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Work-Related Musculoskeletal Disorders, Job Stressors and Gender Responses in Foundry Industry

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The main aim of this paper was to identify job stressors, gender responses and association of psychosocial work stressors with prevalence of work related musculoskeletal disorders (MSDs) among foundry workers. The data were obtained with ergonomics checklist using Likert scale. The results of this study showed a high prevalence of MSDs among workers. The male workers were more prone to pain in neck while the female workers were more prone to MSDs in upper back and shoulders. Correlation analysis showed significant relationship of dimensions of work aspects with pain and discomfort. It proved that the work-related MSDs are the results of interaction of multiple stressors associated with work and work environment, and other personal factors. ANOVA indicated that the perception of work aspects as stressors differed significantly between male and female workers.

job stressors gender differences MSDs foundry workers Likert scale

1. INTRODUCTION

The Indian foundry industry is well established. According to the recent census of world casting production, India is the second largest casting producer with a production of ~7.44 million tonnes of various grades of castings. There are ~4500 units from which 80% are small scale units, 10% are medium and 10% are large scale units. The industry directly employs ~500 000 people and indirectly ~150 000 people. The small units depends mainly on manual labour.

Manual carrying is a major source of hazards and problems for industrial workers worldwide. Tasks which are performed manually constitute a considerable proportion of work done in industries around the globe, especially in developing areas. Manual carrying is defined as the unaided moving of objects, often combined with twisted and awkward postures, contributing to musculoskeletal disorders (MSDs). MSDs may be considered as work-related when pain in, e.g., the neck, shoulders or back, is associated with physical strain in body areas during work when there are no other visible signs of general illness affecting the musculoskeletal system. Labourers performing lifting/lowering, carrying and pushing/pulling heavy materials have increased rates of MSDs. In the military sector, stress of load carrying during prolonged marching can lead to clinical disorders**.** Overexertion and poor lifting techniques in manual carrying cause the majority of foundry workers' injuries [1, 2, 3]. Workers handling castings, hot core and molten metal suffer from traumatic injuries and burns because of inadequate personal protective equipment and poor work practices [3]. MSDs affect a large proportion of the working population and their quality of life. MSDs contribute to increasing costs of healthcare, work absence and higher social insurance expenditures in most welfare states.

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Job stress and its results, e.g., fall of concentration and ability to make decisions, absent-mindedness, poor memory and doubtfulness in people, also cause injuries to the workers [4]. Studies proved that stress played a role in 37% of the accidents and injuries in industry [5]. Age and work demands are also associated with MSDs [6]. Gender differences are important in the prevalence and severity of MSDs and the perception of work as stressor. The aim of this study was to examine different dimensions of work stressors among the foundry workers in Agra, India, and to explore its associations with the prevalence of MSDs and the existence of any gender differences.

2. JOB DESCRIPTION

2.1. Rotary Furnace

Working with a rotary furnace involves a wide range of tasks such as carrying and loading raw material to a furnace, carrying and filling fuel, rotating the furnace, opening a tapping hole, and filling a ladle with molten metal. These tasks are repetitive. The furnace is used daily for 22–24 h. Workers lift oil manually into tanks placed at a height of ~3 m.

2.2. Cupola Furnace

In a cupola furnace, castings are made of molten metal according to an end-user specification. Working with a cupola furnace involves a wide range of tasks such as making a pattern, making and assembling a mould, melting and refining metal, pouring metal into a mould and removing adherent sand and superfluous metal from a finished casting. Working with a cupola furnace is a hard physical job involving carrying heavy loads. Workers are exposed to heat of molten metal and vibration of tools. Levels of total and respirable dust, concentrations of NO_2, SO and CO, concentrations of SiO_2 and Pb are very dangerous for workers.

3. METHODS

The study involved 516 workers from foundries in Agra, (Table 1). The subjects were divided into two groups: rotary workers (152 men, 76 women) and cupola workers (101 men, 187 women). An interviewer explained the questionnaire to the subjects in their local language. Most subjects had low economic status and received low salary. Their physical capabilities and possible health risks were not respected.

3.1. Survey

The study used interviewer-administered questionnaires. A National Institute for Occupational Safety and Research (NIOSH) checklist evaluated the prevalence of self-reported MSDs among the subjects [7]. The subjects answered questions on severity of pain in the past 2 years, days of work lost because of pain, perception on the causes of pain and remedial measures taken to alleviate pain. Severity of pain was scored on a 1–4 scale (*mild*, *moderate*, *severe* and *unbearable*) and loss of productivity was measured in terms of days of work lost because of pain and restricted duties. Informed consent was obtained from each participant before starting the study.

TABLE 1. Reasons for No Participation in Study

	Rotary Workers				Cupola Workers					
	Male		Female		Male		Female		Total	
Reason	*n*	%	*n*	%	*n*	%	*n*	%	*N*	%
Invited workers	189	100	110	100	145	100	225	100	669	100
not available during study	15	7.9	12	10.9	8	5.5	11	4.9	46	6.9
previous musculoskeletal disorders	7	3.7	6	5.4	10	6.9	8	3.5	31	4.6
poor response	11	5.8	9	8.2	18	12.4	13	5.8	51	7.6
reason unknown	4	2.1	7	6.4	8	5.5	6	2.7	25	3.7
Subjects	152	80.5	76	69.1	101	69.7	187	83.1	516	77.1

A multimethod ergonomics checklist identified aspects of work and stressors [8]. The ergonomics checkpoints used in this study (see Appendix A, p. 373) include the enquiry on work system analysis such as job characteristics, physical and psychosocial stresses of work, job diagnostic dimensions, constraints of workplace and tools, and hazards of physical environment. The checklist entries were graded on a 1–5 Likert scale (1 = *strong disagreement*, 5 = *strong agreement*). A low value was a positive indicator of the perception of absence of stress. The relative loading of scores for each section of the checkpoints was the ratio of the summated score to maximum cumulative scores. The relative loadings for each work stressors would be 0–1 and the loading of each aspect of work of ≥.5 was considered as a stressor [9]. Values greater than the middle value of the maximum possible score were positive indicators of stressors.

4. DATA ANALYSIS

SPSS version 17 was used for data analysis. The descriptive statistics, including prevalence percentage and odds ratio (*OR*) of the test measures were obtained with reference to subject groups, personal characteristics, physiological and psychosocial stressors. Kolmogorov–Smirnov test checked the normality of data. The distribution of the data for most variables was normal ($p < .05$) in both rotary and cupola workers. To understand the effects of work stressors and characteristics of the worker with MSDs, multivariate analysis was done using binary logistic regression model with backward elimination method. Pearson correlation examined the relationship of the work stressors and MSDs. Cronbach's α values for the ergonomics checklists for the rotary and cupola workers were .672–.848; the values indicated moderate to adequate reliability. Analysis of variance (ANOVA) was used to compare responses of the workers to different work stressors (adjusted for age and gender).

5. RESULTS

Mean age and work experience of the male subjects were significantly higher ($p < .001$) than those of the female subjects in both rotary and cupola furnaces (Table 2). The rotary workers worked longer per day than the cupola workers ($p < .001$), which also varied significantly between genders. The male subjects were more literate than the female subjects in both foundries.

5.1. Prevalence of MSDs

Figure 1 shows that ~84% of male and ~76% of female rotary workers reported work-related MSDs. The female rotary and cupola workers were more prone to developing pain and discomfort in the upper back (*OR* 2.4, 95% CI [1.5, 4.1], $p < .05$ and *OR* 2.3, 95% CI [2.1, 3.7], $p < .01$, respectively) and shoulders (*OR* 1.6, 95% CI [1.4, 4.2], $p < .05$ and *OR* 2.3, 95% CI [1.5, 2.9], $p < .05$, respectively). The male workers were more prone to developing pain in the neck (*OR* 3.7, 95% CI [1.9, 4.8], $p < .001$). For the female rotary workers, age over 25 years ($p < .05$), marital status ($p < .05$) and work experience of over 10 years ($p < .05$) had a significant influence on MSDs (Table 3). The male rotary (*OR* 6.4) and cupola (*OR* 2.5) workers had greater productivity loss because of days of work lost because of pain. The subjects had mixed responses on their perception of the cause of pain and discomfort, and were indifferent to remedial measures (Table 4).

TABLE 2. Characteristics of Subjects

	Rotary Workers		Cupola Workers	
Characteristic	**Male (*n* = 152)**	**Female (*n* = 76)**	**Male (*n* = 101)**	**Female (*n* = 187)**
Age (years) [a]	44.2 (10.5)	30.4 (10.5)	43.6 (11.5)	32.9 (11.4)
Work experience (years) [a]	24.7 (9.2)	13.4 (8.7)	21 (11.5)	14.2 (10.6)
Work (hours/day) [a]	10.5 (3.7)	11.4 (3.2)	9.3 (2.6)	7.4 (2.4)
Literacy [b]	76	71	82	71

Notes. a = *M* (*SD*), b = percentage.

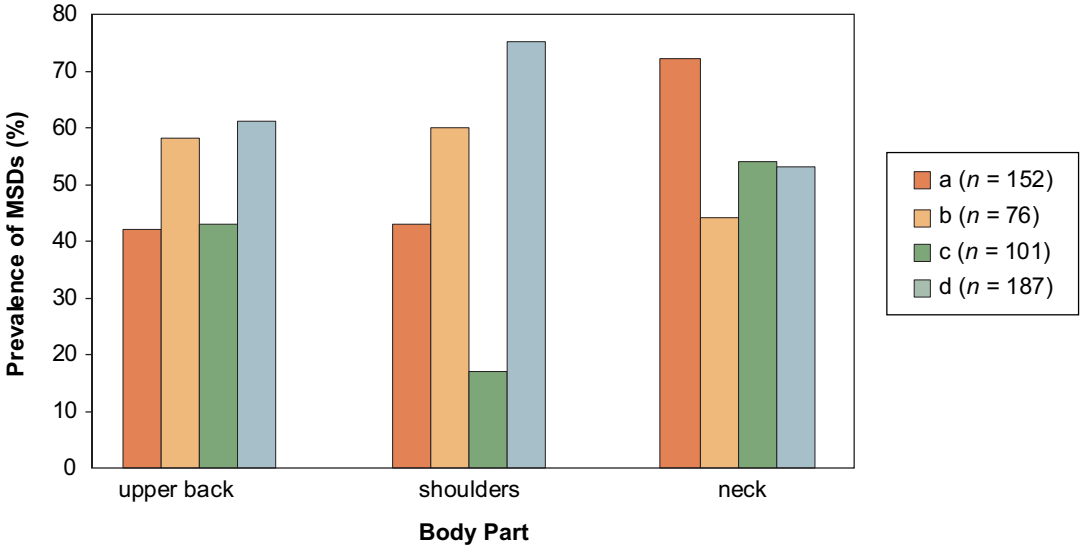

Figure 1. Prevalence of musculoskeletal disorders by body part in rotary male workers (a), rotary female workers (b), cupola male workers (c), cupola female workers (d).

TABLE 3. Characteristics of Subjects and Their Association With Musculoskeletal Disorders

	Rotary Workers					
	Male			Female		
Characteristic	***OR***	**95% CI**	***p***	***OR***	**95% CI**	***p***
Age >25 years[a]	1.1	[1.3, 1.7]	.60	1.5	[0.6, 4.9]	.30
Working hours >8 h[b]	1.2	[1.4, 1.9]	.70	0.7	[0.3, 4.2]	.80
Married[c]	2.2	[0.7, 13.6]	.40	1.6	[0.7, 4.6]	.30
Work experience >10 years[d]	0.6	[0.1, 3.4]	.60	1.4	[0.3, 3.2]	.60
Literate[e]	1.6	[0.5, 4.8]	.20	2.5	[0.5, 5.6]	.05
	Cupola Workers					
	Male			Female		
Characteristic	***OR***	**95% CI**	***p***	***OR***	**95% CI**	***p***
Age >25 years[a]	0.7	[0.2, 5.2]	.70	3.1	[1.4, 6.8]	.07
Working hours >8 h[b]	9.8	[9.8, 14.2]	.20	2.7	[0.8, 5.1]	.80
Married[c]	0.4	[0.3, 5.3]	.40	2.3	[1.3, 4.1]	.07
Work experience >10 years[d]	1.3	[0.7, 3.1]	.70	2.7	[1.3, 3.6]	.08
Literate[e]	0.8	[0.2, 3.2]	.60	3.2	[0.8, 5.3]	.04

Notes. OR = odds ratio, CI = confidence interval; a = against ≤25 years, b = against ≤8 h, c = against nonmarried, d = against ≤10 years, e = against illiterate.

5.2. Work aspects and MSDs

The ergonomics checklists elucidated multiple aspects of work of the subjects. Figures 2–3 show responses of the subjects on work stressors as a function of gender. The rotary male workers identified skill acquisition ($p < .05$), work posture ($p < .001$), noisy workplace ($p < .01$), work schedules ($p < .001$), mental overload ($p < .001$), and work methods and tools ($p < .001$) as more stressful than the female workers who identified demand of job specialization ($p < .001$), workplace designs ($p < .01$), and working environment ($p < 001$) as significantly stressful. The cupola male workers identified job specialization ($p < .001$), task situation ($p < .001$), manual materials handling ($p < .001$), workplace designs ($p < .001$), work environment ($p < .01$), work safety ($p < .05$) and job autonomy ($p < .001$) as more stressful than the female workers who perceived

TABLE 4. Pain, Remedial Measures and Causes of Musculoskeletal Disorders

	Rotary Workers				
Variable	**Male**	**Female**	***OR***	**95% CI**	***p***
Pain[a]					
severe	18	15	0.8	[0.4, 1.7]	*ns*
mild	52	40	1.4	[0.8, 3.1]	*ns*
Productivity loss[a]	26	9	6.4	[1.7, 15.6]	.001
Cause of pain[a]					
posture	18	6	6.1	[1.3, 15.9]	.01
work equipment	23	19	1.7	[0.6, 3.7]	*ns*
work method	23	14	1.9	[0.7, 3.2]	*ns*
exhaustion and work load	24	8	3.6	[1.4, 9.2]	.01
personal reasons and others	6	22	0.5	[0.6, 1.3]	*ns*
Remedial measure[a]					
pain killer oral medicine (self-medication)	21	16	1.9	[0.7, 4.1]	*ns*
medical aid (consultation)	13	17	0.4	[2.3, 4.6]	*ns*
balm massage	12	13	0.8	[2.6, 3.1]	*ns*
hot water foot bath	7	4	1.3	[0.6, 4.9]	*ns*
rest	12	16	0.7	[0.6, 2.4]	*ns*
no remedial measure	61	67	0.8	[0.7, 1.8]	*ns*
	Cupola Workers				
Variable	**Male**	**Female**	***OR***	**95% CI**	***p***
Pain[a]					
severe	24	16	2.3	[1.1, 3.1]	.05
mild	50	34	0.5	[0.4, 0.7]	*ns*
Productivity loss[a]	24	13	2.5	[1.4, 5.9]	.01
Cause of pain[a]					
posture	26	17	1.7	[1.3, 4.1]	.05
work equipment	54	67	0.5	[0.4, 0.9]	*ns*
work method	49	56	0.6	[0.7, 2.3]	*ns*
exhaustion and work load	16	31	0.7	[0.5, 0.8]	*ns*
personal reasons and others	4	7	0.5	[0.3, 2.4]	*ns*
Remedial measure[a]					
pain killer oral medicine (self-medication)	27	12	3.2	[1.4, 5.8]	.01
medical aid (consultation)	3	9	0.5	[0.3, 0.7]	*ns*
balm massage	7	12	0.7	[0.4, 2.4]	*ns*
hot water foot bath	9	13	0.6	[0.3, 1.3]	*ns*
rest	7	13	0.7	[0.6, 2.3]	*ns*
no remedial measure	39	41	0.9	[0.7, 1.7]	*ns*

Notes. OR = odds ratio, CI = confidence interval; a = percentage.

auxiliary support ($p < .05$) and noisy work environment ($p < .001$) as more stressful.

5.3. Psychosocial Variables and MSDs

Over 57%–72% of the subjects complained about chronic fatigue. About 76% rotary female workers (*OR* 2.3) and 47% cupola male workers (*OR* 6.1) had poor job satisfaction with positive association to developing MSDs in the upper back, shoulders or neck (Table 5). Job dis-satisfaction (*OR* 6.1, $p < .05$) among the cupola workers and cognitive anxiety among both male rotary (OR 5.1, $p < .05$) and male cupola workers (*OR* 7.1, $p < .05$) had a positive effect on the occurrence of MSDs.

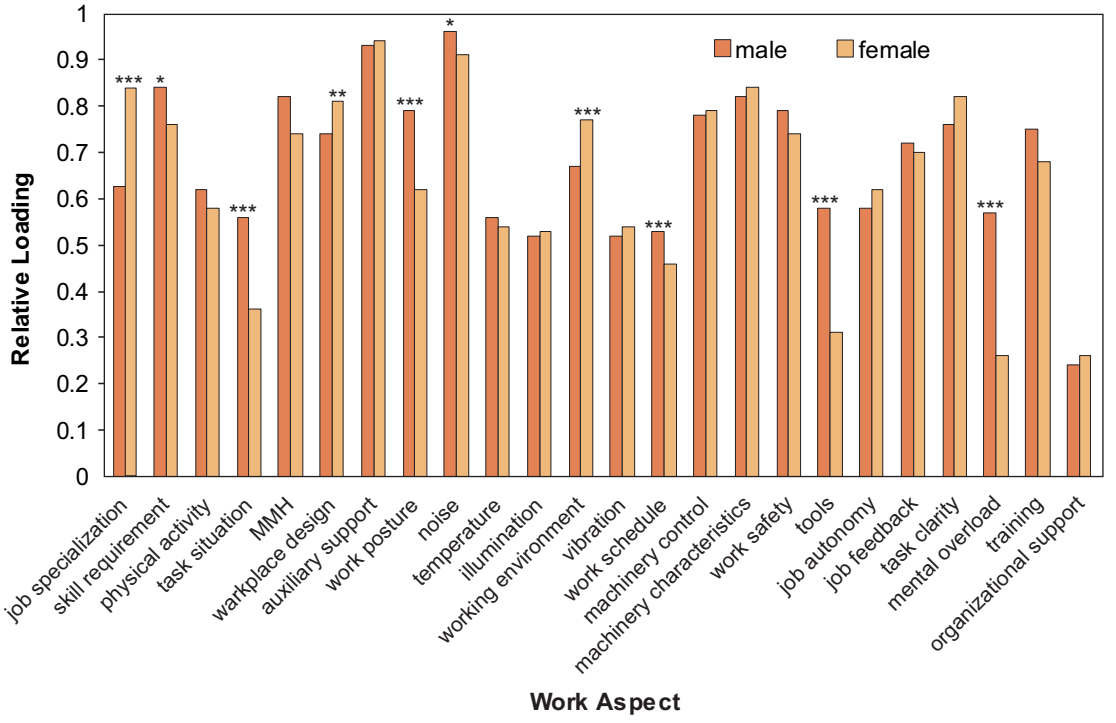

Figure 2. Responses on work aspects (rotary). *Notes.* * $p < .05$, ** $p < .01$, *** $p < .001$; MMH = manual materials handling.

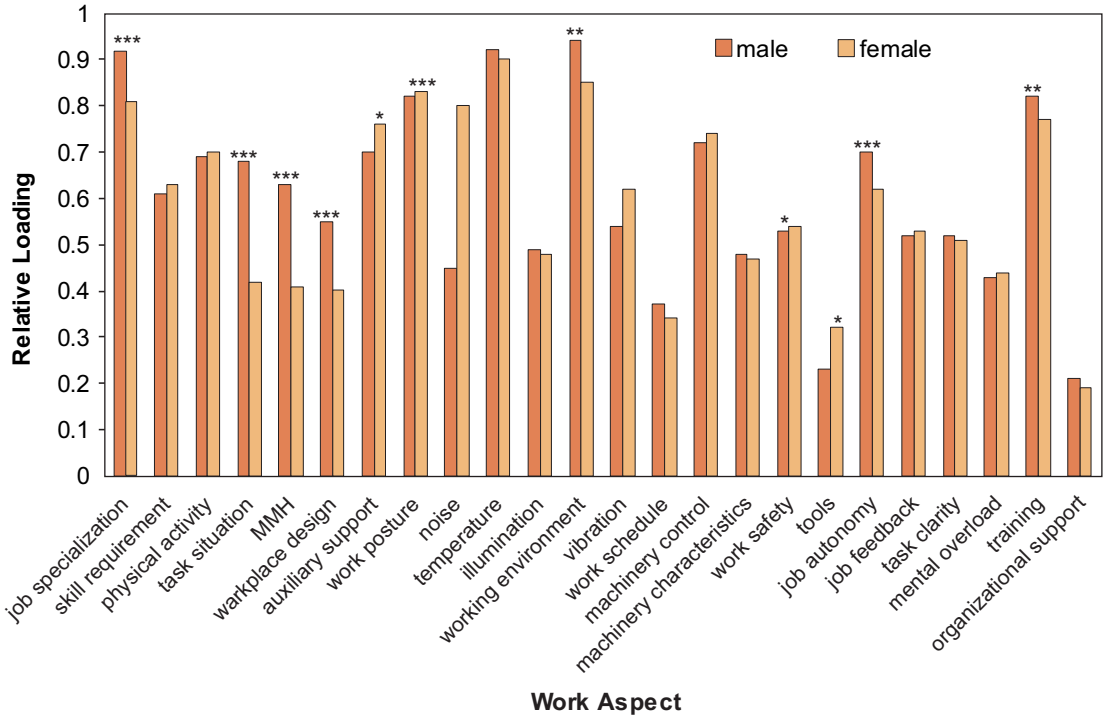

Figure 3. Responses on work aspects (cupola). *Notes.* * $p < .05$, ** $p < .01$, *** $p < .001$; MMH = manual materials handling.

Lack of task clarity (*OR* 4.7, $p < .001$) and poor job feedback (*OR* 8.1, $p < .001$) also influenced the development of MSDs among the male cupola workers. Mental overload had significant effect on the occurrence of MSDs among the male (*OR* 4.9, $p < .001$) and the female (*OR* 4.3, $p < .001$) cupola workers. The higher social and domestic disruptions among the female workers (rotary 72%, cupola 64%) had no significant impact on MSDs. Multivariate analysis indicated that job experience ≤10 years (*OR* 4.2, $p < .05$), poor working environment (*OR* 12.3, $p < .05$), literacy (*OR* 3.25, $p < .01$) and marriage (*OR* 6.2, $p < .05$) contributed to the occurrence of pain among the rotary workers. Age over 25 years (*OR* 4.3, $p < .05$), poor machinery design (*OR* 3.4, $p < .002$), high mental overload (*OR* 6.2, $p < .001$) and performance of specialized job (*OR* 16.2, $p < .05$) had a significant impact on occurrence of pain among the cupola workers. Table 6 shows the results of the correlation coefficient between the work stressors and the occurrence of MSDs.

6. DISCUSSION AND CONCLUSION

The foundry industry in Agra is one of the oldest industrial clusters of the country. The foundry industry is a leading business in Agra with ~340 units producing cast iron pipe fittings, motor and tractor parts, weights and measures, machinery for glass and textile factories, diesel engines, pumping sets, generators and agricultural implements. Most units are small and employ directly and indirectly ~200 000 people. The study on foundry workers in Agra shows a self-reported prevalence of MSDs among the male and female workers caused by multidimensional work stressors. The results of the statistical analysis show that different work stressors are responsible for the prevalence of MSDs among the workers. The study shows the difference between the male and female workers' responses to the work stressors. The study also shows that psychosocial variables are relevant in the difference between males and females [9].

TABLE 5. Psychosocial Variables and Their Association With Musculoskeletal Disorders as Indicated by Risk Estimate

	Rotary Workers							
	Male				Female			
Variable	**%**	***OR***	**95% CI**	***p***	**%**	***OR***	**95% CI**	***p***
Chronic fatigue	59	1.4	[0.6, 3.3]	.37	57	0.6	[0.7, 3.3]	.43
Job dissatisfaction	43	0.7	[0.7, 2.7]	.21	76	2.3	[0.4, 9.7]	.48
Cognitive anxiety	61	5.1	[1.3, 18.3]	.03	41	3.1	[0.5, 3.8]	.32
Job autonomy	79	1.4	[0.6, 4.3]	.31	64	0.4	[0.2, 4.4]	.60
Job feedback	81	4.8	[1.7, 23.6]	.02	88	3.2	[0.5, 11.3]	.70
Task clarity	74	2.7	[0.4, 5.2]	.41	83	0.7	[0.3, 7.3]	.40
Mental overload	63	0.7	[0.7, 3.1]	.03	71	0.6	[0.2, 5.7]	.50
Socio-domestic disruption	65	0.6	[0.7, 3.1]	.43	72	1.3	[0.6, 2.9]	.79
	Cupola Workers							
	Male				**Female**			
Variable	**%**	***OR***	**95% CI**	***p***	**%**	***OR***	**95% CI**	***p***
Chronic fatigue	58	2.3	[0.5, 4.5]	.30	72	0.6	[0.3, 3.6]	.40
Job dissatisfaction	47	6.1	[2.3, 21.7]	.04	27	3.1	[0.3, 3.9]	.50
Cognitive anxiety	25	7.1	[2.7, 11.6]	.04	16	3.7	[0.6, 22.7]	.04
Job autonomy	74	3.8	[1.4, 1.9]	.63	82	3.4	[0.6, 7.3]	.38
Job feedback	92	8.1	[2.1, 14.6]	.005	63	2.5	[3.7, 14.7]	.20
Task clarity	81	4.7	[1.6, 11.2]	.03	58	3.6	[0.7, 5.8]	.47
Mental overload	72	4.9	[2.3, 31.3]	.002	51	4.3	[2.3, 17.4]	.01
Socio-domestic disruption	71	1.9	[0.7, 4.2]	.48	64	0.7	[0.4, 15.1]	.30

Notes. OR = odds ratio, CI = confidence interval.

TABLE 6. Correlation Between Work Aspects and Musculoskeletal Disorders

	Rotary					
	Male			Female		
Work Aspect	**Upper Back**	**Shoulders**	**Neck**	**Upper Back**	**Shoulders**	**Neck**
Skill requirement	***		**			
Manual materials handling	*	**	*			
Task situation						
Workplace design						
Auxiliary support	*	**				
Strenuous work posture		*				
Hot environment	**				*	
Noise at workplace						**
Less illumination						
Working environment	*	**				
Work schedules						
Machine characteristics						
Machinery control				*		
Tool mismatch						***
Work safety						
Poor job autonomy	*			***		
Poor job feedback						
Task clarity						
Mental overload		**		*	**	

	Cupola					
	Male			Female		
Work Aspect	**Upper Back**	**Shoulders**	**Neck**	**Upper Back**	**Shoulders**	**Neck**
Skill requirement		*				
Manual materials handling	*	*		*	*	
Task situation	*	**	*			
Workplace design	**	*	**	**		*
Auxiliary support		*				
Strenuous work posture	*		*			*
Hot environment				*		
Noise at workplace			*		*	
Less illumination					*	
Working environment				*		
Work schedules		*				
Machine characteristics	*			*		*
Machinery control		*				*
Tool mismatch				**		*
Work safety	*	*		***		*
Poor job autonomy	*	**				
Poor job feedback			*	***		**
Task clarity	*	*	*	**		**
Mental overload	*	*	***	***		

Notes. * $p < .05$; ** $p < .01$; *** $p < .001$.

Work-related MSDs are a major health problems among workers in both industrialized and industrially developing countries [10, 11]. Heinrich's study reveals that the human factor is the main cause of accidents [12]. Researchers believe that unsafe behaviors are the key factor for over 70% of occupational accidents [13]. High occupational stress is one of the most important causes of unsafe behaviors except for lack of necessary skills, inherent characteristics, incorrect beliefs and attitudes [8]. ILO and NIOSH studies on foundry workers confirmed the prevalence of MSDs [14, 15]. In the present study, ~72% of cupola male workers had neck pain and 75% cupola female workers had shoulder pain. The workers who perceived their work as monotonous or boring were at an increased risk of developing shoulder pain [16]. The reasons of a high prevalence of MSDs among the foundry workers are awkward work postures, lifting heavy loads and carrying loads for a long distance. This study observed that long working hours (over 8 h) and long job duration (over 10 years) had a positive impact on the occurrence of MSDs among women, as observed by Costa, Sarton and Akerstedt [17]. Long working hours deteriorate both physical and mental health [18, 19, 20]. About 67% of women had primary education only and the remaining were illiterate, which made them vulnerable to psychosocial stress (exploitation, less bargaining power) [21]. Psychosocial stressors are associated with MSDs [22]. In cupola foundries, fettling workers are exposed to noise over 100 dB(*A*) and most workers spend long hours in hot environments, which makes them vulnerable to MSDs. Poor housekeeping and poorly lighted area in foundries cause slips, trips and other types of falls on walking and working surfaces [23]. Correlation analysis showed a significant relationship of dimensions of work aspects (Table 6) with pain and discomfort. This proves that work-related MSDs are the results of an interaction of multiple stressors associated with work and the working environment, and other personal factors. ANOVA indicated that the perception of work aspects as stressors differs significantly between male and female workers. Differences in the prevalence of MSDs among male and female workers need to by analyzed, intervention strategies must be developed considering the gender differences among the rotary and cupola workers. Gender differences in the prevalence and occupational consequences of MSDs are consistently found in epidemiological studies. Today, occupational accidents are potential threats because of their serious humanitarian, economic, social and environmental consequences [24]. Worker's health and well-being has gained attention because of the increased number of workers' compensation claims and considerable personal, organizational and medical costs associated with stress-related illnesses [25]. Healthcare expenditures of workers who report high levels of stress are 50% higher than other workers [26]. Job stress should be recognized as an important factor causing occupational injuries among foundry workers.

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Appendix A. Ergonomics checklist

Work Aspect	Details
Job specialization	specific job, production volume, quality of work and multiple task
Skill requirement	training, knowledge, skill required for job, frequent mistakes at work, job rotation and machine paced work
Physical work/activity	target oriented pace, repetitive movements, muscular exertion and working position
Manual materials handling	load handling mode, load weight, distance, height, etc.
Task situation	material loading, handle position, unsafe practices and mechanical aids
Workplace design	work distance away from normal reach, poor clearance space, presence of obstacles
Auxiliary support	storage space, restricted passage, design mismatches of staircases, awkward positioning of limbs for hand foot hold, poor supports
Work posture	arm stretch, wrist extension, neck/shoulder angle, bent and twisted, one sided body movement
Noise	noise at work area, absence of sound isolation and emergence measures.
Climate	temperature, humidity, ventilation device at workplace
Lighting	illumination intensity, presence of shadows, etc.
Work environment	presence of dust, poor ventilation, monitoring of the workplace for chemical toxicants, absence of protective measures
Vibration	continuous exposure and possibility to eliminate or isolate
Work schedule	working at night and overtime, uneven distribution of work tasks, incorporation of work rest and working at a predetermined pace
Machinery control	awkward positioning, mismatched dimensions with body parts, force, speed and precision required in operation, and unpleasant feelings while operation
Machine characteristics	maintenance, high noise level and poor visibility of machine due to dust
Tools	using with alternate hands, weight, handle form and position
Work safety	removal and fastening of accessories, poor positioning, contact with body parts, difficult to inspect and lack of instruction for safe operation
Job autonomy	time schedules, absence of assistance and insufficient people for assistance of work, rigid method of work
Task clarity	unambiguous goal, job restrictiveness, work conflict, boredom, poor scope
Mental overload	high workload, repetitive act, superficial attention, multiple choice and simple motor act
Training	advancement to higher levels, lack of opportunities, poor training and incentives
Organizational commitment	organizational role, medical services, control absenteeism, labour inspection and monitoring