OCCUPATIONAL INJURIES IN WELDERS – RESULTS FROM A SIX MONTH FOLLOW-UP STUDY

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Background: Injuries are an under recognized public health problem globally. We assessed the number and type of occupational injuries in welders, in a prospective manner. **Methods:** A cohort of 208 welders was re-interviewed twice at three-month intervals to determine the type and frequency of injuries in the welders primarily involved in the automobile sector, in the twin cities of Islamabad and Rawalpindi in Pakistan. Data was analyzed for frequencies and counts with STATA 8. **Results:** Cumulatively, 105 injuries were reported by 61 welders in the two follow-ups, who took 28 days off as a result of these injuries, in the past six months. Four welders reported multiple injuries involving the same injury episode. None of the welders reported any permanent disfigurement as a result of these injuries. **Conclusion:** Occupational injuries are common in the welders working primarily in the automobile sector in the twin cities of Islamabad and Rawalpindi. Foreign bodies in the eyes are the most common type of injuries sustained by these welders.
Key Words: Injuries, Welders, Pakistan

INTRODUCTION

Health directly impacts labor productivity, as output is increased in workers with better health.[1] According to World Health Organization, there are about 250 million cases of injuries per year at work worldwide.[2] Occupational injuries are a neglected area of health policy in Pakistan. Neither National Health Policy approved by the Federal Cabinet on December 17th 1997, nor National Health Policy – The Way Forward, promulgated by the Ministry of Health in 2001; even mention the term "Occupational injuries."[3,4]

Non-industrial welding workers are predominantly involved in the automobile or real-estate sectors; welders involved in the later sector generally undertake work entailing welding of mufflers or repairs following automobiles following accidents or crashes. Often it means lying underneath the vehicle for carrying out welding/repair. Welding produces ultraviolet and infrared radiation at damaging levels[5]. The welding process can result in various hazards such as bodily injuries on the face and limbs, fire and explosion.[6-13] Studying multiple occupations with various study designs, welders in occupational settings like construction and automobile factories have been identified as having a high risk of ophthalmic injuries due to burns compared to other occupations.[6-10] International Labor Organization lists bodily including eye injuries due to sparks and fall related injuries especially common in welders.[13] Ranking of occupations based on cost-related injuries has identified welders as a high risk occupation.[12] While ocular melanoma and cataract have been reported as a long term sequels associated with welding.[9,11,13]

The welders are part of an informal occupational sector and like most other informal occupational sectors in Pakistan very little information is available on occupational injuries in this group.[14,15]

This study was undertaken to determine the burden of occupational injuries in a prospective manner in a cohort of welders working in the automobile sector in the twin cities of Islamabad and Rawalpindi. The baseline study, including hazards perception, and the number of injuries in the past three months as well as the past one year; has been reported previously.[15]

MATERIAL AND METHODS

A baseline survey was of 208 welders was completed in the twin cities of Islamabad and Rawalpindi from 1st to 10th September 1999. Only those welders were interviewed who were allowed to work independently or with minimal supervision by their employers. This was done to exclude apprentices/helpers in the welding shops, as their inexperience hypothetically could inflate the occupational injury prevalence rates. The injury was defined as either

requiring a visit to a physician or use of any self prescribed medication/ointment. Two trained interviewers using a pre-tested uniform questionnaire interviewed all the subjects and recorded their responses, in addition to their names and addresses for proper identification during follow-up. At the end of baseline interview each welder was told that he would be re-interviewed twice at the interval of three months regarding any work related injuries. None of the respondents objected to being subsequently re-interviewed twice.

Baseline survey in addition to demographic information, collected information about type, involvement of body part, and sequel of having sustained work related injuries in the past three and twelve months. While during the two subsequent follow-ups same information about work related injuries was collected. The original group of 208 welders was re-interviewed twice i.e. from 4th to 9th December 1999, and from 10th to 13th March 2000. Same interviewers re-interviewed the original group using the same definition of injury. After ascertaining the identity of each respondent, they asked about any work related injury since the last interview i.e. in the past three months, and its sequel by using a brief, pre-tested and uniform questionnaire with both closed and open-ended questions. In order to avoid the "healthy worker effect", a question was also asked about knowing any welder in their shop who was either too sick to come to work on the day of interview, as a result of work related injury or either has died as a result of one, during the past three months[16]. This additionally also allowed for complete follow-up of the original group. Data was analyzed for frequencies and counts using STATA 8.

RESULTS

The average age of the cohort of 208 welders followed was 30.3 years (range 15 – 63 years). Everyone who reported for work on the day of follow-up visits was interviewed. During the first follow-up 199 (95.7%) welders were successfully re-contacted and interviewed, while in the second follow-up 201 (96.6%) were re-contacted and interviewed. No one refused to be interviewed. The number and type of occupational injuries reported at the two follow-ups is presented in table I. Foreign body in the eyes was the most common injury type reported at both follow-ups.

Table-1: Number of occupational injuries reported during the past three months, at two follow-ups, by welders.

Type of Injury	**1st Follow-up**		**2nd Follow-up**	
	No. (199)	**%**	**No. (201)**	**%**
Burns on face	11	5.5	14	6.9
Burns on limbs or body	17	8.5	22	10.9
Foreign body in the eyes	18	9.0	23	11.4
Total number of injuries	46	23.1	59	29.3

Cumulatively, 105 injuries were reported by 61 welders in the two follow-ups, who took 28 days off as a result of these injuries, in the past six months. Four welders reported multiple injuries involving the same injury episode. None of the welders reported any permanent disfigurement as a result of these injuries. And neither any welder reported knowing any welder who has either died as a result of occupational injuries or was too sick to come to work.

During two follow up visits, interviewers specifically inquired about the nine and seven individuals who were not available for first and second follow up interview respectively. Reason for their absence on the day of interview, at their work place was determined from either their colleagues or neighbors. None of the missing individuals were absent from work, owing to either any work related injury or death.

DISCUSSION

Welding process uses heat to melt and fuse together metal pieces. In Pakistan non-industrial welding workers as a group are not regulated by the government in terms of enforcing occupational safety and protection of workers, unlike in most developed countries where morbidity and mortality studies have been conducted on welders working with modernized equipment. Hence, making it difficult to compare injuries in welders studied in countries like Pakistan with occupational studies conducted in entirely different work environments of advanced countries. A recent study reported that in 2001, occupational injuries and illnesses in welders resulted in 171 days away from work per then thousand construction workers, while in 2001 fatal occupational injuries rate in welders was 39.9 per ten thousand workers in United States[17]. In a study looking at workers compensation claims owing to occupational injuries, welders were responsible for 5.1% of all eye injury compensation claims[18]. While a study conducted in Australia reported that burns and foreign body entering in the eye comprised of 6%, of all the eye injuries in emergency departments due to occupational welding related activities[19].

The results of this first follow-up study of occupational injuries in welders indicated that injuries in welders involved primarily in automobile sector are fairly common, based on three month recall period, as over 20% of welders reported sustaining occupational injuries requiring either self-treatment or visit to a physician in the first follow up, while almost 30% in the second follow up. These results are somewhat higher than the baseline study, which reported 18.7% welders sustaining injuries in the past three months[15].

During the two follow-ups at the interval of three months, over 95% of the original group was successfully re-contacted. The higher reported rates of injuries in the two follow-ups could be attributed to the recall bias, as during the follow-up interviews welders were probably more likely to have recalled the injuries, knowing that there will be follow-up interviews.

The baseline study reported that 18.7% and 30.3% of welders had sustained occupational injuries in the past three months and one year, respectively. Although, the reported number of welders who sustained injuries was higher in the two successive three-month follow-ups, the type and frequency of occupational injuries sustained were essentially similar. As baseline study reported the most common (40.3%) injury type was foreign body in the eyes followed by burns on limbs or body (37.5) and facial injury/burns (22.2); the same was the profile in the two follow-ups. A previous Pakistani study of 36 welders in Karachi reported 340 injuries in the past three months, but did not define what constituted injury[14]. Authors are unable to explain much lower number of injuries in the baseline[15] and follow up study, perhaps minor injuries not requiring any treatment excluded in our studies account for the substantially lower number of injuries.

Results from this study need to be interpreted with caution. The major limitation of this study was the use of convenience sampling, which limits generalizability of results as representative of welders in Pakistan. Secondly all the welders who comprised our original group were selected on the basis of their availability at the time of baseline study. Welders with more severe injuries or the ones who died as a result of occupational injuries prior to the initiation of our baseline study were obviously not included.

There is a need for nationwide population based survey on occupational injuries in the country, using indigenously standardized instruments, for better understanding of correlates and determinants of occupational injuries in the country. Prospective studies with longer duration of follow-ups at shorter intervals would be required to better understand the epidemiology of occupational injuries in the welders; this will further elucidate seasonal pattern of occupational injuries. Additionally, these studies will help policymakers to develop effective and meaningful occupational standards for the safety of labor force, both in the formal and informal sectors in the country.

CONCLUSION

Three month prevalence of occupational injuries ranged from over 20% to almost 30% in two successive follow ups of welders working primarily in the automobile sector in the twin cities of Islamabad and Rawalpindi. Foreign bodies in the eyes were the most common type of injuries sustained by these welders.

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