



Physiological workload of women workers engaged in “khakhra making industry”

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Abstract: In India, Small Scale Industries (SSI) constitutes an important and crucial segment of the industrial sector. One such industry, which offers employment opportunity to women workers, is the “khakhra making industry”. “Khakhra” which is a thinly rolled out chapattis which are made crisp over a griddle having different flavors. Originating, from the state of Gujarat, as part of Gujarati cuisine in India. The main objective of the study is to evaluate the physiological workload of women working in this industry. The experimental study was conducted in a unit of khakhra making industry in Nallasopara area of the Thane District in Maharashtra. 15 women respondent participated for the study who is engaged in 3 different tasks of khakhra making i.e. Dough making, Khakhra rolling and khakhra roasting 5 engaged in each tasks ranging from the age group of 18 -55yrs of age. Results of the study revealed that Physiological workload of the khakhra making workers was “Moderately heavy” as compared to other studies done on different occupations by Department of Resource management.

Introduction:

The world has moved towards 21st century with widespread mechanization and automation in every field but this advancement is seen more in the developed countries. In a country like India, because of its large population size and generally having low socio economic status, the use of manpower may likely persist on a larger scale in the coming decades. Most of the work force is employed in organized as well as unorganized sectors. On the other hand, there are still many jobs that must be done manually, involving physical strain.

Ergonomics is the study of work in relation to the environment in which it is performed (the workplace) and those who perform it (workers). It is used to determine how the workplace can be designed or adapted to the worker in order to prevent a variety of health problems and to increase efficiency.

In India, Small Scale Industries (SSI) constitutes an important and crucial segment of the industrial sector. The definition of Small Scale Industries varies from one country to another. In most of the countries of the world, the criterion for defining a small enterprise is related to the size of employment. The small-scale industries sector plays a vital role in the growth of the country. It contributes almost 40% of the gross industrial value added in the Indian economy.

In small scale industry where both the gender work together play an important role in employment formation, resource utilization and income generation and helping to promote changes in a gradual and phased manner. They have been given an important place in the framework of Indian planning since beginning for increasing both economic and ideological reasons. Small-scale enterprises are generally more labour intensive than larger organizations. As a matter of fact, small-scale sector has now emerged as a dynamic and vibrant sector for the Indian economy in recent years.

Though India is now considered a major manpower and is turning into a developed country from a developing country, a large section of its population still belong to the lower socio economic sector. In developing countries, great efforts are directed towards the advancement of small-scale industries as these are considered the engine for their economic

growth. According to WHO, over 1000 million people worldwide are employed in small-scale industries. The 'Khakhra making' industry is one such industry which offers employment opportunities to unskilled women worker from lower socio-economic status. In urban set up like metropolitan city Mumbai where professionally skilled workforce mainly women nowadays going for work have very little time to prepare snacks at home. As a result they depend on readymade snacks, which have given opportunity to unskilled women workers to work in such industries.

"Khakhra are thinly rolled out chapattis which are made crisp over a griddle. Khakhra is a popular teatime snack. Originating from the state of Gujarat, as part of Gujarati cuisine in India. Khakhra are uniquely hand-made and roasted to provide a delicious, crunchy and healthy snack enjoyed with a selection of pickles and chutneys. There are several varieties of khakhra such as methi (Fenugreek), jeera khakhra, punjabi masala khakhra, chilly garlic khakhra, black pepper khakhra, plain khakhra, etc."

Although such industries are identified with women empowerment in India, very often the women are forced to work in poor working conditions, long working hours, low wages, etc. As a result they suffer poor health. An awkward and static posture has been recognized as a risk factor for health problem in other occupations like construction workers, railway platform sweepers, basket makers, food grain packers, etc.

The aim of the study was to evaluate the physiological workload of women working in Khakhra making industry.

Methodology:

The present study was conducted in one unit by name "Ambika Mahila Gruh udyog" of khakhra making industry in Nallasopara area of the Thane District in Maharashtra. The female respondents having minimum 6 months of work experience and not having suffered from any major health problems were the part of the study. These women were engaged different activities like dough making, Khakhra rolling and Khakhra Roasting. Pregnant women and lactating mothers are not taken as a respondent. The women in Khakhra making industry were engaged in Khakhra making activities like dough making, Khakhra rolling and Khakhra Roasting for continuous 8 to 10 hours a day. Usually the posture adopted by most of them was sitting cross-legged on the floor without any back support. The physiological cost of work was calculated based on the heart rate readings total of 15 women workers in the study with 5 respondents in each task i.e. dough making, khakhra rolling, and khakhra roasting being performed by these respondents.

The Heart rate monitor (Model No: Polar A300) was used for documenting Heart rate. The Polar Coded Transmitter, which measures the heart's electrical activity, was fitted around the subject's chest with an elastic strap at the level of the inferior border. Initially 10 min. of rest, 10 min. of activity followed by 10 min. of recovery was documented. The Energy Expenditure and workload was calculated by using the Varghese et al (1994) formula:
Energy Expenditure (kj/min.) = $0.159 \times \text{Heart Rate (bts/min.)} - 8072$

Result:

The result of the study documented that mostly the respondents worked for 8 to 10 hours in a day in this industry to support the family income by adopting a sitting cross legged posture on floor without any back support. The average age of the workers was 34.4 years (Range 18-55yrs). The physiological cost of work was calculated using working Heart Rate while performing



the different activities like dough making, khakhra rolling and khakhra roasting. Recorded Average Heart rate values are shown in following table:

Table 1: Energy Expenditure and Physiological Workload of different activities of Khakhra making.

Activity	Dough Making	Khakhra Rolling	Khakhra Roasting	Energy expenditure	Physiological Workload
Average Resting HR	99.6 (bts/min.)	96.2 (bts/min.)	102 (bts/min.)	5.1 - 7.5 (kj/min.)	Light
Average Activity HR	107 (bts/min.)	105.1 (bts/min.)	110.6 (bts/min.)	7.6 – 10.0 (kj/min.)	Moderately Heavy
Average Recovery HR	101.1 (bts/min.)	98.2 (bts/min.)	105.1 (bts/min.)	5.1 - 7.5 (kj/min.)	Light

From the above table it is found out that in all the three different activities performed by the women their Heart rate varies. Average Resting HR for dough making is 99.6 bts/min, khakhra rolling is 96.2 bts/min. and khakhra roasting 102 bts/min. which falls between the Energy expenditure 5.1 - 7.5 kj/min. which indicates the physiological workload as "Light" followed by Average activity heart rate for dough making is 107 bts/min, khakhra rolling is 105.1 bts/min. and khakhra roasting 110.6 bts/min. which falls between 7.6 – 10.0 kj/min. which indicates the physiological workload as "Moderately heavy" and followed by Average recovery HR dough making is 101.1 bts/min, khakhra rolling is 98.2 bts/min. and khakhra roasting 105.1 bts/min. rated as the "Light".

According to workload classification as proposed by Varghese et al (1994), all the 3 different activities of Khakhra making was rated under 'Moderately heavy' during activity period.

Therefore from the results it can be concluded that khakhra making activity requires more energy as compared to their resting and recovery period.

Based on the results of physiological workload changes in work - rest patterns was proposed which would reduce the physiological workload of women workers.

Conclusion:

In the small scale industry mostly female workers are the major working force involved in different activities with different physiological workloads as reported in DRS project carried by Post Graduate department of Resource Management. In the Khakhra making industry the women worker perceived the work as "Heavy". The physiological workload for each task during activity was found to be "Moderately Heavy". Indicating that workers were working against their individual capacity and were reported of being fatigued. Hence it was recommended that work rest patterns needs modification according to the ergonomic principles. Besides allotting the tasks according to the individuals' capacity. Conclusively, it is also suggested that importance should be given to work, worker and work place in small-scale industry with respect to ergonomic considerations.

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