

Ergonomic evaluation of rural and urban kitchen design of Muzaffarpur district in Bihar

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■ **ABSTRACT** : Ergonomic designed kitchen has become the need of almost all the women keeping into consideration their multifarious activities. Ergonomics contributes to designing and evaluation of task, products, environment and system in order to make them compatible with the needs, abilities and limitations of homemakers. Besides most of the women are not aware of ergonomic design of kitchen. Keeping these rational in mind the study was conducted in Muzaffarpur district of Bihar State. The main purpose of this research is to evaluate the various kitchen design in both rural and urban areas for work effectiveness. Various parameters viz., physiological, cardio-vascular, energy expenditure and perceived exertion were taken for ergonomic evaluation of kitchen design. The study analysed the working counter i.e. counter height, counter width, counter depth and kitchen size. The analysis of results indicated that a majority of respondents (40%) had their kitchen size 10 x12 feet to 12 x14 feet in rural areas, while in urban area maximum respondents (50%) possessed their kitchen size below 6x8 feet which is smaller than the standard size (8 x10 feet) of the kitchen. In case of rural areas a large majority of respondents (90%) had their open shelves for their storage provisions which needs improvement in kitchen design, while in urban area respondents (66.70%) had cupboards for storage of items in their kitchen. In rural area maximum respondents (80%) had their cooking counter height between 15- 45 cm and in urban area only half of the respondents had their cooking counter height 15-45 cm. In rural area's majority of respondents (40%) had their cooking counter width between 15-25 cm, whereas in urban area maximum respondents (43.30%) had their cooking counter width 85-125 cm.

■ **KEY WORDS**: Ergonomics, Work effectiveness, Kitchen size, Storage, Cooking counter

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Ergonomic designed kitchen designed has become the need of almost all the women keeping into consideration their multifarious activities of the women. Ergonomics contributes to designing and evaluation of task, products, environment and system in

order to make them compatible with the needs, abilities and limitations of homemakers. Besides most of the women are not aware of ergonomic design of kitchen due to which the functional design of kitchen especially in rural areas is poor, leading to affects the homemaker's

health. This is supported by the findings of Verma (2001) who studied on kitchen as a work places and reported that functional aspect of kitchen designs were neglected in both rural and urban areas and (Kumari and Dayal, 2009) Poorly designed kitchen work surfaces and spaces causes permanent body damage of the worker. The storage shelves were also found beyond the comfortable reach of homemakers leading to undue bending, stooping and stretching of body.

The environmental conditions were also observed above the comfortable limits, making the homemaker very uncomfortable during performing the kitchen work.

Now these days almost all the homemakers are actively involved in multipharious activities right from their household responsibilities to economic activities. Thus they need to simplify their household activities with the implication of ergonomic principles in designing their kitchen, so that the homemakers can correct and suitable work posture while doing various activities in their kitchen. Hence, they will perform other important activities for the welfare of their family.

■ RESEARCH METHODS

Study was conducted in Muzaffarpur district of Bihar state. Out of which two blocks namely Bandra Bock and Musahri block were randomly selected. From each block Ratwara village as rural area and Bhagwanpur city as urban area to make comparative study of rural

and urban areas kitchen design. Further, 30 female respondents from both the rural and urban areas were selected for conducting research. The various anthropometric data *viz.*, height, weight, BP, pulse rate etc. were recorded with the use of appropriate tools and machines.

■ RESEARCH FINDINGS AND DISCUSSION

The results obtained from the present investigation as well as relevant discussion have been summarized under following heads :

Dimensions of cooking counter in rural and urban kitchen:

The analysis of data in Table 1 indicated the information regarding kitchen size, cooking counter dimensions *i.e.* height, width depth of of selected of respondent's kitchen in rural and urban area.

Counter's height:

The information pertaining to cooking counter height shows that majority of respondents (65%) had their cooking counter height of 15-45 cm followed by the respondents (25%) had their cooking counter height 45-65 cm and only 10 per cent had their cooking counter height 65-85 cm irrespective of different selected area. In rural area maximum number of respondents (80%) had their cooking counter height between 15- 45 cm. While in case of urban area half of the respondents (50%) had their cooking counter height 15-45 cm.

Table 1 : Dimensions of respondent's kitchen and cooking counters in rural and urban area						(n=60)
Sr. No.	Dimensions	Categories	Rural (30) (F and P)	Urban (30) (F and P)	Total (F and P)	
1.	Counter's height (cm)	15-45	24 (80.00)	15 (50.00)	39 (65.00)	
		45-65	6 (20.00)	9 (30.00)	15 (25.00)	
		65-85	--	6 (20.00)	6(10.00)	
2.	Counter's width (cm)	25-65	11 (36.70)	08 (26.70)	19 (31.70)	
		65-85	11 (36.70)	9 (30.00)	20 (33.30)	
		85-125	8 (26.60)	13 (43.30)	21 (35.00)	
3.	Counter's depth (cm)	15-25	12 (40.00)	--	12 (20.00)	
		25-35	10 (33.40)	6 (20.00)	16 (26.70)	
		35-55	8 (26.60)	24 (80.00)	32 (53.30)	
4.	Kitchen size	Below 6x8 feet	10 (33.30)	15 (50.00)	25 (41.70)	
		6x8 to 8x10 feet	5 (16.70)	8 (26.70)	13 (21.60)	
		10x10 to 12x14 feet	12 (40.00)	3 (10.00)	15 (25.00)	
		Above 12x14 feet	3 (10.00)	4 (13.30)	7 (11.70)	

Counter's width:

In case of rural area majority of respondents (43.30%) had their cooking counter width was 85-125 cm. whereas in urban area maximum number of respondents (36.70%) had their cooking counter width was 65-85 cm.

Counter's depth:

The data regarding counter's depth revealed that a large majority of respondents (80%) had their cooking counter depth 35-55 cm. While in urban area majority of respondents (40%) had their cooking counter depth 15-25 cm. These findings were more or less similar to the Steidl's report (1968), who have 30-32 inches (76-81) cm, width 36-40 inches (91-102) cm and depth from 24-27 inches (61-69) cm.

Kitchen size (Feet) :

On overall basis that majority of respondents (41.70%) had their kitchen size below 6 x 8 feet followed by the respondents (25%) had their kitchen space (10 x 12 to 12 x 14 feet) whereas in urban area respondents (21.60%) had their kitchen and very few women (11.70%) had their kitchen space above 12x14 feet. In case of rural area maximum respondents (40%) had their kitchen size of 10x 12 to 12x14 feet and minimum number of kitchen size (10%) was found above 12x14 feet. While in urban area fifty per cent respondents reported that they had their kitchen size below 6x 8 feet. The analysis of results highlighted a very few respondents had their that only (11.70%). Standard size of kitchen *i.e.* 8x10 feet which requires changes in kitchen size to perform

efficiency.

Storage provision in rural and urban respondents kitchen:**Storage:**

Table 2 indicates the information regarding kitchen storage provision in the form of cupboards or open shelves. The overall data highlighted that majority of respondents (78.30%) were having their open shelves for storage provision in their kitchen and 21.70 per cent respondents were storing kitchen items in cupboard. In case of rural area majority of respondents (90%) had open shelves for storage provisions while in urban area (66.70%) respondents had cupboards for storage of items in their kitchen.

Shelves height :

The information pertaining to Shelves height shows that the majority of respondents (63.33%) had their shelves height of 39-53 cm followed by the respondents (25%) had their shelves height 25-39 cm and only 11.70 percent respondents had their shelves height 11-25 cm. In case of rural area maximum number of respondents (76.70%) had their shelves height 39-53 cm. Whereas in urban area fifty per cent of respondents were their kitchen shelves height 39-53 cm.

Shelves width:

In case of rural area maximum number of respondents (83.30%) were working with shelves width of 100-165 cm. While in urban area majority of respondents (60%) had shelves width of their kitchen

Sr. No.	Characteristic	Categories	Rural (30) (F and P)	Urban (30) (F and P)	Total (F and P)
1.	Storage	Open shelves	27 (90.00)	20 (66.70)	47 (78.30)
		Cupboards	3 (10.00)	10 (33.30)	13 (21.70)
2.	Shelves height (cm)	11-25	2 (06.70)	3 (10.00)	7 (11.70)
		25-39	5 (16.60)	12 (40.00)	15 (25.00)
		39-53	23 (76.70)	15 (50.00)	38 (63.30)
3.	Shelves width (cm)	45-100	25 (16.70)	18 (60.00)	43 (71.60)
		100-165	5 (83.30)	10 (33.30)	15 (25.00)
		165-200	--	2 (06.70)	2 (03.00)
4.	Shelves depth (cm)	20-40	23 (76.70)	27 (90.00)	50 (83.30)
		40-60	7 (23.30)	3 (10.00)	10 (16.70)
		60-80	--	--	--

was 45-100 cm.

Shelves depth:

Data indicated that in case of rural area majority of respondents (76.70%) had of their shelves depth was 20-40 cm, whereas in urban area maximum number of respondents (90%) had their shelves depth of was 20-40 cm.

These findings are substantiated with Vinay and Chaudhary (2005) who also found that the height of the top shelves was not within the maximum reach of the user. Approximately 27.33 per cent respondents have to raise their heels to reach the top shelves and some time they have to use patra or stool to store items.

Conclusion:

It can be concluded that a clear-cut differences was found in rural and urban area's kitchen design particularly in storage provision and also in the dimension of cooking counter cupboard should be preferred and top shelves height need to changed to as it should be within maximum reach of the users. Women can contribute much more works in efficient kitchen and they can justify their roles

in household activities. This would facilitate comfort and easy in reaching and performing the various kitchen activities while provide easy mobility leading to save their efforts. This would also minimise many postural problems.

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