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MUSCULOSKELETAL DISORDER ASSOCIATED WITH DEVICE USAGE AT THE TEACHER PROFESSION

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ABSTRAK

Salah satu penyakit yang paling sering terjadi pada pekerja adalah gangguan muskuloskeletal, dimana prevalensi gangguan muskuloskeletal pada guru sekitar 39% hingga 95%. Sebagian besar guru mengalami gangguan muskuloskeletal kronis dan keluhan subyektif, salah satunya adalah nyeri pada tungkai atas. Beberapa penelitian menunjukkan hubungan antara gadget dan postur tubuh pengguna dapat menyebabkan ketidaknyamanan dan kelelahan pada tangan, siku, dan bahu. Artikel ini membahas tentang penggunaan gadget dengan posisi yang tidak ergonomis sering mengakibatkan keluhan muskuloskeletal. Pembebanan statis dengan memegang perangkat genggam atau gadget dalam waktu yang lama, sering kali dengan postur tubuh yang tidak ergonomis dan penggunaan otot-otot yang berlebihan pada tungkai atas, cenderung berkontribusi pada sindrom nyeri miofasial pada otot-otot tangan dan lengan, yang mengakibatkan rasa sakit pada tungkai atas.

ABSTRACT

Musculoskeletal Disorder Associated with Device Usage at The Teacher Profession. One of the most common diseases in workers is musculoskeletal disorders. where the prevalence of musculoskeletal disorders in teachers is around 39% to 95%. Most teachers experience chronic musculoskeletal disorders and subjective complaints, one of which is pain in the upper limbs**.** Some studies show the relationship between gadgets and user posture can cause discomfort and fatigue in the hands, elbows, and shoulders. This article discuss about the use of gadgets in an unergonomic position often results in musculoskeletal complaints. Static loading by holding handheld devices or gadgets for long periods, often with unergonomic postures and excessive use of muscles in the upper limbs, is likely to contribute to myofascial pain syndrome in the muscles of the hands and arms, resulting in pain in the upper limbs.

INTRODUCTION

The use of technology in work is increasing rapidly, both in education and other fields. Along with the development of the era, technology such as gadgets has become one of the mandatory equipment workers use. In 2019, Indonesia was in fifth place with the largest internet usage in the world. [2] Technology benefits teachers because it will make work more effective and efficient.[5,6] The use of technological tools such as computers, laptops, smartphones, and other types of gadgets is inseparable from the daily teaching process of teachers. However, the increasing use of this

technology will have side effects on physical health**.** One type of disorder that occurs is musculoskeletal pain.[5]

According to the International Labor Organization (ILO), every year, there are problems caused by work. As many as 160 million people suffer from work-related diseases, and 270 million workers become victims of accidents every year. One of the most common diseases in workers is musculoskeletal disorders. Based on a study of 9,482 workers in 12 districts and cities in Indonesia, the most common health problems experienced by workers are musculoskeletal disorders (16%), cardiovascular disorders (8%), nerve disorders (3%), and ENT disorders (1.5%). [5,7]Workers in Manado experience musculoskeletal complaints with a mild illness category of 46.4% in the waist and 39.3% in the upper neck, lower neck, and back. Based on the *Nordic Body Map questionnaire,* workers complain about neck, back, waist, shoulders, arms, or hands.[6] Teachers often feel musculoskeletal complaints due to bad habits such as posture and excessive work duration. [8] One example is the teachers' wrong use of gadgets, which can cause upper limb pain. Misuse of gadgets by teachers occurs due to bad habits of the teacher himself or the work environment, such as the facilities provided and high work demands that increase the risk of upper limb pain complaints in teachers.[1,8]

Musculoskeletal complaints occur due to damage to ligaments, tendons, or joints.[8] According to WHO, 1.71 billion people have musculoskeletal problems. The prevalence of musculoskeletal problems in Indonesia reaches 7.3%, and one of the musculoskeletal problems often occurs in the education sector, where the prevalence of musculoskeletal disorders in teachers is around 39% to 95%. Most teachers experience chronic musculoskeletal disorders and subjective complaints, one of which is pain in the upper limbs**.**[1,9] The definition of pain developed by *the International Association for the Study of Pain taxonomy group* is an unpleasant sensory and emotional experience associated with actual, potential, or tissue damage.[10]

The upper limb pain consists of the shoulder, upper arm, elbow, forearm, wrist, and hand. Upper limb pain is increasing every year worldwide due to prolonged, vigorous, and repetitive use of gadgets. Hand pain is the third most common body part for work-related injuries and is very common in the adult population.[1,11] Continuous and repetitive thumb and finger movements have been identified as risk factors that can cause disorders of the thumb and finger muscles in the forearm. Some studies show the relationship between gadgets and user posture can cause discomfort and fatigue in the hands, elbows, and shoulders Click or tap here to enter text.. 6 In previous studies in Balakrishnan, gadget users with a duration of 2-14 hours a day found pain in the upper limbs. So, the duration of gadget use is an important factor in complaining of pain. [8]Age also affects upper limb pain due to decreased physiological, neurological, and physical abilities, especially after 30 to 40 years, with different rhythms for each person. [12,13]In addition to age, pain in the upper limbs can also occur in workers who do repetitive movements for a long time, and in the education sector, repetitive movements often occur in teachers when using technology assistance for the learning process.[1,9,14]

Static loading by holding handheld devices or gadgets for long periods, often with unergonomic postures and excessive use of muscles in the upper limbs are likely to contribute to myofascial pain syndrome in the muscles of the hands and arms, resulting in pain in the upper limbs.[1–4]

METHOD

This literature review uses secondary data obtained from relevant scientific journals. The method used in the scientific study is Preferred Reporting Items for Literature Review. Journal searches were conducted in electronic databases, including PubMed, Science Direct, Europe PMC, Wiley Online Library, and Cochrane. The search utilized keywords such as "musculoskeletal disorder", "device usage", and "teachers".

DISCUSSION

Upper limb pain is a condition with discomfort, throbbing sensation, or pain that can occur in the shoulder, upper arm, elbow, forearm, wrist, and hand. This can occur due to intense and sudden actions such as lifting heavy objects, or it can also occur due to repetitive movements or repeated exposure to vibration, pressure, or unnatural body postures. [11,15] Several possible causative factors, such as neuropathy, tendinopathy, and other musculoskeletal complaints, can also cause the pain. [15] The pain will tend to be intense and localized. Specific postures or movements can make the pain worse or better if the pain is in a joint. Some people who experience this pain often describe it as tired or having tight muscles.[15]

In upper limb injuries, there will be a loss of functional ability in the form of reduced or lost hand dexterity in daily activities, such as moving, turning, and placing objects. In addition, there is also a decrease in the range of motion of the joints and muscle strength, the emergence of changes in skin color, pain, edema, and decreased sensory abilities.[16]

The incidence of musculoskeletal disorders of the upper limbs has increased worldwide due to prolonged, vigorous, and repetitive use of gadgets.[1] In Berolo et al.'s study regarding complaints of pain in the upper extremities due to gadgets, it was found that 84% of participants experienced pain in at least one part of the body, with the most frequent pain being pain at the base of the thumb in both the right and left hands with a percentage in the right shoulder (52%), left shoulder (46%), right arm (32%), and left arm (27%).[17] Hand pain is widespread in the adult population, with a prevalence of approximately 19.1%, and is the third most common injury in workers. According to a national database in the United States, over the past decade, an estimated 2.6 million hand and wrist injuries have occurred each year.[11]

Risk factors associated with upper limb pain are divided into modifiable and non-modifiable factors. Non-modifiable risk factors include increasing age and gender. Modifiable risk factors include work duration, work that requires repetitive movements, and work posture.[18]

The relationship between age and health disorders is that as a person ages, it will be followed by damage to body tissues, resulting in decreased physical abilities, namely decreased muscle strength, which will affect daily activities. [13]At 50-60 years, 20% of muscle strength and 60% of sensory-motor abilities will decrease. Even for someone who is >60 years old, their physical work ability is only 50% compared to that of a person aged 25 years. There is a study that says that workers aged >38 will have a high chance of experiencing musculoskeletal disorders. This is one of the factors in the existence of health problems in workers. The older they are, the more complaints they feel.[14,19]

Gender is related to muscle strength between women and men. Men have a greater range of power than women because men use more physical power to carry out daily activities while women are less good in terms of physical power in their daily activities. As a result, women are more likely

to suffer from musculoskeletal complaints than men.[14] Activity levels that are too heavy or light have a higher risk of musculoskeletal pain. Excessive physical activity can be a cause of musculoskeletal pain such as upper limbs due to the increased risk of injury to tissues, bones, and nerves.[20] Duration of work is related to the time when carrying out a job. Long working hours will cause asymmetric muscle imbalances, which cause musculoskeletal complaints in pain. Working more than 8 hours will increase the risk of pain in the shoulders, upper back, lower back, and arms. So, long working hours can cause someone to suffer from musculoskeletal complaints.[14] According to research, continuous movement will increase muscle activity and fatigue, thereby increasing a person's risk of developing musculoskeletal complaints such as those in the arms.[14] Work posture or body position of workers when doing a job that is not right will increase the risk of musculoskeletal complaints because skeletal muscle problems will increase the risk if the posture has a position that is further away from the body's center of gravity. Work posture cannot be a risk factor if the duration is only 10 seconds and with a frequency of 2 times/minute.[14]

The use of gadgets in an unergonomic position often results in musculoskeletal complaints. In a study in Bangladesh, there was a significant relationship between gadget use and pain in the neck, shoulders, elbows, and hands. [21,22]In a previous study conducted in 2010, musculoskeletal complaints in gadget users were found to be 84% of participants experiencing pain. The most common pain felt in the right and left hands was often felt at the base of the thumb. In the right hand, 2% reported severe pain, 9% reported moderate pain, and 17% reported mild pain. In the left hand, 1% reported severe pain, 4% reported moderate pain, and 15% reported mild pain. In addition to the hands, pain was also reported in other areas, namely 32% in the right elbow of the lower arm, 27% in the left elbow and lower arm, 52% in the right shoulder, 46% in the left shoulder, 68% in the neck, and 62% in the upper back.[23]

In a prevalence study examining the distribution of musculoskeletal symptoms in the upper extremities, pain distribution was found among different anatomical regions of the arm. This provides new insights into risk factors for musculoskeletal symptoms among mobile device users. The results showed a significant association between position and time spent using mobile devices and reported pain such as in the middle of the right thumb and the base of the right thumb. In mobile devices such as laptops and computers, there was greater static tension in the hand and arm muscles during use. In participants with 94% right-handed dominance, only 26% used their thumbs to type on laptops and computers. This means that many thumb movements are used for the use of other devices such as mobile phones and iPads to surf the internet and others in combination with time and poor posture, so repetitive use is not beneficial for the joints and muscles of the hand.[23]

CONCLUSION

The use of gadgets in an unergonomic position often results in musculoskeletal complaints. [2,5]Static loading by holding handheld devices or gadgets for long periods, often with unergonomic postures and excessive use of muscles in the upper limbs, is likely to contribute to myofascial pain syndrome in the muscles of the hands and arms, resulting in pain in the upper limbs.

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