Short Communication

Injuries and Injury Care among Child Labourers in Gem Polishing Industries in Jaipur, India

Rajnarayan R TIWARI, Asim SAHA, Jagdish R. PARIKH and Habibullah N. SAIYED

Occupational Medicine Division, National Institute of Occupational Health, India

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Although life had been made comfortable due to technological development, it also brought some disadvantages. These include fatal and non-fatal injuries. These injuries can be afflicted at any place of which the workplace is one. At the workplace, injuries, if they occur can either lead to permanent or temporary disability or mortality and account for a significant proportion of deaths and disabilities^{1–4}). These types of injuries are mostly recorded as the victims of these types of grave injuries are often provided with monetary compensation through legislation enacted for the welfare of the workers. But, in many industries, such serious injuries are not common but trivial injuries are frequent and usually remain unnoticed and unreported. These trivial injuries if not properly cared for can lead to wound contamination and sepsis^{5–8}) that can be life threatening.

The gem polishing industry at Jaipur is one such industry which exposes the workers to such frequent minor injuries. In Jaipur, approximately 200,000 people are employed in this industry, of whom about 20,000 are children. This industry is an unorganized sector and the workers are not protected by the legislation made for the welfare of workers applicable to the organized sectors. The workers are also not covered by any health service schemes. Secondly, these industries employ a considerable proportion of child workers, even though it is prohibited under the Constitution of India.

In the gem polishing industry of Jaipur the raw semi-precious stones are mostly imported from African nations. These raw stones are then cut with the help of a rotating saw to remove those parts that contain some impurities. This is followed by separating the raw stones on the basis of their colours. After sorting, the stones are reshaped

with the help of a rotating wheel into the desired shape and then to the desired size and measured with calipers. This is followed by faceting the stone so that the multiple facets using the principle of refraction give a shine to the stone. Finally, these stones are polished with chromic oxide powder and quartz powder to increase the shine and lustre. Some of these finished materials are used for preparing neck jewellerys and are converted into beads with a drill. The schematic flow chart of the process is shown in Fig. 1. The processes which are likely to result in injuries include the cutting process which causes cuts, the faceting process that causes abrasions and the drilling process which causes piercing type of injuries (Fig. 1). Except for the making of jewellery, sorting and marketing, the children work in almost all the processes and therefore are prone to injury.

The occurrence of injuries at the workplace depends upon a number of factors including the age of workers, familiarity with the hazardous processes, amount of precision required, daily working duration, etc⁹). Similarly, the complication of the wound in the form of contamination and sepsis will depend upon the knowledge regarding first aid and proper wound care, but neither this sector of unorganized child labour nor this issue of minor injuries and knowledge regarding wound care has been studied. Therefore we have carried out the present study to find out the prevalence of injuries, factors associated with the occurrence of injuries and knowledge regarding wound care and first aid.

Material and Methods

The present cross sectional study was carried out among child labourers (not yet 18th yr old) in the Gem Polishing industries of Jaipur. Using the interview technique as a tool for data collection, the demographic characteristics, occupational history and history of injury at work were recorded on a predesigned proforma. A total of 588 study subjects randomly selected from the different working units were included in the study. All the children worked as employed workers. Self reported injury of any kind to any body part can be regarded as a process hazard, since working in the gem polishing industry was exposing the worker to the possibility of injury. The study risk factors included age <14 yr, female sex, daily working duration >6 h and experience in the job <2yr. For application of test of significance and calculation of the odds ratio the age, daily working hours and duration of employment were dichotomized. The child labourers were categorized into two age groups i.e. those who have not completed 14 yr of life and those who have completed their 14th yr but have not completed 18 yr of life¹⁰). The daily working hours and duration of employment were arbitrarily dichotomized.

For assessing the status of injury/ wound care a sub sample of 67 children from those who reported injury

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Correspondence to: R. R. Tiwari, Occupational Medicine Division, National Institute of Occupational Health, Meghani Nagar, Ahmedabad-380016, Gujarat, India
(e-mail: rajtiwari2810@yahoo.co.in)

Fig. 1. The flow chart of the various processes in the gem polishing industry with the types of injuries likely to occur.

were asked simple questions regarding the frequency of injuries, site of injury, washing of hands after injury, topical application and the use of protective devices for the prevention of injuries.

Statistical analysis included calculation of proportions and percentages, application of test of significance i.e. Chi-square test and calculation of risk by Odds ratio with its 95% confidence intervals¹¹.

Results

The age wise distribution of study subjects revealed that the majority of the subjects (78.3%) belonged to the 10–14 yr age group whereas only 23 (3.9%) of the subjects were more than 14 yr of age. The mean age of the child labourers was found to be 11.31 ± 5.34 yr. 272 (46.2%) subjects were males while 316 (53.8%) were

Table 1. Distribution of injuries according to various epidemiological factors

Characteristics	Injury	No of injuries	χ^2	OR (95% CI)
Age (in years)				
<14	210 (38.1)	341 (61.9)	5.88*	1.66 (0.79–3.47)
≥14	10 (27.0)	27 (73.0)		
Sex				
Female	113 (35.7)	203 (64.3)	0.59	1.16 (0.84–1.59)
Male	107 (39.3)	165 (60.7)		
Working hours				
>6	191 (39.4)	294 (60.6)	3.53*	1.65# (1.05–2.58)
≤6	29 (28.2)	74 (71.8)		
Duration of employment (in yrs)				
<2	146 (43.1)	193 (56.9)	9.40*	1.78# (1.29–2.41)
≥2	74 (29.7)	175 (70.3)		

*: Significant with $p < 0.05$. #: Significant

Table 2. Responses to the questions asked for assessing injury care

Statement	Responses	Number	%
How frequently you suffer from injuries at workplace?	Frequently	53	79.1
	Occasionally	14	20.9
What are the common sites of injury?	Fingers	61	91.0
	Others	6	9.0
Do you wash your hands properly after you get injuries?	Yes	60	89.5
	No	7	10.5
What do you apply to the wound after you get injury on fingers?	Nothing	20	29.8
	Medicated bandaid	17	25.4
	Indigenous herbs	18	26.9
	Mustard oil	4	5.9
	Ointment	5	7.5
	Kerosene oil	3	4.5
Do you wear balloon rubber while working?	Yes	55	82.1
	No	12	17.9

females.

338 (57.7%) child labourers were in the occupation for the past 2 yr whereas only 7.2% of the child labourers had been working for more than 5 yr. The mean duration of exposure was 20.24 ± 20.69 months. Most (92%) of the children worked daily for 4–12 h. The mean daily hours of work were found to be 6.28 ± 1.88 h.

Table 1 shows the distribution of the injuries according to study risk factors. The responses of the sub sample of the subjects to the questions asked to assessing the wound/injury care are shown in Table 2.

Discussion

The present study included a high proportion of female subjects. This may be because females constitute a source of cheap labour, but such a large proportion of female child labour further worsens the female literacy rates in the country¹². But when the differences in the prevalence of injuries according to the sex were studied no significant difference was found between the sexes. This suggests that the work processes are equally injury prone irrespective of sex. Similarly no extra risk was found with either sex.

The injuries were found to be more common among those aged <14 yr. This may be attributed to the fact these children being immature do not really understand the safety practices, thereby frequently getting injuries. When risk was estimated, the Odds ratio was found to be statistically non-significant. Nevertheless, this practice of employing child labour should be altogether eliminated particularly in such injury prone occupations, as the physical and mental growth of the children in such a growth spurt phase may be affected¹³.

It was observed that the children working for more than 6 h reported more injuries those working for a shorter time each day. This can be attributed to both mental as well as physical fatigue, thereby increasing the chance of injury as the work, being precision work, demands concentration. When the risk was calculated again those working for a shorter time were at less risk than those working for a longer time.

The duration of employment was also found to be a statistically significant risk factor for the occurrence of injuries. It was observed that those working in the occupation for more than 2 yr reported fewer injuries than those working less than 2 yr. This may be attributed to the lack of proper awareness of the injury prone nature of machine parts and processes in the occupation¹⁴. Secondly, this may be because of lack of skill in those working since for a shorter time.

For assessing the status of injury care practices among children, a set of five simple questions were asked of a sub sample of 67 children. The majority of the children responded that they frequently suffer from injury. Sometimes these injuries are inflicted by rapidly revolving

sharp cutting wheel, and at while other times injury is caused by small pieces of cut stone flying out at high speed. Whereas the wheel causes injuries to the fingers, flying stone mainly injures the eyes. The majority of the subjects mentioned that the fingers were common sites for incisive types of injury. This is attributed to the unsafe manufacturing process because there is no enclosure of the sharp moving parts.

Although most of the subjects mentioned that they wash their hands whenever they get an injury, a small proportion do not care about washing hands. This is serious because the hands of those working in the polishing process get covered with chemicals such as chromium oxide, quartz powder, etc., and any break in the skin due to injury will result in harmful absorption of such chemicals. Moreover, contamination of the wound will also hamper its quick healing.

When asked regarding topical application over the wound, about half of the subjects applied medications known to heal the wound while nearly 30% of the subjects didn't care for the wound while another 11% either applied mustard oil or kerosene oil which are harmful substances. Similarly, poor injury care practices in children were also reported in other studies^{15, 16}. Such harmful practices in wound care should be stopped and people should be made aware of proper wound care.

When asked about the preventive measures or protective devices used for preventing such cut injuries, the majority of the subjects mentioned that they wear ruptured balloons. They feel that this being a latex material will help in preventing injuries. But it was not so as evidenced by the fact that though the majority of them wore it, still they suffered from injuries. Thus, other protective measures such as hard finger caps are advised.

Thus to conclude, the prevalence of injuries among child labourers in the gem polishing industry in Jaipur was found to be 37.4% and age <14 yr, daily working duration for >6 h and duration of employment <2 yr was found to be significantly associated with the occurrence of injuries while the occurrence of injury showed no predilection for either sex. The study also revealed that poor injury care practices such as not washing hands after injury occurs, applying harmful substances to the wound and neglecting the wound were prevalent in this group of subjects, and this needs to be improved through health education.

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