WHAT IS ERGONOMICS AND HOW IMPORTANT IS ERGONOMICS TOWARD OFFICE WORKERS

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ABSTRACT

Nowadays, people tend to spend more and more time working in the office. The office cannot be guaranteed to be the safer place for the workers. Both lack of ergonomics awareness and the combination of repetitive movement, poor posture and environment, and over use of computers can lead to excruciating pain and eventually the inability to work at the computer or perform simple tasks. The injury can be developed from mild to the extreme level and it may be like a life-changing injury.

In this paper, I would like to identify the importance of ergonomics and to look into the associated causes of ergonomics issues toward office workers. Face to face interview with beverage function supervisor was one of the data collections in this paper.

KEY WORDS: Ergonomics / Office Environmental / Workstations / Injury

23 pages

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CHAPTER I
INTRODUCTION

As an office worker, people always think that it is safer to work in the office than outside but it is wrong because if people lack of ergonomics awareness then they can get injured while working in the office. The level of injury can be from mild discomfort up to disability.

Ergonomics is a multidisciplinary activity striving to assemble information on people's capabilities and, to use that information in designing jobs, products, workplaces, and equipment to work safely and efficiently. Office ergonomics is balancing between human capabilities and job demands. Sometime people like to go beyond their capabilities because they want to get their work done. For example some people spend 4 to 5 hours at their computer without resting their eyes.

In this paper I would like to look into how ergonomics is important to office workers because I am an office worker and I have heard and saw my colleague get injured while working in the office. People tend to work long hours without exercises and rest because they always get busy all day long or sometime people need to really focus on their work and don't want to lose their concentration. These are the common habits for office workers which can cause the injury to them in the long run. Office ergonomics issues are common in the oil and gas, petrochemical, and software industries or anywhere where people are performing a majority of their work on the computer.

I will first see the level of ergonomics awareness for office workers because each of the office workers has different level of ergonomics awareness. A study from (Shikdar and Al-Kindi, 2007) on Workstation components will be one of the areas that will look into as this is like a second home to some people. They spend about 6 hours each day at the workstation so this is definitely an important area to look at. Office environmental is also part of ergonomics because good office environment

or poor office environment has effects to office workers. It will be interesting to see how office environment can affect office workers. Lehner-Collins (2007)

Principles of ergonomics at workplace by (MacLeod, n.d) will be discussed in this paper. There are very easy to understand and easy to apply at workplace. Some of the principles are known by workers but they might have overlooked at them. The paper also pointed out ten good reasons from Humantech, Inc. (2013) why you need ergonomics at workplace. They have put into three parts which are pain, cost and changing trends. It is start from the basic up until extreme level.

At the end of the literature review there will be one case study from (Goossens et al 2012). The study was about an office chair to influence the sitting behavior of office workers. They have conducted a field test for four weeks to observe the sitting behavior of office workers. Normally you will see each person has different sitting behavior depends on the chair and the body type.

CHAPTER II
LITERATURE REVIEW

Ergonomics is the science and technology of fitting the activities and environment to the abilities, dimensions and needs of people to improve performance while improving comfort in health and safety.

To understand more about ergonomics, it is important to know what factors that have impact to the office employees. So the literature review will discuss on factors of ergonomics issues.

There are not many people know what ergonomics is. Only a few office workers can actually define the word ergonomics but most understand its effect on their productivity and physical well-being. From the survey of 700 office workers in the U.S. and found that only 20percent know what is the definition of ergonomics (Trippany, 2007).

2.1 Workstation Components

Workstation Component is one of the main factor that impact to office employees because it is like a second home to them. They have to spend about 6 to 8 hours each day at the workstation. A research from (Shikdar and Al-Kindi, 2007) on ergonomics deficiencies in workstation design in the offices found that the major ergonomics deficiencies were in physical design and layout of the workstations, employee postures, work practices and training. They found that 55percent of the employees used nonadjustable chairs, 48percent of computers faced windows, 90 percent of the employees used computers more than 4 hrs. /days, 45 percent of the employees adopted bent and unsupported back postures and 20 percent used office tables for computers. From this poor workstation components can cause many problems to the employees such as eyestrain, shoulder pain, back pain, arm pain, wrist

pain and neck pain due to unsupported equipment. These results could lead to serious ergonomics deficiencies in the office workstation design, layout and usage.

2.2 Office Environmental

Office Environment is another factor that has impact to office employees' mental health. For example if you have got a bad office environment such as the light is too bright or too dark, the temperature in the office is too high or too low then you wouldn't want to stay there long. Your mind can only handle so much information before it gets overstimulated. Once this happens then you will lose your concentration and can't really focus on the work. This is where the mistake starts to occurred and slow down your productivity. Lehner-Collins (2007)

2.3 Principles of Ergonomics

(MacLeod, n.d) has summarized some of the principles of ergonomics. These principles can apply to office working environmental.

2.3.1 Principle 1: Work in neutral postures

This is the starting point of the tasks that you are going to do. Each person will position themselves differently depends on the body type. The best position is to keep your body in a neutral.

2.3.2 Principle 2: Reduce excessive force

Everyone likes to excess force such as carry a heavy box or pulling a heavy cart because it can safes their time but by doing this can create a potential for weakness and injury. You need to recognize activities that require excessive force then think of the ways to reduce that force to prevent you from injury.

2.3.3 Principle 3: Keep everything in easy reach

At the office there are many documents and things on your workstation and sometime you have to make a long reach to document which can injured you easily so you have to think carefully when making a long reach and see if there is a way to reduce that reach or not.

2.3.4 Principle 4: Work at proper heights

Working at the right height is a way to make things easier and comfortable for workers.

2.3.5 Principle 5: Reduce excessive motions

This principle is about number of motions that you make each day, whether with your fingers, your wrists, your arms or your back at the office.

2.3.6 Principle 6: Move, exercise and stretch

To be healthy the body needs to be exercised and stretched during the day. We can simply have like 2 minutes break for every hour such as get out from your workstation and do some stretching all parts of the body.

2.3.7 Principle 7: Maintain a comfortable environment

The comfortable environment can be lighting and glare as most of office employees are using computer so the lighting is the key issue because the highly polished computer screen reflects every stray bit of light around office. Having a bad lighting setup can hurt the eyes in a long run.

2.4 Why you need office ergonomics

They have put into three categories of not having office ergonomics program such as pain, cost and changing trends.

2.4.1 Pain

Lack of office ergonomics can hurts the office employees so implementing an office ergonomics program can reduce the job-related discomfort and pain experienced by up to one-half of office employees. Most common pain that hurt the office employees is the back pain because of the poor postures at their work stations. The company needs to provide training to them along with the right tools and equipment which can leads to more productivity from employees and decrease number of injury and illness. In figure 1 one study found that 16percent of the employees facing the extreme pain at the end of the workday and people with the sedentary jobs have got chances to die from heart disease than who have active jobs. Humantech, Inc. (2013)

Figure 2.1 10 Reasons why you need office ergonomics (Humantech, Inc. 2013)

2.4.2 Cost

Injury and illness from lack of office ergonomics are high because they take times to develop so we also need to take time to heal them. Having a sitting hygiene and reduces the incorrect postures can save the company a lot of money.

"The magnitude, cost, and burden of work-related musculoskeletal disorders (WMSDs) are enormous. From 1992-2000, there were 380,485 Washington state-accepted workers' compensation state fund claims for nondramatic soft tissue musculoskeletal disorders of the neck, back, and upper extremity. These claims resulted in $2.9 billion in direct costs and 26.9percent of all state fund workers' compensation claims. Of WMSD claims during this time period, 32.4percent were compensable with an average of 123 lost time days per compensable claim." The Health of Washington State (2002).

As per figure 2 it shows that the costs to the company is between $24,000 and $60,000 per incidence and require an average of 23 days away from work to recover.

The main root cause for work related musculoskeletal disorders is mismatch between the physical requirement of the job and the physical capacity of the human body. So balancing between human capabilities and job demands is very important factor. For example heavy lifting, repetitive motion, forceful exertion, contact stress, vibration and awkward posture.

Figure 2.2 10 Reasons why you need office ergonomics (Humantech, Inc. 2013)

In Roth, C. (2012) study, it is trying to shows how ergonomics impacts the cost of doing business. In the United States during the financial crisis most of the companies are trying to survive by reducing operating expenses, reducing costs, improving productivity and ergonomics program is like a tool to help the companies. Ergonomics program can reduce workers compensation claims, lost work time and human error. The important thing during crisis, many companies are forced to work with fewer employees who are doing more jobs so the companies need to implement a cost-effective program that help employees in their job tasks and provide knowledge for equipment, tools and workstations.

The companies need to understand that ergonomics injuries are not part of doing business and do not have to be an expectation of expense of the company. The companies can control the risk factors and ease the tasks to allow for greater productivity and higher profits with reduced operating costs.

Ergonomics is a proven science for becoming proactive and not accepting injury trending. It offers the changes in the office to reduce operating costs and

increase the profitability while keeping employees safe and free of risk factors. For example improve the safety and health of workers, reduce the company's costs related with lost work time and reduce issues of productivity and quality.

2.4.3 Changing trends

With the new technology and more advances day by day so the workplace environment is constantly changing. Office employees are sitting more and working longer hours at their workstations so a good office ergonomics program is needed. In figure 3 it states that in year 2030 one of five Americans will be over age 65 and it's projected that 25percent of the adult population will suffer from ergonomics illness. One of four middle class Americans will have to work at lease age 80 to live comfortably in retirement and the average American adult spends at least 50percent to 70percent of the day sitting at work. One of five people telecommutes at least once a week and only 10percent of the global population work from home.

In Treppa, B. (2009) survey study, there were 45 surveys completed and five formal interviews conducted. From the survey study it suggested that ergonomics has its place in companies. When respondents were asked about the benefit of the adoption of ergonomics, the results were surprising. The results showed that 46.7 percent of the study believed ergonomics would be beneficial in decreasing ergonomics injuries, while 35.6 percent were neutral on the subject.

In term of injuries and costs related to ergonomics the data showed that 80 percent of the respondents have documented injuries from ergonomic issues. Out of 80 percent, 46.2 percent reported that ergonomics injuries accounted for between 1 percent and 10 percent of their injuries.

As far as cost goes, 84.5 percent of those surveyed believe that it is cost effective to address ergonomics issues. Five interviewers also pointed in the same direction as aiming towards the cost effectiveness of correcting ergonomics issues in the office.

From this study, there has been a change for the good in the world of ergonomics based on the results collected in the survey as well as interviews; a trend shows that ergonomics definitely is a primary concern of a majority of the participating safety professionals. The key concern seems to come from of an

increased knowledge of true ergonomics issue as well as cost savings from fewer injuries in the office resulting from ergonomics problems.

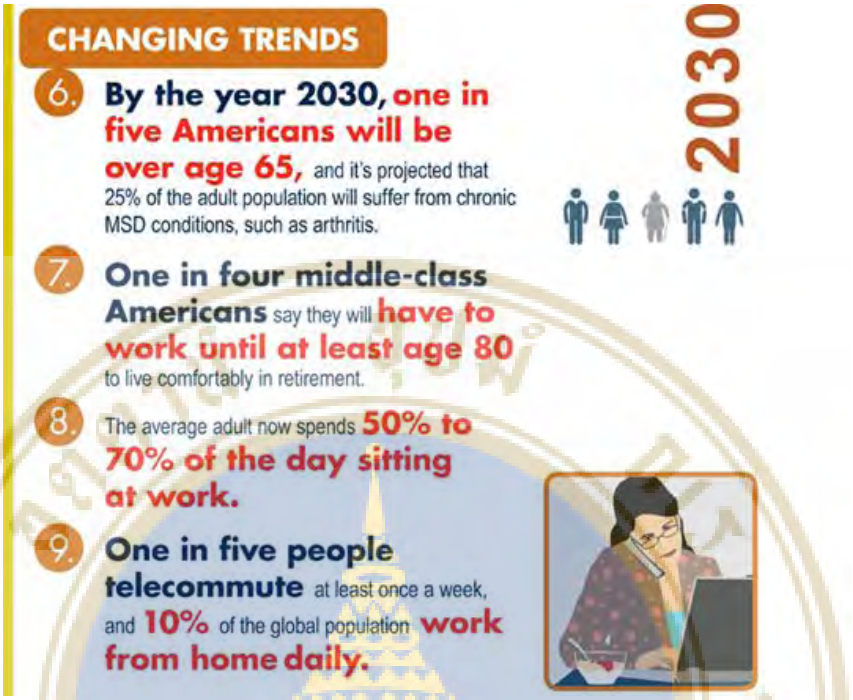

Figure 2.3 10 Reasons why you need office ergonomics (Humantech, Inc. 2013)

Lastly with an effective ergonomics programs in place, it has been proven that it can reduces work-related injury claims and cost as much as 75 percent as per figure 4.

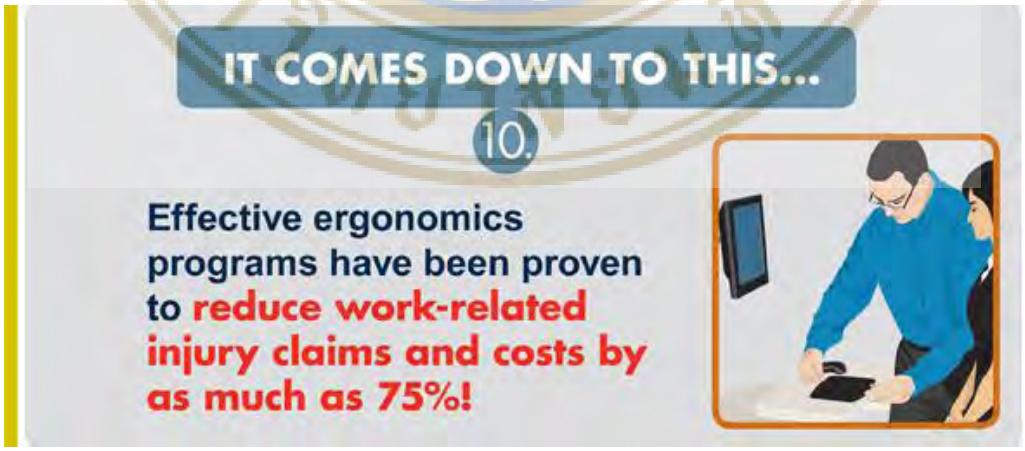

Figure 2.4 10 Reasons why you need office ergonomics (Humantech, Inc. 2013)

2.4.4 Studied Papers

The paper that studied by (Goossens et al 2012) was about an office chair to influence the sitting behavior of office workers. Since there was a lot of effort has been put in designing the office chairs according to ergonomics. The features all have to be adjusted in different ways mostly a knob underneath the seat surface and because every office chair offers different solutions. Users hardly use all of the adjustments and do not use the office chair and the optimal ergonomics way.

In this paper they have conducted a field test for 4 weeks. 40 office workers were selected for this test. They were 13 males and 27 females. The criteria were that they had no history of back pain for the last 6 months and they were working for at least 3 days a week during 4 consecutive weeks. During 4 weeks the sitting behavior of all the groups is measured with technology in the Smart Chair. All the workers started with a Control week to measure regular sitting behavior. They were given the new chair without any extra instructions. After the Control week has passed then they were divided into three groups that will receive different interventions. All of the groups will continue this condition for another three weeks.

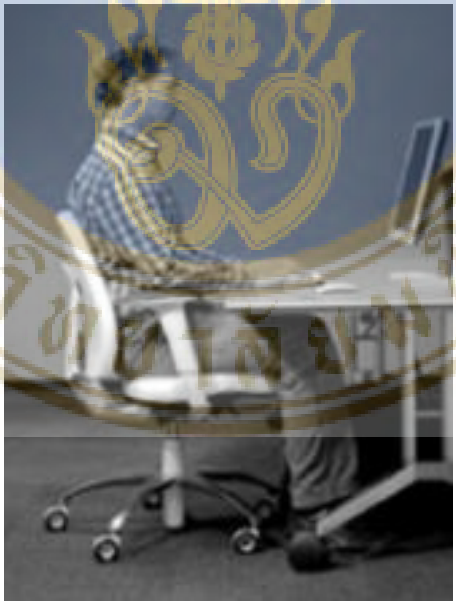

Figure 2.5 the % of time that was spent in the basic posture can be measured by means of the chairs. (Goossens et al 2012)

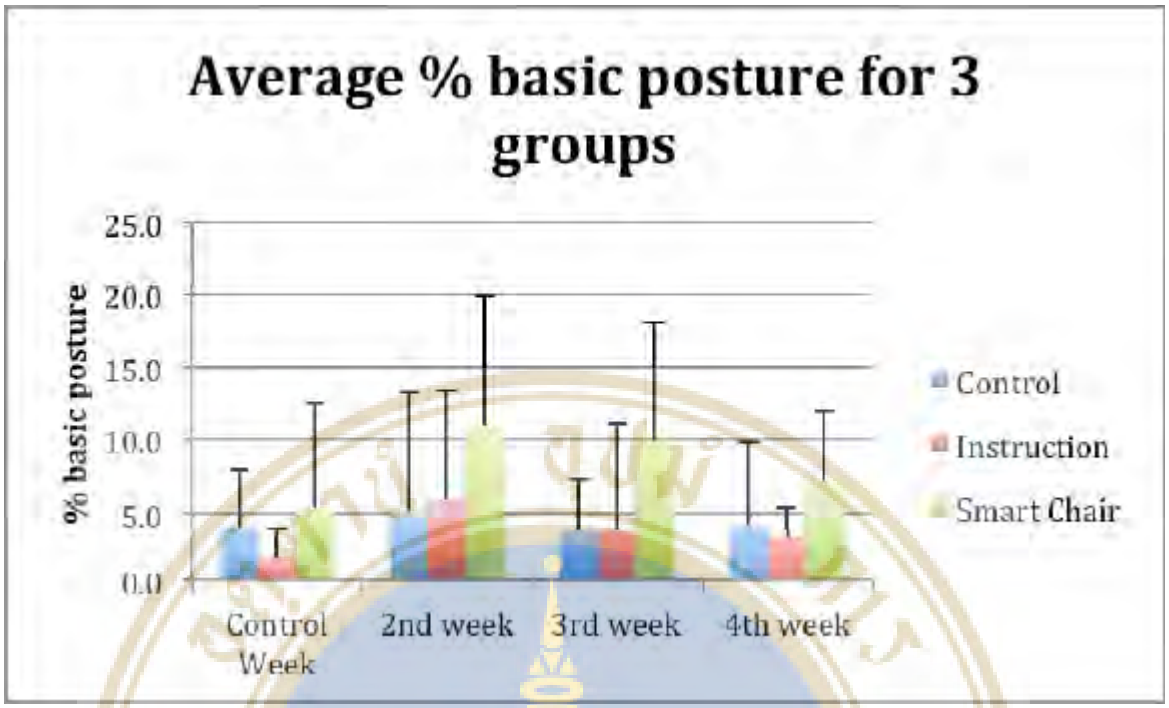

Figure 2.6 The Average % basic posture for 3 groups (Goossens et al 2012)

In the figure 6, the average percentage of time that basic posture was adopted during a week for all the subjects in a group. It can be seen that there is an increase of the average percentage of basic posture after the control week for as well the group that received an instruction and the group that received feedback of their sitting habits by means of a label on the smart chair. In week 2 the average effect is largest for the smart chair and it seems to reduce in the weeks after that.

Group A is a smart chair group that received an instruction on the optimal use of the chair in the beginning of the second week and received feedback on their posture every hour that they sit from week 2 to week 4.

Group B is an instruction group that received an instruction on the optimal use of the chair in the second week but did not receive feedback.

Group C is a Control group. They did not get any feedback or instruction at all.

The result from this field test as can be seen in figure 6, there was an effect between three different groups. The control group did not change its sitting behavior in the 2nd week, 3rd week and 4th week compared to the control week, whereas the

other two groups did show an effect. There was not much difference between the groups in the control week but the effect started in the second week for the Smart Chair group and the Instruction group. In the third week the effect is not important for the Smart Chair group or the Instruction group. In the fourth week the effect is not important to the Smart Chair group but it is important to the Instruction group.

From the result that we have got from the field test, the influence of feedback on the behavior of office workers seems hopeful. The result was shown that an instruction on how to use the office chair has an effect on the behavior as expected which means that office workers can change their behavior on the basis of feedback because during the first week after the feedback the percentage that the office workers of the Smart Chair group has increased from 5.4 percent to 11percent. Lastly the data also confirmed that there is a large difference between office workers in their sitting behavior.

CHAPTER III
FINDINGS

From the literature reviews, the researcher has conducted survey with 700 office workers in the U.S. and found that there are not many office workers know what ergonomics is. Only 20 percent of them know the definition of ergonomics. (Trippany, 2007).

According to (Shikdar and Al-Kindi, 2007) research, it is interesting to see how the companies did not focus on the ergonomics as the researcher found that 55 percent of the office workers used nonadjustable chairs, 48 percent of computers faced windows, 45 percent of the office workers adopted bent and unsupported back postures and 20 percent used office tables for computers. These are very poor workstations for ergonomics.

The researchers found that the office environment exhausts your mental health as well as physical health. Poor office lighting and stale air sap your energy and office workers have to sit all day long which slows down the digestion system and speeds up weight gain. So come outside and take some fresh air can helps a bit. (Lehner-Collins, 2007)

(MacLeod, n.d) has identified seven principles of ergonomics which can be applied to office working environmental. These are very easy and simple principles.

1. Work in neutral postures
2. Reduce excessive force
3. Keep everything in easy reach
4. Work at proper heights
5. Reduce excessive motions
6. Move, exercise and stretch
7. Maintain a comfortable environment

There are really good ten reasons why you need office ergonomics which was given by (Humantech, lnc. 2013). They have put into three categories which are pain, cost and changing trends.

1. Discomfort - one-half of the office workers are doing a routine jobs and the study found that 16 percent reported being in extreme pain at the end of the workday.
2. Back pain – office workers are likely to suffer from back pain due to the poor postures at their desks.
3. Heart disease – people with sedentary jobs are twice as likely to die from heart disease as those who have active jobs because the human body needs to have some movement every hour.
4. Illness costs – Musculoskeletal disorders account for about one third of injury and illness costs in U.S. businesses.
5. Cost and days away from work – it is not cheap to be healed. For non-surgical treatment of carpal tunnel syndrome costs businesses between $24,000 and $60,000 per case and require an average of 23 days away from work to recover.
6. Population with age over 65 – by the year 2030, one in five Americans will be over age 65 and this where you will start to see more people suffer with musculoskeletal disorders as it has developed when they were at middle ages.
7. Work until the age of 80 – one in four middle-class Americans say they will have to work until at least age of 80 to live comfortably in retirement so they have to keep themselves healthy at all time by following ergonomics guideline.
8. Time spends at work – as right now most people spend 50 percent to 70 percent of their time sitting at work all day long which means they have got a high risk to be injured if they aren't do thing in ergonomics way.
9. Telecommute – one in five people telecommute at least once a week and only 10 percent of the global population work from home.
10. Reduce injury and costs – having an effective ergonomics programs in place can reduce work-related injury claims and costs by as much as 75 percent. This is a huge percentage and it is not hard to be ergonomics at work.

The paper that studied by (Goossens et al 2012) was trying to prove if an office chair can influence the sitting behavior of office workers. The researchers have conducted a field test for 4 weeks with 40 office workers which were 13 males and 27 females. At the end of the test, they have found that an instruction on how to use the office chair has an effect on the behavior so this means that each of the office workers has different sitting behavior but if the instruction was given to them then the sitting behavior will be the same.

CHAPTER III
DATA COLLECTION METHODOLOGY

I have interviewed a beverage function supervisor at CP ALL Public Company Limited. Her name is Mrs. Chompoo Sasivadee, who has been with the company for 10 years.

CHAPTER IV
RESEARCH FINDINGS

According to the interview with Mrs. Sasivadee, she said that there is ergonomics at workplace and the company will give you a short brief of ergonomics on the first day at work. There is no training to employees on ergonomics but there are some posters on ergonomics around office. The company doesn't provide ergonomics workstation especially the chair because most of workers have to buy small pillow and put on the back of the chair to support their back. The lighting in the office is good but the temperature isn't because it is too cold. Ergonomics is there in the organization but they did not take it seriously so some of the old employees are suffering with the injury from lack of ergonomics.

CHAPTER V
DISCUSSION

The purpose of this study was to understand how important ergonomics is to office workers. There are several points that we have looked into such as what is ergonomics, the statistic of health and safety for employees, what are the impacts for not having awareness in ergonomics, what is the cost not to be ergonomic focus and how the trend is for Thai people for ergonomics.

The company will get impacted due to lack of ergonomics awareness. The impact will start from the employees then to the company. The employees can get injuries or illness by many ways such as poor workstation, poor office environment. For poor workstation, it can cause an employee with discomfort up to disorder in the long run and for poor office environment such as poor lighting can be a safety hazard. Misjudgment of the position, shape or speed of an object can lead to accidents and injury to employees. From these two examples above, they will cause the company with low productivity then financial loss because the employees will have to take day off to heal themselves. The cost of recovery is not cheap at all. The impact for lack of ergonomics will start from small but if the company does not prevent this then the impact will becomes huge in the long run.

The study found that in general organizations do not do ergonomics at work place. According to (Health and safety statistics), during 2011/12 in Great Britain an estimated of 1.8 Million people were suffering from an illness long standing as well as new cases and they believed was caused or made worse by their current or past work. 1.1 Million Worked in the last 12 months and a further of 0.7 million were former workers. There were 452,000 new cases amongst those working in the last 12 months and 620,000 were old cases. There are around 80 percent of new work-related conditions were musculoskeletal disorders, stress, depression or anxiety.

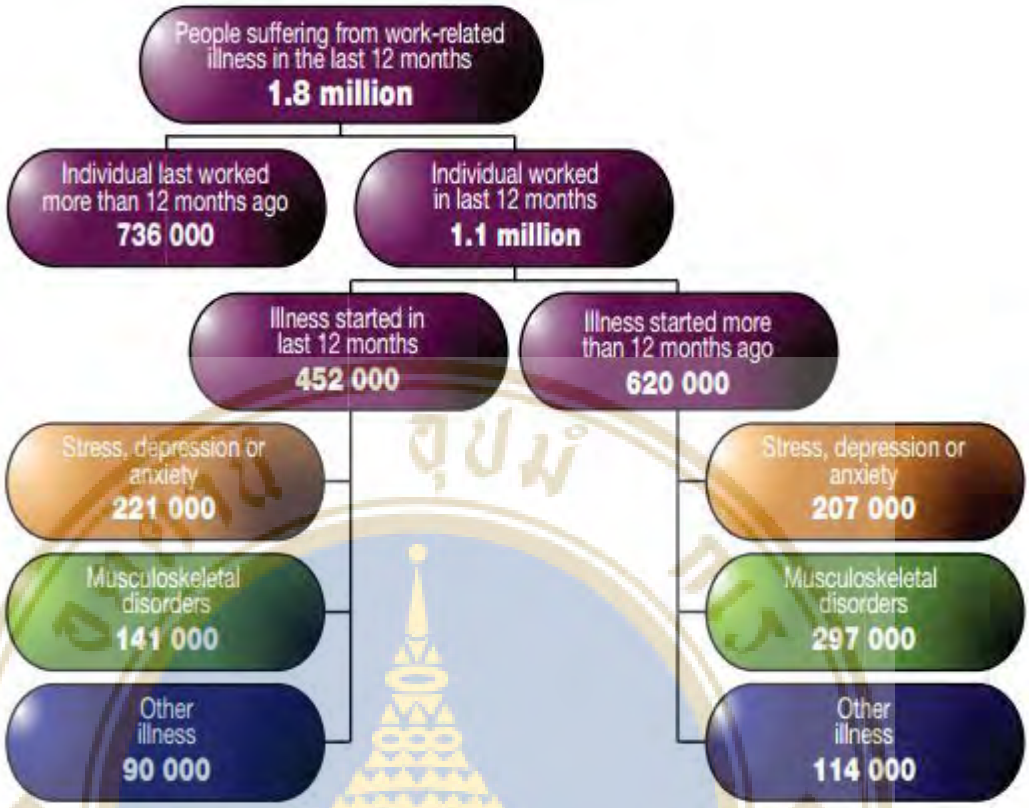

Figure 5.1 Labour Force Survey http://www.hse.gov.uk/statistics/lis/wsit6w12.xls

Nowadays, the increased use of computer screens, keyboards and mice in recent years has been associated with an increased occurrence of disorders in the neck and upper extremities. Poor workstations design, continuous computer use for the entire workday and repetitive computer work such as data entry have been associated with an increased risk of developing symptoms related to musculoskeletal disorders. When company is lack of ergonomic focus then there will be some cost for that. If we look at (Health and safety statistics) of Great Britain in year 2011/12, the total number of working days lost were 22.7 million days due to work-related illness and 4.3 million due to workplace injuries. The average for each person that suffering took around 17 days off work, 21 days for ill health and 7.3 days for injuries. The stress, depression and musculoskeletal disorders are accounted for the majority of days lost due to work-related ill health with 10.4 and 7.5 million days respectively. For stress and depression cases usually have a higher lost day than musculoskeletal disorders. In term of financial part, the total cost was about 13.8 billion pounds where 8.4 billion

pounds was the cost of illness at workplace and 5.4 billion pounds was for injury at workplace.

Based on the finding in changing trends in America that by the year 2030, one five Americans will be over age 65 and its projected that 25percent of the adult population will suffer from chronic musculoskeletal disorders so if we look at Thailand population, the largest age sector of 45.6 percent is between 25 to 54 years old as per figure 8. The median age is 35.1 years old. (Thailand) So the changing trends in Thailand will be the year of 2043 that one five Thai will be over age 65 which about 13 years slower than America.

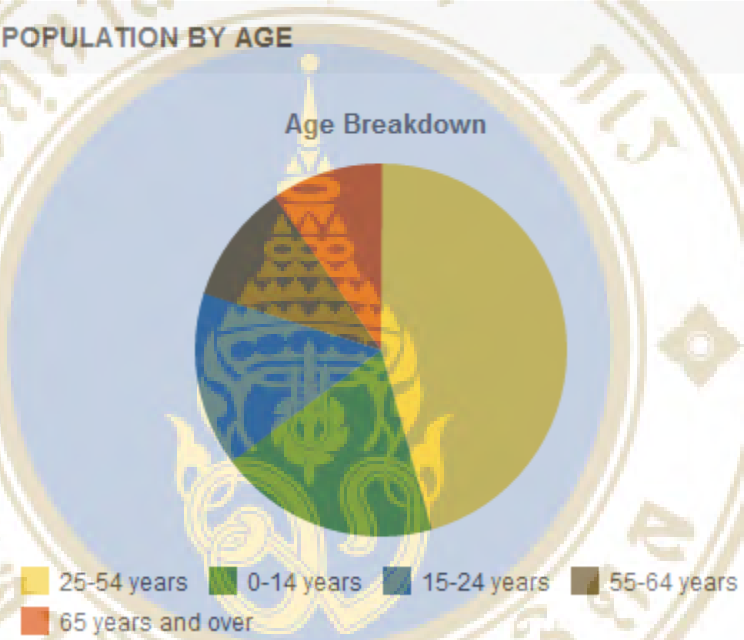

Figure 5.2 Population by age (http://country-acts.findthedata.org/l/134/Thailand)

Lastly, with the face to face interviewed that I had with Mrs. Sasivadee CPALL did have ergonomics in the organization but did not take it seriously. There was no training to employees only a short brief on the first day of work. The workstations are not ergonomics. Employees are using small pillows on the chair to support their back. Each employee has to adjust themselves to be comfortable at their workstations which are not the correct postures and it will leads to an injury to the office workers in the future.

5.1 Lessons Learned

From this project, I have learnt more on ergonomic. At first I thought that ergonomics is all about just posture at the workstation but after I have done some reading I have realized that there are a lot more for ergonomics.

5.2 Improvements

In this project, the number of interviewer was too small because of the time constrain. It would be great if I have more time so I can develop some questionnaires and do some more surveys with office workers in Thailand.

5.3 Recommendations

There are a few recommendations that I would like to point out here but I will put them into two parts. The first part will be about the project and the second part will be about research findings.

- The study should focus more on specific country such as Thailand.
- There should be more surveys with office workers in Thailand.
- There should be some field tests with office workers in Thailand.
- Provide basic training of ergonomics to office workers will be a good start as this can increase the awareness for them and can minimize the chance of injury in the workplace.
- Change the layout of the office to be ergonomics. Simple projects but big solutions in the long run.
- Balancing between human capabilities and job demands by following principles of ergonomics.

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