

# Correlation of Work-Related Stress and Muscle Tightness in Work from Home Professionals during Covid-19 Pandemic

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## Abstract

**Background:** The outbreak of Covid-19 has changed many aspects in people's life. Majority of the organizations all over India had shut their premises and shifted to work from home. This sudden shift has led to an increase in stress and anxiety among all the employees, who are working from home. Working from home may cause an increase in work-related stress, anxiety, and isolation, which influences job effectiveness, well-being, and work-life balance of an individual. Thus, the aim of our study was to find out the correlation of work-related stress and muscle tightness in work from professionals. **Method:** 50 subjects were recruited in our study by random sampling technique from an age group of 25-55 years. Consent was taken. Work-related stress was assessed in subjects using International Stress Management Association Questionnaire (ISMA) and muscle tightness was assessed using Individual muscle testing. **Results & Conclusion:** In our study, we found out that there is a positive correlation between work-related stress and muscle tightness in work from home individuals with an r-value of 0.82.

**Keywords:** Covid-19, Stress, Work from home, Muscle tightness, International Stress Management Association Questionnaire

## Introduction

In December 2019, a new infectious respiratory disease had arisen in the city of Wuhan, Hubei province, China. It was named by the World Health Organization (WHO) as COVID-19 (coronavirus disease 2019). A new class of coronavirus, known as SARS-CoV-2 (severe acute respiratory syndrome coronavirus 2) has been found to be responsible for the occurrence of this disease. As far as the history of human civilization is concerned, there are instances of severe outbreaks of diseases caused by a number of viruses. According to the report of the World Health Organization (WHO) as of April 18, 2020, the current outbreak of COVID-19 has affected over 216,411 people and killed more than 146,198 people in more than 200 countries throughout the world. <sup>(1,2)</sup>

The World Health Organization (WHO) had declared Covid-19 as a public health emergency of international concern and government had imposed social mobility and travel restrictions for the people. Educational institutions and companies were closed and the public were encouraged to work from home. <sup>(3,4)</sup> To minimize physical contact among individuals and prevent new infections, many companies implemented "mobile working" or "home working" or "remote working", a form of carrying out a job without specific place of work restrictions, with the possible use of technological tools. It has been estimated that about 81% of the worldwide workforce has been affected by workplace changes. <sup>(5)</sup>

For the majority of the employees, it was the first experience of working from home. Considering the advantages of work from home environment, such as reduced commuting time, possible productivity

gains, increased staff motivation, better work–life balance, and better control over time schedule, while among disadvantages faced by the employees there are difficulties in monitoring performance of work, cost of working from home, Improper communication problems, no clear separation between home and work tasks, and unsuitability with all works. <sup>(6,7)</sup> Considering, work from home environment, sedentary lifestyle is a major risk factor across a spectrum of preventable diseases that lower the quality of life. Sedentary lifestyle can lead to various problems like tightness of muscle, decreased joint range of motion and decreased flexibility hampering daily activities of an individual <sup>(8)</sup>

Stress is known to have a negative influence on employees' performance, productivity and overall satisfaction. Stress may make people more susceptible to the vulnerable COVID-19 virus infection. <sup>(9)</sup> Stress is a term used to define the body's physiological and/or psychological reaction to circumstances that require behavioral adjustment. According to the Japanese National Survey of Health in 2004, 49% of individuals aged 12 years or older reported experiencing stress in their daily lives. This survey examined stress in 28 domains, including work, family, and neighborhood relationships, as well as living-, social-financial, and health-related situations. Work-related problems were the most frequent stressors, followed by health-related and then financial problems <sup>(10)</sup>

According to American psychological association, when the body is stressed, muscles tense up. Muscle tension is almost a reflex reaction to stress—the body's way of guarding against injury and pain. With sudden onset stress, the muscles tense up all at once, and then release their tension when the stress passes. Chronic stress causes the muscles in the body to be in a more or less constant state of guardedness. When muscles are taut and tense for long periods of time, this may trigger other reactions of the body and even promote stress-related disorders. For example, both tension-type headache and migraine headache are associated with chronic muscle tension in the area of the shoulders, neck and head. Musculoskeletal pain in the low back and upper extremities has also been linked to stress, especially job stress. <sup>(11)</sup>

## Materials And Methods

Ethical clearance was taken from institutional ethical committee of Tilak Maharashtra Vidyapeeth-College of Physiotherapy. The aims and objectives of the research were explained to the participants and those who were willingly to participate were included in the study. Written consent was obtained. A total of 50 participants were included in our study as per inclusion criteria. Basic demographic data like age, gender, profession, duration of work and total years of experience were collected. The inclusion criteria were Participants Male and female having score 14 or more in ISMA Questionnaire, Subjects in the age group of 25-55 years, Subjects working from home since last 6 months and Subjects with desk job for a minimum 5 hours/day. The Exclusion criteria was participants who were not- cooperative, History of any recent surgeries in upper limb and lower limb in past 6 months, History of any recent musculoskeletal injuries like fractures, dislocations, joint instability or any soft tissue injuries in past 6 months and any congenital deformity of upper and lower limbs. The subjects were asked to fill the questionnaire – International Stress Management Association Questionnaire. The responses of the questionnaires were collected and analyzed. The subjects who score 14 and above in International Stress Management Association Questionnaire were further evaluated for muscle tightness with the help of Individual Muscle Testing.

The nature and purpose of the study and International Stress Management Association Questionnaire (ISMA) was properly explained to each and every subject. Consent was taken after explaining International Stress Management Association. Questionnaire (ISMA) scale was distributed and asked to fill by subjects. Muscle tightness was assessed for pectoralis major, Sternocleidomastoid, Scalene, All the three fibers of Trapezius and Quadratus Lumborum. The data was properly analyzed and interpreted.

## International Stress Management Association Questionnaire (ISMA)

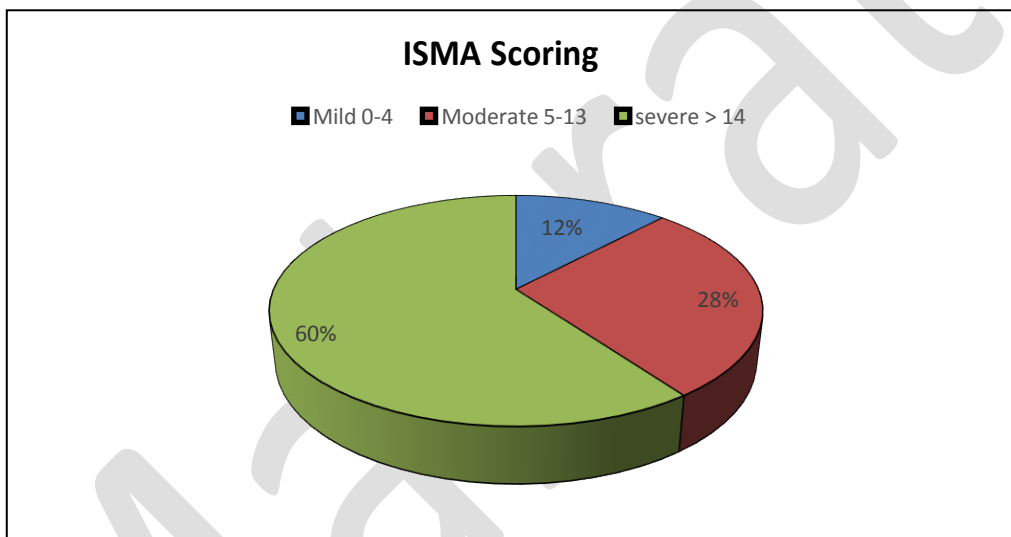
The scale consists of 25 questions. The grading of the scale is as follows - 4 points or less denotes you are likely to suffer from stress related illness. If the scoring is from 5– 13 points it denotes that you are more likely to experience stress related ill health either mental, physical or both and 14 points or more denotes you are the most prone to stress showing a great many traits or characteristics that are creating un-healthy behaviors. This means that you are also more likely to experience stress & stress-related illness e.g., diabetes, irritable bowel, migraine, back and neck pain, high bloodpressure, heart disease/strokes, mental ill health (depression, anxiety & stress) <sup>(12)</sup>

## Muscle tightness

It was assessed by using Individual Muscle Testing for neck and back muscles such as pectoralis major, Sternocleidomastoid, Scalene, All the three fibers of Trapezius and Quadratus lumborum. <sup>(13)</sup>

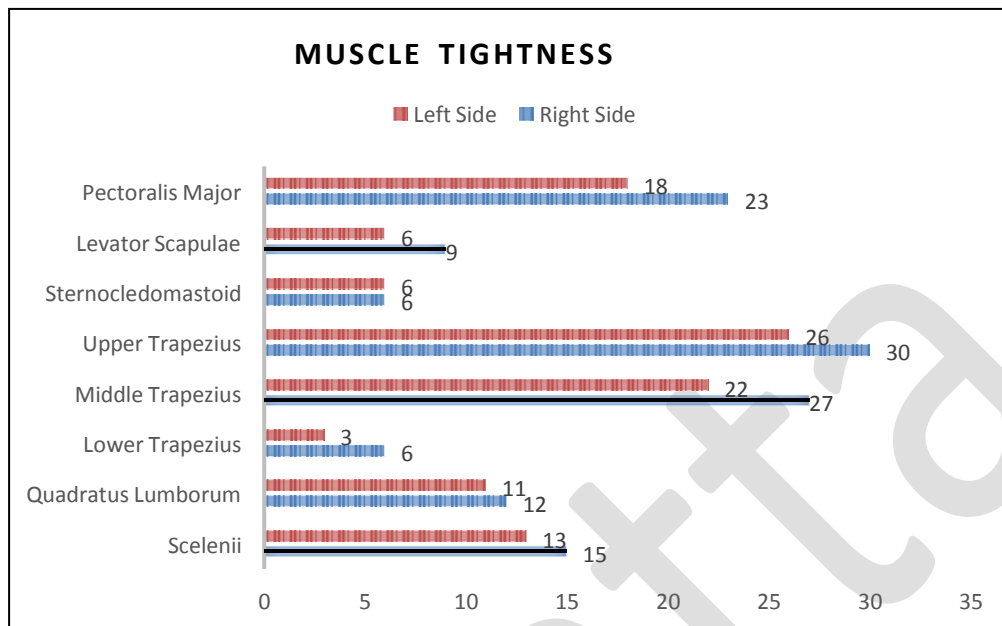
## Results

**Graph No. 1: Distribution of subjects according to work related stress using International Stress Management Association (ISMA)**



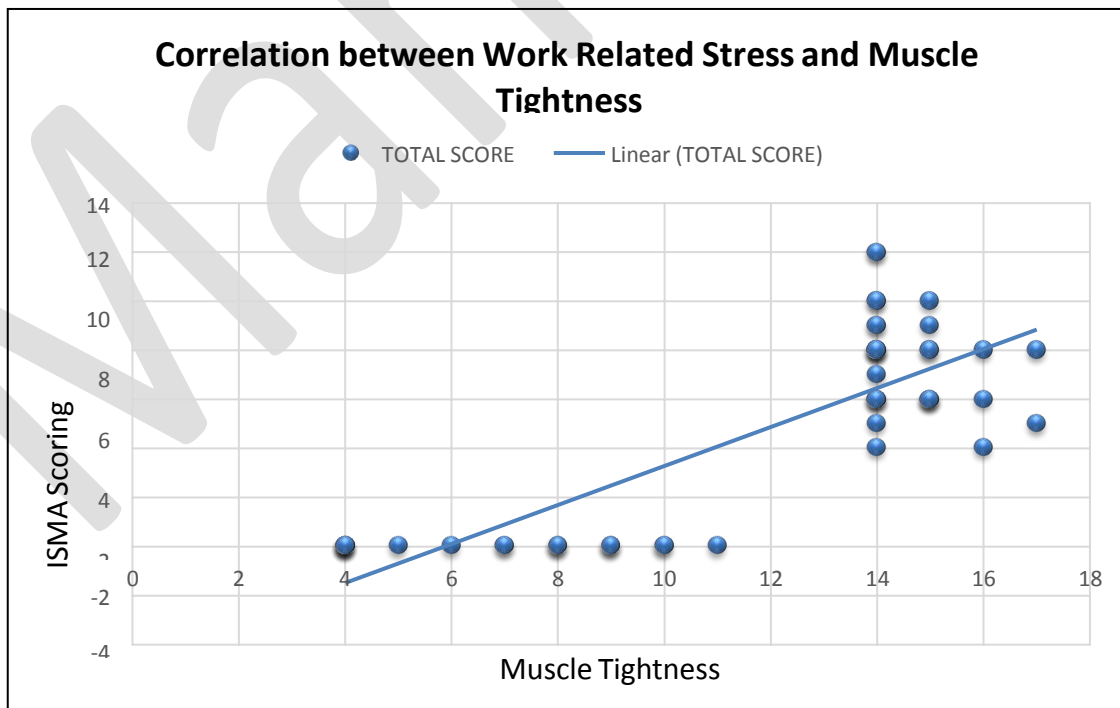
**Interpretation:** Above graph represents the severity in work-related stress in individuals working from home in current situation. About 60% of individuals feel severe work related stress and on other hand only 12% has mild and 28% has moderate work related stress as per International Stress Management Association (ISMA) scale.

**Graph No. 2: Distribution of subjects according to muscle tightness**



**Interpretation:** Above graph represents muscular tightness in individuals working from home as a profession. In relation to left sided muscle shorting shows less impact than right side. Pectoralis major, Upper and middle trapezius show more muscle tightness than other muscles in individuals working from home as a profession.

**Graph No. 3: Correlation between Work – Related Stress and Muscles Tightness in Work from Home Professionals**



**Interpretation:** Above graph represents a positive correlation ( $r = 0.82$ ) between work-related stress and muscle tightness in individuals working from home as a profession.

## Discussion

Our results in the present study showed that the work-related stress was significantly correlated with increase in muscle tightness in the upper limb and back muscles in work from home subjects. Graph no 1. tells information regarding the amount of work-related stress present in our subjects. The outcome measure for evaluating work-related stress was International Stress Management Association (ISMA) Questionnaire. The grading of the scale for work-related stress was Mild, Moderate and Severe. In the scale, 4 points or less is in Mild category, Scores between 5-13 points comes in Moderate category and scores with 14 and above comes in severe category.

In our study, out of 50 subjects 12% of the subjects were having mild stress, 27% of the subjects were having moderate stress and 61% of the subjects were having severe stress. The possible reason for severe stress in the subjects may be due to COVID 19 Pandemic, many people were working from home and were having work deadlines also the man power was reduced to accommodate financial loss of the companies. Many people had feared of losing their jobs due to a fall in economy of the country. Dr. Jolly Sahni has revealed that there is high impact of the COVID -19 pandemic on the person's behavioural aspect, stress and coping mechanism of employees working from home. Her findings suggested that the stress levels were moderate to high among all the subjects the boundaries have mixed up due to invisible Work-home interface (WHI) and home-work interface (HWI) as the home demands clash with the work demands and vice-versa. Also, the type of organizational support provided during the pandemic was not sufficient for the team.<sup>(14)</sup>

Graph no 2 shows percentage of individual muscle tightness in the upper limb and back muscles on each side of the subjects. The base criteria to evaluate for muscle tightness in our study was those subjects who scored 14 and above on international stress management association (ISMA) questionnaire were evaluated for muscle tightness. The muscles included in our study were Pectoralis major, Levator scapulae, Sternocleidomastoid, Scalene, Trapezius-all the three fibers of and Quadratus lumborum. For statistical analysis, in grading for muscles tightness, we had considered 1 if the muscle tightness was present and 0 if there was no muscle tightness. Among all these muscles 30% of the subjects were having tightness in Upper trapezius, 27% of the subjects were having tightness in middle trapezius and 23% of the subjects were having tightness in pectoralis major, 9% in Levator scapulae, 6% in Sternocleidomastoid, 6% in lower trapezius, 12% in quadratus lumborum and 15% in Scalene for right side. For statistical analysis in grading for muscles tightness, we had considered 1 if muscle tightness was present and 0 if there was no muscle tightness. Due to change in working style many people developed wrong sitting posture and also, there was lack of proper furniture due to which many subjects developed muscle tightness. V Johnston et al. underwent the study on Neck movement and muscle activity characteristics in female office workers with neck pain. The study concluded that, the results are consistent with those found in other cervical musculoskeletal disorders and may represent an altered muscle recruitment strategy to stabilize the head and neck.<sup>(15)</sup>

Aa Ganerwal et. al underwent a study on the effects of working hours on nerve conduction test in computer operators and the conclusion was that symptoms of pain, muscle tightness, paraesthesia and muscle weakness was found in computer operators who worked for long hours<sup>(17)</sup>

Graph 3 shows a represents a positive correlation ( $r = 0.82$ ) between work-related stress and muscle tightness in individuals working from home as a profession. Pradip B et al underwent the study on prevalence of tightness in hip muscles in the middle-aged Indian men engaging in prolonged desk jobs: A descriptive study. The sample of the study was 120 IT professionals. The outcome measures were the standard tests for measuring muscle length, three hip muscles: hamstrings, iliopsoas and piriformis were measured for tightness.

The study concluded that a majority of desk job professionals can develop tightness in these muscles making prone to low back pain or other symptoms associated with back or hip in some

point of time in their life. <sup>(16)</sup>

From our study, we can say that when the stress of an individual's increases, the tightness of the muscles also increases. Stress could also be work – related and many other environmental factors. Also, according to the study of American psychological association when the body is stressed, muscle tensed up. When there is contraction of muscles for longer period of time, this leads to many triggers to muscles and also promotes stress – related disorders. Chronic stress leads to muscles tightness which is due to abnormal contraction of the muscles and it leadsto pain and muscles tightness. In our study, there was a correlation between work-related stress and muscle tightness. Preventive strategies can be implemented by giving guidance to all the employees about proper ergonomics which has to be followed at home and work-related stress can also be reduced with the proper timemanagement.

## Conclusion

In our study, we found that there is a Positive correlation between Work- Related Stress and Muscle tightness in Work from Home Professionals with R value of 0.82.

## References

1. Chakraborty I, Maity P. COVID-19 outbreak: Migration, effects on society, global environment and prevention. *Science of the Total Environment*. 2020 Aug 1;728:138882
2. Khatri S, Mahendrakar V. NECK PAIN AND DISABILITY, AN UNWANTED GUEST AFTER THE COVID-19 PANDEMIC OUTBREAK! HOW TO DEAL WITH IT? *Turkish Journal Of Physiotherapy and Rehabilitation.*;32:3.
3. Sohrabi C, Alsafi Z, O'Neill N, Khan M, Kerwan A, Al-Jabir A, Iosifidis C, Agha R. World Health Organization declares global emergency: A review of the 2019 novel coronavirus (COVID-19). *International journal of surgery*. 2020 Apr 1;76:71-6.
4. Mahendrakar V, Motling D, Sonawadekar B. Assessment of Neck Pain using Smartphone Addiction Scale and Neck Disability Index. In 30-60year Adults During Covid-19 Pandemic.
5. Moretti A, Menna F, Aulicino M, Paoletta M, Liguori S, Iolascon G. Characterization of home working population during COVID-19 emergency: a cross-sectional analysis. *International Journal of Environmental Research and Public Health*. 2020 Jan;17(17):6284.
6. The Balance Careers. The Pros and Cons of a Flexible Work Schedule. Available online: <https://www.thebalancecareers.com/advantages-and-disadvantages-of-flexible-work-schedules-1917964> (accessed on 26 June 2020).
7. Nibusiness info. Employees Working from Home. Available online: <https://www.nibusinessinfo.co.uk/content/advantages-and-disadvantages-employees-working-home> (accessed on 26 June 2020).
8. Collins J. Effects of aging. 2004; 6(10):123-6
9. Anderson, G. (2020). Psychological Stress and COVID-19: Interactions with Gut Microbiome and Circadian Rhythm in Driving Symptom Severity
10. Japanese Ministry of Health and Welfare: National Survey of Health 2004. Tokyo: Kosei Toukei Kyoukai 2006.
11. American Psychological association. 2018. <https://www.apa.org/topics/stress/body>
12. Vaskari, R. G., & Sugumaran, V. B. (2020). Prevalence of Stress Among Software Professionals in Hyderabad, Telangana State, India. *Central African Journal of Public Health*, 6(4), 207-212.
13. Escolar, D. M., Henricson, E. K., Mayhew, J., Florence, J., Leshner, R., Patel, K. M., & Clemens, P. R. (2001). Clinical evaluator reliability for quantitative and

14. manual muscle testing measures of strength in children. *Muscle & Nerve: Official Journal of the American Association of Electrodiagnostic Medicine*, 24(6), 787-793.
15. Sahni, J. (2020). Impact of COVID-19 on employee behavior: Stress and coping mechanism during WFH (Work from Home) among service industry employees. *International Journal of Operations Management*, 1(1), 35-48.
16. Johnston, V., Jull, G., Souvlis, T., & Jimmieson, N. L. (2008). Neck movement and muscle activity characteristics in female office workers with neck pain. *Spine*, 33(5), 555-563.
17. Pradip, B., Sudhir, B., & Nidhi, B. (2018). Prevalence of tightness in hip muscles in middle aged Indian men engaging in prolonged desk jobs: A descriptive study. *Int. J. Phys. Educ. Sports Health*, 5(2), 15-21.
18. Ganeriwal, A. A., Biswas, D. A., & Srivastava, T. K. (2013). The effects of working hours on nerve conduction test in computer operators. *Malaysian orthopaedic journal*, 7(1), 1.