

Association of Upper Trapezius Pain with Perceived Exertion and Depression in Workers of the Food Industry

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ABSTRACT

OBJECTIVE: To determine the association of upper trapezius pain with perceived exertion and depression among food industry workers.

METHODOLOGY: It was an analytical cross-sectional study carried out from November 2021 to March 2022 after Ethical approval. One hundred food worker samples in Lahore were selected by a non-probability convenient sampling technique. The participants were male and female in the age group of 25-40, with 8-12 hours of duty time/day. The outcome tools were the Visual Analogue Scale, Borg Exertion Scale and Depression Inventory Scale. All the data was entered in SPSS V.25 for analysis of data. Quantitative variables are presented using Mean \pm SD (Standard deviation) and categorical variables with frequencies, while the association was determined using the Chi-square test.

RESULTS: In the current study, there were 76% male and 24% female participants with a mean age of 30.53 \pm 5.30 years. Among the participants, 32% had moderate pain, 24% had severe pain, 21% had strenuous physical activity exertion, and 19% had light physical activity exertion, But 21% had mild depression, and 9% had severe depression. There was a significant association between upper trapezius pain rating with physical activity exertion level at P= 0.007 and depression at P= 0.000

CONCLUSION: This study concluded that there was a significant association between upper trapezius pain, the level of Physical Exertion and Depression. The upper trapezius pain intensity increases the level of depression and physical exertion.

KEYWORDS: Association, Depression, Food Workers, Perceived Exertion, Pain, Upper Trapezius.

INTRODUCTION

Musculoskeletal disorders (MSDS) are problems within the tendon, ligaments and muscles. At the same time, intervertebral discs and vascular and nervous systems don't directly result from acute or instant events but affect an area unit put in step by step and inveterately. The primary factor in developing MSDS of the shoulder and neck is tiredness due to overuse of muscles¹. Cooks and restaurant staff is at high menace for occupational musculoskeletal disorders (WMSDs) because of increased stress on the body related to getting ready materials and cooking. A high rate of WMSDs has become prevalent among food industry workers (FSWs) due to muscle overuse. Myofascial trigger points (MTrPs) are considered a common leading source of musculoskeletal pain and discomfort. These are the hyperirritable nodule and present with tenderness in the tight band of muscles, producing a massive contribution to the development of discomfort and leading to motor pathology. Among the upper

quadrant, the upper trapezius (UT) is the most reported issue; most suffer from the development of MTrPs². Occupational musculoskeletal disorders are the major reported causes of rigorous long-run pain and physical incapacity, mainly owing to adverse geographic point factors and awkward postures that may influence all body parts³. It is a fact that work-related neck disorders (WRNDs) are usually caused by poor positioning of head and neck muscles during long working hours⁴. E Wood E 2018⁵ stated that systematic disorders were the leading reason for injury and lost time at work. Food service staff are exposed to a range of stressors together with repetitive manual labor, lifting, and forceful movements in addition to awkward postures and prolonged standing. In a recent study, chefs or cooks reported a 7% prevalence rate. Depression is related to underprivileged health behaviors and communal challenges.

Consequently, it's obligatory to order and build up anticipatory approaches for each disorder⁶. In the construction of workstations and work activities, the safety of the person performing the tasks should be kept in mind. Perception of effort has been deliberated for a spread of physical exertions, typically for exercise and rehabilitation programs⁷. The perceived rate of exertion (RPE) is a simple scale to assess muscle fatigue during daily activities. This scale is also called Borg rate of perceived exertion (BCR-10), and the Rate of perceived Discomfort (RPD) is obtained

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with a modified version. Many of the authors had stated that there is an association of muscle fatigue measures, including myoelectric indicators, time or endurance and rate of perceived exertion is moderate to high⁸. Mobbing has emerged inside the work and is more and more spreading. It affects the employees expressively (aggression, reduced resistance to worry, irritability, nervousness) and physically (fatigue, weakness, chronic fatigue syndrome and pains in several body elements). In contrast, severe bullying will even end in depression and suicide cases⁹. Glock CH 2019¹⁰ stated that RPE scores of the arm, shoulder, and trunk were overstated because of the continual physical efforts of the staff over time; therefore, prolonged and repetitive packaging tasks were the main reason for subjective discomfort.

Upper trapezius muscle pain is a growing public health problem in food workers and other people that required to be addressed. To the researcher's knowledge, there is insufficient data on this topic in Pakistan. The current study aimed to determine an association of upper trapezius pain with perceived exertion and depression among food industry workers. This study will help to assess the association between upper trapezius pain and its associated factors among food industry workers. Results will help develop preventive measures in posture, limiting heavyweight, overuse of upper trapezius muscles and reducing working hours among them. They can get rid of the pain as well as depression in future, and it may also improve their work efficiency.

METHODOLOGY

It was an analytical cross-sectional study carried out from November 2021 to March 2022 after Ethical approval. One hundred food worker samples in Lahore were selected by a non-probability convenient sampling technique. The data was collected from different restaurants in Lahore, including Cakes & Bakes, United Restaurant, McDonald's and Big Man Pizza House. Male and female food workers aged 25-40 years, with work duration longer than eight months, unilateral and non-traumatic shoulder pain, tenderness of upper trapezius muscle more than twice over the past week and having 8-12 duty hours were included¹¹. The sample size was calculated using $n = \frac{Z_{1-\alpha/2} \rho (1-\rho) d^2}{P}$, where $Z_{1-\alpha/2}$ is the standard normal variate (at 5% type I error ($p < .05$), it is 1.96, and at 1% error ($p < 0.01$) considered significant below 0.05, hence 1.96 is used in the formula. $P =$ expected proportion in population based on previous studies—and $d =$ Absolute error or precision. We calculated $Z = 1.96$, $P = 0.54$, $1-p = 0.46$ and $D = 0.007$. Using 54% proportion of the condition sample size is $n = 100$.² While the participants with any preceding diagnosis of shoulder instability, shoulder fracture, any of the systematic illness, i.e. arthritic swelling, systemic lupus erythematosus, shoulder surgery and systematic diseases, i.e. Epigastritis were excluded.

The outcome was measured using Borg-Perceived

Exertion Scale, Depression Inventory and Visual Analogue Scale. The Borg rating scale is based on the assessment of sensation in a person that is experienced during any physical performance, including respiratory and heart rate and level of fatigue and sweating. Physical exertion is based on rating it from 6-20, providing an estimated heart rate depending upon the performed physical activity. On scale value of 6 indicates "no exertion at all", 12 to 14 "moderate exertion", and 20 "exertion at all" stop activity¹². Major depressive inventory was used, which has 10 to 12 questions, and each question has six options, including "all the time" (5) to "no time" (0). A score of 4 or 5 on two of three scale items indicates "mild", and a score of 4 or 5 on two of 3 items indicates "moderate". In comparison, a score of 4 or 5 in all three items indicates "severe", and no of items reduced to nine indicates "major"¹³. The visual analogue scale was used for pain, with 0 to 10 scoring in which 0 shows no pain, 1-3 mild pain, 4-6 moderate pain and 7-10 severe pain¹⁴.

Participants were assured that their personal information would not be disclosed following the ethical principles of human subjects. Participants in the study were informed, and the participants signed a consent form. SPSS version 25 was used for the analysis of data. Mean, and standard deviations were calculated for quantitative variables and frequency/percentages for categorical variables, and the Chi-square test was used to determine the association between the outcomes.

RESULTS

In the current study, there were 76% male and 24% female participants with a mean age of 30.5 ± 5.3 years. The participants' mean weight was 69 ± 13.9 kg, and the mean height was $5.57 \pm .38$ feet. The Mean BMI of the participants was found to be 23.9 ± 4.37 . Among the participants, 32(32%) had moderate pain, and 24(24%) were suffering from severe pain and, 21(21%) were having hard physical activity exertion level, 19% had a light physical activity exertion level. While 48 (48%) had no depression, 21(21%) had mild depression, and 9(9%) had severe depression. (Table I)

Table I: Demographics

Category	Frequency (%)
Male	76(76%)
Female	24(24%)
Age Mean	30.53 ± 5.30
Height(ft) Mean	$5.57 \pm .38$
Weight(kg) Mean	69.03 ± 13.91
Body Mass Index Mean	23.90 ± 4.37

Ft= feet, Kg=Kilograms

The mean pain score was 3.90 ± 2.81 , Mean Depression Score was 20.43 ± 9.18 , and the Mean physical exertion score was 4.63 ± 1.91 . P value 0.007 indicates a significant association between Physical activity Exertion level and upper trapezius Pain Rating. (Table II)

Table II: Frequency Distribution of Pain, Exertion and Depression

Outcome	Category	Frequency (%age)
Pain Rating	No Pain	15 (15%)
	Mild Pain	29 (29%)
	Moderate Pain	32 (32%)
	Severe Pain	24 (24%)
Physical activity exertion level	No Exertion	7 (7%)
	Extremely light	8(8%)
	Very Light	13 (13%)
	Light	19 (19%)
	Somewhat Hard	16(16%)
	Hard (heavy)	21 (21%)
	Very Hard	10 (10%)
	Extremely Hard	5 (5%)
	Maximal Exertion	1 (1%)
Depression Level	No Depression	48 (48%)
	Mild Depression	21 (21%)
	Moderate Depression	22 (22%)
	Severe Depression	9(9%)

Table III: Association of Pain and Physical Exertion Level

Pain Rating	Physical activity Exertion level									Total	P-value
	No Exertion	Extremely light	Very Light	Light	Somewhat Hard	Hard (heavy)	Very Hard	Extremely Hard	Maximal Exertion		
No pain	2	2	3	1	4	3	0	0	0	15	0.007
Mild Pain	4	4	6	6	4	5	0	0	0	29	
Moderate Pain	1	2	3	9	4	7	6	0	0	32	
Severe Pain	0	0	1	3	4	6	4	5	1	24	
Total	7	8	13	19	16	21	10	5	1	100	

Table IV: Association of Pain and Level of Depression

Pain Rating	Depression Level				Total	P-value
	No Depression	Mild Depression	Moderate Depression	Severe Depression		
No pain	15	0	0	0	15	0.000
Mild Pain	29	0	0	0	29	
Moderate Pain	4	21	7	0	32	
Severe Pain	0	0	15	9	24	
Total	48	21	22	9	100	

P value is significant at ≤ 0.01

A P-value of .000 indicates that there is a significant association between upper trapezius pain with the level of Depression Level. The P-value indicates a significant positive association between pain score and depression score. Increasing pain increases the level of depression score among workers. (Table III & Table IV)

DISCUSSION

This study aimed to find an association between upper trapezius pain with perceived physical exertion and depression among workers in the food industry. Cooks and restaurant employees are at high risk for Work-Related Musculoskeletal Disorders (WMSDs) because of the increased stress on the body related to getting ready materials and cooking. This analytical study was conducted on a sample of 100 food workers, both male and female participants. There was a significant association of upper trapezius pain rating with physical activity exertion level and depression level among the participants. The current study found 56% moderate to severe depression among the participants due to upper trapezius tightness, and it was associated with exertion and depression among industry workers. Williams N 2017¹² anticipated factors related to biomechanical factors, stress level, and shoulder pain prevalence among workers. It was found that shoulder ache was directly related to biomechanical factors and the stress level perceived among the food industry workers. The perceived stress level was linked to the psychological demand of each population under study. Still, the social support of workers was correlated negatively to the level of perceived stress solely within the pharmaceutical producing website²⁰. In the current

study, participants have 21% had a hard physical activity exertion level, and 19% had a light physical activity exertion level due to work type and working hours with excessive physical exertion. Since food workers habitually carry foodstuff or supplies and very often pick up cuisine equipment, humeral elevation occurs with high incidence. So there might be Serratus anterior weakness that can lead to overwork of the upper trapezius and causes pain¹⁵.

In this study, 30% had mild depression and severe depression combined, and a P-value = 0.000 indicated a significant association between depression and upper trapezius Pain. P-value has stated that there is a significant association between pain score and depression level reported by participants. Christiane H et al.¹⁶ provided a unique and imperative insight into the association between food timidity, depression and comfortable work among women; this presents a significant public health apprehension, particularly as the high rate of food diffidence dramatically increases the chance of poor health and its development outcomes. In 2018, Pancardo P 2018¹⁷ stated that bodily labor activities should reflect physical condition and environmental factors like hotness, dampness, and altitude; or factors affecting individual physical response within physical activities like breaking in and becoming accustomed. Khal KM 2020¹⁸ observed muscle fatigue in infraspinatus, which was clinically significant because RPE, heart rate and perceived level of fatigue was correlated moderate to strong. This finding was important, as it assessed the sensations of an active shoulder movement during the exercise rather than the whole body response. Falla D 2017¹⁹ undignified that during repetitive lifting activities, the upper trapezius muscle was shifting its activity distribution to the caudal region as a whole during the assessment. This adjustment in the allotment of activity to different muscle regions has crucial implications for the persistence and deterioration of neck-shoulder pain throughout repetitive tasks. Still, further, the middle of skeletal muscle activity was shifted to the caudal within the painful condition. In the current study, only 15% had no pain, but 85% had pain from mild to severe because 40% had hard-to-light exertion of physical activities at their jobs. Kumgai G et al²⁰ highlighted that neck pain might be a disabling condition in employees due to working hours and other associated factors.

This study was conducted on less sample and was confined to Lahore due to limited time, and all participants were selected from specific areas. Future researchers should take a larger sample from multiple settings and a sample from other cities to generalize the results.

CONCLUSION

This study concluded a significant association between upper trapezius pain with physical activity exertion and depression Level. An increase in pain

intensity increases the level of depression and physical exertion.

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Data Sharing Statement: The corresponding author can provide the data proving the findings of this study on request. Privacy or ethical restrictions bound us from sharing the data publically.

AUTHOR CONTRIBUTIONS

Irfan S: Concept & design, analysis, data collection, interpretation of data, drafting & revision

Mahmood W: Concept & design, analysis, interpretation of data, drafting & revision

Mahmood T: Concept & design, analysis, data collection, interpretation of data, drafting, final approval

Shahid HZ: Concept & design, analysis, data collection, interpretation of data, drafting & revision

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