



Occupational health hazards of women construction workers in Coimbatore city

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ABSTRACT

Health at work and healthy work environment are amongst the most valuable assets of individuals, communities and countries. Occupational health is an important strategy not only to ensure the health of workers, but also to contribute positively to productivity, quality of products, work motivation, job satisfaction and thereby to the overall quality of life of individuals and society. The construction industry is responsible for around four per cent of particulate emissions along with water, air and noise pollution. The study was conducted in construction sites in Coimbatore city. Women construction workers who spend most of their working time in this environment were found to be affected by inhaling the polluted air, Water available for use was also found to be contaminated with dust/dirt (68%), debris (32%) emerging from construction activity and being exposed to noise, high levels of dust (typically from concrete, cement, wood and stone) which get carried for large distances over a long period of time. Headache, nausea, irritation, partial deafness, which they endured by the end of the day eventually may lead to serious hearing problems in the long run. The samples doubtlessly inhaled polluted air for more than eight hours a day. The study revealed that the selected samples were exposed to intense heat of the sun, rain and high humidity in addition to physical workload combined with awkward posture during performance of activities. Such exposures leave tell tale marks on their health status and they were found to suffer from exposure – specific ailments.

INTRODUCTION

Health at work and healthy work environment are amongst the most valuable assets of individuals, communities and countries (Chandra, 2011 and WHO, 1995). Occupational health is an important strategy not only to ensure the health of workers, but also to contribute positively to productivity, quality of products, work motivation, job satisfaction and thereby to the overall quality of life of individuals and society.

In India, public health emphasizes more on communicable diseases, malnutrition and reproductive healthcare. Majority of the population is working in industrial sector. Increasing burden of occupational hazards and changing occupational morbidity are not addressed. Still occupational health is seen as a secondary issue while formulating health policy and health-related programmes (Pandve and Bhuyar, 2008).

In India, occupational health is more than simply a health issue, which includes child labour, poor industrial

legislation, vast informal sector, less attention to industrial hygiene and poor surveillance data. It is not integrated with primary healthcare, and it is the mandate of the Ministry of Labour, not the Ministry of Health. Occupational health in India has to compete with primary health and curative health for its budget. Since 1950, the International Labour Organization (ILO) and the WHO have shared a common definition of occupational health. It was adopted by the Joint ILO/WHO Committee on Occupational Health at its first session in 1950 and revised at its twelfth session in 1995. The definition reads: Occupational health should aim at: the promotion and maintenance of the highest degree of physical, mental and social well-being of workers in all occupations; the prevention amongst workers of departures from health caused by their working conditions; the protection of workers in their employment from risks resulting from factors adverse to health; the placing and maintenance of the worker in an occupational environment adapted to his physiological and psychological capabilities; and, to summarize, the adaptation of work to man (woman) and of each man (woman) to his/ her job” (<http://www.answers.com/topic/advisory-committee-on-construction-safety-and-health>).

Construction is by its very nature a problem in ergonomics requiring work above head height and below waist level (Smallwood and Haupt, 2007). Work related musculoskeletal disorders among women in informal sectors are a major health problem in India (Nag, 2009). Construction is a physically demanding occupation, these women workers often lift, stoop, kneel, twist, grip, stretch, reach overhead, or work in other awkward positions to do a job are at risk of developing work and posture – related musculoskeletal disorders and ortho problems. These problems among them is all the more prominent, but invisible. These problems do not surface but stay invisible as these women and their socio-economic status demand them to earn.

MATERIAL AND METHODS

A micro level study of 500 construction workers was conducted in Coimbatore city. Personal interview along with observation was the method selected for conduct of the study. It reveals that Workers mostly comprised of landless labourers moving to cities in search of works, where they were exploited by contractors because they were socially backward, unorganized, uninformed, and

poor. Work was characterized by its casual nature, temporary relationship between employers and employees, lack of basic amenities and inadequacy of welfare facilities. The extent of unionization in the construction industry being very low due to migratory and seasonal nature of workers and scattered location of work sites, added to their plight. They lived in huts or under canvas, where no sanitary facilities and creche facilities are available. Children of all ages were brought along with them to the worksites. Workers were exposed to scorching heat, rain, cold, dust, molten materials etc.

OBSERVATIONS AND ANALYSIS

The Results and Discussion were explained with the following headings and sub headings :

Working environment :

Work environment means the milieu around a person - the room, home or place where one is working. It is all about materialistic things and living beings that are around when one is working, literally called the ‘working condition’. In recent years as Pal *et al.* (2001) state ‘working conditions’ has emerged as a multi-attribute function (<http://www.blurtit.com>). Hence, this part of the study analyses the working environment conditions of the selected sample under:

- Ambience in the work area
- Amenities available
- Workplace culture
- Safety culture

Ambience in the work area :

Elements constituting the working conditions vector namely are: occupational safety, health, fire prevention and ergonomics (Pal *et al.*, 2001). The elements of vector of ergonomics considered for satisfaction of the samples’ well being was analyzed in the work area. Hence, this part of the study portrays the status quo of the existing work environment with particular reference to:

- Pollution
- Temperature and humidity
- Seasons impact on activities

Work environment pollution :

The construction industry is responsible for around four per cent of particulate emissions along with water, air and noise pollution (<http://www.sustainablebuild.co>).

uk/ConstructionMethodsCategory). Women construction workers who spend most of their working time in this environment were found to be affected by inhaling the polluted air, drinking the polluted water and being exposed to noise. The physical environments in which they work proved to be hazardous as they worked in the open space. Table 1 gives the details on the pollution existing and reported by the samples in the work environment.

Type	Particulars	Per cent responding*
Air	Dust	100
	Paint smell	43
Water	Dust and dirt	68
	Debris	32
Noise	Concrete mixer	90
	Cutting roads	75
	Vehicles/traffic	63
	Welding	52
	Drilling	50
	Breaking stones	50

* Multiple response

Observation coupled with the reports from all the samples studied revealed that all construction sites generated high levels of dust (typically from concrete, cement, wood and stone) which get carried for large distances over a long period of time and the smell of paint in the final stages of construction. The samples doubtlessly inhaled polluted air for more than eight hours a day. Water available for use was also found to be contaminated with dust/dirt (68%) and debris (32%) emerging from construction activity (Fig. 1). Drinking water was not polluted as the selected samples were provided with potable water in their sites they worked. However, they used contaminated water for ablution and washing vessels after eating.

The surveyed women workers revealed that 90 per cent of them were affected by the noise produced by concrete mixer and general clutter specific of construction sites. Noises polluted by passing vehicles, welding and drilling were reported as nuisance by 63, 52 and 50 per cent of samples, respectively. It is important to note that though these workers were working away from the place of noise production, the impacts are inevitable. Manual cutting of iron rods and wood, laying floor and concrete beams, railing, breaking stone, digging, demolition of constructed parts, wood work and carpentry were typical

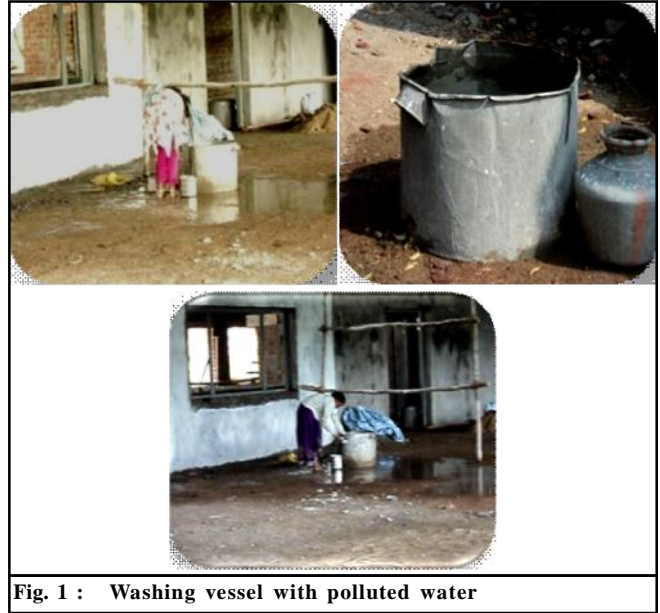


Fig. 1 : Washing vessel with polluted water

sources of noise in the sites, which they were accustomed to yet found difficult to tolerate. Headache, nausea, irritation, partial deafness, which they endured by the end of the day eventually may lead to serious hearing problems in the long run.

Temperature and humidity :

Various ambient working conditions can cause a hazard to the safety and health of workers, alongside acute effects which can lead directly to accidents. These are long-term effects, which can give rise to chronic damage to health and to a reduction of efficiency and dissatisfaction on the part of the workers (<http://www.gefaehrdungsbeurleiung.de>).

The study revealed that the selected samples were exposed to intense heat of the sun, rain and high humidity in addition to physical workload combined with awkward posture during performance of activities. Such exposures leave tell tale marks on their health status and they were found to suffer from exposure – specific ailments. To name a few; severe headache, dehydration (due to intense heat of the sun), cold/influenza and fever (rain) serious migraine etc. (humidity).

Seasons impact on activities :

The workers have to work in winter, summer, autumn or rainy season. Exposure to all types of weather conditions, were causal factors for health disorders and

they may fall sick report Tiwary and Gangopadhyay (2011). Women construction workers felt February-May spell as the most conducive environment for working while they hated the May-July season, because the intensity of heat during summer tired and fatigued them; yet their economic necessities forced them to work ignoring their feeling of tiredness. The sample chosen for the study was acclimatized to hot weather hence, they could work even during hot summer, despite becoming dehydrated. In winter among the selected sample the 'aged' expressed difficulty to work in the morning hours as they suffered from respiratory and arthritis problems. During rainy season, the women workers found it difficult to get a job as most of the construction sites preferred not to work. Hence, they suffered from financial problems. Some of the samples revealed if at all they got job and worked in the rain, they suffered from cold, cough and throat infection as they were not provided with any personal protective clothing. In addition to seasonal changes, environmental conditions such as sunlight, wind direction and speed, and daily temperature fluctuations affected their safety thresholds. Inhalation of air borne particles varied depending on wind conditions. Windy days were also a problem for women workers as they worked in the open space with mud, sand and cement. So, when the wind blew they inhaled all the dust and polluted their system including eyes making it difficult to carry out their activities. Eventually they suffered from allergies.

The study revealed that the samples were greatly affected during all seasons by some reason or the other (Fig. 2). Their conditions were worst as they were not provided with any personal protective clothing for the seasons. These factors not only added to their physical and mental agony but also were highly drudgery causing.

Amenities available :

Privacy for sanitation in the workplace is invisible in



Fig. 2 : Working in summer and winter with difficulty

construction sites, state Tiwary and Gangopadhyay (2011). The study conducted pointed to similar results as presence of sanitary and water facilities for personal activities (nature's call) were difficult to be found in the locale studied. The samples also reported that these were frequently a problem on a new construction site and if at all temporary facilities were provided they were usually unisex, often without privacy and generally not well maintained. These features were there to be observed too. In many sites the women workers were not provided with any sanitary and potable water facilities. They were found to contain their urges for nature's call and thirst, thus, self-allying themselves to urinary tract infections, electrolyte imbalances and some much health disorders.

This industry differs from most other industries in that it is constantly in flux. Working conditions remain seldom the same from one day to the next, posing many challenges to the workers as Rowlinson (2000); Haupt (2001) and Hinze and Olbina (2008), also had pointed out. Many things are best learned by experience, but safety is not one of them. Safety equipment such as hard hats, safety boots, gloves, goggles and other prescribed safety gear are reportedly not provided. Many even lack awareness of the value of safety equipment, and remark that such gear could interfere with their movements. When anyone of the women suffered injury or cut, they just put something on it and restored working. First-aid boxes were not found in any of the sites as Nathan (1999), also had reported in his study.

Workplace culture :

Construction field is one of the oldest activities of mankind where the chances of getting exploited and dominated is more compared to that in other fields, caused mainly because of the dependence of female workers on male workers state Kamatchi Devi and Jeyanthi (2008). In the present study too interaction was found to get strained due to three major factors existing in the sector. They are:

- Wage discrimination
- Domination
- Gender – related discrimination

Wage discrimination :

Discrimination in wages and working conditions between different groups was found to be rife. The study revealed the women to be assigned only unskilled jobs

for which they were paid Rs. 120/- to 150/- a day till 2011 (revised to Rs. 250/- in 2012 in Coimbatore City). They were thus, found to spend their productive years only in such unskilled, casual/ contractual labour as is evident from 13, 15 and 20 per cent who had remained/ continued in these mean jobs for 16 – 20, 21 – 25 years and 26 – 30 years, respectively. Monotony and casualisation/feminization of labour are thus, made evident. Barnabas *et al.* (2009) also found in a study conducted during the same period, that the actual wages of women studied ranged from Rs. 51 to 160/- a day whereas the daily wages that men received ranged from Rs. 71 to more than Rs. 250/-. Many women were employed on wages below the minimum wages set by the government, namely Rs. 120/- per day.

Domination :

Construction is the worst model of patriarchal culture. The contractors, the gang leader, the mistry (foreman) all believe in male domination. Not only the contractors, but also the engineers/chief engineers would do their worst to make sure that a competent woman in the organization is pulled down and made to quit opines, Chittibabu (2007). Entrusting heavy work (72%) to those workers who were not subservient, and using their services for personal work (87%) though was found to be quite rampant, interest evinced by the male co workers, supervisors/contractors in retaining them in the unskilled status, thereby preventing their access to better jobs/ promotion was expressed with agony by cent per cent of the studied samples. Thus, domination over the weaker sex was found to be pronounced among the selected sample groups too.

Gender-related discrimination :

This part of the study is discussed under the following heads:

- Psychological violence
- Sexual harassment
- Stress

Psychological violence :

Psychological violence is widespread in construction sites everywhere, with verbal abuse right at the top followed by bullying and mobbing report Martino (2002); Cassitto *et al.* (2003) and Tiwary and Gangopadhyay (2011). This being rampant in every work spot, the extent

of incidence in the concerned work sites was studied, the findings of which are tabulated below.

Nature	Per cent responding*
Using vulgar words	58
Abuse	52
Criticism and bullying	35

*Multiple response

Scolding using vulgar words, abusing and bullying were the typical cases of psychological violence experienced by the samples. The workers (58%) revealed that it is a common practice in the entire construction site where the male workers, supervisors and/or contractors casually used vulgar words to scold them. Bullying was reported by 35 per cent while 52 per cent feared to express that they were abused by their male counterparts, supervisors and contractors. A sight slowing in the pace of work due to tiredness or muscular pain, talking while working with fellow workers, coming late to the site, absenteeism (despite cut on wages), requests for leave or other benefits, bringing children to work site – all were instances where they had to be prepared for psychological violence. Non-cooperation by the workers to do favours also had landed them in such predicaments.

Sexual harassment :

Sexual exploitation in the industry is rife, given the insecurity of a daily wage system. Chatterjee (2001) and Ramdoss (2010) support through the findings of their studies that sexual harassment was severe for women in the unorganized sector where jobs were not protected. Table 3 depicts the type of sexual harassment suffered by the women workers.

Types	Per cent responding*
Inappropriate invitations	54
Hugging	38
Brushing	27
Blowing whistle	12
Showing pornography	10
Unwelcome touching	4

*Multiple response

Apart from the psychological violence which the samples endured mainly because of non-co-operation with the male workers (in all cadres), the sample also were

found to suffer physical abuse to selves. Inappropriate invitations (54%), hugging (38%) and occasional brushing (27%) were mainly reported of. Cheap behavioural expressions like blowing whistle (12%), showing pornography (10%) and unwelcome touching (4%) were also regular happenings. But the agonizing fact was that none of the samples reported of their plight to anybody. Even these data could be drawn out of the samples only after a lot of cajoling and ensuring that their data would be kept confidential as all of them feared the consequences. Hence, an enquiry was made to find out the reason for not reporting.

Reasons for not reporting :

Mixed feelings of fear, harassment and subordination to male dominance was thus, found to be ingrained in the selected sample. Fearing ill treatment in the workspot (78%) and loss of job permanently (for they will be branded as non-cooperative) was expressed as reasons for enduring such abuses and insults without reporting. Job insecurity is evidently a true phenomenon. Contrarily cooperative co-workers (women) were reported of being rewarded aptly. Since appointment to the jobs, disbursement of wages and other fringe benefits vested solely on the site overseers (masons, supervisors, contractors) all aspects happened within a closed circle which enforced such subordination on the part of the women workers. They entered and left the service as casual unskilled labourers on contract basis. Adjustment and cooperation to male dominance and discrimination is therefore, an unwritten dictum. These factors reiterate the casualisation and feminization of such labourers. The workplace culture in this sector was not found to be labour-friendly for the women folk. Gopalakrishnan (2007) also found that 94 per cent of the women did not report harassment. In her study as a result of harassment, 22 per cent had quit the work though 16 per cent had ignored it. Many victims of sexual harassment at workplace avoid reporting it. Several reasons were cited by the victims for non-reporting behaviour such as fear, job loss and secondary victimization and re victimization opines Ramdoss (2010). Such job conditions eventually led to feelings of stress among the samples.

Stress :

Many job conditions contributed to stress for these women. Such job conditions included heavy workload

demands, little control over work, role ambiguity and conflict, job insecurity, poor relationship with coworkers and supervisors, and work that are narrow, repetitive and monotonous. Other factors such as sexual harassment and work and family balance issues, further added as stressors in the workplace. Unequal division of labour, the amount of time they spent at their workplace and workload due to dual roles had made these women workers stressed out. Job stress has been linked with cardiovascular disease, musculoskeletal disorders, depression and burnout (<http://www.cdc.gov/niosh/OI-123.html>). As these samples are also prone to such workplace-related, job stress-induced health disorders in the long run, the factors which they expressed as stressful was found out and are presented in Table 4.

Table 4 : Workplace – related stress – triggerers	
Stress - triggerers	Per cent responding*
Fear of losing the job	100
Wage discrimination	100
Monotonous and repetitive tasks	100
Incorrect posture	100
Family problems	100
Multiple roles	100
Financial worries	100
Domination faced	98
Health anxieties	98
Sexual harassment	87
Ill treatment faced	78
Lack of facilities (sanitary, potable water and protective clothing)	65

*Multiple response

Despite being as tradeswomen for more than 26–30 years, the agony of being in the same status of an ‘unskilled labourer’ without any prospects for moving up the ladder itself was a big stressor. Out of the 12 stress causing factors more than 67 per cent of the factors were related to the workspot and working conditions. Stress was aggravated by the fear of losing job, wage discrimination, monotonous and repetitive tasks, incorrect posture, family problems, multiple roles and financial worries for all the samples, while domination faced and health anxieties (98% each), sexual harassment (87%), ill treatment faced (78%) and lack of facilities (65%), also found a mention.

Basu *et al.* (2008) had reported the type of work and work stress to vary from one worksite to the next.

This was also found to be true. Studies conducted had shown that jobs like carrying different loads, passing bricks manually, sieving sand, shoveling, filling mud in the foundation and sweeping prevailed as ‘branded tasks’ for women in this sector proving the existing belief on feminization of these jobs which determined the higher premise for stress-related disorders in women which warrants their safety and health.

Safety culture :

Safety culture among the workers was found to be low and making them understand the importance and adoption of safe working methods and basic safety norms was hence, a tough task for the industry. When they handled hazardous materials in their work (like cement or heavy tools) their knowledge of the after effects of the chemicals they inhaled was almost absent. They were not aware of their right to a conducive environment and did not demand any facilities to carry out their work safely. Naturally they were being exploited by their employers as Narayanan (2010) also had reported. In addition to physical workload and awkward postures the female labourers were also exposed to dust, intense heat of the sun, biological pathogens, etc which Sett and Sahu (2008) had reported of in their study. Above all the labour contractors had not provided any protective devices nor were they found to take any responsibility for injuries or health problems at the worksite. Majority of the female workers (89%) worked barefoot (Fig. 3) and they used no protective devices against heat, dust etc. Similarly none of them were ready to point out that they were working in injury-prone circumstances fearing ‘ousting’ by the immediate bosses. Though many of the samples agreed to have been witnesses to worksite injuries and incidences of irresponsible behaviour from ‘bosses’ they were reluctant to reveal facts. Awareness on the health and safety hazards associated with such working conditions was found to be partially negligible and basically ignored. The implementation of protective

equipment for construction workers must be made effective (Narayanan, 2010).

Contrarily the samples studied agreed to be suffering from known health disorders which had manifested due to tasks done specifically in the workspot. Enduring irregular menstrual periods was the prominent reproductive health problem reported of by 82 per cent of the samples attributing to it the heavy weight they carried whole day long while 22 per cent suffered urinary tract infection due to improper toilet facilities. Five per cent had endured abortion or miscarriage.

Apart from these the sample could identify a few other occupation related problems which they endured regularly.

Occupational health hazards :

The WHO categorizes work-related diseases as ‘multifactorial’ in origin. They are diseases where workplace factors may be associated in their occurrence, but there may not be a specific risk factor in each case. Examples of work-related diseases include hypertension, ischaemic heart disease, psychosomatic illness, musculoskeletal diseases and chronic non-specific respiratory disease/chronic bronchitis. In the examples cited, work may be associated in the causation of or be an aggravating factor in a pre-existing condition (Koh and Jeyaratnam, 2001).

Table 5 : Differences between occupational and work-related diseases (Koh and Jeyaratnam, 2001)	
Work-related diseases	Occupational diseases
Occurs largely in the community	Occurs mainly among working populations
Multifactorial’ in origin	Cause-specific
Exposure at workplace may be a factor	Exposure at workplace is essential
May be notifiable and compensable	Notifiable and compensable

Source: Deacon (2003)



Fig. 3 : Working with barefoot

The following Table 6 gives the details on the occupation-related health hazards encountered by the samples in their work environment.

The study revealed 90 per cent of the women construction workers to complain of respiratory problems followed by allergic reactions (32%), asthma (22%) and bronchitis (12%) mainly caused due to inhalation of dust. Contact dermatitis caused by cement was reported by

one quarter of the sample. Irritation and partial hearing loss due to noise pollution and headache and rashes by working under sun were reported by 100 per cent each of the surveyed women workers. Exposure to cold environment resulted in arthritis for ten per cent of the women. Gynaecological disorders such as menstrual problems and miscarriage among young women due to carrying heavy loads was reported by 82 per cent and five per cent of surveyed women, respectively. Water and improper sanitary facilities had led to fever (56%) and urinary tract infection among 22 per cent of the samples. Around 21 per cent also suffered throat infection/irritation as a perennial problem. An injury such as sprain/strain of muscles, working in the sites was complained of by a negligible five per cent of the samples due to unsafe

working conditions. Above all these, awkward work posture had impacted pain in many body parts for the selected sample. Pain in the extremities, both upper and lower, shoulder, neck and back was reported by almost 100 per cent of the samples, revealing that they were victims of WSMDs irrespective of the age range (very young included) they belonged to. These factors reiterate that the samples run a high risk of falling prey to occupational health disorders. As onset of occupational health disorders manifest only after many years (even after they quit the job), the study has projected that the samples will definitely suffer many of the OHDs.

Conclusion :

Based on the results ambience in the work area

Table 6 : Occupation-related health hazards endured		
Triggering factors	Health hazards endured	Per cent responding*
Work posture	- Shoulder pain	100
	- Neck pain	100
	- Upper back pain	100
	- Low back pain	100
	- Knees	100
	- Hand pain	80
	- Wrist pain	68
Noise	- Irritation	100
	- Partial hearing loss	100
Heat	- Headache	100
	- Rashes	100
Dust	- Respiratory problem	90
	- Allergic reactions	32
	- Asthma	22
	- Bronchitis	12
Work load	- Menstrual problems	82
	- Urinary tract infection	22
	- Abortion/miscarriage	5
Paint smell	- Respiratory problems	72
	- Headache	43
Cement	- Contact dermatitis	25
Water	- Fever	56
	- Influenza	22
	- Throat infection	21
Cold	- Sinusitis	100
	- Arthritis	10
Injuries	- Sprain/strain	5

*Multiple response



Fig. 4 : Occupational health hazards

was found to be polluted with flying dirt, dust, debris and with noise from concrete mixers, vehicles, welding/drilling works, cutting stones and rods and breaking stones. Safety culture was thus, found to be non-existent in the works sites, paving way for resultant occupational health hazards for women workers. Adjustment and co-operation to male dominance and discrimination were therefore, written dicta in their work place culture, highlighting further the casualisation and feminisation of labour. They were not protected through social security schemes or medical/ insurance benefits being 'branded as unskilled labour' despite having put in 26-30 years of experience further affected their psychological status very badly. Ultimately, the activities performed by them were 'branded' as women's jobs. Working in an unorganised set up, lack of knowledge on social security (as they were not offered any) and lack of unionism to support and voice their grievances had left them with no 'identity' and little room for redress. To conclude improvement of the working conditions, better organization of work and ergonomics

interventions are suggested as necessary measures for reduction of pain and feeling of discomfort.

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