



Assessment of Upper Extremity Musculoskeletal Problems in Sweet makers: A Cross sectional Study

Nehali Gupte¹, Dr. Rutika Shivdikar²

¹Intern, DPO'S Nett College Of Physiotherapy, Thane, Maharashtra

²Assistant Professor, DPO'S Nett College Of Physiotherapy, Thane, Maharashtra

Corresponding Author: Nehali Gupte, Dr. Rutika Shivdikar

Date of Submission: 10-12-2022

Date of Acceptance: 24-12-2022

ABSTRACT: The objective is to assess musculoskeletal Disorders (MSDs) in upper extremity due to awkward postures or repetitive movements using Rapid Upper Limb Assessment (RULA) and to assess the level of body discomfort in sweet makers using BodyPart discomfort scale (BPD). Total 320 male sweet makers participated in the study, with age group of 25-45 years and work experience of minimum 5 years. According to the working positions, discomfort score was taken on BPD scale and RULA score was calculated. It was found that maximum number of sweet makers had discomfort in neck region and medium risk was found to be maximum on arm and wrist analysis. The study concludes that there is medium risk of developing musculoskeletal conditions of upper extremity in sweet makers.

KEYWORDS: musculoskeletal disorders, sweet makers, Rapid Upper Limb Assessment (RULA), Body part Discomfort scale (BPD).

I. INTRODUCTION

Indian desserts, also referred to as mithai, are a vital part of Indian cooking. Mithai is frequently used as a form of greeting, religious gift, celebration, giving presents, gatherings, and hospitality on the Indian subcontinent [1]. As a result, a sizable workforce is employed in this unorganised industry both in India and throughout the Asian continent. Approximately 7% of all workers in the nation are employed in this sector. The economy of our nation therefore includes a sizable portion of this unorganised labour employment [2].

The working processes in this profession still largely rely on human work and cannot be replaced by machines [3]. Work productivity is a topic of discussion in several studies on musculoskeletal conditions that influence the workers condition. Awkward postures are physical

working conditions that relate with sick leave [4]. Working in food industry is a heavy work and the workers suffer various types of pain and injuries of body, generating economic costs in compensation and absenteeism.

Musculoskeletal issues are a hazard for the public health in many ways for those who are working. A musculoskeletal condition is defined as damage to the body's supporting tissues, such as the nerves, cartilage, muscles, and bones. The physical demands of the task, the frequency and repetition of motions, and the posture used while working are the physical risk factors that lead to MSDs. MSD symptoms severely restrict mobility and dexterity, which results in early retirement from the workforce, decreased levels of wellbeing, and a decreased capacity for participation. As MSD problems become more common with age, younger persons are also afflicted during the years of highest income [5].

Musculoskeletal problems caused by work are a range of excruciating conditions affecting the tendons, muscles, and nerves. They go by various names, including soft tissue disorders, overuse syndrome, repetitive motion injuries, and cumulative trauma syndromes. When the body is held in various static positions at work, musculoskeletal ailments might develop. They result from grasping, twisting, and clenching hand and arm movements. Due to their frequent repetition, rapidity, and lack of relaxation in between motions, these actions are dangerous in working environments. There is a broad range of occupations in this subject, including those in the manufacturing and food processing sectors. It is a medical condition that is brought on by long-term exposure to repetitive activity, and it has significantly increased every year [6].

However the profession of sweet making involves tasks in static posture, long standing hours of working, constant forward leaning and repetitive upper body movements that might put them into



risks for developing musculoskeletal problems. The people belonging to this profession do not have any information about correct ergonomics that has to be maintained. Due to their busy schedule they are unable to take breaks and have to perform their work repetitively. All this collectively worsens and leads to musculoskeletal problems. In addition to this because of their financial status they are unable to take leaves for rest again leading to severe problems and different forms of injuries Chronic job can have a negative impact on a worker's mental, emotional, and physical health over time and can have major repercussions if it is not effectively addressed.

Therefore, all these problems not only causes danger to workers well-being but also cause harm to public environment.

II. MATERIALS AND METHODOLOGY

Materials used:

1. Pen and pencil
2. Demographic data form
3. Consent form
4. Body part discomfort Scale (BPD)[7]
5. Rapid Upper Limb Assessment(RULA)[8][9]

Study design: One time observational (cross sectional)

Duration of study: 18 months

Location of study: Metropolitan city

Sample size: The participants analysed were 320 for this study

Sample population: Male sweet makers between age group of 25-45 years and having work experience of minimum 5 years .

Sampling method: Convenient

Inclusive criteria:

1. Male sweet makers
2. Participants willing to participate
3. Age of experience should be minimum 5 years
4. Age- 25-45 years
5. sweet makers performing manual work

Exclusion criteria:

1. Subjects with musculoskeletal conditions like recent fractures, spinal conditions like PIVD, recent
2. surgery
3. Age of experience should not be less than 5 years
4. Participants not willing to participate

DATA ANALYSIS

The data was collected was collected on a data sheet and a master chart was prepared using Microsoft excel. The data was statistically analysed using SPSS version 28.0. Data was then plotted in form of tables. Chi square test was used for comparison of parameters and descriptive analysis was used for finding frequency of BPD and RULA score.

III. RESULTS

The study found that highest level of sweet makers of about 57.6% had intolerable pain on BPD scale. On comparison with hours of shift and arm and wrist analysis, workers with 12 hours of shift had medium risk in arm and wrist analysis($p < 0.01$). It was also found that workers who had minimum 5 years of experience had low risk in arm and wrist analysis($p < 0.01$). It was found that low level of risk was highest in 51.6% of sweet makers on RULA scale.

Table 1: Body part discomfort wise distribution of sweet makers

BPD	Frequency	Percentage		
Upper back	60	18.75		
Neck	83	25.94		
RT/LT hand	12	3.75		
RT hand	20	6.25		
RT/LT shoulder	18	5.63		
RT shoulder	26	8.13		
RT/LT upper arm	4	1.25		
RT upper arm	15	4.69		

Interpretation: highest level of discomfort was found in neck in 25.94% of sweet makers

Table 2: risk level for arm and wrist analysis

Arm and wrist analysis	Frequency	Percentage
Low risk (3-4)	142	44.40
Medium risk (5-6)	178	55.60
Total	320	100.00

Interpretation: highest level of sweet makers of about 55.60% have medium risk in arm and wrist analysis



Table 3: Comparison between age groups and arm and wrist analysis

Age groups	Arm and wrist analysis						Chi square statistic	p value
	Low risk (3-4)		Medium risk (5-6)		Total			
	Frequency	%	Frequency	%	F	%		
25-30 years	76	53.52	66	37.08	142	44.38	10.81	0.01
31-35 years	32	22.54	43	24.16	75	23.44		
36-40 years	27	19.01	50	28.09	77	24.06		
41-45 years	7	4.93	19	10.67	26	8.13		
Total	142	100.00	178	100.00	320	100.00		

Inference: <0.05 statistically significant

Interpretation: Chi square test was done for comparison between age groups and arm and wrist analysis in which association was found between them. Young sweet makers have low risk of arm and wrist analysis.

IV. DISCUSSION

Sweets or mithai is found to be an integral part of Indian culture. Any occasion or festival is considered to be purely incomplete without mithai. Depending on every state and festivals celebrated there is variety of sweets made in India. So considering the vast variety of sweets a large amount of population is engrossed in the profession of sweet making. The sweet makers are prone to repetitive movements of the upper limb and long hours of working. So musculoskeletal problems are found to be a threat to this profession due to repeated cycles of working, abnormal postures and lack of rest due to workload.

This study included 320 male sweet makers between the age group of about 25-45 years. The workers had work experience of 6-20 years and their working hours were 8-12 hours. Demographic data was collected and RULA and body part discomfort scale was used for assessment. Our study is different in regard that the other studies have aimed to evaluate work related musculoskeletal problems in different body parts in various groups of cooking professionals. In present study, we are considering upper extremity in evaluating musculoskeletal problems as this is majorly used and prone of carrying repetitive activities specifically in this profession. There are very few studies based on this population, so this profession of sweet makers was chosen for this study.

A research was done by Salleh NFM on musculoskeletal complaints and ergonomic risk factors among catering workers in Malaysia, in which it was found that their highest reported complaint was in knees in 58% of participants due to long hours of standing [10]. Our study found that highest prevalence of pain was in neck in

25.94% of sweet makers due continuous neck bending and sitting postures.

A study was carried by Mohd Asrul Ahmad on workers in food manufacturing factories in Malaysia, it was found that relationship between age and musculoskeletal disorders in manufacturing industries. ($p < 0.05$) [4]. Our research was able to demonstrate association between age and risk of developing musculoskeletal problems. It was found that younger the age, lower is the risk of developing musculoskeletal disorders. ($p < 0.05$)

A research was done by Xu and Cheng in Hong Kong on ergonomic assessment of chefs in which it was found that nearly two third of the chefs had medium risk on basis of RULA score as it included continuous standing postures [11]. In our study it was found that, majority of sweet makers, of about 51.56% had low risk of developing musculoskeletal disorders on RULA score, as most of sweet makers had to perform work in sitting postures.

A research was carried by Bijal Karelia on restaurant chefs in India the level of developing musculoskeletal risk, it was found that highest prevalence of pain was found in neck in 19.03% of participants due to continuous neck bending postures [3]. These results are similar to our results that showed highest level of pain in neck due to constant neck bending.

A study was conducted by S. Shankar on male kitchen workers, in which it was evaluated that upper limb disorders were found to be associated with age, years of experience and repetitive work. Our study was also able to establish the association between level of risk and work of experience [12]. Our study found that there was medium level of risk in arm and wrist analysis in sweet makers who were working for 12 hours ($p < 0.05$) and low level of risk in neck, trunk leg analysis for sweet makers working for 12 hours of



shift ($p < 0.05$). It was also found that younger sweet makers had low risk in arm, wrist and neck, trunk leg analysis ($p < 0.05$). Also it was found that sweet makers who had minimum 5 years of experience had low risk in arm, wrist analysis. ($p < 0.05$). Along with this it was also found that, there was no association between years of experience and neck, trunk, leg analysis ($p > 0.05$). On comparison with arm, wrist analysis and neck, trunk, leg analysis, it was found that there was no association between them. ($p > 0.05$)

A research was carried by Seri Kamat among workers in food services of cafeteria in Malaysia, in this study it was found that the RULA score was 7 in majority of participants including males and females on the basis of their working and cooking postures. The trunk posture consisted of high RULA score due to need of bending of body for performing the task [13]. In our study, it was found that medium risk was maximum on arm and wrist analysis as the sweet makers had to perform repetitive activities of upper limb.

Hence, the study concludes that there was medium risk found to be maximum in 55.60% of sweet makers on arm and wrist analysis, which tells that there is medium risk of developing upper extremity musculoskeletal problems in sweet makers. Also, the younger sweet makers had low risk of developing upper extremity musculoskeletal problems. Whereas, the workers who 12 hours of working shift had medium risk on arm and wrist analysis.

V. CONCLUSION

The results of study were able to show that there is medium risk of developing musculoskeletal problems of upper extremity as 55.60% of sweet makers had medium risk on arm and wrist analysis. Also it was concluded that, young sweet makers had lower risk of developing musculoskeletal disorders of upper extremity.

REFERENCES

- [1]. List of indian sweets and desserts. https://wikipedia.org/wiki/list_of_indian_sweets_and_desserts
- [2]. Subhashis Sahu, Subhabarta Moitra, Santi Gopal Maity. Evaluation of the musculoskeletal problems related to Occupational health of sweet makers of West Bengal. *Al Ameen J Med Sci* 2013;6(2):150-157
- [3]. Bijal J Karelia, Deepali Rathod, Ajay Kumar. Assessment of posture related musculoskeletal risks levels in restaurant chefs using Rapid entire body assessment. *International Journal of Health Sciences and Research*. Vol.11; Issue 5; May 2021. 333-339
- [4]. Mohd Asrul, Farah Ayuni Shafic, Work related musculoskeletal disorders among workers in food manufacturing factories in Hulu Langat, Selangor, Malaysia, *Malaysian Journal of Medicine and Sciences*, 2021; 74-79
- [5]. Musculoskeletal health: <https://www.who.int/news-room/fact-sheets/detail/musculoskeletal-conditions>
- [6]. Michel Aptel,ANGES Aublet Cuvelier, work related musculoskeletal disorders of the upper limb, *Joint bone spine* 2002; 5:46-55
- [7]. Premkumari, Devanand Maski, M. Veerangouda, Sunil Shirwal. Evaluation of body discomfort score of Agricultural worker during weeding Operation. *International journal of current microbiology and applied sciences*. 2018. 7(10). 365-373
- [8]. Ajay Kumar, Dr. Surendra Kamath. A study of reliability and validity of RULA against REBA among the employees operating computers in bank.
- [9]. Lynn McAtmney, E. Nigell Corlett. RULA: a survey method for investigation of work related upper limb disorders. *Applied ergonomics* 1993 vol 24(2). 91-99
- [10]. Salleh NFM, Sukadarin EH, Preliminary study of musculoskeletal; complains of ergonomic risk factors among catering workers, *Asia Pacific environmental and occupational Health Journal*, 2017; vol 3(1); 39-43
- [11]. Xu Y-W, Cheng AS, An onsite ergonomics assessment for risk of work related musculoskeletal disorders among cooks in chinese restaurant work. 2014; 48(4); 539-545.
- [12]. S Shankar, M Shanmugam, J. Srinivasan. Prevalence of upper limb disorders and investigations of risk factors among commercial kitchen male workers in South India. *Ergonomics in people. Proceedings of the International conference of Humanising work and work environment* 2015. 27-33
- [13]. Seri Rahayu Kamat, Eezsafauzia NORDIN, Investigation of musculoskeletal disorders among workers in food services (CAFETERIA), *Human factors and ergonomics journal* 2017, vol 2(3); 27-33