

Full Length Research Paper

Review of relationship between knowledge of management, workforce productivity and nervous fatigue

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The worker fatigue models which consist of two variables of physical fatigue and nervous fatigue are suitable tools for the managers of companies in predicting the dangers due to fatigue in the work environment. These two variables are again divided into several independent variables which affect the whole model. This research aims to identify the variables which have an effect on the nervous fatigue of the workforce and tries to find which factors impact the workers. The procedure followed in this research is to investigate the previous studies and collect a relatively comprehensive amount of data for easy access to the required information for the future researchers in the field of nervous fatigue. The results of the analysis show that nervous fatigue is one of the effective variables in the performance of the workforce. By increasing their knowledge on the variables affecting the nervous fatigue, the managers of the production and service companies can make the necessary arrangements to control and reduce the dangers due to nervous fatigue in the work environment. Therefore, this research project will help them to improve the performance of their workforce and hence promote workforce productivity.

Key words: Nervous fatigue, workforce productivity, environment, management.

INTRODUCTION

Today, in the world, the main concern of the managers is to reduce the dangers of nervous fatigue on the workforce and make use of the maximum ability and capacity of the workers in the work environment. This issue is highly observed in the developing countries where the workforce is still used for the exercise of tasks. Some developing countries have certain programs in progress to replace human workforce with fully automatic and robotic machinery and instruments. Until then, the managers will have to increase not only their own information, but also the knowledge of their personnel in order to prevent, as much as they can, the occurrence of dangerous events due to nervous fatigue in the work

environment. This problem led the researchers into making a wide investigation into the factors affecting nervous fatigue. The workforce fatigue models are suitable instruments which can assist the managers in making decisions (Jaber et al., 2010). The earlier researchers usually added only one variable or some variables to the models at the same time.

This trend has continued up to now to let others add other progressive variables to the previous models so that the degree of fault could be reduced (Dawson et al., 2011).

Through the collection and analysis of the previous findings, this research intends to facilitate the job of the managers and the personnel in accessing their required information. Due to the vastness of the domain of research, it has been decided to narrow the research scope down only to the factors which affect the workforce nervous fatigue.

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LITERATURE REVIEW

Forgetfulness is an independent variable which is a sub category of nervous fatigue. It gets more extensive when the level of nervous fatigue, which is usually a product of the lack of sufficient rest, goes high, or when the amount of retraining on the variables dependent on it goes down. Research on the subject is indicative of a deep relationship between somnolence and forgetting to perform the tasks to be performed by the workers when at work (Fichten et al., 1995; Marchini et al., 1983; Martin, 1988; Shepard, 1984; Stepanski et al., 1989). It seems that the forgetfulness caused by the exhaustion of workers is mostly a result of reduced levels of their mental and physical energies (Libman et al., 2007). A recent study conducted on some patients suffering from forgetfulness shows that a large number of such patients do not get enough sleep specially before starting work. This causes depression which in turn results in forgetting some work tasks when working on different work shifts (Hossain, 2005). In-service training, courses at certain points can reduce the work induced nervous pressures on workers, help them with more self confidence at work, and minimize worker's forgetfulness (Kher, 1999; Bokhorst, 2006; Yue, 2005; Eklund, 1997; Niebel, 2003).

Recent studies show that a boost in the independent variable of forgetfulness induced by increased nervous pressure on the work force can sometimes drive the company into crisis; they also suggest that the variable can be minimized through right policy-making, precise planning and proper control of the environmental factors in the work place on the part of the management (Zamiska, 2007; Hopp, 2004; Bokhorst et al., 2006; Dowson et al., 2011; Enoka, 2008). Retraining is another independent factor, in direct relationship with mental and nervous fatigue. The significance of training for the workforce in the period of working for a company, its role in the work force productivity while on duty, as well as its clear influence on the workforce productivity at work has been fully discussed in the previous studies in the literature where it has been proven that the variable has direct effects on workforce productivity at work (Mccreery et al., 1999; Wisner, 1993; Jaber, 2003; Zamiska, 2007). The previous studies suggest that incorporation of in-service training at certain intervals during the personnel's service is of prime importance. For instance, retraining every six months especially for jobs involving the operation of sophisticated machinery can reduce the risk of damage and develop skills and experiences which in turn lead to the enhancement of the workforce productivity (Kaliprasad, 2006; Roche, 2005; Wilosn, 2006). The management in manufacturing and service companies can plan and provide the required training and retraining to upgrade their personnel's knowledge and ability. Thus, the risk of damage to the machinery and the operators is lowered and quality of the product and the general productivity improved (Paradise, 2008; Wilson, 2006; Lee et

al., 1997; Campbell, 1999). Training the work force and refreshing it obviously reduces work induced stress, mental involvement, and tensions at work and generally contributes to the deflation of the negative effect of nervous fatigue on the workers as it develops their ability to manage their duties at work, and that is why the variable can be of considerable importance in the nervous fatigue (Gebauer, 2006; Hundley et al., 2005; Martin, 2002). The previous studies on the subject indicate that nervous fatigue is affected by many other variables such as stress, retraining, and forgetfulness the most effective of which is stress, that is in turn affected by such other variables as temperature, humidity, Vibrations, light, work time limitation, weak management, noise, uncooperative workmates, nervous preoccupations, etc. (Edward, 1981; Enoka, 2008; Wisner, 1993; Bokhorst et al., 2006; Hopp, 2004; Mccrerry, 1999; Dowson et al., 2011). Studies on doing complicated work tasks, especially when they involve operating complex machinery or equipment, have shown that as a result of factors such as lack of proper training, lack of team working, the high amount of data needed for the operation or the limited experience of the operator, the machinery is not calibrated and deployed properly, which increases the risk of damage to the work force and the machinery in operation, and lowers the productivity and the quality of the final product (Mccreery, 2004; Felan, 2001; Krajewski, 1987; Kher, 2000).

The stress imposed on the workforce while on duty, as a result of the lack of proper environmental conditions and management in the work place is another important factor affecting forgetfulness in workers while working (Edward, 1981; Kher, 2000; Wisner, 1993; Mccreery, 1999). Indoor environmental quality may affect physiological and psychological processes that, in turn, may affect performance of tasks that may interact with other factors to affect overall productivity (Parsons, 1993). Seppanen and Fisk (2003) developed a conceptual economic model for owner-occupied buildings that shows the links between improvements in indoor environment quality and financial gains. It is very important to consider the effect of indoor environmental quality on office workers' health and productivity. Earlier studies about the effect of thermal conditions on productivity were done mainly by field study. They showed that accident rates were high or output rate decreased in hot environments (Chrenko, 1973; Vernon, 1919). Some reviews and a summarized model for the effects of the thermal environment on mental performance showed that nervous performance decreases with heat (Parsons, 1993; Wyon, 1986; Seppanen and Fisk, 2003). On the other hand, it was also reported that performance of mental tasks is generally unaffected by heat (Pepler and Warner, 1968; Sundstrom, 1987). Productivity research is somewhat confusing because the results are sometimes conflicting (Lorsch and Abdou, 1994). The difference of task types or workers' psychological factors, such as motivation level, may affect the results.

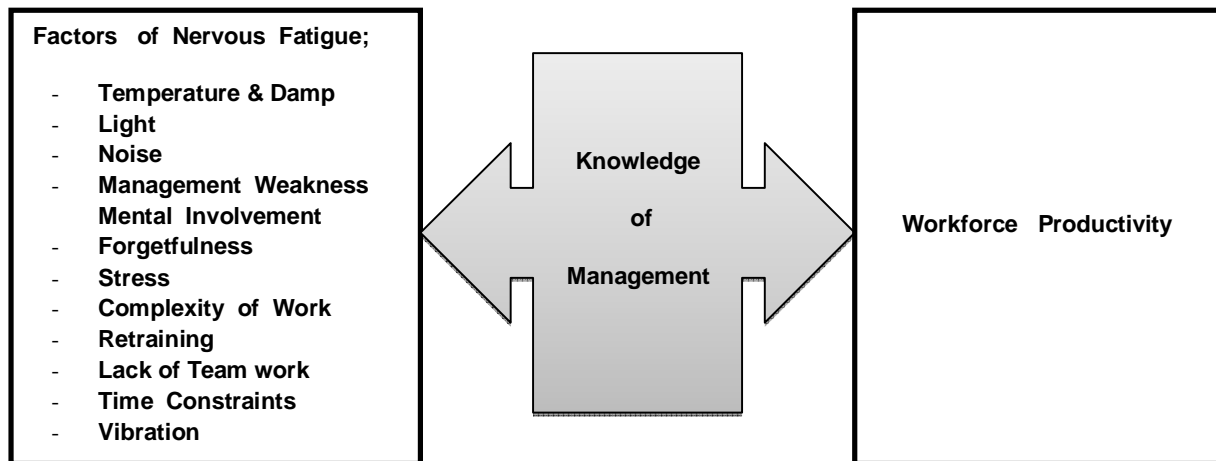


Figure 1. Model of study.

As previously stated, an increase in stress level in the work place can cause the development of forgetfulness in the workforce which means that the variable of forgetfulness is under the influence of stress factor; thus, stress control in the work place becomes a necessity (Zamiska, 2007). At the same time, training is an effective variable in controlling the stress level in the workforce, and managers are to plan and provide retraining for the workforce (Bokhorst, 2006; Zamiska, 2007). The following model is introduced on the basis of the literature review (Figure 1). It also helps to have a better understanding of the factors which affect the fatigue model. In the next section, this model will be analyzed and discussed. Furthermore, in order to become familiar with the properties of many of the mentioned variables in the study model, there will be discussion on every one of the variables.

ANALYSIS AND DISCUSSION

Temperature and damp

Temperature and moisture are among the most important factors in the work environment. Previous studies have shown that high temperature and moisture in the work environment increase stress and nervous fatigue, giving rise to insufficient incentive to keep on working. This is also true in the work environments which have very low temperature. The managers of companies and organizations must make arrangements to adjust the relative temperature and moisture to the level that the personnel can bear. The temperature and moisture must not be so high that the workers cannot stand. Besides, it should be taken into consideration that the temperature and moisture in the work environment should be in accord with the working personnel and the machinery and facilities in that

place. Therefore, it is necessary to make such arrangements that temperature and moisture set for the work environment will not damage the systems inside the place. The balance between the desirable temperature and moisture and the personnel and machinery will affect the performance and productivity of the personnel of the organization (Enoka, 2008).

Noise

Noise is one of the other crucial factors in the work environment. Excessive sound and noise in the work environment can give rise to stress and nervous fatigue in the workforce. Therefore, the managers should put up covers and barriers to prevent the outside sound pollution from entering the inside of the workplace. They should also regulate the operating machinery so that they would not make any noise as much as possible. They can also provide the personnel with special sound proof headsets to hinder physical damage to them. In this way, the managers can largely reduce the amount of stress and nervous fatigue on the personnel (Hopp, 2004).

Light

Undoubtedly, light is one of the important factors in inflicting nervous fatigue. There have been various studies on the performance of the personnel in the work environment. The result of these studies show that direct light to the eyes brings about nervous tiredness and make them hurt so they will not have sufficient incentive to keep with their work. Furthermore, very low light can dim visibility and aggravate the chance of having accidents with the instruments. Therefore, the managers must make the required arrangements in providing

sufficient and suitable light at night shifts (Bokorst et al., 2006).

Vibration

One of the factors that affect nervous fatigue is vibration in the work environment especially in the production workshops. The vibration due to the falling of heavy things or the vibration caused by operating heavy machinery will negatively affect the workers. Therefore, if the work stations are appropriately designed, and the instruments are properly placed, and the machines are installed according to the standards, unwanted vibrations can be greatly prevented. This will reduce the nervous damage to the personnel and hence the efficiency and productivity of the workforce will be improved (Hopp, 2004).

Time constraints

In many production or service professions, the performance of any task from start to finish and the start of the second task have already been scheduled and are known to the personnel. In some professions, the personnel have to bear much nervous pressure to do their job most optimally. Thus, the managers should assign the tasks according to the capacity, gender, physical ability, speed, and skills of the personnel. This will considerably reduce the damage due to nervous fatigue in the workplace and so will boost the performance of the personnel (Dowson et al., 2011).

Management weakness

One of the crucial factors in any organization or company is an efficient and suitable management. The weakness of management in planning and controlling the environmental factors of the workplace can lead to many hazardous events for the personnel and will damage the operational instruments, too. Previous studies have shown that in the work environment where the managers lack sufficient skills and knowledge about the principles of ergonomics, there occur injustice, lack of sufficient incentive, abundant physical and nervous damage, recurrent absences on the part of the personnel, decline in the quality of production and service and in general reduction in the productivity of the personnel (Paradise, 2008).

Lack of team work

Various studies have been conducted on the training and retraining of the working personnel in the production and service companies. The findings of these studies indicate that there is no team work in performing the assigned tasks. This factor turns so critical in cases where the

personnel lack the sufficient knowledge and skills for the performance of their tasks. The lack of cooperation among the workers and their avoidance from giving guidance to each other especially to the fresh and less experienced personnel can result in the aggravation of nervous pressure and stress among the personnel. Therefore, the managers should repeatedly hold meetings and put up suitable notices to invite the experienced workers to give a hand to the company. Team work will considerably be effective in the quality and output products as well as reducing nervous fatigue (Hopp, 2004).

Mental involvement

The personnel's nervous pre-occupations especially at work are regarded as a very dangerous determinant in causing incidents and physical damage in the workers. Research has shown that nervous pre-occupations particularly in the production jobs can sometimes lead to mutilation or heavy damage to the machines. Therefore, the managers should pay careful attention to this very critical and sensitive factor which is a subdivision of nervous fatigue. They can considerably prevent such events from happening by removing their personnel's family or financial problems (Gebauer, 2006).

Complexity of work

One of the important factors in increasing worker fatigue and bringing about stress among the personnel is the work complications. In some professions where the workers have to work with computers and sophisticated instruments, this issue is more outstanding. The complexity of working with instruments and machines or the incomprehensibility of the instructions for the performance of certain tasks can worsen stress and nervous pressures leading to irreparable damage. The company managers should hold suitable specialty courses in order to increase the skill and experience of the personnel, and provide simple to understand instructions. Furthermore, they may use the professional personnel in doing complicated and sensitive work (McCreery, 2004).

Stress

Nervous pressure or stress, is, in fact, the product of several factors some of which are as follows; lack of proper training, lack of proper scheduling by the managers, non-team work, work complications, short period of each task, and lack of sufficient light, temperature, moisture, inconvenient vibration, disturbing noise, and nervous pre-occupations. As stress increases in the work environment, the dangers due to nervous fatigue and reduction in efficiency and productivity will follow. Through accurate and harmonious programs and

the creation of interactions among the workers, the managers of the organizations and companies can make the work environment have the least stress on the personnel (Zamiska, 2007).

Retraining

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Forgetfulness

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CONCLUSIONS

The increased pace of work is a result of rapid changes in global economics and working life making the work structure in many developed countries very demanding. Efficient and effective employees are required in the face of time pressure. Flexibility on the part of employees is expected in many departments even if they have to work for extended hours and reduced breaks or rest time, resulting in irregularities from the beginning to the end of the work shifts. The important factors related to increased workforce productivity are fatigue, mild rhythm of the work volume and sufficient sleep. Fatigue being an important element of the modern day lifestyle has a number of consequences, notably acute and chronic types of fatigue that result in exhaustion and employees discontent. These fatigues are usually caused by muscles. Nervous fatigue can be as a result of nervous or intellectual labor or nervous fatigue due to work overload or the repetitive use of the same neural system subdivision. Chronic fatigue can result from viral agents, permanent diseases and chronic sensitivity of the employees. For example, driving drowsily; an imbalance between the intensity / duration of work and the rest duration caused by fatigue in workforce was found by a number of scholars recently. That can be related to long work and subsequently being unable to maintain the required. Fatigue caused by lack of sleep is the most renowned element and is related to long periods of repetitive work, job stress, and instability in the employee, efficiency, reduction of security and increased disease risk. This fatigue is also found frequently in drivers of workshops and increases the risks of incidents along with longer periods of works and mandatory overtime leading towards increased mental distress, physical disorders

and cardiovascular diseases. After discussing and analyzing different research projects, it can be concluded that all the mentioned variables in this research will have a direct effect on the nervous fatigue of the workforce. However, what is obvious is that some of the variables such as forgetfulness, retraining and management weakness will have greater effects on nervous fatigue and stress. The importance of having sufficient knowledge about the characteristics of each of these variables cannot be denied. Both the managers and the staff should have the required and sufficient information in this regard. In companies where programming is based on human factor engineering, there will be much less damage. Thus, this research can open a new door for the managers and staff of the companies to have access to some parts of ergonomics. The obtained information from this research gives an alert to those company managers that do not care about the human factor engineering and the personnel's nervous fatigue. The future researchers are invited to try every one of the variables mentioned in this research separately in one or several companies as a case study. In this way, they can compare the figures with each other and so they will be able to get informed of the effect of each variable on nervous fatigue. Meanwhile, by using these statistical data, it will be possible to prioritize the variables according to their degree of inflicting nervous fatigue.

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