Physical Health Associated Risks in Computer Based Workers

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Physical Health-Associated Risks in Computer-Based Workers

Millions are using screens in the fast-growing digital world, spending long hours working at a desk (Bureau of Labor Statistics, 2024). Sedentary time in more developed countries is common, this can lead to major health issues(Duran et al., 2023). High-paying and competitive jobs come with health drawbacks that are often overlooked by workers and companies. Prolonged sitting, strain injuries, poor posture, and ligament issues are only a few of the problems that these workers face. Pairing physical health issues with the already prominent mental health problems of computer-based workers will lead to workers leaving their jobs, being burned out, and having a decreased quality of life. Finding solutions and spreading awareness is important for individuals in the fast-growing field where workers spend more than half their day at a desk. More importantly, finding and reproducible ways to implement these solutions is a big goal to ensure the accessibility of these solutions for all workers. This paper will cover how prolonged sitting and poor ergonomic practices in the tech industry are big reasons for physical strain, musculoskeletal disorders, and mental fatigue. It will also cover how these health issues can occur. These health issues can be reduced through practical ergonomic improvements, workplace training, and healthy habits. Reducing these issues can improve workers' productivity and overall quality of life.

Having a context and background knowledge of common physical health issues is important for acknowledging the problems that come with being a computer-based worker. These physical health issues can play into many of the reasons why workers can feel burnt out and have a decreased quality of life. Common health issues faced by computer-based workers are musculoskeletal disorders (MSDs), conditions such as carpal tunnel syndrome, and back pain.

Problems like these arise from repetitive movements and they also occur from poor posture over long periods.

Improper monitor positions can lead to changed postures which then develop into musculoskeletal disorders. According to Kang et al. (2012), forward head posture is a result of leaning towards screens, and has been shown to negatively affect postural balance and spine alignment. These issues that develop over time may feel insignificant until they become severe and painful. Additionally, “Postural imbalance and impaired ability to regulate movement in forward and backward direction was also found” (Kang et al., 2012). This shows how there are consequences to having poor posture and they can develop to negatively affect the worker's life. It also shows how many physical health issues will build up over time and go unnoticed until they are too prominent to ignore. This research explains how small habits and behaviors can lead to long-term physiological consequences.

Similarly, those who sit for long hours can develop repetitive strain injuries (RSIs). Baker et al. (2018) emphasized that “prolonged sedentary behavior affects both musculoskeletal and cognitive health.” underlining the need for physical activity and rest. To add on, Padma and his team state, “Employees working in the IT industry are prone to develop a lot of health problems due to continuous physical and mental stress of their work. Diseases are either induced, sustained, or exacerbated by stress” (Padma et al., 2015). Sometimes health problems aren’t always outcomes of physical issues but also can manifest through stress and biological factors over periods. These issues can then become worse or sustained without proper intervention. This makes it clear that physical health issues are connected with mental strain. The combination of physical and psychological stress can lead to declining performance and worse health for workers.

A very common physical health issue is Carpal Tunnel Syndrome. Carpal Tunnel Syndrome is when the peripheral nerve is trapped or squeezed on(Padua et al., 2016). One of the causes is when the median nerve has pressure on it(Mayo Clinic, 2024). Workers who constantly find their wrists in uncomfortable positions may develop Carpal Tunnel Syndrome over time. This injury is a preventable condition if seen and corrected early through proper ergonomics. Carpal Tunnel Syndrome remains a widespread issue among workers showing that many companies fail to educate and prioritize ergonomics.

Eye strain and vision-related problems are common in computer-based workers due to the long periods that they sit in front of screens “Computer vision syndrome, also referred to as digital eye strain, describes a group of eye- and vision-related problems that result from prolonged computer, tablet, e-reader and cell phone use” (American Optometric Association, n.d.). Computer vision syndrome is being found more as people spend more time looking at screens in their daily lives. “At greatest risk for developing CVS are those persons who spend two or more continuous hours at a computer or using a digital screen device every day” (American Optometric Association, n.d.). Computer-based workers are especially prone to CVS as they are spending hours on computers often without breaks. “Digital screen time has been cited as a potential modifiable environmental risk factor that can increase myopia risk” (Lanca & Saw, 2020). Myopia is nearsightedness that needs corrective lenses like glasses to fix. This is suboptimal as computer workers who develop myopia will need to spend money and time with glasses. Lastly, “The common symptoms associated with CVS or digital eye strain are: eye strain, headaches, blurred vision, dry eyes, neck and shoulder pain”(American Optometric Association, n.d.). As screen time becomes more common in daily work, these risks that come

from sitting in front of screens are becoming more pressing. Vision-related problems reduce comfort and also affect the concentration and productivity of computer-based workers.

Other associated health risks that may not be physical are also prominent and endanger computer-based workers. “Software engineers run at the risk of developing insomnia, those with severe insomnia had poor quality of life in comparison with the others” (Zadeh & Begum, 2010). This study shows how software engineers who are computer-based workers have a risk of developing insomnia, which then leads to a reduced quality of life. Additionally, “Stress at work has been linked with coronary heart disease and metabolic syndrome” (Padma et al., 2015). These are major health risks and are life-changing that show broader consequences of ignoring workers' well-being. Pairing these associated risks with physical health risks can cause major problems in workers’ lives, negatively affecting them in both their private and office lives. Knowing these associated health risks is important to solving issues that can occur.

Having reviewed the physical health risks and issues and some reasons as to why they can occur, it is important to understand what the causes and factors of them are. Finding these causes and factors will help come to more conclusive and effective solutions and preventative measures. These solutions will allow workers to work more productively and sustainably for longer periods of time.

Longer work hours are one of the reasons why workers may experience many of the common physical health issues. Prolonged work hours mean that workers will be sitting at their desks for longer periods of time. According to Baker et al. (2018), “Prolonged sitting is a potential hazard for workers’ musculoskeletal health.” Many of the musculoskeletal problems that occur with computer-based workers are often due to the long hours with no breaks that they are sitting. Additionally, poor posture while working with a computer for longer periods of time

is correlated with neck pain because of musculoskeletal disorders (Kang et al., 2012).Poor posture is another reason why many workers develop musculoskeletal disorders and will experience pain or discomfort while working. These habits can unconsciously form due to work pressure and lack of awareness. After time they can become chronic pain cycles.

Another factor that plays into workers' decline in health is their work environments and factors. Workplace ergonomics and the physical setup of a workstation are major contributors to the physical decline of computer-based workers. According to the Occupational Health and Safety Association "Workers in many different industries and occupations can be exposed to risk factors at work, such as lifting heavy items, bending, reaching overhead, pushing and pulling heavy loads, working in awkward body postures and performing the same or similar tasks repetitively."(Occupational Health and Safety Association[OSHA], n.d.). Often many computer-based workers will be working in weird body positions if they are already experiencing pain, and they will be doing the same tasks many times in the same day, like moving a mouse or typing on a keyboard. These repetitive movements may not seem dangerous or significant in the short term but they will gradually worsen and have long-term issues like wrist strain, back pain, and joint problems. The strain and decline in health can also decrease the productivity and workflow of workers.

Issues with Repetitive Strain Injuries(RSIs) and Carpal Tunnel Syndrome are commonly found in computer-based workers. According to Princeton University, "Repetitive Strain Injury results from forceful, awkward, and/or repetitive use of your limbs, producing damaged muscles, tendons, and nerves" (Princeton University Health Services, n.d.). Repetitive and awkward movements can occur when workers are using their keyboards or mouse. These small and frequent motions build up over time which then leads to chronic pain and loss of mobility in the

hands, wrist, and forearms. These kinds of injuries not only affect how well an employee is able to work but can also lead to medical treatments and time wasted finding solutions. This shows the need for employers and workers to emphasize correct ergonomic practices and proper training.

Extended screen time leads to risks of vision-related health issues for computer-based workers. According to the American Optometric Association, “Viewing a computer or digital screen often makes the eyes work harder. As a result, the unique characteristics and high visual demands of computer and digital screen viewing make many individuals susceptible to the development of vision-related symptoms” (American Optometric Association, n.d.). Many computer-related vision problems occur because workers’ eyes are demanded to work harder, which in the end causes computer vision syndrome and, in the latter cases, can alter vision altogether. “These symptoms may be caused by: poor lighting, glare on a digital screen, improper viewing distances, poor seating posture, uncorrected vision problems, a combination of these factors” (American Optometric Association, n.d.). These conditions will lead to headaches, blurred vision, eye strain, and permanent changes in vision. Computer-based workers are required to have a sustained focus on a digital screen without breaks which makes these risks more dangerous in more modern office environments. Implementing interventions and solutions like constant breaks is important to reduce the risk of long-term vision problems and burdens that workers will have to deal with.

Lastly, the lack of awareness and education about these health issues is why many workers don’t know how to fix or improve themselves even when they are seeking help. Tulane University states, “Alongside physical consequences for workers, ignoring workplace ergonomics safety can also have negative consequences for employers” (Tulane University,

2023). Ignoring workplace ergonomics is not only bad for workers but also for employers. Workers who are experiencing physical issues will be less productive and less satisfied with their jobs. This creates a wave of problems like decreased productivity, higher healthcare costs, and reduced satisfaction. Without proper knowledge and education, workers may not recognize the early stages of strain or may lack good practices to prevent it. When employers fail to accommodate their workers and implement ergonomic training they are contributing to the worker's injuries and issues. Increasing awareness in both the workers and employers will be a crucial step towards more ergonomics and safe workplaces.

With an understanding of common physical health issues and their causes and factors, implementing solutions and preventative measures will be better. These solutions will help workers stay productive and also protect themselves from long-term harm. Finding accessible solutions is also important so factors like cost and budget do not need to be considered.

There are multiple solutions that can improve ergonomics and prevent injuries which need to be bought or added to the workstations. Ergonomic chairs, standing desks, footrests, wrist supports, monitor stands, and more are common equipment that helps employees have an ergonomic workspace (Tulane University, 2023). Most of the equipment mentioned by Tulane University (2023) will help with musculoskeletal disorders and, more importantly, prevent them from happening. Ergonomic chairs provide support for the back while helping to maintain proper posture. Standing desks help workers with posture and circulation since they are enabled to stand while working and not sit. Footrests can support a worker’s legs to keep a good posture. Wrist support can help workers by reducing the amount of pressure they are putting on their wrists, which is especially important for reducing the risk of carpal tunnel syndrome. Monitor stands can put the workers’ monitors in ideal positions to relieve strain on the eyes and to fit all

postures. These solutions are all helpful for the ergonomics of the office, but they all need a certain amount of money to obtain and use.

There are many ergonomic products that can help reduce pain but often they come with a cost that can be a barrier to both workers and employers. Solutions that cost nothing are most optimal as they will be the most accessible. Starting with the keyboard, it is important to reduce strain on the arms and fingers by keeping them in relaxed and neutral positions. While typing, the wrists should be held up and not resting—this reduces strain and prevents unnatural angles (Princeton University Health Services, n.d.). These changes to how workers use their keyboards will make a difference, even though there might be a small learning curve and process to get it accomplished. Changing small behaviors like wrist positioning can prevent injuries in the long term without forcing workers to spend money. No-cost solutions are important to help those who do not have financial freedom or where employers do not provide ergonomic tools or training. Advertising and spreading these solutions will help minimize pain in computer-based workers.

Having proper monitor positioning is important for an ergonomically sound workstation which can improve physical and visual strain. “Your monitor should be slightly below eye level and straight ahead, not to one side. It should be about arm’s length away from your face so you can easily read the screen, not leaning your head forward, which puts strain on your neck” (Princeton University Health Services, n.d.). Proper monitor position can reduce risk factors like vision problems and improper posture, which can then prevent issues from occurring. This adjustment to the workstation can make a lasting impact on workers who are spending long hours in front of monitors and screens. Improper monitor positioning can be detrimental to workers' eyes and physical well-being which can lead to forward head posture which was mentioned before.

Having proper and correct chair height is an important factor for good posture and reduced strain during long periods in front of a desk. “Improper chair height can cause discomfort and pain in the hips, legs, and lower back. To achieve a proper sitting posture, individuals should raise their chairs high to allow the feet to rest flat on the floor, thighs to be parallel to the floor, and hips to be level with the knees” (Tulane University, 2023). Proper chair height improves posture and head position relative to the monitor. This adjustment of the chair helps prevent problems that develop from long periods of improper sitting. A well-set up chair position protects the lower body and also acts as a support for correct upper body posture which then can help workers correctly use their keyboards and monitors. Correct chair height can reduce fatigue and help workers stay concentrated and healthy.

Preventing problems and issues in workers is the most important and valuable goal. Prevention is better than allowing issues to occur and only fixing them afterward. “Training is an important element in the ergonomic process. It ensures that workers are aware of ergonomics and its benefits, become informed about ergonomics-related concerns in the workplace, and understand the importance of reporting early symptoms of MSDs” (Occupational Safety and Health Administration [OSHA], n.d.). By informing workers about ergonomics and the risks that can happen, they become aware of their ergonomics during work, and this awareness will help them stay responsible for their health. This method of prevention helps workers take action in the early stages of their injuries which can prevent severity and manifestations of those injuries later in the future. Additionally, this method creates a culture and awareness of workplace health which can put priority of prevention above costly treatments. Education and training can majorly positively impact offices by battling injuries early and preventing workers from suffering from injuries.

Identifying factors that can result in injuries in workplace environments is essential to prevent long-term injury in computer-based workers. “An important step in the ergonomic process is to identify and assess ergonomic problems in the workplace before they result in MSDs” (OSHA, n.d.). By identifying risk factors and problems in the office or workstation, it becomes easier to fix and improve on them before workers use them and injure themselves. Assessments of offices and workstations help employers implement necessary adjustments before workers can be affected by them. This action will allow employers to help their employees not deal with injuries that have already occurred but deal with them before they have the chance to. Eliminating risks from offices can help workers stay productive and focused without having to deal with injuries that develop over time.

Now that there is an understanding of physical health issues, the causes and factors, and solutions or preventative measures, the last thing to cover is the outcomes that workers may see. It is important to understand the outcomes of the solutions that were discussed.

“A well-executed ergonomic improvement plan can reduce the risk of work-related musculoskeletal disorders, improve productivity, and enhance employee morale and job satisfaction” (Tulane University, 2023). Improving ergonomics and having a plan can help both workers and employers. Workers will experience less discomfort and fewer issues, while employers will benefit from happier and more productive employees.

“Ergonomics—fitting a job to a person—helps lessen muscle fatigue, increases productivity, and reduces the number and severity of work-related MSDs” (OSHA, n.d.). Ergonomics in the office will result in overall better employees, which can create a smoother working process and environment. These outcomes only happen when office safety and ergonomics are considered. Having preventative measures and solutions will help workers

achieve and maintain these outcomes. When workers have support in their work environment they will more likely remain more productive and have overall higher performance.

However, these benefits can only come when both workers and employers are able to recognize the risks and implement solutions. Buying and having ergonomic tools is not enough and does not replace education, early intervention, and healthy habits. Workers need to be trained and reminded of ergonomic principles so that they stay fresh in the mind because practices and habits can fade and be forgotten. Companies and employers should have regular assessments to make sure that office spaces and work environments are all aligned with healthy ergonomic practices. Involving employees in the improvement process can help them become more invested in their well-being. Additionally, making small changes like encouraging small and constant breaks can be an easy solution to help ease physical strain on the workers. Being successful and accomplishing all these solutions can help workers stay healthy, more productive, and satisfied with both their office and personal lives.

Physical health issues in computer-based workers are a rising issue that has already affected many. These health issues like musculoskeletal disorders, vision problems, or repetitive strain injuries can result in workers having a worsened work and life experience. Identifying these issues and finding the cause of them is important to find solutions that can help fix them. Solutions such as equipment adjustments, awareness, and frequent breaks can all help to prevent and reduce injuries from happening. Finding these solutions will result in workers feeling and working better which not only benefits them but also their employers.

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