



A study of workstation: Hostel Mess Kitchen

Swati Khatkar ^{1*}, Dr. Promilakrishna Chahal ²

¹ Student, Department of Family Resource Management, COHS, Chaudhary Charan Singh Hararyana Agricultural University, Hisar, Haryana, India

² Assistant Scientist, Department of Family Resource Management, COHS, Chaudhary Charan Singh Hararyana Agricultural University, Hisar, Haryana, India

* Corresponding Author: **Swati Khatkar**

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Abstract

Work center is a section of production facility where all tasks associated with particular process are performed. The basic idea is that any workstation, should be set up to accommodate the specific details of work performed that is to be performed there. The purpose of the study was to analyse the hostel mess kitchen. In kitchen many activities were done so, one activity was selected i.e. chapatti making for the study. All the trips and movement of the activities were studied and depicted through pathway chart. Existing condition of the work, worker and workplace of this unit was analysed. Self-structured schedule was developed to the workstation, evaluate the work, worker and workplace and to find out the problems and their solution. Findings were analysed, discussed and reported. Further improvements were also recommended.

Keywords: Workcenter, designing, ergonomic, and kitchen

Introduction

In general term hostel premises comprises of a separate dining facility for hostel residents. The hostel mess has a separate dining hall and a well – equipped kitchen catering to large numbers of students. In hostel mess there is a serving of breakfast, lunch, evening tea and dinner everyday and the weekly menu is available with mess in-charge. Hostel mess kitchen consists of different work centers. Work center is section of production facility where all tasks associated with particular process are performed. The basic idea is that any workstation, should be set up to accommodate the specific details of the work performed that is to be performed there. Work surfaces should be placed at the correct ergonomic height and made of the most appropriate materials. Ergonomic comfort in the kitchen can be achieved through appropriate design layout, comprehension of dimensional parameters and an appraisal of equipment efficiency for the use of worker. Worker have to work harder and their optimum efficiency cannot be achieved mainly because work place are not ideally designed. Hence to obtain maximum efficiency in work with least cost of the body. There should be ideal relationship between work, worker and workplace (Braton, 1992) ^[1].

In designing of kitchen human factors is also considered it is defined as the scientific discipline concerned with the understanding of interactions among humans and other elements of a system and the profession that applies theory, principles, data and methods to design, to optimize human well-being and overall system performance (Patil, 2018) ^[6]. Workplace is an important dimension that expedite the activity and exerts minimum stress on the workers. It is adequate as per the anthropometric measurements of the worker (Kaur *et al.* 2007) ^[2]. The workplace or work area especially kitchen should be adequately designed and properly arranged in order to reduce the physical, psychological and temporal cost of the worker. The planning of the kitchen area needs to be considered important place to facilitate to carry out all the activity by reducing the effects of fatigue and accidents in the kitchen.

Improper plan of kitchen area i.e., work surface, storage space, dimension of kitchen platform, distance in work centers, shape and size of the kitchen cause discomfort, become fatigue, muscular pain, bend in body posture and increasing work cost, whereas proper planned kitchen area minimizes stress, fatigue, reduced muscular pain.

Therefore workspace must get considerable attention in the designing of the layout. Tools and supplies that go with the tasks performed should be handy but not in the way. The height of the shelf force people to either raise their heels or use patra/stools to reach the shelf. Tiptoeing to reach out topmost shelves also increases human costs (Kumari and Dayal, 2009) [3]. The best and most convenient storage locations should be allocated to the tools and supplies used most frequently. Designing a workplace that adheres to ergonomic principles is a tough task, since it requires taking into account a large number of interacting and variable factors, as well as attempting to meet a large number of standards, some of which may be conflicting. In fact, the workplace components, the working people, the task requirements, the surroundings, and the working person's regular body movements and postures are all interdependent (Marmaras and Nathanael, 2006) [4].

The most basic objective of the appropriate work station or center is to ensure a smooth flow of work, material, people and information through the system. Effective work center can also utilize space efficiently, utilize labor efficiently, facilitate communication and interaction between workers, eliminate wasted or redundant movement, incorporate safety and security measures, promote product and service quality, encourage proper maintenance activities, provide flexibility to adapt to changing conditions etc. considering the importance of kitchen platform, there is need to design kitchen and ergonomically evaluation of kitchen.

Objective

- To analyse hostel mess kitchen as per human factors.

Methodology

Present study was conducted in hostel mess, Gangotri hostel, new wing, ccshau, Hisar. To study the hostel mess kitchen as per human factor. Three meals were prepared for above 200 girls daily. In meal preparation many activities were found to be done by the worker. So, I took only one activity i.e. chapatti making. The total number of worker working in a mess were found to be ten and the worker involved in chapatti making were four. The study was carried out by gathering data through observation method and the structured questionnaire. Hostel mess kitchen, worker and the workplace were analysed. Anthropometrical observations were recorded by using measuring tape. The observed data were tabulated and analysis of data were made and further improvements were recommended.

Findings and Discussion

The findings from the present study was presented and discussed below:

It is clear from table 1 that in the study of work, 70% of the work was satisfactory and the rest 30% was unsatisfactory under the areas of dough making and utensil for preparation or in the cooking area was not appropriate according to the number of students living in the hostel as they have to prepare dough for 2-3 times. Other than that number and size of the stove was estimated and compared with the total consumption of the hostel students and gas supply in work center is as per the requirement. There was availability of all the equipment and storage for chapatti making.

Table 1: Study of work

Sr. No.		Yes	No
1	Cooking area according to the workers anthropometric measurement.		✓
2	No. of stove is sufficient according to the no. of students	✓	
3	Size of the stove is according to the no. of students	✓	
4	Availability of all the equipments of chapatti making	✓	
5	Proper storage for the chapatti	✓	
6	Proper space available for the dough making		✓
7	Size of dough preparing utensil is proper		✓
8	Distance between the preparation area and serving area is suitable	✓	
9	Availability of proper dough rolling area	✓	
10	Proper gas supply in the stove	✓	
Total		7	3

It was observed from table 2 that in the study of worker, 60% of the worker was unsatisfactory because they are facing physical, psychological and environmental problem due to which there was bad impact on the health of the worker. They have to work for long hours which results in fatigue, tiredness, pain in muscles, joint pain, feeling of anxiety or loss of interest in doing activities. The work counter was not comfortable not seating arrangement was given for the worker for rest in between. Work counter was not

ergonomically fit to the worker as per the standard guidelines the counter should be below 3 inches to the elbow height of the worker. In this the height of the counter is 33 inches and the elbow height of the worker are 43,41,44,45 and 43.5 respectively. On the other hand equipment used by the workers were easy to use and handle. And the number of worker's involved in chapatti making activity were sufficient according to number of students.

Table 2: Study of worker

Sr. No.		Yes	N0
1	Worker's elbow height suitable to the work counter		✓
2	Fatigue feeled by the worker's (N)	✓	
3	Physical problem faced by the worker's (N)	✓	
4	Environmental problem faced by the worker (N)	✓	
5	Psychological problem faced by the worker (N)	✓	
6	Work counter is comfortable		✓
7	Equipments used by the worker are easy to use	✓	
8	Worker's long hour of working (N)	✓	
9	Availability of seating arrangement for worker's during work		✓
10	Sufficient no. of worker according to the no. of students	✓	
Total		7	3

N-indicates negative statement

The observation recorded from table 3 that in study of workplace it was find that 70% of the surrounding was not satisfactory. Firstly, the cleanliness and sanitation of the mess was not maintained appropriately. For ventilation there was only two exhaust fan and nine windows which were not all

open during the work so there was problem of ventilation. Normally 500 lux lighting was required for the workplace area but the lighting was not sufficient according to the area and the work.

Table 3: Study of workplace

Sr. No.	Proper/ Appropriate	Yes	No
1	ventilation		✓
2	lighting		✓
3	space	✓	
4	cleanliness/sanitation		✓
5	drainage/washing	✓	
Total		2	3

Flow of Activity

Table 4

Sr. No.	Steps involved	Time taken(min)	Quantity
1	Storage room	1	—
2	Collecting flour	1	7-8 kg
3	Taking water	2	2 litre
4	Taking salt	20 sec	5-6 tbs
5	Kneading of dough	7-8	—
6	Preparation of dough balls	}	1 hour 15 min
7	Flatten/rolling dough balls		
8	Baking chapatti		
9	Storing chapatti	}	

Pathway chart of the activity

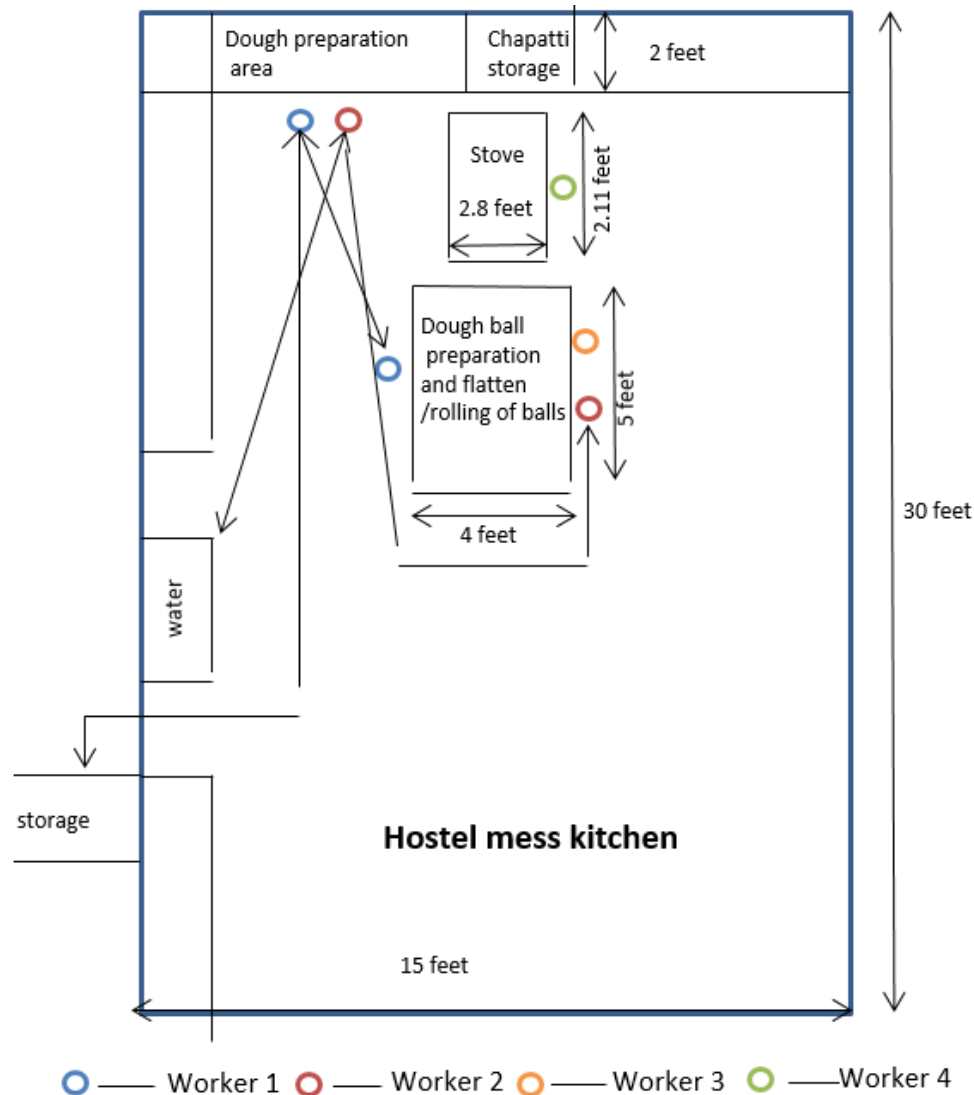


Fig 1

According to figure 1 chapatti making process were completely studied. First step in the activity was preparation of the dough, for preparation of dough seven to eight kilogram wheat flour was required as per the number of students, for collecting the flour worker 1 was gone in storage area which was away from the work center i.e. 17 feet, around two minutes was taken by the worker in collecting flour from storage area to back to the preparation area. Then water is required for kneading of the dough for taking water another worker 2 was gone, take two litre approximately and back to the preparation area in two minutes. Now salt was poured into the flour which was present on the side of the preparation area. After pouring the salt, kneading of the dough was started. Two workers were involved in dough preparation at the same place and time taken by them for complete kneading of dough was seven to eight minutes. After the kneading of the dough, dough balls were being prepared on another preparation center. Worker 1 was involved in preparing dough balls and side by side rolling/flattening of the dough balls was done, in rolling the dough balls workers 2 and worker 3 were involved. After the rolling of balls that rolled balls were put on to the stove for the baking of chapatti which is done by the 4th worker. Then the baked chapattis were

stored in the storage box which was kept on to the side slab of the stove. Around one hour fifteen minutes were taken for the preparation of dough balls, rolled them and baked them because all these three steps were done collectively. In this whole process of chapatti making 1 hour 30 minutes were involved. Therefore in this way, the whole activity was studied and further recommendation were given to them to make them comfortable

Recommended suggestions

- Recommended high height workers to uplift the area of work using suitable materials to prevent bending and distorting the body posture.
- Uplift the burners and stove with suitable base material according to the working convenience.
- Utensils cleaning washers were recommended to use big tubs for collective cleaning to prevent water wastage and bending to the low height taps.
- Use of the stool or chair in between for taking rest
- Dough kneaders were suggested to divide the work according to the slab area and prepare it separately simultaneously.
- To improve ventilation it was asked to keep all the

- windows open throughout and use table fan if possible.
- To avoid any kind of drainage problem to collect leftover food from the plates separately in a beaker in order to prevent blockage while washing.
- Workers were recommended to increase the length of tongs and slotted spoon according to their convenience and use in suitable length rods.
- For sanitation they were asked to use gloves and caps.

Conclusion

To ensure enhanced work efficiency of hostel mess kitchen design has to be developed on the basis of the ergonomic principle & anthropometric measurement of the worker. The result of the present study will be used to understand and improve the work, worker and workplace relationship to have healthy and safety of workers. This will help to minimize physical and energy cost of worker to improve work efficiency, reduce the stress on worker and to provide better working environment.

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