

# Effect of Erroneous In Ergonomics and Its Remedies to Workers in Industries-A Literature Survey

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**Abstract:** - Industries act major role in the development of a nation. Many company workers have health problem since they do not follow or do not have awareness of ergonomics. These workers are the back bone for developing those companies. As an engineer our job is to keep the worker's health in safe manner. Enormous effects of health issues arises on worker's body due to erroneous of ergonomics while carrying out and perform manual material handling for the following periods of prolonged sitting, lifting and different tasks in their job. And also inadequate lighting, improper ventilation, are also effects in erratum of ergonomics, many pains and other symptoms on the body like feet, lumber region, erector spine muscles, cervical region, shoulders, upper arm, joints, knees, legs etc. so this review focuses on different kinds of industrial workers like garments, fertilizer, weaving, pharmaceutical, textile, cigarette, hand-woven carpet, office workers, small scale industries, taxi drivers, automotive industry, female nurses, their working condition to analysis the effect of erratum in ergonomics on health outcomes and remedies for industrial workers.

**Keywords:** Ergonomics, Erratum in Ergonomics, Musculoskeletal Disorders.

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## 1.Introduction

Ergonomics derived from two greek words: 'ergon' meaning work and 'nomoi' meaning natural laws, it literally means science of work. So practitioners of ergonomics, study the work and how to be done and how better to be, it is the attempt to make work better. Hence, ergonomics becomes so useful, and also making things comfortable and efficient comes into a play. The emphasis within ergonomics is to ensure the design, strength and ability of people and minimize the effects of their limitations, rather than forcing them to adopt. Practitioners study how people interacts with products, process and environment day to day in regulate to get better them, to make easier to use, safer more ease and efficient (1). But nothing can happen without a thorough knowledge and understanding of the user and their experience. Applying of good ergonomics will lead to easy use of product, increase efficiency in manufacturing, make furniture comfortable, contributes to safety, environment needs to make it fit for purpose.

**1.1 Physical Ergonomics:** It concerned with human anatomy and some of the anthropometric physiological and bio mechanical characteristics as they relate to physical activity. Its principles are widely used in design of both consumer and industrial products. For example, screw driver handles made with serrations to improve finger grip to increase friction between the skin of the hand and the handle surface. Physical ergonomics is also important in medicinal pasture, mainly to those diagnose with physiological ailments or carpel tunnel syndrome. It is also focused to patient safety and avoids medicinal error. Doctors, nurses and technicians progress separately and as a team. How must be a healthy facilities developed to achieve a best results (2).

Applying ergonomics to workplace can,

- Reduce the potential for accidents
- Decrease the possible for injury and ill health

- Improve performance and productivity (3)

The account of ergonomics and human factors can reduce dramatically the likelihood of an accident. For example, in the drawing of control panels the location of switches and buttons switches that could be accidentally knocked on or off might start the wrong sequence of events that could lead to an accident. In hazardous industries, incorrect decisions or mistake actions have had catastrophic results.

## 1.2. Ergonomics benefits due to strong workplace

- Ergonomics reduce cost by systematically reducing ergonomic risk factors, that can prevent costly MSDS, and also it helps to cost saving.
- The productivity will increase often due to best ergonomics by designing a job to allow for good posture, fewer motions, better heights, less exertion and reaches, so it helps workplace more efficient.
- Good ergonomics vanish the frustration and fatigue among the workers and do their best work leads to improve quality. For example, the employee might not fasten the screw tight enough due to a high force requirement which could create a product quality issue.
- Improves employee engagement when employee notice that the company putting efforts to ensure health and safety and if an employee does not lead to any discomfort or fatigue in their workday then it increases employee involvement.
- Creates a better safety culture ergonomics shows company commitment to safety and health as core regulator. The cumulative effect of previous four benefits of ergonomics is a stronger safety culture a company. Healthy employees are most expensive asset, creating the safety and health culture at company will lead to better human performance for organization. (29)

### 1.3. Advantages of Ergonomics in Industries

- Increasing savings by fewer injuries, more productive and sustainable employees, and fewer worker compensation claims
- Fewer employees experiencing pains by implementing ergonomic improvements and can reduce risk factor that lead to comfort

## 2. Investigation of Ergonomics Status in Various Industries

Alireza Choobineh et al (1) concluded that the musculoskeletal symptoms as related to ergonomic factors in Iranian hand-woven carpet industry and general guidelines for workstation design. In carpet weaving is a high risk activity for mounting musculoskeletal disorders (MSDs). The study was carried out in the Iranian hand-woven carpet industry, on purpose of the prevalence of MSD symptom, detection of major factors connected with MSD and progress of strategy for workstation design. About 1,439 randomly selected weavers participate in this study. In the Iranian hand-woven carpet industry study showed that there was a high rate of poor working conditions and musculoskeletal problems. Thus, working conditions and control of musculoskeletal disorders risk factors seem to be get developed. In relation to musculoskeletal problems several factors were found to be important, especially loom type, working posture, daily working time and seat type. The individual factors including age, gender, marital status and job tenure, musculoskeletal symptoms were also associated. An improved working posture towards the new weaving workstation was based on development of design guidelines which was more generally acceptable to the weavers, thus it might reduce prevalence of MSDs symptoms.

Alireza Choobineh et al (2) investigated the impact of ergonomics intervention on musculoskeletal disorders which had a multi factorial etiology that examine psychosocial risk factors and musculoskeletal symptoms between office workers of an Iranian oil refinery and also to observe the following effects of ergonomics involvement on musculoskeletal discomfort and psychosocial risk factors. The study between, 73 office workers as a case group and 61 office workers as a control group from an Iranian oil refinery plant were randomly chosen and examined. Before and after the interventional program The Nordic Musculoskeletal Disorders Questionnaire and the Persian version of the Job Content Questionnaire (P-JCQ) were used as collecting data tools between the office workers Low back problem (28.8%) was reported to be the most common problem. Important difference found between incidence rates of reported musculoskeletal in lower back, upper back and ankle/feet regions before and after involvement. After intervention, mostly in these regions, musculoskeletal disorders get reduced. There was no significant affiliation was found between reported musculoskeletal problems and psychosocial factors before and after the intrusion. For success the full commitment of management and training to the people involved were the contributing factors. Only with

- It can reduce the primary risk factors for MSDS, so workers are more efficient, productive and have greater job satisfaction
- It can keep the workplace safer
- Reduced absenteeism of ergonomics leads to healthy and pain free workers who are more likely to be engaged and productive (30)

the support of management and active participation of the workers interventions can be carried out.

P. Chavalitsakulchai et al (3) examined the musculoskeletal disorders of female workers and ergonomics problems in five different industries of a developing country have surveyed about 50% experienced a high occurrence of musculoskeletal symptoms in their lower backs, particularly among the textile workers. for the period of last year, the garment workers had musculoskeletal pains in their shoulders, lower back, and hips/thighs, while the fertilizer workers also experienced musculoskeletal symptoms in their shoulders, lower back, hips/thighs, knees, and ankles/feet and also the pharmaceutical workers had musculoskeletal discomforts in their shoulders, lower back, and hips/thighs. Among all workers the textile workers had pain in their upper back, lower back, hips/thighs, and knees. The cigarette workers also experienced musculoskeletal pains in their neck, upper back, lower back, and knees. From this survey, it is confirmed that low-cost improvements are required for the five surveyed industries. The key factors are the assistance of management and workers contribution. The five surveyed industries need ergonomics application to progress the safety and health of the workers, particularly with observe to musculoskeletal problems.

E.N.Corlett (4) investigated the people in industry- the contribution of industrial ergonomics and he reported that the involvement of industrial ergonomics is to imply that many problems which is major in production in the future will require to be study more from a observation point of the human aspect of industry than from the scientific or monetary stand points. The man concerned with design of work or tools need to know the size and power of people, what postures they can adopt and for how long, and how they distinguish, take in and use information quickly and without error. The use of consistent knowledge and ergonomics techniques in this area was becoming as vital for industry today as it until the end of time has been in the areas of scientific or monetary resources.

G.G.Ray et al (5) analyzed the ergonomics evaluation of working posture adopted by women engaged in small scale industries-are performing various tasks by acquire squat on floor postures, occasionally they use patla for sitting principle. It was pragmatically that 80% of workers have body pain in daily event, 50% of the workers report that the pain continuous even at the night rest. The foremost position of the body pain were back bone 76%, leg 53%, head and neck 35%, hand 35%, about 90% of the worker report that there were no vary in the pain model since it was first skilled. This indicate that there are occupation related body

pain and for those workers who are working for more than 8 years a ruthless lum-baro-scaral vertebral column disorders have been experimental. Therefore, wooden patla with adjustable forward-download slop from 0 to 25 degree were used to find out the finest sitting angle from the view point of electromyography responses and centre of gravity displacement.

S.D. Baulk et al (6) examined a field study of sleep and fatigue in a regular rotating 12-hour shift system-observe sleep behavior for 20 employees, subjective fatigue were investigated over a 14 day period. Generally plant work incorporated tasks such as manual handling, furnace tapping, shipping metal sheets, operating machinery and driving forklifts. Many of the working areas at the plant were exposed to high temperature and or loud noise, all participant persistent their standard work schedule, and went about their usual duty. As a result with a reduction of snooze is normally obtain on the second shift of each type (day& nights), therefore participants had at least 5hour sleep before each shift, while fatigue rank reach during day shifts were mild but night shifts lead to higher levels, principally towards the end of shift. This study had confirmed that super visioning of fatigue level is for both employers and employees. While hours of work must be programmed to allow tolerable revival between shifts, employers must also educate on work-related risk, including fatigue.

Tatiana de Oliveira Sato et al (7) examined the evaluation of musculoskeletal health outcomes in the context of job rotation and multifunctional jobs-according to production demands work schedules were programmed and workers were educated to gain new skills and multi function. Since the number of workers frequently decreases, the overload on the remaining workers increases. Workers exposed to higher musculoskeletal demands feel fatigue and pain after a extended period of bare and if that gets continued, the symptoms will become more severe thus causing work absenteeism. The company had made ergonomic change with redesign of the machines and equipment and organizational changes that included job rotation. Hence, workers drastically discriminate between progressive workload levels and specific tasks were non linear during shifts.

Lie T. Merijantia et al (8) reported the role of night shift work on blood pressure among healthy female nurses-health care posture, employ more night shift workers than any other industry. A study performed among 152 healthy female nurses to determine the relationship of night shift work and blood pressure among healthy nurses from one hospital in Central Jakarta. Shift workers had a drastically lower age and shorter job experience than day workers. Systolic blood pressure was considerably subjective by shift worker, working in the hospital on a 24-hour shift lead to unusually high Systolic blood pressure in female nurses, thus signifying that this type of work may be a risk factor for cardiovascular disease. This study showed that higher SBP was more common in shift workers than in day workers, which may be an sign that shift work was connected with a risk of systolic hypertension.

Efua Vandyck et al (9) analyzed the work practices and ergonomic problems experienced by garment workers in Ghana-Dressmakers and tailors every now and then perform their work under stressful condition. Noise and temperature levels were high and the ventilation is also poor. However, the seating they sit on were frequently a bigger trouble. Nonadjustable seating with no backrest, seat pads and properly contoured seat pans were used. The growth of musculoskeletal diseases as a outcome of poor postures, poorly designed and confused workstations, and lack of attentiveness about the potential benefit of ergonomics have been broadly reported. There was an vital enlightening role for trade organizations to assist manufacturers to advance working conditions for their workers. Such events would be comparatively straightforward yet would have a actual force on the workplace.

Sang D. Choi (10) investigated a study of trade-specific occupational ergonomics considerations in the U.S. construction industry-to start discussion on ergonomic issues, and practical solutions to reduce WMSDs and injuries in the construction industry. Operational in the building and erection industry related to severe and health risks, including risk for strains and sprains, and work-related musculoskeletal disorders and injuries. Many of the injuries that occur in the construction industry were due to the manual materials handling, carrying heavy loads, etc. Stretching exercise programs can increase joint & muscle flexibility in addition to back muscle, and improve shoulder satisfaction as well as reduce pain disability. Before making an attempt to build up the training program the site-supervisor and/or company health/safety personnel should assess the trade-specific job sites and materials that will be used during the construction project sufficient training and education should be given on the detailed types of materials that will be used during the job and the hazards associated with them were also to be educated.

Suzi Marinoa et al (11) analyzed the maintenance of submersible pumps in the septic tanks- ergonomic and biological risks to the worker-buildings where there was the risk of disposing of waste via the sewers, septic tanks are built. These septic tanks exertion with submersible pumps that set in motion the waste and send it to the air pipe of carbon steel that are linked to a sewage station. So safeguarding are exposed to various biological and ergonomic risks. This type of action requires its great physical performers who were also focus to contact with human waste in the form of liquids, gases and solids. In addition the problems mentioned, still thermal comfort, exposure to high temperatures can also cause diseases such as hyperthermia or heatstroke. To decrease these risk some safety measures are required such that, the use of Personal Protective Equipment (PPE). Its use brings superior safety and stillness of mind to workers: half-face masks, waterproof boots, and latex gloves, goggles and overalls water proof.

Klaudia M. M. N. Silva et al (12) investigated the footwear factory's assembly sector opposing organizational structure

and quality from the ergonomic work analysis and organization having many employees found several problems when analyze from the ergonomics view. Mostly throughout the work day women, stay in standing position. And there was a strong smell of raw material caused by an incompetent air circulation and excessive machinery noises. Physical and cognitive overwork in the works in the area of the assembly and surplus of extra hours, influence honestly in the quality of the final product, number of customers has been decreasing while the quantity of complaints in the customer's service had increased.

Nandita Bhattacharyya et al (13) discussed and developed the design scopes towards occupational wellness of women workers-specific reference to local agro based food processing industries in NE India-In two out of ten industries, only slicing and bottling were ended with machines. Regular knife with or without handle were being used for peeling of pineapple. The handles were wrap with rags according to their holder needs. Only in one industry, long knife were used. Peeling, coring and slicing were typically done either in standing or sitting positions on a high work tables. The stools used were high, without back support and without proper foot rests. The workers initiate that postures were uncomfortable as they stand or sit for hours without rest. Mechanization of tea plucking was still not practiced, with some exception, which puts additional stress to the hands and the wrists of the tea pluckers apart from worsening the quality of tea leaves. It was experimental that the pluckers exercise the thumb and forefinger of either hand while plucking along with holding the plucked leaves before transfer the shoots to the basket. There are special combination of arm and finger actions, experience and degree of fatigue of the worker. The workers set up the posture uncomfortable, as they need to keep maintain the same postures for the entire shift with load at back. Awkward neck, back, shoulder, wrist, hand and postures were the risk factors.

S.A. Miguez et al (14) investigated the participatory ergonomics and new work reducing neck complaints in Assembling while the work-related musculoskeletal disorders were repeatedly originate among the industrial workers and they donate considerably to absenteeism. A participatory ergonomics approach was used to generate a new work location, which is aimed at dropping neck complaints in a cell phone assembly. Introducing an adaptable angled small counter, these dimensions showed both posture and comfort improvements. 90% of the workers chosen the new work station and the neck problems were reduced in 75% of the group.

Nicole Neuberta et al (15) discussed the charge of ergonomics a model according to the influence of ergonomic workplace design for economical and efficient indicators of the automotive industry for all generations of operators, Ergonomic workplace design (EWD) enable a healthy working style and has been rising incredibly. Ergonomics can be profit-generating and cost-saving if the company integrate the ergonomics from a systematic point of view. The costs with help of EWD because, with

reducing financial losses through injuries, accidents and absenteeism, arising productivity of the account in quality and productivity. No EWD creates quality problems and so far alternative measure and scrap, discomfort led to advance problems of various parts of their body and unsatisfactory work actions.

Suzi Marinao et al (16) reviewed the ergonomic analysis in the bagging of grain equipment unsuitability of the work stations for the manufacture of medicines, food for cattle and planting, the industries uses granulated urea, nitrogen, ammonia and nitric acid and adopt the process of bagging grain for the urea which comes in bags to the final customer. It was likely to recognize that, for workers, the insufficiency of the job is one of the reasons that cause accidents. Task analysis proves that poor setting up of the environment in terms of layout, temperature, lighting, design, impose on operators the most faulty postures that can cause injuries and fatigue result in the need of too much of physical effort and noise difference with the recommendations. In ergonomics, the alteration to the environment, jobs and work organization in general, vary with the requirements, benefit and capability of each company.

Samuel J. Howarth et al (17) concluded using sitting as a component of job rotation strategies are lifting/lowering kinetics and kinematics altered following prolonged sitting for developing low-back pain, repetitive lifting and sitting for extended durations have been acknowledged as risk factors. When workers are frequently requisite to carry out manual materials handling tasks at once follow periods of prolonged sitting either as a secondary job component of a dissimilar tasks in a job rotation approach will lead to various uncomfortable postures leads WMSDs. Rotation among work tasks with different physical demands has been worn as a method for dropping exposure to possible injury-inducing professional scenarios.

Seyyed Ali Moussavi Najarkola et al (18) evaluated of upper limb musculoskeletal loads due to attitude, replication, and strength by rapid upper limb assessment in a textile factory of both male and female workers were work equal in number, in spinning and weaving, and in bobbin dyeing and textile cutting. Disorders were reported and data were obtained for upper arm, wrist, trunk neck, leg and lower arm disorders in 497 (87.8%), 255 (45.1%) 318 (56.2%), 383 (67.7%), 439 (77%), and 163 (28.8%)workers, correspondingly. Specific events for redesigning tasks and measures must be implement to address these risks. Such measures were frequently vital and composite.

Ayesha Anjum et al (19) studied regarding the health concerns among workers in weaving industry due to exposure of toxic chemicals, occupational health problems to workers involved in hand made carpets were subjected as skeletal deformities, ergonomic, eyesight and several health problems. Serious crippling arthritis of the knee and permanent deformities of fingers were caused during squatting working. By proper care and precautions most of these diseases and health problems in weaving industry can be avoided. There must be some condition of protecting

equipments. For example ear plugs, face masks, first aid facility, gloves and proper uniform, for the protection of workers from the efficient environment and there must also be the condition of health insurance by the mill owners with the co-operation of Government.

Anette Kaergaard et al (20) derived the musculoskeletal disorders of the neck and shoulders in female sewing machine operators and several others groups of women performing repetitive task have a high occurrence of musculoskeletal complaints, neck and shoulder disorders. The job involve repetitive, highly monotonous tasks performed in a sitting working posture with upper back curved and head bent over the sewing machine. The work was visually challenging and requires a high degree of attention and truth. Thus it supports the multifactorial nature of both aetiology and prognosis of these disorders.

Rajnarayan R Tiwari et al (21) examined the low back pain among textile workers while working in sitting position it was attributed to the twisting and bending of vertebral column subjecting it to excessive stress. Thus, it can be accomplished that along with occupational risk factors, some non-occupational risk factors also play responsibility in the development of low back pain, which includes prolonged hours of sitting. Hence, ergonomic principles should be used for controlling occupational risk factors and interventions should also be completed to control non occupational risk factors.

Anjali NAG et al (22) studied the sexual kind differences, job stressors and MSD's in weaving industries encompass a extensive series of tasks such as manual arrangement of raw materials, carding and spinning in cord machine, dyeing by acid and chrome dyes preceding the actual weaving. The workers are usually exposed to noise and dust. The job weighted high attention in creation designs. Fibers were boiled in a vat containing acetic acid and dye solution, wash in running water and dried, and spindles are made out of fibers. There was an vital enlightening role for trade organizations to assist manufacturers to advance working conditions for their workers. Such events would be comparatively straight forward yet would have a actual force on the workplace.

Helenice Jane Cote Gil Coury et al (23) examined to influence of gender on work-related musculoskeletal disorders in repetitive tasks while workers responsibility on performing highly repetitive task were work-related musculoskeletal disorders (WRMDs) was high. In this study WRMDs symptoms were compared between female and male workers performing the same repetitive industrial tasks. Taking about 103 workers (84 female and 19 male) worked in two product sorting sections, in these two sections, female workers until 2 yr before this study, 19 men were hire in an effort to control WRMDs. The analysis indicates that symptom was mostly influenced by the work done and, secondarily influenced by gender, job tenure and age. There was no significant difference in symptoms between male and female workers when compared within the same age group or in the same job tenure. Sick leave,

sparkly more severe medical symptoms, was unfair mainly by job tenure. Thus, replacements of female workers by male workers is a worthless strategy to control WRMDs when confronting poor working conditions.

Ruth k. Raanaas et al (24) surveyed of Norwegian taxi drivers musculoskeletal health, and work related risk factors to determine the prevalence of musculoskeletal pain a questionnaire survey was carried out among taxi drivers in Norway and to classify work-related factors that were possible to increase the risk of neck, shoulder or lower back pain. To form the subject group nearly 1500 taxi drivers were chosen nationally. Musculoskeletal pain occurrence (MSP) was assess with the Nordic Musculoskeletal Questionnaire (NMQ), and work-related factors with a survey designed for the purpose. 929 (63.4%) of the drivers contacted as a response. The results taxi drivers have an prominent risk of musculoskeletal problems when compared to a Norwegian population. When workload and lifestyle factors were analyzed at once, individual risk factors for MSP were recognized as driving hours per shift and per week, sleeping in the car throughout rest breaks, practice of violence, body mass index (BMI), unhealthful eating practice and little physical work out female drivers and non-western immigrant being at higher risk and in addition to this, employed drivers had superior risk for MSP than taxi owner.

Kurt Landau et al (25) concluded that musculoskeletal disorders in assembly jobs in the automotive industry with special reference to age management aspects, when workers performing assembling jobs, which regularly absorb highly tedious, short-cycle operation and this difficulty seem expected to become more acute in the future. Two absolutely different solutions were being used: (1) before musculoskeletal problems arise older workers were phased out under early retirement schemes, and first choice was given to younger workers, temporary or subcontracted basis. (2) Ergonomic and medicinal hazards points in congress processes are recognized and eliminate by alteration of the work mock-up, whether older or younger workers are involved. As the results, globally active corporation reported with a case study at 256 work stations on an assembly line for middle class cars manufactured. The following interactions were noted: The age of the assembly workers influence the selection of workplace were Older workers are found mainly in jobs with a 'very favorable' expert rating, younger workers in jobs with '(very) unfavorable' ratings. Therefore, age and job strain in this case were not independent variables. Older workers still find fault of lumbar spine symptoms in spite of low stress forced by their present jobs. This seems to point to long-term cumulative effects. Head-neck-shoulder symptoms frequently get occurred in older workers working under 'unfavorable' conditions, it was suitable to avoid possible harm of physical performance more or less totally by allotting jobs causing less strain to older workers.

Magdalena Jaworek et al (26) evaluated the burnout syndrome as a mediator for the effect of work-related factors on musculoskeletal complaints among hospital nurses, the

present study experienced the theory that be exhausted syndrome mediates effects of work-related factor, such as work difficulty and work stimulus, on the occurrence of musculoskeletal complaints between hospital nurses. Across 4 hospitals located in southwestern Poland 237 nurses from various wards were taken as sample for this study. Data was composed through three questionnaires. One of the questionnaires calculated work-related factors and contained elements that afford factor analysis. Results of structural equation showed that work demands were positively linked to burnout syndrome and musculoskeletal complaints.

Inga-Lill Engkvist (27) analyzed the back injuries among nurses – a comparison of the accident processes after a 10-year follow-up during the years 1992–1993 and 2002–2003 accident among nurses in the hospitals of Stockholm County

### 3. Current Trends In organizing Workplace Ergonomics

Improving workplace ergonomics continue to be a major issue for employers and a key element of most EHS (environment, health and safety) programs. Looking back over several years, it is encouraging to see the trends and changes in how workplace ergonomics is managed. These lessons are being adopted by benefitting, leading companies. (28)

#### 3.1 Getting proactive

More years ago, the focus of most ergonomics programs was on musculoskeletal disorders, and come within reach of reactive, then by concluding symptoms and injuries as a measure of problem and success, by using qualitative tools and tend to react to injuries and employee complaints. Presently, leading companies are positive, they using quantitative tools to evaluate exposure to musculoskeletal disorder risk factors and then focus their efforts on changing the job conditions to reduce the level of exposure before an injury occurs. This shift is important as recognized ergonomics programs mature, they become more capable and effectual. (28)

#### 3.2 Integrating the process

Organization with effective ergonomics programs tend to handle ergonomics as a process that is align with development processes. These development processes may include permanent improvement, lean manufacturing, safety management systems and six sigma. It was the right direction and formation needed at the time, but it was a group of individual program fundamentals that were not coupled together. Since then, quality, business and EHS leaders have adopt the principles of permanent improvement to move from a program to a process approach, ensures that the processes are sustainable as leaders, time and business wants to change and integrate the processes into the business and ensures that they are not dependent upon a the minority people, and provides a logical system for shaping and dynamic perfection. (28)

#### 3.3 Engaging others and shifting ownership

Ergonomics processes engage people at all levels of the organization, from the top officials to each employees. Each person has clearly elaborate roles that mutually reduce MSD

due to over-exertion back injuries were reported. On having interviews with the injured person detailed information about the accident process was obtained. Interviews were conducted with 130 and 132 nurses during the two study periods. Major accidents occurred throughout ordinary planned patient transfers, and the spreading up of the type of patient transfer were very common. The grouping of fewer nurses with increased age and weight, between both nurses and patients shows the importance of dropping the heavy workload at the time of patient transfers. A program, including management and staff on all levels, with a wide-ranging approach, with identifying risks in the environment, assessment of the patient, training of the nurse and purchase of equipments will be achievable.

risk factors in the workplace. Ergonomics programs depends on site experts, who typically were EHS team members. Successful organizations enlarge ownership, accountability and involvement for ergonomics to people outside the EHS personnel. Employees involvement and management leadership are two critical basics of safety and environmental management systems, and employees are also vital components of a successful ergonomics process. Employees normally get involved in various ways: they can moderate their own workstations, become members of safety team involved in assess and improve conditions, in a Kaizen event, so they have the skills to conduct assessment and make workplace modulation to improve ergonomics. (28)

#### 3.4 Moving upstream

Consistently addressing ergonomics in the design phase of new processes, layouts, products and equipment, is a common practice of superior organizations. Few percent of all organizations are from this level. The maximum value of good upstream design is the reduced cost of making changes. The cost of altering equipment and plan is in place is more than thousand times the cost of making the alteration in the design phase. Progressive foremost companies have integrated design criteria in their hold projects and people accountable for designing workplaces and tasks with low exposure to MSD risk factors. (28)

### 4. Conclusion

In this study, it is emphasized that organizations should formulate and periodically review general and detailed goals related to occupational health and safety for each level of management. Workers performing tasks that involve a potential hazard to them or other workers should be adequately competent (have proper education, training, and experience). An organization's health and safety system should include procedures for internal communication among its various levels and units and among workers and representatives. It should also include health and safety procedures for communicating with concerned third parties. A company should also identify those jobs and areas where serious hazards are most likely to occur. Through proper planning and actions, they should ensure that such tasks are

performed in proper conditions. Talk to employees and get them to suggest ideas and discuss feasible solutions. Engage employees from the initial stage of the process – this will help them to adopt changes.

Look for likely causes and consider possible solutions. A minor alteration may be all that is needed to make a task easier and safer to perform, arrange items stored on shelving so those used most frequently and those that are the heaviest are between waist and shoulder height, raise the platform to help operators reach the controls (or alternatively relocate the controls), remove obstacles from

under desks so there is enough leg room; provide height-adjusting chairs, so each operator can work at their preferred work height; change shift work patterns; introduce job rotation between different tasks to reduce physical and mental fatigue. Always make sure any alterations are properly evaluated by the people doing the job. Be careful that a change introduced to solve one problem does not create difficulties somewhere else. Adopting an ergonomics and human factors approach can save money in the long term by avoiding severe accidents, reducing injuries, reducing sick leaves, and improving quality and productivity.

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