

Physical Fitness of Women Workers Involved in Tea Factory in Nilgiri

Gayathri Devi .M¹, Aditi Vats²

¹G.B.Pant University of Agriculture and Technology, college of Home Science, Pant Nagar, Uttarakhand, India

²G.B.Pant University of Agriculture and Technology, college of Home Science, Pant Nagar, Uttarakhand, India

Abstract: Nilgiri tea is most popular for its dark intensive flavour and aroma. In Nilgiri most of the tea factory workers are women. The role of women in tea sector cannot be ignored. Simultaneously they are doing household works and are engaged in tea sector to support the monthly income of the family. The main aim of study is to assess the physical fitness level of the women workers those engaged in tea processing activities. Forty workers from two factories were randomly selected. Physical characteristics were assessed by using BMI, Harvard step stool test and grip strength dynamometer. Majority respondents were having mesomorphic body type and their physical fitness was unsatisfactory. This can be overcome by organising nutritional awareness campaign and ergonomic intervention.

Keywords: tea factories, processing activities, physical characteristics

1. Introduction

Physical fitness is a broad term denoting dynamic qualities that allow satisfying the needs regarding mental, emotional stability special consciousness and adoptability spiritual and oral fear and organic health are consistent with heredity. Physical fitness means that the organic system of the body is healthy and function efficiently vigorous tasks and leisure activities beyond organic development, muscular strength and stamina. Physical fitness implies efficient performance in exercises **Bucher and Prentice (1985)**. It provides adequate energy to perform greater amount of work and also helps to recover from fatigue much faster. Individuals show differences in physical fitness as well as in its components, such as physical characteristics like body mass index (BMI), body type, strength, muscular endurance, cardio-respiratory endurance, flexibility etc. It is primarily dependent on the functioning of the cardio – respiratory system and the capacity of utilization of oxygen by an individual at maximal level of physical ability and is determined by the maximum oxygen intake or maximum aerobic power or aerobic capacity (VO₂ max), which is regarded as a direct measure of physical fitness.

Nilgiri tea is most popular for its dark intensive flavour and aroma. In Nilgiri most of the tea factory workers are women. The role of women in tea sector cannot be ignored. Simultaneously they are doing household works and are engaged in tea sector to support the monthly income of the family (**Hariharan and Kumar, 2014**). Therefore there should be job demand and physical fitness compatibility to improve the health status of women worker so that they can perform their activities more efficiently which will increase more productivity. Objective of the study is to measure the physical fitness of the women those who engaged in tea processing activities.

2. Material and Methods

Sample selection

Forty healthy adult women working in tea factory between

the age group of 30-60years were selected as a subject for the study. Physical characteristics were assessed by taking measurements of height, weight, BMI and assessment of body type. Physical fitness was interpreted by using physical fitness index (Harvard Step Stool test).

Body Mass Index (BMI)

Body mass index or quetelet index is the index used to find out physical fitness of the workers.

$$\text{Body Mass Index} = \frac{\text{Weight (Kg)}}{\text{Height}^2 \text{ (M)}}$$

According to World Health Organisation (WHO) if BMI is less than 18.5 under weight and may be able to indicate malnutrition, an eating disorder and health problem. If BMI is greater than 25, then is categorized as overweight and if BMI is greater than 30 it is categorized obese.

Body type:

Less than is 21.5 = Ectomorph; 21.5-25 = Mesomorph; greater than is 25=Endomorph

Physical fitness

Physical fitness of subjects were measured by using three methods

1. With the help of step stool ergo meter
2. By assessing the VO₂ max of the subject

To determine the physical fitness of selected respondent's step stool ergo meter was used. The dimension of step stool ergo meter was L× B×H: 45×30×24 cm. Prior to the test proper instructions were given and the test was properly explained. Duration of activity was 5 minutes and stepping rate was 30 steps/ minute. The transmitter of heart rate monitor was tied under the pectoral muscles nor too tight or too loose and the receiver of the heart rate monitor was tied on the wrist of respondent. Respondent was given sufficient rest and then resting heart rate was

recorded. After that the respondent was asked to perform the stepping activity on the step stool. During the stepping activity, heart rate of the subject was recorded for every one minute for a period of 5 minutes. After 5 minutes of activity the respondent was asked to sit on the resting chair and the recovery heart rate was recorded for 5 minutes at an interval of one minute. The physical fitness score was calculated by using following formula:

Physical fitness Index

$$= \text{Duration of stepping (Sec)} \times 100$$

Sum of I, II, III min recovery heart rate

Classification of physical fitness based on the physical fitness score

Physical fitness index score	Fitness category
Upto 80	Poor
81-100	Low average
101-115	High average
116-135	Good
136-150	Very good
Beyond 150	Excellent

Source: Varghese et al (1994)

Physical fitness through aerobic capacity (VO₂ ml/Kg × min.):

It is defined as the amount of oxygen consumed during rhythmic dynamic progressively increasing exercise done by any kind of ergo meter (treadmill, stationary bicycle ergo meter, hand cranking etc.) at sea level under thermally neutral condition when more muscle mass recruited then the capacity of O₂ is increased. VO₂ max was calculated by using following regression equation (Chauhan and Saha, 1999):

$$VO_2 \text{ (ml/Kg} \times \text{min.)} = 0.377 \times \text{step-stool test score (PFI)} - 12.767$$

The use of Harvard step test scores as a measure of physical fitness was strongly supported by many scientists in view of strong positive correlation being observed between physical fitness index (step stool ergo meter test) and VO₂ max (Astrand and Rhyning 1954, Astrand and Rodehl 1970, Banerjee and Saha 1970)

Level of physical fitness based on the VO₂ max

VO ₂ max(l/min)	Level of physical fitness
Up to 15.0	Poor
16.0-25.0	Low average
26.0-30.0	High average
31-40	Good
41.0-45.0	Very good
Beyond 45	Excellent

3. Results and Discussion

3.1 Physical characteristics:

Physical characteristics of women workers engaged in tea

processing activities are tabulated and in the table 1 show that the mean age of respondents was 41.42 years and mean weight was 54.35 Kg with a mean height 151.92 cm. The body mass index of the respondents was 23.41 and VO₂ max was 24.65. Borah et al 2001 found that BMI of rural women of Assam involved in the activity of sun drying of grains was 19.8 which were also in normal category. Borah and Baruah (2016) also informed that BMI of women workers involved in cashew nut industry in Meghalaya was 19.46 which also in normal category.

Table 1: Physical characteristics of women workers involved in tea processing activities

SL. No	Physical parameters	Mean ± Standard deviation
1.	Age (years)	41.42 ± 5.7
2.	Weight(Kg)	54.35 ± 9.9
3.	Height (cm)	151.92 ± 6.1
4.	BMI	23.41 ± 3.8
5.	VO ₂	24.65 ± 3.8

3.2 Body type

Further analysis of data on body type revealed that 15% of the respondents were belonged to ectomorphic (skinny appearance) body type and 50 percent of respondents were belonged to mesomorphic (well developed muscular skeletal system) and 35 percent of respondents belonged to endomorphic (body with high fat content) body type category. Kishtwaria and Aruna (2007) reported that majority of women workers had well built body type i.e. (63.3%), 33.33% had ectomorph body type.

Table 2: Body type of the respondents engaged in tea processing activities

Age group	Score	Body type	Percentage
31-45 years (n = 20)	<21.50	Ectomorphic	20
	21.50-25.0	Mesomorphic	36
	>25.0	Endomorphic	39
45-60 years (n = 20)	<21.50	Ectomorphic	10
	21.50-25.0	Mesomorphic	64
	>25.0	Endomorphic	31
Total 31- 60 years (n = 40)	<21.50	Ectomorphic	15
	21.50-25.0	Mesomorphic	50
	>25.0	Endomorphic	35

3.3 Physical fitness

Regarding physical fitness index table 3 shows that majority (65%) of respondents were belong low average category and 30 percent of respondents belonged to high average category and only 5 percent belonged the category of good. Based on VO₂ max 75 percent of workers belonged to low average category and only 5 percent of workers were having good physical fitness. Borah and Baruah 2016 found that physical fitness and BMI of the majority of women subjects was below average in cashew nut industry. When both the age group were compared it was found that the elder women's (45-60 years) were more physically fit than the middle age group women's. This also showed that none of the women in any age group

were found in very good and excellent fitness categories.

Table 3: Physical fitness of the respondents engaged in tea processing activities

PFI- Step Test (%)	Age group		Total (31- 60 years) n = 40
	(31-45 years) n = 20	(45-60 years) n = 20	
Low average	55	75	65
High average	40	20	30
Good	5	5	5
PFI-VO2 Max			
Low average	65	85	75
High average	30	10	20
Good	5	5	5

4. Conclusion

After examining the physical fitness of women workers involved in selected activity of tea processing industry can be said that the physical fitness level of respondents was unsatisfactory. It can be concluded that the physical fitness of women in involved in tea industry was unsatisfactory due to heavy work load, poor nutritional status, less resting period etc and which can be overcome by organizing nutritional awareness campaign, providing ergonomically designed tools and equipments and proper rest period.

Reference

- [1] Astrand, P.O and Rhyning, I. A. 1954 . Monogram for calculation of aerobic capacity (Physical fitness) from pulse rates during submaximal work. *Journal of Applied Physiology*, 7:218-221.
- [2] Astrand, P.O and Rodahl, K.1970. *Textbook of Work Physiology*. McGraw Hill, New York.
- [3] Banerjee, B and Saha, H. 1970. Energy cost of some daily activities of tropical male and female subjects. *Journal of Applied Physiology*. 29:203.
- [4] Borah, R and Kalita , M. 2001. Identifying drudgery prone home activities in rural areas of upper Bhahmaputra valley zone of Assam. *Stud Home Com Sci*, 5(3):165-168.
- [5] Bucher, Charles, A and William, E. Prentice. 1985. *Fitness for college and Life*, SaintLouis: Times Movis Mosby college press. 74
- [6] Borah , S and Baruah .2016. Physical fitness of women worker involved in cashew nut factory in Meghalaya. *International journal of physical education and sports health of India*.3(1):13-16
- [7] Clarke, E.H. 1971. Multipart pricing of public goods. *Public Choice*, 11:17-33.
- [8] Chauhan, M.K and Saha, P.N. 1999. Acceptable limits of physiological workload for physically active Indian women. Paper presented in the Advance Training Center in Ergonomics (Feb 22 – 24). SNTD Women's University, Mumbai.
- [9] Hariharan, N.P. and Kumar, S.S.2014. A Study On The Economic Status Of
- [10] Workers In Large Tea Estates With Special Reference To The Nilgiris District Of Tamil Nadu In India. *International Journal of Applied Business and Economic Research*.12 (3):717-727.

- [11] Shephard, R.J. 1986. Concepts of fitness and physical activity. In: *Fitness of Nation-Lessons from Canada Fitness Survey*. M Hebbelinck, R.J. Shephard (EDs.) Karger Basel Pvt. Ltd.
- [12] Varghese, M.A., Saha, P.H., Bhatnagar, A. and Choudhan, M. (1994). Development of data base for occupational workload and physical fitness status of Indian women. DSA project report SNTD womens university, BOMBAY, INDIA.
- [13] WHO: Global Database on Body Mass Index. BMI Classification. WHO website. http://apps.who.int/bmi/index.jsp?introPage=intro_3.html.

Author Profile

Gayathri Devi .M, G. B. Pant University of Agriculture and Technology, college of Home Science, Pant Nagar, Uttarakhand. Presently PhD Research Scholar, College of Home Science, Professor Jayasankar Telangana State Agricultural University, Hyderabad, Telangana.

Dr. Aditi Vats, Professor, Department of Family Resource Management, college of Home Science, G. B. Pant University of Agriculture and Technology, Pant Nagar, (U. S. Nagar) Uttarakhand.