

Awareness of Ergonomics in Information Technology(IT) professionals working from home since Covid-19 Pandemic facing Musculoskeletal pain

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Abstract - Background: Most of the people might choose their sofa, bed to sit and work rather than desk and chair. People might be feeling comfortable sitting on sofas but most of them are not aware of their posture while working. People might be suffering through neck, back pain due to the same. Faulty posture while working may lead the person to future musculoskeletal postural adaptations. The home environment is likely to be faulty in many aspects in comparison to the workplace. In particular, the absence of ergonomic office furniture at home may impede the adoption of healthy posture and may promote the onset of musculoskeletal disorders. Working in a sedentary position for prolonged periods increases the risk of neck pain and or back pain. Home working may also cause stress, anxiety and isolation which may influence job effectiveness, well-being and work-life balance. This study aims on finding out the awareness of ergonomic advices in IT professionals working from home facing musculoskeletal pain. **Methods:** 107 IT professionals were given a self-made questionnaire in form of a google form who were in the range of 20 to 50 years. **Result:** Data was analyzed and according to the study, about 57% of the people are aware about their postures while working and 57.5% of them are aware about the ideal posture to be practiced while working. **Conclusion:** This study concluded that most of the IT professionals had an awareness towards their posture attained while working from home. More over considerable IT professionals are aware about the ideal posture that needs to be attained in order to avoid getting musculoskeletal pain.

Index Terms - Covid-19, IT professionals, work from home, Ergonomics, Musculoskeletal Pain.

1.INTRODUCTION

Ergonomics is the study of human responses to their work while working in their workstations. More

specifically, ergonomics is the science of designing the job to fit an individual rather than forcing his or her body to fit the job. Health and safety are maintained by practicing ergonomics which improves working efficiency, comfort and easiness to work.¹

A well ergonomically arranged working environment and working efficiency and health is having a strong relationship. Well-arranged physical conditions, such as appropriate temperature and low noise level and an ergonomic working environment increases job satisfaction and productivity. To prevent long term injuries and possible fatigue in working environment it is important to use right and ergonomic equipment, tools and methods. Correct posture during work is one of the most important factors in preventing health problems arising from working environment. Improper ergonomic working environments is leading occupational musculoskeletal disorders leading injuries and such disorders can have a serious adverse effect on well-being of individual and the performance. While setting up the working space at home and working from home needs to adopt an ergonomic approach for staying healthy and productive.⁸

A good ergonomic design not only maximizes the capabilities of workers by increasing productivity and job satisfaction, but also benefits the employer by decreasing the cost for health. In other words, ergonomic enables “fitting the task to the worker”. Extended work for prolonged periods can adversely affect not only vision but also the muscles of the neck, upper back, shoulders and arms leading to visual and muscular fatigue and discomfort in the absence of good ergonomic design.²

Sitting continuously with hips and knees at 90-degree angles does not makes so difference but altering

position by standing, sitting, walking and even lying down is healthier. The things that support good ergonomics include tables that are height adjustable for both sitting and standing positions, telephone and computer systems accessible all over the office and should be comfortable and lie down chairs in quite areas. As the duration and frequency of computer use increases the importance of optimum posture increases. The awkward and ergonomically bad postures can only be tolerated for short periods of time.¹⁰

The first COVID-19 case was reported in India on 30th January 2020 and up to 10th may 2020 some 67,152 confirmed covid cases and 2,206 deaths had been reported across the country. India went into a lockdown 25th march 2020 to combat the spread of COVID-19 infections and reduce the pressure on healthcare systems. Accordingly, people were confined to their homes with limited access to many services, which are temporarily closed, thus producing huge complications.³

In India to implement WFH policy Amazon, Flipkart, Uber, Swiggy, Snapdeal, Paytm, Ola, Wipro and Tech Mahindra were the first companies. 90% of IT employees worked from home out of which 65% of them were working from home in metros and 35% from small towns as Indian government made WFH mandatory. Work scenario is completely changed as a single space is being used for domestic purposes as well as workplace due to work from home policy which is negatively impacting maintaining the work-life balance. Mercer Hong Kong conducted a live poll and revealed that work- space set-up at home had negative impact on the work and interrupted by children (39%) and other family members (27%). Several ergonomic/ occupational injuries and illness causes due to lack of proper workstation. The term Ergonomic originates from the Greek “nomos” meaning rule, and “ergo” meaning work. The ergonomic rule to justify the fact that human operator or worker should be identified like a person not a robot or machine and suggest working with normal posture, keeping work necessities in easy reach, comfortable workspace and minimization of injuries / illness/ work related disorders. Various body parts including eye, head, shoulders and back are associated with discomfort due to improper setting of monitors and keyboards.⁶

Working from home is a working style that was created in the early 2000s when communication technologies began to develop and to ensure that employees avoid commuting, provide flexibility in schedules and achieve a better work life balance. To reduce the physical contact between individuals and prevent new infections, many companies have driven their white-collar workers to work from home from collective offices with the possible use of technological tools.⁴

The importance of physical work requirements is gradually diminishing due to internet-based technologies and mobiles. In developed and developing countries work from home working from home has become more popular and necessary in most of the world. Freedom of work schedule, more time at home with family and increased leisure time, lowered stress and increased efficiency and also reduced cost and time on commuting work are some of the positive aspects of working from home. Loss of control and reduced productivity, managing work and family obligations in the same environment and at the same time, adverse effect of prolonged work periods at home causing nervous and tense mood, too much time at home, lack of working transparency, risk of obesity, difficulty in controlling work and life balance, difficulty in coordination and communication, social isolation and difficulty in accessing important documents and relevant technology from home securely are the adverse factors of working from home.⁸

The advantage of work from home includes reduced commute time, productivity gains, increased work motivation, better work life balance and better control over the schedule, while disadvantages include difficulty in keeping track of performance, cost of working from home, communication problems due to distance and a lack of clear distinction between home and work duties. The home environment can be flawed in many ways compared to the workplace. In particular, the absence of ergonomic office furniture at home can hinder a healthy posture and trigger musculoskeletal disorders. In addition, working in a sedentary position for a long time increases a risk on neck and back pain.⁴ The etiology of computer- related musculoskeletal disorders is suggested to be multifactorial, involving repetitive and forceful hand and finger exertions, awkward postures, prolonged

hours of computer use and non-neutral postures of the hands and arms with repetitive of forceful work.²

Switching to work from home is associated with the more and more time spent each day in sedentary activities. As a result of greater sitting and screentime while work meetings, longer working hours per day and also the ability of engaging in activities outside the home is reduced affected due to public health safety guidelines. Increase in sedentary behaviors has become major public health concern as it has adverse effects on physical and mental health.¹⁷

A user-centered approach to impact knowledge of the anatomy and the physiology of the body in addition to the nature of work and workstation design is needed to enable individuals to organize their workplace to prevent various health hazards. In computer handling; span of usage, duration of total work, number of consecutive hours, nature of job, type of computer used and its placement are to be considered. Both physical and psychological factors have to be measured to be enhance efficacy. Symptoms like pain, numbness, tingling etc in various body parts like wrists, shoulders, back and legs and eye stains occur due to improper seating, lack of short breaks during work and improper seating. Organization of workplace, proper height of the seat, working posture, proper use of armrest, backrest, straight alignment of the wrist and the elbow and positions on keyboard can prevent various health hazards.² Exposure to computer input devices is increasingly prevalent the risk factors associated with it may have important public health implications.¹⁴

Home working may also cause stress, anxiety and isolation which may influence job effectiveness, well-being and work-life balance. Over the past decade the number of people suffering from musculoskeletal disorders has been increased by 25 percent. Duration of computer use, and amount of work which led to increased work stress are the major contributing factors.¹¹

Use of computers, laptops or even sitting in a computerized workplaces makes negative effects on human health as the individual is exposed to the dangerous waves this EMS radiations may cause slow or rapid lead to several health hazards.¹² work related musculoskeletal disorders where musculoskeletal disorders caused by manual tasks represent a larger part.¹⁸

As the ergonomics can be considered as a basic need for computer workers and even many companies are concerned about employee's well-being ergonomic awareness should be made in the people and they should be knowing the effects and bad postural habit hazards and need of getting off the sedentary life practices. Covid -19 has become the key source to lead work from home and now people are supposed to adapt the situation and maintain their work life balance irrespective of the negative bindings coming along with that. The surrounding of the employee should also be work friendly family members should encourage and should be giving space to their family member as a worker. Both quality and quantity of work should be maintained so as the person should follow good posture habits to decrease the risk of musculoskeletal disorders.

2.MATERIALS AND METHODOLOGY

Participants: 107 IT professionals

INCLUSION CRITERIA:

- IT workers following work from home for more than 1 year
- Working hours per day at home for more than 6 hours
- Working on laptop and computer
- Pain history since work from home
- Age - 20-49yrs both male and female

EXCLUSION CRITERIA:

- Pain history before work from home
- Age more than 50 years
- Participants involved in jobs other than work from home

OUTCOME MEASURES:

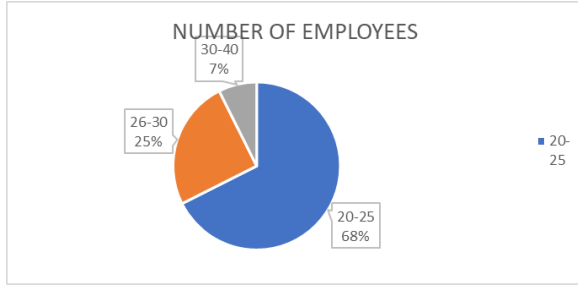
- Self-made questionnaire

OBJECTIVES:

- To assess the IT professionals working from home since COVID-19 pandemic facing musculoskeletal pain by using standard Nordic musculoskeletal scale.
- To evaluate ergonomic awareness in IT professionals working from home using self-constructed questionnaire.

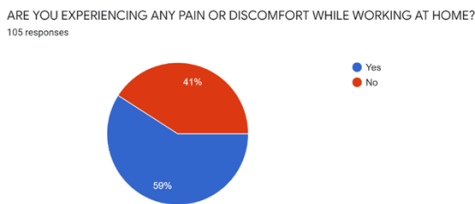
3.RESULT

1.Graph 1: Age



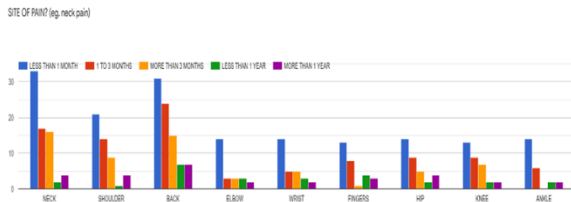
Interpretation For the study of 108 subjects targeted out of which 93.5% of population were under the age of 30 yrs.

2.Graph 2. Pain:



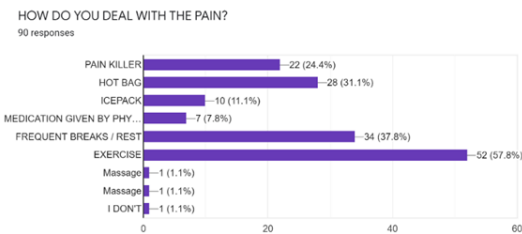
Interpretation: About 59% of total population experiencing pain/ discomfort while working from home.

3.Graph 3: Site of Pain



Interpretation: Neck pain is experienced by most of the employees for less than 1 month. Back pain is experienced more from past 1 to 3 months by the employees.

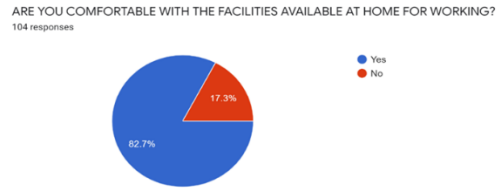
4.Graph 4: Dealing with pain



Interpretation: Out of total 90 responses 57.7% people deal with their pain by doing exercises 24.4% people

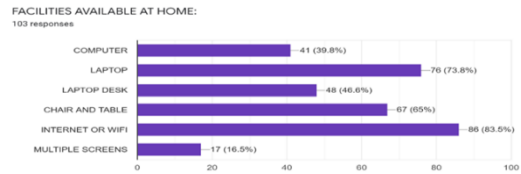
takes pain killers for their pain 37.8% of people takes frequent breaks for the pain.

5.Graph 5: comfortable with the home setup



Interpretation: about 82.7% of total population people are comfortable with the facilities available at home while left 17.3% of people are not comfortable with the facilities available at home.

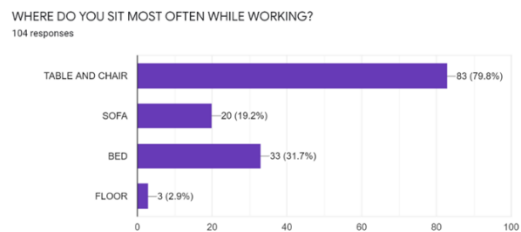
6.Graph 6.: Facilities available at home



Interpretation: Internet facility is available to nearly 83.5% of employees. Laptop and laptop desks are available to nearly 73.8% and 46.6% of the employees respectively.

Computer and computer table and chair is available to 39.8% and 65% of the employees respectively. Multiple screens are available to 16.5% of the employees.

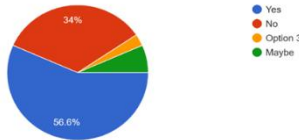
7.Graph 7: Where do they sit while working from home



Interpretation: About 79.8% of total population sits on table and chair while working while 31.7% of people sits on bed and about 19.2% of people uses sofa to sit while working.

8.Graph 8: Awareness of posture

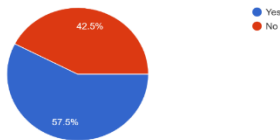
ARE YOU AWARE ABOUT YOUR POSTURE WHILE WORKING AT HOME?
106 responses



Interpretation: about 56.6% of people are aware about their posture while working at home and about 34% of total people are unaware about their posture while working from home.

9.Graph 9: Awareness about Ideal posture

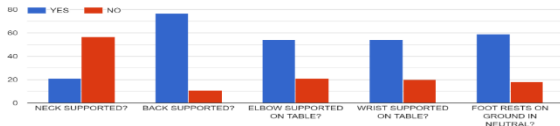
ARE YOU AWARE ABOUT IDEAL POSTURE TO BE PRACTISED WHILE WORKING ?
106 responses



Interpretation: About 57.5% of total population people are aware about the ideal posture to be practised while working and left 42.5% of people are unaware about the ideal posture to be practised while working from home.

10.Graph 10: sitting chair specifications

WHILE SITTING ON CHAIR:



Interpretation: About 75% of people have their back supported while sitting on chair and only 10% of people don't have back support.

About 58% of people don't have neck support to their chair and only 20% of people have neck support to their chair.

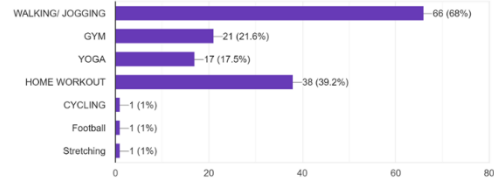
About 54% of people have their elbows supported on the table while sitting on table and 20% of them don't have elbow support.

About 55% of people have wrist resting and supported on table and 20% of people don't have wrist support.

About 59% of people rests their foot on ground in neutral position while sitting on chair while working and 18% of them don't rests their foot on ground in neutral.

11.Graph 11: Type of Physical activity

TYPE OF PHYSICAL ACTIVITY:
97 responses



Interpretation: About 68% of people are doing walks regularly and 21.6% of people goes to gym. About 17.5% of people does yoga and about 39.2% of people are doing home workout.

12.Graph 12: Physically stressful

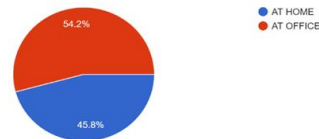
WHAT IS PHYSICALLY MORE STRESSFUL?
104 responses



Interpretation: About 52.9% of people are feeling more stressful while working from home while 47.1% of people feels working at office is more stressful.

13.Graph 13: Work preference

WHERE DO YOU PREFER TO WORK FROM?
107 responses



Interpretation: About 54.2% of people prefers work at office while 45.8% of people prefers work at home.

4.DISCUSSION

The study was conducted to know ergonomic awareness in IT professionals working from home since Covid-19 pandemic facing musculoskeletal pain. Most of the people experienced pain while working from home and there were a lot of factors contributing and leading in workers - discomfort. In this study we have primarily focussed on the ergonomics and posture and work-related musculoskeletal disorders. As the work pattern, place and behaviours of people changed as affection of the pandemic mental and

physical stress. Home bind restrictions may had led the people in many problems.

In this study of 108 subjects, 58.3% of them were males and 41.7% of them were females. The mean age of participants was 27.75 yrs. 89.8% of them were right side dominated people and remaining 10.2% of them were left side dominated. For the study 97.9% of people were agreed to give their consent towards their participation in this study. There is not much difference seen in the working hours per day at workplace and at home as most of them are had 9 hours per day working at office as well as at home. Many people had undefined work time like it had been depending on their targets which sometimes may go till 9 to 10- 11 hours per day.

Total of 59% of people experienced pain while working from home. Many factors contributed to lead them in musculoskeletal pain like bad posture, less movement, no fixed rest intervals, indefinite schedule, sedentary behaviours due to pandemic and public health concern restrictions given by the government. Neck and back pain were the most common. 57.8% of people chose exercise to deal with the pain on the other side 37.8% of them chose rest and frequent breaks to deal with the pain. Many of them were aware about the cryotherapy and hot moist pack for pain reduction.

Break and rest intervals during work day plays an important role in the lead to any discomfort. The employees should get enough rest intervals for productive and qualitative work output. According to this study about 40.2% of people take 1 long break along with two or more smaller breaks. That means employees are getting breaks which is helping them to make work- life balance. It is difficult to continue work and sit in front of laptop or computer screens people should be getting breaks for relaxation. Nearly 29.4% of them gets regular break after every 1 hour. Sitting for longer duration without rest intervals increases intra-discal load and weakens posterior lumbar structures.² People should follow the rule of 20-20-20 which suggests that the computer user should take a break after every 20 minutes for least 20 seconds and look at objects that are 20 feet away from them.¹ Most of the people relax themselves during rest intervals by walking and stretching. Which is good that people were actively taking break and walk for relaxation while 63.5% of them rely on caffeine to boost their energy as they choose tea or coffee for relaxation.

Companies should be providing enough facilities to the employees working from home as the people are also working from rural areas. For better work output the worker should be in good environment and should be getting every possible facility for working effectively and efficiently. Facilities like computer, laptop, computer table and chair, laptop desk, multiple screens, internet or WIFI connection. Around 82.7% of them were comfortable with the facilities available at home. As most of the people were comfortable with the facilities available at home the point of ergonomic comes to put the effects on employees. Around 56.6% of employees were aware about their postures while working at home and same 57.5% of them were aware about the ideal posture to be practised while working. Half of the people nearly 50.5% and 49. 5% used revolving chair and stable chair respectively. Only half percentile of workers knew the things about sitting postures, ergonomic environment, health issues arising from sitting work. Various health hazards can be prevented by working posture, organisation of workplace, proper height of the seat, proper use of armrest, backrest, straight alignment of the wrist and the elbow and positions on the keyboard.

The early sign of musculoskeletal disorder is perceived muscular tension as a result of work directional and psychosocial factors as well as from physical load and individual factors. The onset and progress of musculoskeletal injuries and to improve one's health status the knowledge and application of ergonomics can serve to prevent. The "at-ease posture" considered as the feet resting comfortably on the floor or on a footrest; knees slightly lower than the hips with a 2-4inch gap between the back of the knees and front edge of the chair with the back against the chair. Low back pain is associated with sitting in an ergonomically unfit chair for longer periods. Low back pain can be prevented by sitting in a ergonomically fit comfortable position, use of backrest inclined for maximum convenience, frequent change in posture, enough rest and stretches. The height of the keyboard and the location of the pointing of the device allow the wrist to be straight in the line with the elbow accordingly workstations need to be designed. The best wrist posture while typing on the keyboard is to keep the wrist in horizontal position which will also help in reducing the risk of carpal tunnel syndrome.¹⁵

Shoulder pain can be prevented by decrease in muscle activity in trapezius muscle by giving support to

forearm and wrist while working on keyboard and input device as a preventive measure. The ideal distance in eyes and the screen of 1.5 feet should be followed so as to reduce the visual discomfort and related disorders.² According to this study many of the people were not having neck support which is directly proportional to lead in muscle weakness of the neck muscles which will result in muscle spasm and then lead to neck pain.

Nearly 46.7% of people were exercising regularly. For computer users who all are working from home exercising regularly is helpful so as not to lead them to sedentary lifestyle. Physical activities include walking, jogging, gym, yoga, home workout. As the study said people were actively participating in physical activities the risk of musculoskeletal disorders is lowered. 52.9% of the employees chose working from home as more stressful. Physically and mentally work from home must be putting a lot of stress to the employees in the covid 19 scenario. About 54.2% of the people prefer to work at office.

5.CONCLUSION

This study concluded that most of the IT professionals had an awareness towards their posture attained while working from home. More over considerable IT professionals are aware about the ideal posture that needs to be attained in order to avoid getting musculoskeletal pain.

This study also helped to know that IT employees are actively taking part in physical activities so as to avoid sedentary lifestyles and they also prefer to work at office over the work from home as working from home is physically as well as mentally difficult.

6.LIMITATION OF THE STUDY

- Limited professionals were included.
- Physical examination was not done.

7.FUTUR SCOPE

It is suggested that a thorough physical examination of the ergonomic setup and a detailed musculoskeletal pain assessment should be done of each employee working from home.

A study should be carried out in other professionals involved in long hours of desk job.

Ethical Clearance – As this study was undertaken with considerations of Declaration of Heilsinki, ethical approval is not required.

Conflict Of Interest – No authors show any conflict of interest.

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