



Study Of Kitchen Design As Per Anthropometry Of User

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ABSTRACT:

The present study was conducted to evaluate kitchen design and studied of one activity i.e. tea making activity. In this activity we studied the user movement and problem's faced during activity. This is done through help of questionnaire and observation method. Workstation should be available according to user to reduce any physical and mental problem. If kitchen workstation is as per users anthropometric measurements that reduce movements from one place to another and activity done on proper time. During this study it was found that the user face problems while grasping things from shelf due to height of storage shelf and the storage shelf as per user reach is available.

Keywords: counter, storage shelf, kitchen, reach of user, anthropometric measurements.

Introduction:

Kitchen workstation is enclosed section or area in which edible food ingredients are bought together gathered combined through proper processing and cooked by various means of cooking method for consumption. Tea making is also part of kitchen workstation. Tea, the most popular beverage consumed by two-thirds of world's population. Drinking tea has been considered a health promoting habit since ancient times. The design of kitchen, storage furniture has impact of the strain, time and effort of the home makers. The homemaker spend lot of money in making more functional, comfortable and presentable which are earlier in clutter of food supplies and utensils (Gupta and Pandya, 2019).

Study of kitchen workstation is done to reduce health issues for user and to suggest ideas for reducing movements, to simplify work for user. A national survey shows that on average, an Indian women spends approximately 3.2 hours a day in kitchen for cooking and cleaning utensils (Johari, 2015)

Indian kitchen are well known for their design aspects. Indian woman spend majority of their time in kitchens either for preparing meals which include washing and cutting vegetables, preparing other food items and cooking, washing utensils, cleaning other household products. Hence, the homemaker tries to design the kitchen according to her comfort and requirements. It can be in terms of height of kitchen counter, storage space, placement of food and cooking equipment's etc. In spite of many changes in the design aspect and kitchen equipment's can lead to ergonomic issues caused by the improper kitchen design. (Lakshmi and Paul 2022) Gilbreth referred to the L-shaped layout as "circular routing" which later came to be called the kitchen work triangle. A specific model was developed in the 1940s to address the efficiency of the kitchen space between the major work centers: Cooking (range), Preparation (sink/dishwasher) and Food Storage (refrigerator). It was designed to maximize the efficiency of a one-cook kitchen that stemmed from Taylorist principles that had to do with time-motion studies from around the turn of the century (Alexendra 2016).

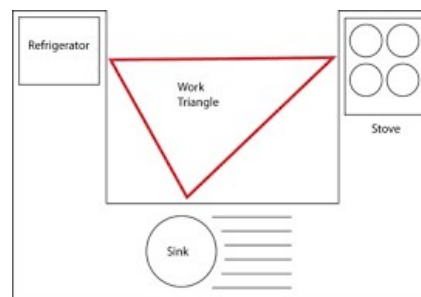


Fig. kitchen triangle

Ergonomics in the kitchen also means positioning your dishwasher or cooker not directly on the ground, but rather at reaching height in the tall units. This will make it easiest to operate the appliances without having to strain your back. As applied to kitchens, ergonomics looks at the way a kitchen should be designed to optimize movement during meal preparation and clean up and minimize the stress on the human body while performing everyday kitchen activities (Rymala mathen 2011). Suppose the user in a kitchen is working on a worktop that is too low or too high. In that case, it causes that person to stand in a wrong way for a prolonged time, causing all sorts of problems such as back pains, neck pains, and various spasms throughout the body, making them very uncomfortable (Tehrani, 2012). The amount of time spent in the kitchen activity, the type of kitchen, the ergonomic benefits utilized by the homemakers in the kitchen are all critical factors to be considered for the well-being of the homemakers (Sultana and Prakash, 2013).

Objectives:

1. To analyse the kitchen as per anthropometry of women.

Methodology:

The present study will be carried out in hisar district, Haryana state. One standing kitchen was analysed for the study, as we all know that many activities are done in kitchen from preparing to cooking. So, I took tea making activity for the experiment. Study was carried out to see the movements of women and problems faced during activity by gathering data through observation method and well structured questionnaire. Work, worker and workplace were analysed. Anthropometric measurements were recorded. The observed data were tabulated and further improvements were recommended.

Anthropometric measurements of user:

Height of user	63inch
Elbow height	38 inch
Normal reach	63 inch
Maximum reach	67 inch

Kitchen dimensions:

Kitchen size	8ft * 8ft
Storage shelf	68 inch
Stove counter	34 inch

Results and findings:

In table 1, work and workstation was studied, kitchen size is studied which is small according to women. Work counter is at appropriate height (34inch) as per elbow height of women(38inch).storage area is not at height of user (68inch). Refrigerator is outside from the kitchen, which increase the movement of women.User was moving to be 3-4 times to take things from kitchen during tea making.Lighting, ventilation, water supply is proper at workplace.

Study of work and workstation:

Table 1:

	Yes	No
Counter height as per anthropometry of women	Yes	
Distance between different centres appropriate		No
Storage counter height according to user		No
Proper movement space	Yes	
Proper ventilation	Yes	
Proper lighting	Yes	
Proper water supply	Yes	

Study of worker:

In table 2, worker was studied, height of worker is 5'3feet. Workers elbow height is 38inch which is suitable for work counter used by her. User's maximum reach is 67inches, which is not suitable according to storage counter. While grasping things from storage area user has to lift her feet up to 4inches from normal reach. User has to face physical problem while grasping things from storage area.

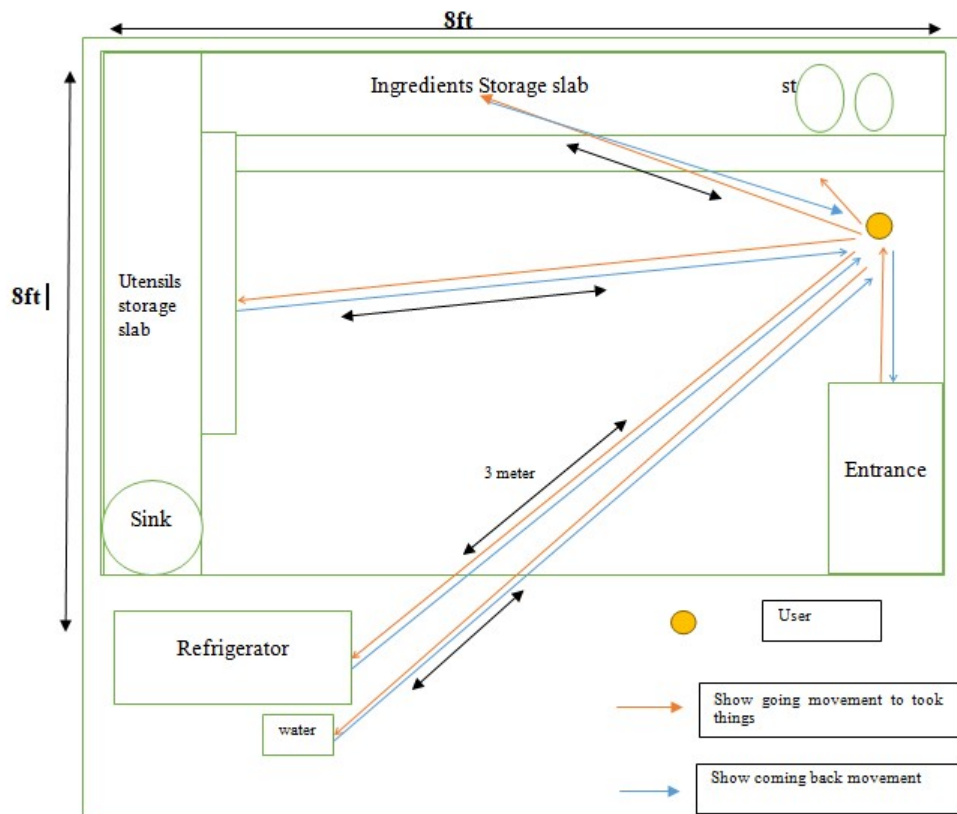
Table 2:

	Yes	No
Workers elbow height suitable to work counter	Yes	
Workers maximum reach suitable to		No

storage counter		
Work counter is comfortable	Yes	
Equipment's use by worker easy to use	Yes	
Physical problem faced by worker	Yes	

Trips and Motion of activity:

S.no	
1	user enter in kitchen
2	Took the utensil from (utensils storage shelf)
3	Took water from outside kitchen
4	Turn on the flame of stove
5	Took tea and sugar from (ingredient storage shelf)
6	Took ginger from refrigerator
7	Took milk from refrigerator
8	Going back to put milk and ginger in refrigerator
9	Took cup from (utensils storage shelf)
10	Took sieve from (stove counter)

Existing condition of kitchen and user movements in metres

According to fig. 1, size of kitchen is 8*8ft. It was found that the user firstly travels for taking utensil from (utensil storage shelf) which was at distance of 1.5 meter from stove counter. Then user travel 3.1 meter to take water (outside kitchen) and 0.5 meter to take tea and sugar from ingredient storage shelf. Then travel 3 meter to take milk and ginger from refrigerator (outside kitchen). In this fig. we sees that user's movement is increased and also time for activity.

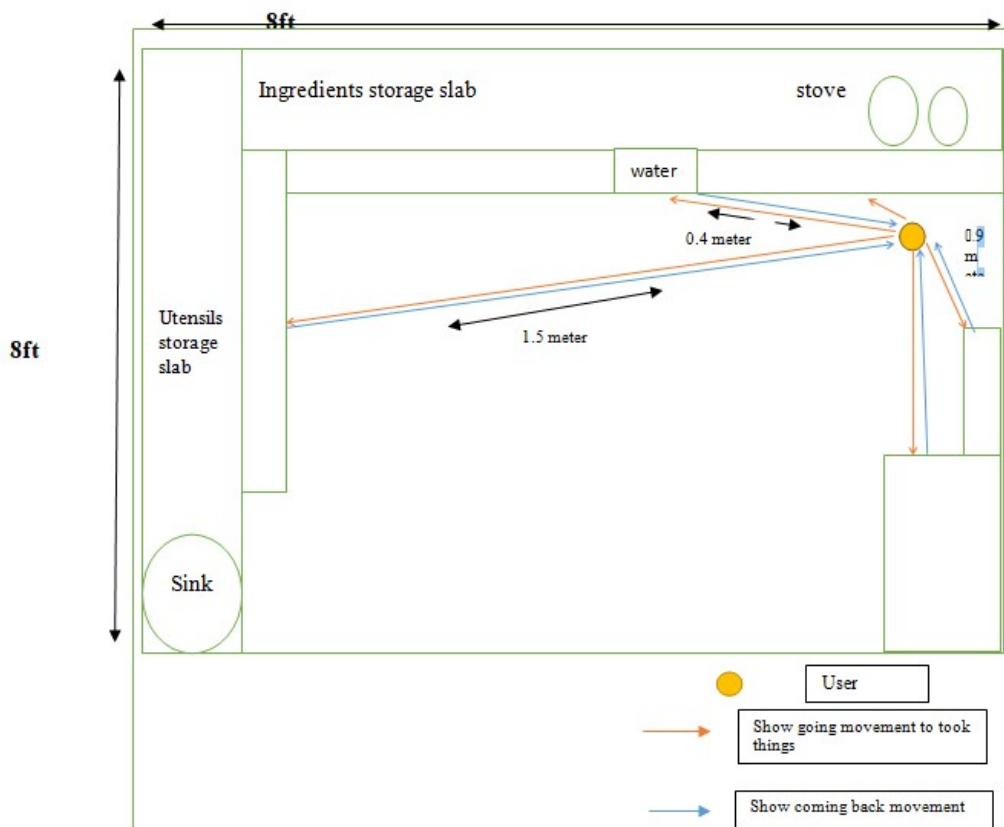
Findings:

- Work counter area is suitable to according anthropometry of user.
- Storage area for ingredients is not at proper height.
- Refrigerator is outside from kitchen which effects the movement of user.
- Size of kitchen is small.
- Worker face difficulties grasping things from storage area.

Suggestions:

- Store ingredients which are used twice or thrice in a whole day according to her easy reach near work counter as compared to storage area to reduce physical problems for grasping things.
- Researcher suggest her that the storage counter height is according to maximum reach of her to easily see, reach or grasp things to reduce energy consumption.
- To buy stand for storing daily useable items near work counter.
- Placement of refrigerator within kitchen.
- She can use trips to reduce movement.
- Follow principles of storage.

After suggestions user movement in kitchen:



As per fig. 2, it was found that User travel 0.9 meters for refrigerator and 0.4 for water. After suggestions user travel less distance, which reduces time taken and movement, also work is easily done without extra movement.

Conclusion:

We conclude that the study of kitchen workstation during tea making activity is done to reduce health issues for the user. So we analyse the work, worker, workplace and existing condition of workstation, anthropometric measurements of user. From this we learn that the movement of user is important regarding the workstation and proper storage area should give that help the user for better working place and environment, Benefit regarding mental and physical activity in kitchen.

References:

1. Johari, A. 2015. Will a government study confirm what we always knew: Indian women work more hours than men. Gender inequality. <https://scroll.in/article/702430/will-a-governmentstudy-confirm-what-we-always-knew-indian-women-work-morehours-than-men>. Last accessed on 16th December 2020
2. Lange, Alexandra (2012-10-25). "The Women Who Invented the Kitchen". Slate. ISSN 1091-2339. Retrieved 2016-9-20
3. Mathen. R (2011). "Application of ergonomics in kitchen designing- Indian perspective, *LPN Lambert Acad. Publ*, 2011 -248pages
4. Tehrani, M.M. 2012. The Role of Technology in Providing the Efficiency of Kitchen Design. Master of Science in Architecture. Eastern Mediterranean University Gazimağusa, North Cyprus
5. Sultana, S. and Prakash, C. 2013. Benefits of using ergonomic kitchen designs for today's homemaker. *Golden Research Thought*, 3(6): 1-7.
6. Gupta, N. and Pandya, E. 2019. Assessing Modular Kitchen through an
7. Ergonomic Lens: A Case Study. International Journal of Engineering Science Invention (IJESI). 8(08):64-72
8. Gupta, N. And Pandya, E. 2019. Assessing Modular Kitchen through an
9. Ergonomic Lens: A Case Study. International Journal of Engineering Science Invention (IJESI). 8(08):64-72
10. Gupta, N. And Pandya, E. 2019. Assessing Modular Kitchen through an
11. Ergonomic Lens: A Case Study. International Journal of Engineering Science Invention (IJESI). 8(08):64-72
12. Gupta, N. and Pandya, E. 2019. Assessing Modular Kitchen through an
13. Ergonomic Lens: A Case Study. International Journal of Engineering Science Invention (IJESI). 8(08):64-72
14. Gupta, N. and Pandya, E. 2019. Assessing Modular Kitchen through an
15. Ergonomic Lens: A Case Study. International Journal of Engineering Science Invention (IJESI). 8(08):64-72
16. 13. Gupta, N. and Pandya, E. 2019. Assessing Modular Kitchen through an
17. Ergonomic Lens: A Case Study. International Journal of Engineering Science Invention (IJESI). 8(08):64-72
18. Gupta, N. and Pandya, E. 2019. Assessing Modular Kitchen through an Ergonomic Lens: A Case Study. International Journal of Engineering Science Invention (IJESI). 8(08):64-72.
19. V. Vijaya Lakshmi and M. Milcah Paul. 2022. Rural Kitchen Design: A Case Study. Current Journal of Applied Science and Technology. 41(2): 36-43.