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Original Article

Risk Assessment of Musculoskeletal Disorders in Food Cooking Workers

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Abstract

Introduction: Employees and manual workers are prone to a variety of musculoskeletal disorders. Therefore, it is very important to assess their health status, among these workers are people who work in the self-service and kitchen areas. Objectives was determination of ergonomic status with two methods hand activity level (HAL) and manual task risk assessment (Man TRA) in personnel of food cooking workers and self- services and risk assessment of musculoskeletal disorders in food cooking workers and self-services.

Methods: By sampling, the sample size was determined and the desired checklists were completed. One of the ergonomic evaluation methods was the method of determining risk level of hand activity. This method was called HAL or Hand Activity Level. The second method was the Manual Task Risk Assessment method or Man TRA. Frequency of symptoms of musculoskeletal diseases were completed based on the examination checklist. Data analyzed with SPSS software.

Results: According to the scores obtained in the evaluations, in the HAL method, 10% of employees need to improve their working conditions. 55% were cautious. 35% did not need action. According to the scores obtained in the Man TRA method, 15% of employees need ergonomic modification of working conditions. 85% did not require ergonomic corrective action. 25% of employees had a history of musculoskeletal disorders.

Conclusion: Both methods were used in ergonomic evaluation of employees, but Man TRA method evaluated the whole body and HAL method evaluated hand ergonomics. Use of two methods was useful in related jobs.

Keywords: Assessment, Risk factor, Musculoskeletal Disorder, Health

Introduction

Employees and manual workers are prone to a variety of musculoskeletal disorders. Therefore, it is very important to assess their health status, among these workers are people who work in the self-service and kitchen areas.

Musculoskeletal disorders are among the most common disabling occupational disorders that cause disability in working people. Most disorders occur in the upper limbs, spine and lower limbs.[1,2]

Hand activity level (HAL) and Manual task risk assessment (ManTRA) are ergonomic assessment methods. HAL is focused on hand activity but ManTRA assessed upper limb, lower limb and spine.[3,4]

Many jobs and work has hazards and risks for musculoskeletal hand disorders.

Food processing and cooking industry had risks for them.

Many jobs has risks for spine, lower and upper limbs. Also, food processing and cooking industry had ergonomic factors too.

Musculoskeletal disorders are in upper limbs for example cubital tunnel syndrome, rotator cuff tendinitis, other tendinitis in fingers osteoarthritis, hand arm vibration syndrome. Musculoskeletal disorders are in lower limbs such as osteoarthritis and in spine for example disk disorders and spondylitis.[4,5]

In studies were shown the risk of food processing and cooking on musculoskeletal and ergonomic factors.[5-7] There were some researches about special food industry jobs, could be caused related disorders.[8-10]

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Ergonomic improvement was necessary and some special tools were designed.[11,12] But attention to jobs with this risks must be done for food processing and cooking workers and self services.[13,14] Ergonomic assessment is necessary for these workers. Theses workers are exposed to ergonomic risk factors for example; awkward postures, heavy lifting conditions, repetitive motions and some force by hands.

Objectives was determination of ergonomic status with two methods hand activity level (HAL) and manual task risk assessment (Man TRA) in personnel in food cooking workers and self- services and risk assessment of musculoskeletal disorders in food cooking workers and self-services.

Materials and Methods

In cross-sectional study and by sampling, the sample size was determined and the desired checklists were completed in food cooking workers and self services personnel.

Chechlists were valid and standard and used in previous studies.[1,4]

Inclusion criteria was food cooking and processing or work in self services for at least six month. Exclusion criteria was having previous musculoskeletal disorders before recent job. In the cross sectional study on food cooking workers and self services, the workers were participated concensusly. This study was done with two checklist HAL and Man TRA and physical examination chechlist too.

One of the ergonomic evaluation methods was the method of determining (risk) the level of hand activity. This method was called HAL or Hand Activity Level.

This method was done by examining two variables, first, the continuity of hand activity and scoring it from 0 to 10, and second, examining the difficulty and difficulty of the work, which was also graded from 0 to 10 too, the first was objective and the second was subjective and related to worker's senses. These scores were combined. According to this three level were determined; no action, caution and improvement was need.[1]

The second method was the Manual Task Risk Assessment method or Man TRA. In this method, total time of work, work cycle and duration of movements as repetition risk factor, work speed and force applied as exertion risk factor, awkward posture, vibration were measured and their score was determined from 1 to 5 for each of them. And finally the final score was obtained from addition of all scores. Score was more than 15, need to improvement of ergonomic factors.[4] Frequency of symptoms of musculoskeletal diseases were completed based on the examination checklist.

Data were gathered with checklists and analysed in SPSS software.

This study approved for ethics in Mashhad university of medical sciences.

Results

In this study 102 workers were participated. They worked in self services and food cooking and processing works. According to the scores obtained in the evaluations, in the HAL method, 10% of employees need to improve their working conditions. 55% were cautious. 35% did not need action. According to the scores obtained in the Man TRA method, 15% of employees need ergonomic modification of working conditions. 85% did not require ergonomic corrective action. 25% of employees had a history of musculoskeletal disorders. Table 1 shows the items in ergonomic risk assessment methods.

Table 1. The Items in Ergonomic Risk Assessment Methods

Result method	Upper limb /Hand	Spine	Lower limb	Speed of work	Continius work	Force/pressure	Posture	Vibration
Man TRA	+	+	+	+	+	+	+	+
HAL	+				+	+		
Total	+	+	+	+	+	+	+	+

The result of assessment methods were shown in table 2. In this study the results were satisfactory in both assessment methods.

Results for hands in two methods were acceptable in most of the time and result of upper limb, lower limb and spine were satisfactory in Man TRA method.

25% of employees had a musculoskeletal disorders such as; carpal tunnel syndrome, osteoarthritis in hand and wrist, Tendinitis of thumb, spine disorders in back and neck, osteoarthritis except hand and wrist and

Table 2. The Result of Assessment Methods

Result method	Acceptable	Caution	Need improvement	Total
Man TRA	85	-	15	100
HAL	35	55	10	100

Table 3. The Musculoskeletal Disorders

Musculoskeletal disorders in hand and wrist	N (%)	Musculoskeletal disorders except hand and wrist	N (%)
Carpal tunnel syndrome	7(7)	Spine disorders in back and neck	10(10)
Osteoarthritis in hand and wrist	1(1)	Osteoarthritis except hand and wrist	4(4)
Tendinitis of thumb	2(2)	Rotator cuff tendinitis	1(1)

rotator cuff tendinitis. Table 3 shows the musculoskeletal disorders in food cooking workers and self services.

Discussion

According to the scores obtained in the evaluations, according to the scores obtained in the Man TRA method, 15% of employees need ergonomic modification of working conditions. 85% did not require ergonomic corrective action. 25% of employees had a history of musculoskeletal disorders.

In the HAL method, 10% of employees need to improve their working conditions. 55% were cautious. 35% did not need action.

Results for hands in two methods were acceptable in most of the time and result of upper limb, lower limb and spine were satisfactory in Man TRA method.

In this study the results were satisfactory in both assessment methods.

HAL was assessed the hand and its activities.[1,2] It was suitable for related jobs and in rapid assessment for job hazards and risk factors assessing.

But occupational health team should not fotgotten the other organs. In cautious part must be studied carefully and assessed in the near future.

In HAL the senses of workers was required and asked [1-4] this method was subjective and objective both of them. If some workers were sensitive, it could be affected on the results of the test. It might be shown the scores more than actual scores.

Man TRA assessed whole body and it was seemed a perfect method. Upper limb, lower limb and spine were assessed and risks were diagnosed.[4]

Ergonomic improvement was necessary with improvement of job tools and environment and design.[11,12]

In other studies were shown the ergonomic risks in food processing and cooking industries.[5-7] There are better results than previous studies.

In this study results are better because of doing ergonomic protocols and attention at health of workers in recent years.

Food cooking and processing industry had many risk factors on health of workers but ergonomics was more prominent than others.

Occupational health team had duty about the ergonomics improvement in the work place. By assessing the ergonomic situation they could determined the ergonomic defects. HAL and Man TRA were two ergonomic methods but there were many ergonomic methods.

HAL was small and easy focused on hand activity but it was subjective and objective item; difficulty of work by hand was subjective item and continuing of work was objective.[1,2] Man TRA was objective and perfect method for whole body and had many items.[4] The researcher advised perfect and objective methods too.

This study had some limitation in attracting participants. It was very necessary to design the job, tools and environment according to ergonomic protocols.

By using new ergonomic tools, musculoskeletal disorders were decreased and workers could be healthy. In these jobs work stations were important too. Designing the work stations by ergonomic protocols were necessary and could be help the wellbeing protection.

Conclusion

Both methods are used in ergonomic evaluation of employees, but Man TRA method evaluates the whole body and HAL method evaluates hand ergonomics and has subjective item. Use of two methods is useful in related jobs.

Ethical Approval

The author would like to thank the Vice Chancellor

for Research of Mashhad University of Medical sciences and etical code was 4000591.

Conflict of Interest

The authors declare no conflicts of interest.

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