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Analysis of occupational health hazards of lac bangle artisans in Muzaffarpur district of Bihar

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Abstract

Lac bangle production system carried out all over the country and made their identity on Indian level. In this way, Muzaffarpur is the city of Bihar state where lots of lac bangle production has been done in unorganised way. Lac bangle industry in India comes under small enterprises and plays an important role in India's Gross Domestic Product (GDP). The process of making Lac bangle (Lahti) is complex and consists of high degree of precision work involving various stages and each stage requires skilled workers. Long hours of work with traditionally designed tools and unorganised, ergonomically not designed work places can cause musculoskeletal disorders (MSDs) and other occupational health problems among lac bangle artisans. The study was conducted in the lac bangle production enterprise in Muzaffarpur district of Bihar state. The descriptive research design was adopted for the study. A total sample size of 120 lac bangle artisans were randomly selected for the study. The results revealed that there exist and physical hazards 78 percent of total respondents work in prolonged sitting posture followed repetitive motion (72%), awkward posture ((68%), prolonged bending (56%) respectively. Furthermore, it was also revealed awkward posture and prolonged bending were reported as 68 percent and 56 percent among artisans respectively.

Keywords: Lac, hazards, ergonomics, artisans, occupational hazards

Introduction

Lac bangle is an ornament worn in hands by all Indian married women. It is the identities of Indian culture and made by skill workers called artisans. Locally, lac bangle is known as lahathi and it is produced in all over the country such as Rajasthan, Uttarpradesh, Bihar, Jharkhand, Mumbai etc. Lac is a natural product and multipurpose and its uses in manufacture of glazed paper, printing and water proofing inks, lac bangles, dry mounting tissue paper, dental plates and optical frames. Out of these lac is used mostly for soothing the wear in the form of lac bangle (Lahathi) because of do not cause infections or irritations like in the case of plastic, glass or metal bangle. Lac bangle industry in India comes under small enterprises and plays an important role in our Gross Domestic Product (GDP). It is carried out all over the country specially Jaipur, Jodhpur, Udaipur, Uttar Pradesh, Odisha, West Bengal, Jharkhand and Bihar. West Rajasthan is known as origin place of lac bangle in India. Lakhera or laheras are the hereditary artisan community involved in lac bangle making in Jharkhand, Rajasthan, Bihar, West Bengal, Odisha, Chhattisgarh, Andhra Pradesh, Telangana, Madhya Pradesh and Maharashtra. In this way Bihar is a state of India where the Lahathi bangle makers are mostly from the districts of Muzaffarpur, Laheriasarai, Madhubani and Lakhisarai (Mishra & Bhatnagar, 2013) [7]. A large number of rural population have been engaged in the production of lac bangles and supplement their family income.

The process of making Lac bangle (Lahti) is complex and requires high degree of precision. It has been passed from various stages and each stage requires skill workers. Firstly Lac (available as coins, block, piece) is melted with limestone to prepare the base or a dough as they call it. Lac dough, which is the basic raw material is rolled before colouring and the coloured lac is applied on it. It is then pressed with a flat wooden piece to make long thin stiff tubes and fix the same on the base of the wire bangle. After this, the bangle is slightly heated to attain the proper shape by rolling over a long round tool made of wood. Bangles are again heated before embellishing. Semi-precious stones, glass beads, small broken mirror pieces etc are heated over a tin plate kept on a small burner. The base of the stones gets heated and thus easily melts the lac surface on which they are placed and stick there after cooling. They are picked up one at a time and stuck on the bangle. After that packaging and storage work has been done by workers.

In the lac bangle production, most of the activities are done traditionally and manual designed tools are used for performing the task. Long hours work with traditionally designed tools and un-ergonomic work places can cause musculoskeletal disorders (MSDs) and other occupational health problems among workers. MSDs are the most common injuries related to poor ergonomics. If these injuries are taken lightly, these will progress to permanent problems (Cooper and Kleiner, 2001)^[5].

In the lac bangle production, artisans adopt lots of activities in sitting and squatting position that result back, leg and neck pain. Due to their low awareness and demand of high productivity, lac bangle artisans conduct these various duties in not proper way, which occupies most of their time and energy. Work related MSDs, low back pain and other health problems result in increased absenteeism and lost working time, adverse effects on labour relations, higher insurance and compensation costs, increased probability of accidents and errors, job transfer and higher turnover of workers, more scrap and decreased production, low-quality work and high administrative and personnel costs (Cardinali, 1998; Miller, 1995; Widanarko *et al.*, 2012)^[4, 8, 9]. The main purpose of this study to identify various occupational health problems among workers engaged in lac bangle enterprise and the effects of ergonomic interventions for improved occupational health as well as productivity. Wellbeing of workers increases productivity, revenue, and reduces absenteeism which would greatly help the economy of the country.

Methodology

The study was conducted in the lac bangle production enterprise in Muzaffarpur district of Bihar state. Descriptive research design was adopted for the study. The two enterprises namely shagun lahathi bhandar at Kachi-pakki road and beauty lahathi cluster at Ratwara in Muzaffarpur were selected purposively. Total sample size was 120 and 60 respondents were taken with random sample techniques from each enterprise. The data was collected using the self structured interview schedule.

Results and Discussion

Assessment of occupational health hazards among artisans in lac bangle enterprise

During lac bangle production in industry they face various hazardous risk factors such as prolonged sitting near the heat, exposure to dust, using manually operated tools for making lac bangles etc. This study analysed hazardous working condition at workplace in lac bangle industry and also focused safety practices due to working stage.

Table 1: Distribution of respondents according to physical hazards

(N=120)

| Sl. No. | Physical hazards | N (%) | N (%) |
|---------|-------------------|---------|---------|
| 1. | Prolonged sitting | 94(78) | 26 (22) |
| 2. | Prolonged bending | 67 (56) | 53 (44) |
| 3. | Repetitive motion | 86 (72) | 34 (28) |
| 4. | Awkward posture | 82 (68) | 38 (32) |

Percentage is given in parenthesis

The data elicited in Table 1 regarding physical hazards includes that 78 percent of total respondents were working in prolonged sitting, 72 percent works in repetitive motion. Furthermore, it was also revealed workers adopt awkward posture and prolonged bending in 68 percent and 56 percent respectively. Therefore it was observed that prolonged sitting is the cause of various problems like back pain, leg pain and neck pain.

Table 2: Distribution of respondents according to biological hazards

(N=120)

| Sl. No. | Biological Health Hazards | N (%) | N (%) |
|---------|----------------------------|---------|---------|
| 1. | Other Infection | 66 (55) | 54 (45) |
| 2. | Hazardous chemical | 42 (35) | 78 (65) |
| 3. | Redness and rashes on skin | 34 (28) | 86 (72) |
| 4. | Respiratory infection | 85 (71) | 44 (37) |
| 5. | Dust | 96 (80) | 24 (20) |

The data pertaining to biological hazards revealed that workers reported hazards because of dust (80%), respiratory infection (71%) and other infection(55%) respectively. Other infections denote skin problem, fungal disease, infection of eyes etc.

Table 3: Distribution of respondents according to environmental hazards

(N=120)

| Sl. No. | Environmental Hazards | N (%) | N (%) |
|---------|--------------------------------|----------|----------|
| 1. | Excess noise | 48 (40) | 72 (60) |
| 2. | Excess heat | 106 (88) | 14 (12) |
| 3. | Improper lighting at workplace | 67 (56) | 53 (44) |
| 4. | Proper ventilation | 41 (34) | 79 (66) |
| 5. | Excess humidity | 41 (34) | 79 (66) |
| 6. | Proper space | 18 (15) | 102 (85) |

The data pertaining to environmental hazards revealed that 88 percent respondents were facing excess heat followed by 85 percent and 66 percent were expressing not proper space and ventilation at workplace respectively whereas around half of the total population they were expressing improper lighting at workplace.

Table 4: Distribution of respondents according to psychological hazards

(N=120)

| Sl. No. | Psychological hazards | N (%) | N (%) |
|---------|--------------------------|----------|----------|
| 1. | Job Stress | 78 (65) | 35 (42) |
| 2. | Sleep disorder | 15 (12) | 105 (87) |
| 3. | Lack of motivation | 86 (72) | 34 (28) |
| 4. | Fatigue and tiredness | 102 (85) | 18 (15) |
| 5. | Work performance targets | 94 (78) | 26 (22) |

The data drawn regarding psychological hazards revealed that 85 percent of the respondents were facing fatigue and tiredness while around 78 percent they were having work performance targets and 72 percent respondents were expressing lack of motivation along with only 65 percent respondents who were having job stress.

Table 5: Chi square testing to know the relationship between Age and occupational risk factors

| | Occupational risk factors | N (%) | Statistical Significant |
|-----|----------------------------------|----------|--|
| Age | Unhygienic working condition | 86 (72) | $\chi = 14.67^*$; $P = 0.0018$, $df = 2$ |
| | Unavailability of drinking water | 15 (13) | |
| | Back pain | 84(70) | |
| | Time pressure | 94(78) | |
| | Lack of control over work task | 78 (65) | |
| | Long working hours | 92(77) | |
| | Thermal discomfort | 106 (88) | |
| | Dust exposure | 96 (80) | |

Significant at 1% level of significant

The analysis is depicted in Table 5 bring to light that testing the chi square relationship between age and occupational risk factors. and. The value of Chi square was found 14.67* which is significant at 1% level of significance and P value estimated 0.0018, degree of freedom (df) was 2. We reject null hypothesis as P value is less than 0.05 and it will concluded from the above table the age of respondents are positively related to occupational risk factors.

Table 6: Chi square testing to know the relationship between Family type and Occupational risk factors

| | Occupational risk factors | N (%) | Statistical Significant |
|-------------|----------------------------------|----------|---|
| Family type | Unhygienic working condition | 86 (72) | 1.29 (NS); $\chi = 0.16$; $P = 0.5639$, $df = 1$ |
| | Unavailability of drinking water | 15 (13) | |
| | Back pain | 84(70) | |
| | Time pressure | 94(78) | |
| | Lack of control over work task | 78 (65) | |
| | Long working hours | 92(77) | |
| | Thermal discomfort | 106 (88) | |
| | Dust exposure | 96 (80) | |

NS = Non Significant

From the table 6 analyzed the chi square testing bring to light that relationship between family type and occupational risk factors. The value of Chi square was found 0.16 which is non significant and P value estimated 0.5639, degree of freedom (df) was 1. Therefore, it was concluded from the above table the overall independent variables are positively related to dependent variable. As p-value is greater than 0.05 we accept null hypothesis hence it concluded that there is significant difference in the overall independent variable with the dependent variable.

Conclusion

In the current study it was analysed most of the work has been done near the heat in sitting position during lac bangle production and these two factors are responsible for various health hazards like leg pain, back pain, heat stress, fatigue and tiredness and musculoskeletal disorder. These hazards make monotonous work and low productivity. Therefore, it is important to create awareness and impart training on occupational health hazards and practising about some ergonomic working rule at workplace This study concluded that lac bangle production is a manual task and it could be seen there was found significant variation at workplace regarding physical, environmental, biological and psychological hazards. Excess heat, adopted prolonged sitting position and time pressure during working hours are the main

factors of irregularities and monotonous of work. Poor posture give harmful effect on musculoskeletal system therefore it should have to practice corrective action on workplace so that it could be improvement of physical health and working environment. In this way we can say that lac bangle artisans are traditional craftsman and they need appropriate awareness, income and government support for their future sustaining so that art and craft work can run smoothly and protect Indian culture for upcoming generation.

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