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Practical Approach towards Issue on Ergonomic Training With Respect to Productivity Improvement

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Abstract

Shift workers of process industries always remain under heavy work pressure while working more efficiently for higher production. In modern work practices, process industries run 24 hours per day due to their process requirement, expensive machineries and to achieve production targets. The main aim of this study was to investigate the prevalence of shift work on sleep variables and the body parts affected by Musculoskeletal Disorders (MSDs). Moreover, it focused on how these problems (sleep and MSDs) affect workers' productivity and absenteeism. For this study 15 different process industries had been selected. The detailed sleep assorted variables and work related musculoskeletal pain/discomfort had been analyzed in different activities with self administered questionnaire (SAQ). This questionnaire consists of 41 questions related to sleep problems, 38 questions related to MSDs and 17 questions related to absenteeism. Responded rate was 57.84%. The collected data was analyzed shift wise (morning, afternoon, night, general and 'R' shift). Intra and inter correlation among the different variables as well as correlation of each variables with absenteeism had been investigated before and after the ergonomic intervention programme (EIP). The results showed that averagely 26.93% workers had been found complaining of sleep problems and 30.36% of night shift workers had been spotted with the problem of MSDs. All sleep and MSDs assorted variables were significantly associated with shift work ($p<0.05$, $p<0.01$). The effect of EIP disclosed that the problems related to sleep and MSDs had been found reduced by 5.41% and 4.75% respectively and absenteeism due to sleep and MSDs by 0.93% and 0.83% respectively after EIP. As a result the improvement in worker's productivity was sought out to be 1.622%.

Keywords: Shift work; Ergonomic training; MSDs; Absenteeism; Productivity

Introduction

Productivity is an important indicator of economic growth and social health. It plays a crucial role in describing business opportunities in the society and it can also be vital in identifying key factor that are attributed to how healthy (or unhealthy) the working population is. Human capital plays an important part in the growth of economy. At micro level, it also affects the productivity. The main concern is not the measurement of productivity in traditional way, but to understand the human factors involved in the progress of organizational productivity.

In modern work practices, process industries like sugar industries, chemical plants, food industries, oil refineries, paper mills etc. are required to run 24 hours per day because the production process is much longer than 8 hours and must be performed continuously. The manufacturing industries often have expensive machineries, which are required to be operated continuously in order to get more and more profit and for that the workers have to work in shift. Now-a-days shift work is an increasingly wide spread practice in industries and services. Shift work involves the work outside the normal day light hours i.e. outside the hours of around 7.00 am to 7.00 pm, the time period in which many people in our society work for 7 to 8 hours in a shift. Shift workers might work in evening, middle of night, over time or extra long work days. They also might work regular days at one time or another. Many shift workers rotate around the clock, which involves changing work times from day to evening or day to night.

Shift work creates a mismatch between the work day and natural daily rhythms. The circadian rhythm is a major body rhythm with regular ups and downs in the 24 hour day. Over a 24 hour period, the circadian clock regulates sleep / wake patterns, body temperature, hormone levels, digestion and many other functions [1,2]. The internal circadian rhythms act upon how alert people feel. This affects their ability to perform. People perform best when alertness and internal body activity is high and worst when alertness and activity are low. In the normal day work, night sleep situation, people work when the circadian rhythms are high and sleep when it is low. When the workers perform poorly they are more likely to make errors that could lead to accidents or injuries [3]. Due to the disturbed circadian rhythm sleep disturbances are the major problems faced by shift workers. The characteristics of sleep disturbance are difficulty in initiating sleep, insufficient sleep, feeling tiredness, trouble to sleep once awakened, sleep duration < 6 hrs and early morning awakening (26).

The second area, relates to musculoskeletal disorders (MSDs). Musculoskeletal disorders have become a major problem in many shift workers. Musculoskeletal disorders [4] can be defined as any disease/ disorder, injury that affects the body's soft tissues, including the damage to tendons, muscles, nerves of hands, wrists, elbows, shoulders, neck and back [5-9]. Almost all organisms, ranging from single cell bacteria to humans, exhibit variety of behavioral, physiological and biochemical circadian rhythm. The presence of molecular clock within a cell and/or organism provides the necessary time keeping for anticipation of daily changes in environmental/ external conditions [10]. Zhang et al. [10] also demonstrated the presence of molecular clock in skeletal muscle.

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Several studies provided the support that skeletal muscle torque, strength and power are higher in the late afternoon compared with the morning.

Work performed at night and early morning shift have been shown to contribute to MSDs [11]. Circadian rhythms of night shift workers get disturbed and result in musculoskeletal disorder [10]. Disorders of the musculoskeletal system represent a main cause for absence from occupational work. These disorders cause the considerable human suffering and economically they are also not very profitable because of reduced working capacity and lessened production. It has been observed that the work capacity and work load should be well-balanced. Otherwise, its result will be health problems and illness which can turn into absence from work. Absenteeism does not include vacation and other leave for which permission has been granted. There are various reasons for absenteeism including sleep disturbances, feeling tired, illness, family and social problems, injuries, accidents, upbringing and boredom. Unscheduled absence may cause adverse effect on productivity [12,13].

Literature review revealed that the use of self administered questionnaires, interview techniques and observational methods were used to identify problems related to sleep patterns, MSDs and absenteeism. Then ergonomic intervention programme was planned as per problems identified. Ergonomic interventions have traditionally focused on adjusting physical work load factors with the aim of reducing musculoskeletal symptoms and subsequent occurrence of sickness absence [10]. During the ergonomic intervention programme coping strategies were provided to optimize the problems related to sleep, MSDs and absenteeism [14-17].

In this study an attempt was made to correlate workers' discomfort with shift work and sleep and its effects on their performance and absenteeism. The study also evaluated the potential effectiveness of ergonomic training provided to the workers of process industries to reduce its acute effects.

Materials and Methods

The present study was conducted in 15 different process industries with the number of employees ranging from 20 to 350. The total number of workers of all industries was 1772. The total questionnaires were filled by 1025 workers. Responded rate was 57.84%.The results of this study were analyzed from the 1025 valid responded questionnaires. Out of the 1772 participants, 37.64% % (n=667) were workers of sugar industry, 11.79% (n=209) were workers of chemical plant and 13.65% (n=70) were workers of oil industry, about 8.52% (n=151) participants were workers of paper and packing industries, 3.95% (n=70) participants were workers of plastic manufacturing industries and 24.43% (n=433) were workers of other (heat treatment plants, manufacturing industries etc.) industries.

Percentage of workers who filled questionnaires was as follows in general shift 63% (n=316), in morning shift 55% (n=215), in afternoon shift 59% (n=209), in night shift 55% (n=212), and in 'R' shift 55% (n=93).

Survey method using self administered questionnaire (SAQ) can generally gather the data related to predicted variables. It is most suitable method when having large number of workers [18] to identify harmful posture at workplace related to MSDs. The observation method for assessing working posture should be chosen as found in many studies [19-21]. The questionnaire based on standard Nordic questionnaire was also used to find the exposure of MSDs.

Useful measures of absence included frequency and duration of sick - leave, reason for sickness/ absence and absence data on different shifts within the organization. The main causes of sleep problems and MSDs pains for absenteeism were taken into considerations. The questionnaires consist of both general and specific questions related to predicted variables and interview technique was also used to collect the relevant data.

The questions addressed major sleep and MSDs problems during the previous 1 year period using the questionnaire in Appendix A, B, B-1. The assorted variables of sleep problems were considered as insufficient sleep, difficulty in initiating sleep, feeling tiredness, trouble to sleep once awakened, sleep duration <6 hrs and early morning awakening. In this study, sleep duration <6 hrs was regarded as short sleep. Taking more than 30 minutes to fall asleep was defined as difficulty in getting to sleep. Sleep quality was considered poor if participants rated their quality of sleep as very poor or not good. Sleep insufficiency was noted if participants rated their daily sleep as definitely or somewhat insufficient. Tiredness was noted if participants answer "yes" to those questions. Trouble getting back to sleep after being awakened was defined if participants take more than 30 minutes to get back to sleep. Sleep to few hours at a time means more number of sleep periods were considered if the sleep periods were 3 or more (one period may be of half hour).

In the questionnaire related to MSDs the worker was asked to identify area or body parts that had pain or discomfort from the body chart in relation to the body regions (neck, shoulder, elbow, wrist/ hand, upper back, lower back, knee and eye). MSDs problems are also related to work place and manual material handling which affect the different body regions. The questionnaire consists of 38 questions related to musculoskeletal problems of different body regions. Various musculoskeletal problems were considered if the pain of corresponding organs noted as "yes". Also it was depended on detailed questionnaire and interviews conducted. Reported MSDs symptoms were limited to the past twelve months.

All units were visited and the questionnaires were completed by interviewing the workers.

The interviews were conducted taking into consideration the following information.

1) Employees' job title, hours work, length of time on present job and employees' general health as well as some personal data such as age, gender, weight and height.

2) Subjective pain/ discomforts of different body regions were measured using modified version of Nordic and detailed questionnaire.

3) For sleep problems and absenteeism causes, some questions were structured and dichotomized alternative "yes" and "no" was used. The advantage was that it was easy for employees to answer and also time saving.

Workplace analysis had been accomplished by observing the task, watching the employees as they were doing the task. Each task had been described according to how it was performed. This was to note the main demands of the task and list the risk factors as to which may be present.

Observational methods have advantages to understand working process and workplace vividly in which workers are performing [22]. Photographs of different postures at the workplace were also taken for analysis.

This study emphasizes on the practical strategies that can be used to reduce the risks associated with the shift work and absenteeism by providing the ergonomic training. It should be remembered that circadian rhythm system is slow to adjust to being awake at night. This means after the few night shifts workers will accumulate the significant amount of sleep loss. So in this study Ergonomic Intervention Programme (EIP) was included. The results from the collected data were used for the basic configuration of the ergonomic training. The health education and training sessions were provided to the workers. The frequency of education and training was 3 times during the period of 10 April to 12 October 2012 and for the duration of 2 hours per session. The education and training sessions were as follows:

1) The practical information regarding sleep (main sleep timing, how to get better sleep, tips for using effective naps, safe and healthy shift workers' diet, alertness levels, circadian rhythm cycle and balancing work and home life).

2) Fitness training programme (muscular exercise at home was encouraged as self health, behavior for participants, relaxation techniques like mediation, yoga, reading and regular exercises).

The information about how to get better sleep included the following practical strategies such as main sleep timing, napping, sleep environment, meal timing and content and circadian rhythm cycle. Also, the fitness training programme was provided on relaxation techniques like meditation, yoga, reading, regular exercises etc. During the working hours two 10-15 minutes tea breaks and 60 minutes of meal brake were allowed which, were seen to reduce both mental and muscular fatigue built up depending on the work being carried out. A training programme on proper lifting techniques, comprised of two major components, lifting techniques and education on body mechanics (anatomy and physiology, biomechanics and ergonomics and injury prevention methods) was provided to reduce MSDs. Higher muscular forces were also reduced by providing jigs and fixtures and using the mechanical aids modifying the exists equipments and work place.

The same questionnaire was distributed again after the training programme and filled by each of the participants who were involved in the training programme.

For the analysis the following statistical techniques were used to meet the objectives of the study.

1) Descriptive statistics was used to explain response rate, mean, standard deviation, frequency and percentage of demographic data.

2) Chi square test was used to determine the association of shift work with various variables (problems related to sleep, MSDs and absenteeism).

3) ANOVA technique was employed to investigate the differences among the means of all the assorted variables related to sleep, MSDs and absenteeism.

4) 4 Pearson's Correlation was used to determine whether there were any relationship between sleep, MSDs and absenteeism. All statistical analyses were conducted using Graph Pad Prism version5.

Result and Discussion

The data was analyzed in terms of frequency of positive and negative responses to each question. The results of demographic characteristic of all workers in process industries indicated that most of the employees were at the age group of 40 to 50 years old. Their mean ages were found near 43 years (SD varies from 7.2 to 8.6 years). The mean years of experience was observed as 20 to 23 years (SD varies from 6.6 to 8 years). If we consider the factors like age and years of experience, this group of workers was found homogeneous (Table 1).

The result showed a negative correlation ($r=-0.63$, $p>0.05$) of age with absenteeism which was not significant. The correlation between years of experience and absenteeism was not significant ($r=0.255$, $p>0.05$). As a result, age and years of experience were excluded from this study.

From the weight and height, BMI was calculated. Mean BMI for

Demographic Characteristics	General Shift	Morning Shift	Afternoon Shift	Night Shift	'R' Shift
Age					
Mean	43.11	43.08	43.68	43.35	44.06
Std. Deviation	8.609	8.299	7.967	8.123	7.278
Min- Max	22-57	25-58	19-58	25-57	27-57
Weight					
Mean	62.66	63.36	62.28	61.31	61.4
Std. Deviation	7.739	8.116	8.225	7.16	7.572
Min-Max	45-85	45-90	45-85	45-80	46-80
Height					
Mean	1.686	1.642	1.674	1.65	1.665
Std. Deviation	0.07043	0.0669	0.07792	0.06706	0.07301
Min-Max	1.5-1.8	1.5-1.8	1.5-1.8	1.5-1.8	1.525-1.8
BMI					
Mean	22.04	23.5	22.23	22.55	22.26
Std. Deviation	2.412	2.73	2.63	2.657	3.213
Min-Max	15.12 - 32.19	15.93 - 32	15.55 - 32.25	15.55 - 29.55	14.6 - 30.53
Year of Experience					
Mean	20.43	22.07	21.89	22.88	22.69
Std. Deviation	8.034	7.019	7.599	7.755	6.684
Min - Max	2-34	6-36	2-36	3-37	8-35

Table 1: Demographic characteristics of all workers.

morning shift workers was found the highest (23.5 with SD=2.73) and that of night shift workers it was 22.55 (SD=2.65).

Result of the study shows that on average 26.93% of the total workers complained of having sleep problems. Among the sleep variables, insufficient sleep was reported majorly (32.63%) by the shift workers. 'R' and night shift workers reported highest percentage of sleep disturbance 35.12% and 31.44% respectively; frequently more often than general shift workers as 17.45%. General shift workers had the lowest proportion of difficulty in initiating sleep (12.8%), while the highest proportion of difficulty in initiating sleep was among 'R' shift workers (31.1%) followed by night shift workers (20.71%) (Figure 1).

Chi Square test was conducted to find if there was any association between sleep variables and shift duty. This study showed the significant association between shift work schedules and sleep variables such as difficulty in initiating sleep (χ^2=19.02, p=0.0008), insufficient sleep (χ^2=19.02, p=0.0008), feel tiredness (χ^2=18.54, p=0.0001). Trouble to sleep once awakened, sleep duration < 6hrs and early morning awakening were significantly associated with shift duty (p<0.0001).

The Pearson correlation analysis with all variables was conducted to identify if there were any intra and inter co-relations among them. The intra co-relations were found to be significant among all the sleep variables except that the difficulty in initiating sleep was not significant with trouble to sleep once awakened (p>0.05). Insufficient sleep was strongly correlated with other remaining sleep variables (p<0.05). It was also found that sleep duration <6 hrs was highly correlated with early morning awakening (r=0.989, p<0.0001).

Pearson's correlation analysis conducted on sleep and MSDs variables as shown in Table 2 indicates that insufficient sleep, tiredness and trouble to sleep once awakened were significantly correlated with all MSDs variables (p<0.05). It was noticed that difficulty in initiating sleep was not significantly correlated with neck, shoulder and knee pain (p>0.05). The effect of sleep duration <6 hrs and early morning awakening were detected as not significant for neck pain and knee pain (p>0.05).

If we take an instance of sleep into consideration we shall find that, post training results dealing with sleep problems were decreased. Insufficient sleep (36.55%) was reported by workers of 'R' shift prior to EIP and 31.03% after EIP. Also night shift workers recorded the same problem 38.20% prior to EIP and 35.37% after EIP. The percentage of early morning awakening was found to be very high among 'R' shift workers (40.86%) before EIP but it was only 31.03% after EIP. The average reduction in sleep problems were observed in 'R' shifts (9.68%) and in general shift (4.56%). The sleep problems were reduced up to the extent of only 3.85% in night shift workers.

The prevalence of ergonomic training programme showed that early morning awakening and trouble to sleep once awakened was

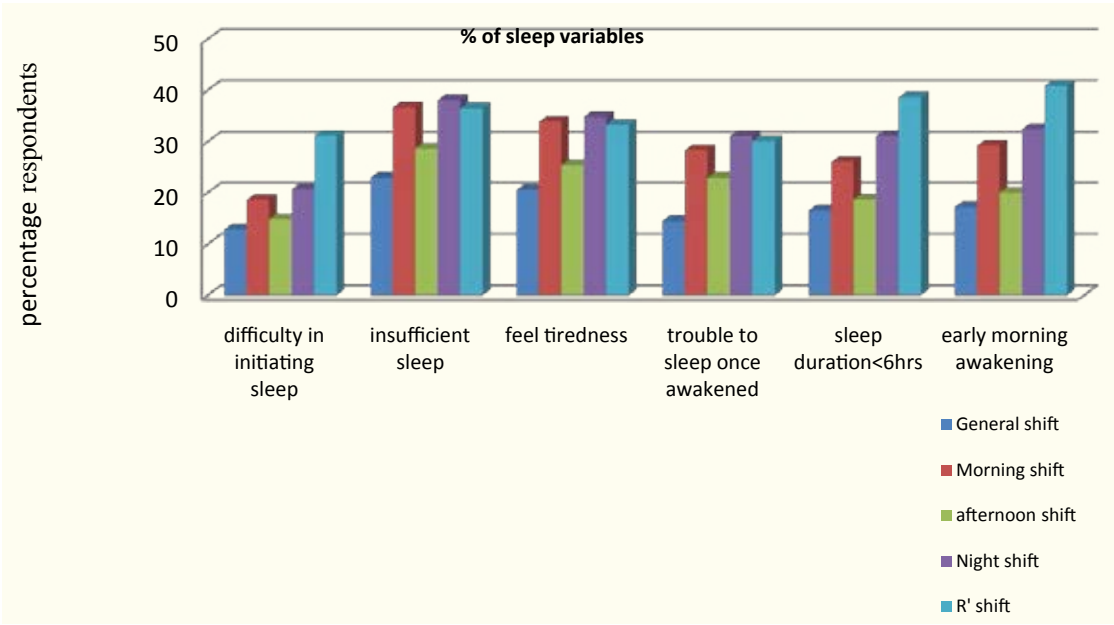

Figure 1: Percentage of respondents who complained against sleep variables (before EIP).

Variables	Neck Pain	Shoulder Pain	Elbow Pain	Wrist/ Hand	Upper Back Pain	Lower Back Pain	Knee Pain	Eye Problems
Difficulty initiating sleep	0.831	0.876	0.921*	0.936*	0.937*	0.903*	0.823	0.863
Insufficient sleep	0.970**	0.973**	0.950*	0.996***	0.986**	0.996***	0.954*	0.907*
Feel tiredness	0.967**	0.978**	0.961**	0.997***	0.993***	0.998***	0.956*	0.916*
Trouble to sleep once awakened	0.983**	0.990**	0.987**	0.953*	0.967**	0.962**	0.991**	0.993***
Sleep duration < 6 hours	0.832	0.881*	0.941*	0.917*	0.931*	0.885*	0.836	0.905*
Early morning awakening	0.865	0.917*	0.966**	0.932*	0.954*	0.913*	0.875	0.931*

(*p < 0.05, **p < 0.01, ***p < 0.001)

Table 2: Correlation between Sleep and MSDs variables.

reduced by 6.5% and 6.3% respectively. After training only 24.26% workers reported about feeling tiredness and 31.9% workers reported about insufficient sleep. In all, the sleep problems were found to be reduced by 5.41% averagely after EIP. The results of one way ANOVA shows that sleep problems differ according to the shift work. ($F=9.305$, $p<0.0001$).

Difficulty in initiating sleep and sleep duration < 6 hrs were not significant with absenteeism ($p>0.05$) (Table 3). On the other hand very strong interaction was observed between trouble to sleep once awakened and absenteeism ($r=0.992$, $p<0.001$). Insufficient sleep, tiredness and early morning awakening were found as potential factor which lead to increase absenteeism because they were statistically significant with absenteeism ($p<0.05$) [18].

The analysis shows that disturbed sleep was a common negative consequence of shift work. The sleep disturbance is one of the most predominant factors leading to increase absenteeism which directly affects the labor productivity, safety and performance of the workers. The percentage of absenteeism due to sleep was found to be 2.349% before EIP and reduced to the extent of 0.93% after EIP. Hence the improvement in labor productivity was seen as 0.858%. Thus the prevalence of sleep directly affects on the absenteeism and labour productivity (Table 5).

Zhang et al. [10], reviewed that the majority of studies were done to date provide evidence that greater muscle strength is seen in the afternoon and this is due to a peripheral or muscle related variable rather than central/ neurological factors. However, there are few studies suggesting that both central and peripheral muscle factors contribute to circadian variations in strength. This study also mentioned the neck pain (25.45%, shoulder pain (22.53%), elbow (21.03), wrist/hand (17.96%), upper back pain (30.15%), knee (31.17%) and eye problem (19.35%). Shoulder and wrist/hand were common musculoskeletal problems among the process industries workers. With variation in work/task and industries, neck and shoulder problems were counted to be higher in prevalence using both the questionnaires i.e., 60% and 57%, respectively.

In the present study, the prevalence of MSDs was found to be significantly associated with the factors like insufficient sleep, feeling tiredness and trouble in sleeping again once awakened ($p<0.05$). Due to the circadian molecular clock disruption produced in the skeletal muscle leads to increase musculoskeletal pain in the body region. This was shown by Chi Square test that all MSDs variables were strongly associated with shift schedule.

Figure 2 represents percentage of eight body parts affected by musculoskeletal disorders problems during each shift. A total of 24.55% workers reported that they had been suffering with MSD symptoms in one or more of eight defined body regions. From SAQ it was seen majorly that the shift workers suffered from lower back pain. 30.78% workers reported that they had been troubled with lower back pain. The shift workers were reported MSDs symptoms in relation to upper back pain (30.15%), knee pain (31.17%), and neck pain (25.45%). 30.36% of night shift workers complained of MSDs symptoms followed by the morning shift (30.72%) and 'R' shift workers (26.47%). Afternoon shift workers (21.77%) reported that they had been troubling with MSDs. Only 15.45% of workers of general shift suffered from MSDs. 30.18% workers of night shift recorded neck pain as their problem. Also 30.83%, 31.95% and 24.40% workers of morning, 'R' and afternoon shift respectively recorded the same problem.

A higher prevalence of shoulder pain was reported in night shift (26.88%) followed by morning shift (26.04%) and 'R' shift (25.80%). 25.94% workers of night shift were found annoyed with elbow pain. 25.80% of 'R' shift and 23.72% of morning shift workers reported the elbow pain. The night shift workers (22.16%) reported the wrist/ hand pain. Morning shift (20.46%) and R' shift workers (19.35%) 'had recorded that they had been suffering from wrist/hand pain. Lower back and upper back pain were found the highest among night shift workers i.e.38.67% and 37.26% respectively. 24.88% workers of afternoon and 19.93% workers of general shift reported upper back pain.37.67% workers of morning and 31.03% workers of 'R' shift stated that they had been suffering from lower back pain.

31.31% workers of afternoon and 21.30% workers of general shift recorded that they had the trouble of lower back pain. Majorly 37.26% of workers of night and 36.31% workers of morning shift recorded knee pain. 30.23% workers of afternoon and 26.88% workers of 'R' shift also recorded knee pain. 24.52% workers of night shift, 23.65% of workers of 'R' shift and 21.39% workers of morning shift were spotted suffering from eye problem followed by 16.74% workers of afternoon and 10.47% workers of general shift.

The result of one way ANOVA shows that the MSDs problems significantly differ according to the shift work ($F=15.22$, $p<0.0001$). The analysis regarding the effect of MSDs problems on absenteeism indicated that, absenteeism was strongly correlated with them ($p<0.05$) (Table 4).

It was found that musculoskeletal disorder causing 2.247%

Sleep variables	Difficulty in initiating sleep	Insufficient sleep	Feel tiredness	Trouble to sleep once awakened	Sleep duration < 6 hours	Early morning awakening
Absenteeism	0.798	0.902*	0.910*	0.992***	0.836	0.879*

(*p < 0.05, **p < 0.01, ***p < 0.001)

Table 3: Correlation between Sleep variables and absenteeism.

Variables	Neck Pain	Shoulder Pain	Elbow Pain	Wrist/Hand Pain	Eye Problem	Knee Pain	Upper Back Pain	Lower Back Pain
Absenteeism	0.969**	0.977**	0.969**	0.915*	0.987*	0.986*	0.939*	0.934*

(*p < 0.05, **p < 0.01, ***p < 0.001)

Table 4: Correlation between MSDs variables and absenteeism.

Productivity (labor/hrs) (before)		Productivity (labor/hrs) (after EIP)		Percentage improvement in productivity (%)		Total productivity improvement
Sleep problems	MSDs	Sleep problems	MSDs	Sleep problems	MSDs	%
131	130.875	129.875	129.875	0.858	0.764	1.622

Table 5: The productivity improvement.

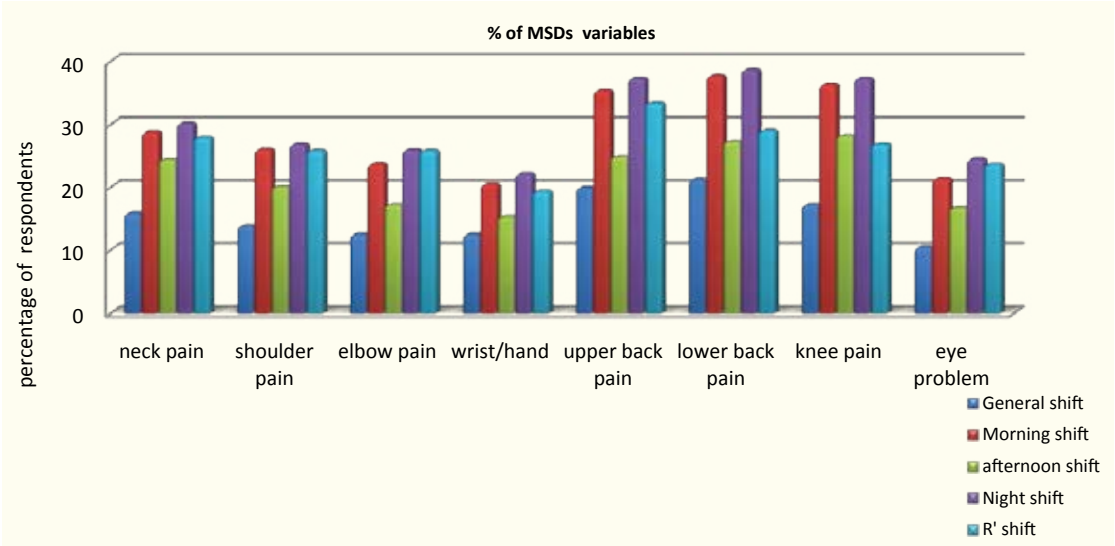

Figure 2: Percentage of respondents who complained against MSDs variables (before EIP).

absenteeism, which affects loss in labour productivity. After EIP the percentage of absenteeism due to MSDs reduced by 0.83% which played the major role in improving the productivity by 0.764%. Due to training and ergonomical approach (EIP) the overall absenteeism decreased by 1.76%. So the increase in labour productivity was 1.622% [14,16,20,23-26].

Conclusion

The present study leads us to the following conclusions-

1. The inter correlation between MSDs and sleep variables shows that pain due to MSDs cause the workers to suffer from sleep disturbance and feel tiredness and the disturbed circadian rhythm due to different shifts leads the musculoskeletal disorder.
2. Circadian disturbances and MSDs problems reduce the quality and quantity of their sleep which reduce the performance and may increase the absenteeism.
3. Significant correlations among sleep variables and absenteeism lead to conclude that it is important to understand the prevalence of sleep variables to control absenteeism. Absenteeism due to sleep has been found to be 2.34%.The greater reduction in sleep variables (5.41%) after EIP shows that the sleep related strategies are significant predictors of shift work coping. The effect of this reducation in sleep leads to reduce the absenteeism by 0.93% and to improve the labour productivity by 0.858%.
4. Correlation between MSDs variable with absenteeism highlights the role of pain due to MSDs on absenteeism with the finding of absenteeism due to MSDs was 2.247%.
5. The overall 4.75% reduction after EIP in MSDs symptoms proves the need of EIP for the workers in process industries. The result shows that absenteeism due to MSDs was reduced by 0.83% and the labour productivity by 0.764% after EIP. It means the control in MSDs pain can improve the labour productivity. The control over MSDs symptoms is found to be less as compare to sleep variables as the strategies in EIP for MSDs require more motivations and efforts than the other strategies.
6. The effect of this reduction in sleep and MSDs variables leads to improve the labour productivity by 0.858% and 0.764% respectively. Thus reduction in sleep and MSDs problems plays a major role in improving the labor productivity in process industries.

In this present study after analyzing all the significant factors, to decrease absenteeism, proper ergonomic training is a potential modifier. The result of both employer and employee analysis clearly indicates that the ergonomic training to the shift workers provides measurable benefits to the industry, its employees and their families.

The study has also shown that the ergonomical approach can lead to decrease various sleep and MSDs variables. Therefore proper training and ergonomics are the best approach to reduce various problems of employees which are related to their mind and body helping them to lead peaceful life. The survey has shown that the training is essential for the betterment of greater productivity and reduces workers' problems related to sleep and MSDs. The ergonomic training programme can be exercised to basic self care treatment and engineering improvement.

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