ignorant of their use or did not feel they were necessary for their work and did not think exposure of their eyes to the flame of oxy acetylene gas had any effect on their eyes.

In a survey of the eye safety practices among welders in Nigeria, 43.7% of the welders wore goggles, 45.4% used sunglasses, while 10.9% did not use any device. In this study only 9% of the welders wore goggle which is very low. Most of the workers (88%) used sunglasses.

The prevalence of visual impairment in the study was 5.1% among tailors of Peshawar. Out of total 77 tailors studied 64.9% did not consider tailoring as hazardous to vision. While about 59.7% tailors were not aware about safety measures regarding their occupation. It was also found that a

pretty good proportional of tailors do not have proper illumination at their work places required to prevent visual impairment. Actually 15 (19.4%) out of total 77 tailors don't have proper illumination system at their work place require to prevent visual impairment. The possible reason for the people resorting to this field as their occupation is most definitely due to lack of proper education and learning facilities available and/or affordable to them. The people engaged in tailoring occupation faces a tough time tackling the occupational health problems. Musculoskeletal, dermal, ocular, and psycho-social problems form the key category of health problems found among them. Our study is supported by some international studies.<sup>24–27</sup>

## CONCLUSION

Welding and tailoring among many other occupations are the one associated with visual impairment at workplace. Our study showed a significant association between visual impairment and lack of proper safety measures at work. Awareness among the affected population is lacking and this needs to be targeted.

## REFERENCES

1. John, Miller. Occupational diseases and Industrial medicine, 2<sup>nd</sup> edition 1960;3:1–4.
2. Raffle PAB. The practice of industrial Medicine. Br J Ind Med 1959;16(1):79.
3. Karvonen M, Mikheev M. Epidemiology of occupational health. WHO Regional Office for Europe; 1986.
4. Park textbook of Preventive and Social Medicine. 18<sup>th</sup> edition, 2005. Occupational Health, p.606–7.
5. Ergonomics at work Place –IJM 1996;42(4):2.
6. Macewen CJ. Eye injuries: a prospective survey of 5671 cases. Br J Ophthalmol 1989;73(11):888–94.
7. National Institute for Occupational Safety and Health. Leading work related diseases and injuries-United States of America. JAMA 1984;251:2503–4.
8. Blomdahl S, Norell S. Perforating eye injury in the Stockholm population. An epidemiological study. Acta Ophthalmol (Copenh) 1984;62:378–90.
9. Schein OD, Hibberd PL, Shingleton BJ, Kunzweiler T, Frambach DA, Seddon JM, et al. The spectrum and burden of ocular injury. Ophthalmology 1988;95(3):300–5.
10. Peate WF. Work-Related Eye Injuries and Illnesses. Am Fam Physician 2007;75(7):1017–22.
11. Kuckelkorn R, Kottek A, Schrage N, Reim M. Poor prognosis of severe chemical and thermal eye burns: the need for adequate emergency care and primary prevention. Int Arch Occup Environ Health 1995;67(4):281–4.
12. Harris PM. Nonfatal occupational injuries involving the eyes 2002. [Internet]. [cited 2006 Nov 3]. Available from <http://www.bls.gov/opub/mlr/cwc/nonfatal-occupational-injuries-involving-the-eyes-2002.pdf>
13. Umeh RE. Ocular trauma as seen in UNTH Enugu (retrospective study Jan. 1980- May 1986 and prospective study June 1986-Oct 1987) Fellowship dissertation. NPMCN May 1988.

14. Omoti AE. Ocular trauma in Benin City, Nigeria. *Afr J Trauma* 2004;2:67–71.
15. Okoye OI, Umeh RE. Eye health of industrial workers in South Eastern Nigeria. *West Afr J Med* 2002;21:132–7.
16. Kozlowski C. UV radiation emitted by selected sources at work stands. *Int J Occup Med Environ Health* 2001;14(3):287–92.
17. Moss CE, Murray WE. Radiation levels in gas welding, torch brazing and oxygen cutting. *Weld J* 1979;9:37–46.
18. Emmet EA, Horstman SW. Factors influencing the output of ultraviolet radiation during welding. *J Occup Med* 1976;18(1):41–4.
19. Okuno T, Ojima J, Saito H. Ultraviolet radiation emitted by CO<sub>2</sub> arc welding. *Ann Occup Hyg* 2001;45(7):597–601.
20. Erhabor G, Fatusi A, Ndububa D. Pulmonary symptoms and functions in Gas welders in Ile Ife. *Nig Med Pr.* 1992;24(5/6):99–101.
21. Klinwork GK. Chronic actinic keratopathy- a condition associated with conjunctival elastosis (pinguecula) and typified with characteristic extracellular concretions. *Am J Pathol* 1972;67(2):327–48.
22. Ewing MR. The significance of a single injury in the causation of basal cell carcinoma of the skin. *Aust NZ J Surg* 1971;41(2):140–7.
23. Pabley SA, Keeney HA. Welding process and ocular hazards and new protective devices. *Indian J Ophthalmol* 1984;32(5):347–9.
24. Chavada V. A cross-sectional and observational study to assess the health status of people engaged in the tailoring occupation in an urban slum of Mumbai, India. *J Clin Diagn Res Ser Online* 2010;4:2495–503.
25. Davies KG, Asanga U, Nku CO, Osim EE. Effects of chronic exposure to welding light on Calabar welders. *Niger J Physiol Sci* 2007;22(1-2):55–8.
26. Lyiade A, Olusola O. Pattern of eye diseases among welders in a Nigeria community. *Afr Health Sci* 2012;12(2):210–6.
27. Fiebai B, Awoyesuku A. Ocular injuries among industrial welders in Port harcourt, Nigeria. *Clin Ophthalmol* 2011;5:1261–3.

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