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The ergonomic perspective of the homemakers in using kitchens

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■ **ABSTRACT :** Ergonomic plays a vital role in designing a kitchen area free from fatigue, reduction of unnecessary movements and excessive expenditure of human energy and time. The perception of giving importance to the kitchen at the time of building a home is changing drastically. The main aim of the study was to analyse the usage of ergonomically designed kitchens among the home makers in Chennai. Ex post facto research design was used for this study. A sample of 1000 homemakers from Chennai city were randomly selected for survey with 500 using ordinary and 500 using modular kitchens. Questionnaire was used to collect the information from the home makers and the data were collected, tabulated and analysed statistically. Statistically significant association was observed between the ergonomic benefits in the kitchen and the characteristics of the home makers like education, employment status and the type of kitchen used at p <0.01 level of significance, because as the level of education increased the homemakers adopting to the use of modular kitchens also increased due to more knowledge and awareness on the use of ergonomically designed kitchens.

■ **KEY WORDS:** Ergonomic perspective, Homemakers, Kitchen

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A good ergonomic kitchen design must put physical, cognitive and organizational ergonomics into consideration. Ergonomic and human factors use knowledge of human abilities and limitation to design system for safe, efficient and comfort human. The kitchen is the central core of each and every homemaker. Adequate knowledge in space is especially important where a homemaker is dealing with cupboards, shelves and the other storage areas. The recommendations for reach levels is an important consideration because it can lessen the stress on the various muscles. Reach levels include the efficient reach levels of the homemakers, without undue strain to the legs, hands and back of the homemakers (Prasad, 2006).

A kitchen is a functional part of any household and it should be seen as the heart of the house. The interior spaces of buildings are designed as places for human movement, activity and respose. There should be a fit between the form and dimensions of interior spaces and our own body dimensions. Our body movements are the vital aspect on how a kitchen should be designed for a homemaker. The dimensions would result on how we reach for something on a top or bottom shelf, perform work, sit down at a table or lean against any space (Pheasant, 2001).

The Indian kitchens are reshaping today as cosmopolitan population embraces a modern consumption fueled lifestyle. The type of food that is consumed has also changed. Kitchens in India are as varied in as Indian food and culture. Each kitchen is fine tuned towards meeting the needs of the local food preparation. Cooking style depends on regional food type, community, taste preference, weather, geography etc. Most of the Indian foods require elaborate pre- processing. Whether the food is spicy and concentration is on making food tastier and spicy. With modern food processing appliances in hand, the task has become simpler for most of the urban ladies in kitchen (Jhamb, 1991).

In the modern world, the role of women goes much beyond the barriers of the home. A women is said to be a pivot of the family and basic unit of physiological change in any society. Homemakers play many roles in their daily lives and they also make themselves ready to meet many demands

(Sinha,1987).

Ergonomic kitchen spaces are another great way to save time and energy. Kitchen requires a lot of body mechanics to complete the activities. Accordingly, an efficient ergonomic kitchen space requires to ease the stress in looking out for utensils and ingredients in the kitchen. The completion of early work would reduce fatigue (Mahoney, 2009).

Objectives of the study:

–To compare the kitchen details and the reasons for the usage of ordinary and the modular kitchen by the homemakers.

–To understand the different equipments used in the ordinary and modular kitchens by the homemakers.

–To analyse the ergonomic benefits utilised in the kitchens by the selected homemakers.

■ RESEARCH METHODS

Purposive sampling technique was used for the study. A sample size of 1000 homemakers of which 500 were using ordinary kitchens and 500 were using modular kitchens were randomly selected from Chennai. Questionnaire was used to collect the information from the samples. The data were collected and interpreted for statistical analysis.

■ RESEARCH FINDINGS AND DISCUSSION

The kitchen details of homemakers using ordinary and modular kitchen were computed using percentage analysis and Chi- square test and the results are presented in Table 1.

Table 1 : Kitchen details of homemakers using ordinary and modular kitchen

Sr. No.	Kitchen details	Ordinary kitchen		Modular kitchen	
		N	%	N	%
	Area of kitchen**				
1.	10 x8 ft	263	52.6	11	2.2
2.	10 x12 ft	237	47.4	123	24.6
3.	10 x 15 ft	0	0	366	73.2
	Kitchen attached				
1.	Store room	26	5.2	201	40.2
2.	Dinning room	86	17.2	195	39.0
3.	Open ended	388	77.6	104	20.8
	Shape of kitchen				
1.	Straight line	204	40.8	13	2.6
2.	U- Shape	67	13.4	202	40.4
3.	L- Shape	156	31.2	28	5.6
4.	Island kitchen	29	5.8	197	39.4
5.	Double walled	44	8.8	60	12.0
	Members using kitchen				
1.	Home makers	280	56.0	184	36.8
2.	Home makers/ family members	145	29.0	28	5.6
3.	Home makers/ cook	50	10.0	178	35.6
4.	Cook	25	1.0	110	22.0

**Area of kitchen and type of kitchen ; χ^2 =63.96; p<0.01

Area of the kitchen:

Nearly 52.6 per cent of the homemakers using ordinary kitchen had of 10 x 8 ft as the size for their kitchen and 73.2 per cent of the modular kitchen users had 10 x 15ft as the size of their kitchens. The other sizes of the kitchens used by the homemakers included 10 x12 ft. Statistically significant association was observed between the area of the kitchen and the type of kitchens used by the homemakers at p<0.01 level (¡ ^{2}=63.96).

Kitchen attachment:

It could be noted from the table that ordinary kitchen users (77.6%) had open ended kitchens and 40.2 per cent of the homes of modular kitchen had their kitchens attached with store room and 39 per cent attached with dining room.

Shape of kitchen:

Almost 40.8 per cent of the homemakers using ordinary kitchen had only straight lined kitchen and 40.4 per cent and 39.4 per cent of the homemakers using modular kitchens had U shape and Island shaped kitchens followed by other homemakers who had L shape and double walled kitchens.

Members using kitchens:

Fifty six per cent of the homemakers using ordinary kitchens used their kitchen by themselves while only 37 per cent of the modular kitchen homemakers were using their kitchens themselves.

Reasons for using ordinary kitchen or modular kitchens given by the homemakers:

Percentage analysis was used to compute the reasons given by the homemakers for their kitchen usage which is presented in Table 2.

There was a difference in the reasons given by the homemakers for using ordinary and modular kitchens. Nearly 82 per cent of the ordinary kitchen users cited that their kitchens are easy to use and there is floor space for two people in the kitchen and around 69 per cent were using ordinary kitchen as it is cheap. Almost 51 per cent of the homemakers were finding ordinary kitchen easy to maintain.

Regarding the modular kitchen using homemakers, majority (92 %) of them found their kitchens are costly and nearly 91 per cent of the homemakers felt that more electronic appliances could be used. Around 90 per cent of the homemakers had more cabinet space and floor space for more than 2 people in their kitchens. The modular kitchen users (85 %) used their kitchens as a mark of high status which was not the case of ordinary kitchen users.

Table 2 : Reasons for using ordinary /modular kitchen by the homemakers

Sr. No.	Reasons for using kitchen	Ordinary kitchen		Modular kitchen	
		N	%	N	%
1.	Cheap	347	69.4	-	-
2.	Easy to use	410	82.0	363	72.6
3.	Easy to maintain	258	51.6	115	23.0
4.	High status	-	-	425	85.0
5.	Pest can be controlled easily	143	28.6	351	70.2
6.	Use of more electronic gadgets/appliances	15	3.0	457	91.4
7.	More cabinet space	125	25.0	451	90.2
8.	Flexible to use	181	36.2	394	78.8
9.	Designed well	29	5.8	319	63.8
10.	Costly	13	2.6	462	92.4
11.	Floor space for only 2 people	412	82.4	93	18.6
12.	Floor space for more than 2 people	24	4.8	451	90.2

% exceeds 100 due to multiple responses

Equipments used inside the kitchens by the homemakers:

There are varieties of equipments used by the homemakers inside the kitchen premises depending upon the area of kitchen and the number of equipments used has to coordinate with the different shapes of the kitchen built. Percentage analysis was used to compute the different equipments used inside the kitchen premises and the results are presented in Table 3.

Table 3 : Equipment used inside the kitchen premises by the homemakers

Sr. No	Equipment used	Ordinary kitchen		Modular kitchen	
		N	%	N	%
1.	Mixie	500	100	500	100
2.	Grinder	181	36.2	175	35.0
3.	Micro wave oven	150	30	500	100
4.	Refrigerator	52	10.4	357	71.4
5.	Water purifier	37	7.4	500	100
6.	Electric chimney/exhaust fans	264	52.8	500	100
7.	Food processor	12	2.4	175	35.0
8.	Electric cooker	311	62.2	500	100
9.	A/c	-	-	357	71.4
10.	Dish washer	-	-	15	3.0

% exceeds 100 due to multiple responses

Differences could be noted on the equipments used inside the kitchen premises from the users of both the kitchens. Cent per cent of the homemakers using both the kitchens has space provision for mixie inside the kitchen premises. Cent per cent of the modular kitchen users had more space for almost all the labour saving devices like microwave ovens, water purifiers, electric chimneys and electric cookers. Comparison with the ordinary kitchen users showed less amount of space provision for keeping most of labour saving devices by the homemakers.

Ergonomic benefits used in kitchens by the homemaker:

Percentage analysis was used to compute the ergonomic benefits utilised in the ordinary and modular kitchens by the homemakers and the results are presented in Table 4.

It is evident from Table 2 that cent per cent of the

Table 4 : Ergonomic benefits used in kitchens by the homemakers

Sr. No.	Ergonomic benefits	Ordinary kitchen		Modular kitchen	
		N	%	N	%
1.	Ventilation	158	31.6	90	18.0
2.	Natural lighting during day time	49	9.8	65	13.0
3.	Temperature / humidity control	264	52.8	500	100.0
4.	Sound absorption effect	15	3.0	75	15.0
5.	Cabinet or shelf-space	158	31.6	500	100.0
6.	Counter space for working	75	15.0	348	69.6
7.	Space for storing all the essential ingredients in the work area	50	10.0	500	100.0
8.	Space for keeping labour saving devices	115	23.0	500	100.0
9.	Sink space for washing/drying utensils	198	39.6	378	75.6
10.	Space for movement	58	11.6	348	69.6
11.	Reach level for storage	75	15.0	398	79.6

% exceeds 100 due to multiple responses

Table 5 : Relationship between ergonomic benefits in the kitchen and the homemakers

Details of the home makers	Ergonomic benefits in the kitchen				Chi-square value	Level of significance
	Yes		No			
	N	%	N	%		
Educational level						
Below X	65	38.9	102	61.1		
X Std.	75	46.9	85	53.1		
XII Std.	95	52.8	85	47.2	8.927	p<0.01
U.G.	142	48.6	150	51.4		
P.G.	81	50.3	80	49.7		
Professional degree	21	52.5	19	47.5		
Employment status						
Working	423	53.2	372	46.8	5.072	p<0.01
Non- working	91	44.4	114	55.6		
Type of kitchen used						
Ordinary	161	32.2	339	67.8	147.572	p<0.01
Modular	353	70.6	147	29.4		

modular kitchen users had more ergonomic benefits like temperature control measures, cabinet /shelf-space, space for storing all ingredients and labour saving devices. When observing the table, it could be seen that the ordinary kitchen users had less ergonomic benefits when compared to homemakers using modular kitchens. Nearly 52 per cent of the ordinary kitchens had temperature and humidity control measures like exhaust fans in their kitchens and 39.6 per cent of the ordinary kitchen users had sink space for washing and drying utensils. With respect to ventilation and cabinet or shelf-space in the ordinary kitchens only 32 per cent had the benefit in their kitchen.

Relationship between ergonomic benefits in the kitchen and the homemakers:

The ergonomic benefits in the kitchen and the relationship between the characteristics of the homemakers is computed using the percentage analysis and the Chi square test and the results are presented in Table 5.

The educational level of the homemaker showed that the ergonomic benefits used were directly related. Nearly 61.1 per cent of the homemakers educated below X Std and were not aware of the ergonomic benefits in the kitchen when compared to 52.5 per cent of the professionally educated homemaker's awareness on ergonomic benefits.

Around 53.2 per cent of the working homemakers were aware of ergonomic benefits when compared to 55.6 per cent of non- working homemakers. The awareness was more in the homemakers (70.6%) using modular kitchen also.

Statistically significant association was observed between the ergonomic benefit level in kitchen and the education level of the homemakers at $p<0.01$ level ($¡^2=8.927$). It is evident that the modular kitchen users were aware of the ergonomic benefits in their kitchens compared to the ordinary kitchen users.

Statistically significant difference was observed between the ergonomic benefit in the kitchen and the employment status at $p<0.01$ level ($¡^2=5.072$), which could be concluded that the employed homemakers using modular kitchens were enjoying more ergonomic benefits in their kitchen compared to the ordinary kitchen users. Statistically significant difference was observed between the ergonomic benefit level in kitchen and the type of kitchen used by the homemakers ($¡^2=147.572$). It is evident that the modular kitchens had more ergonomic benefits compared to ordinary kitchens.

Conclusion:

Women were subjected to greater stress as the demands of home activities caused more discomfort in faulty kitchen designs. The homemakers using different kitchen areas and shape also had direct impact on the fatigue and energy expenditure of the homemakers. An ordinary kitchen would not allow much space for housing more than one electrical gadgets because of the space constraints as not much importance is given for kitchen designing as a whole during construction. The homemakers using modular kitchen enjoyed more reasons for their kitchen usage compared to the ordinary kitchen users. The awareness of ergonomic benefits was low among the less educated women. The working women had more knowledge regarding the ergonomic benefits in using a modular kitchen. The amount of storage areas, counter space for all the essential things required for day to day kitchen activities would enable less time and energy being wasted. The risk of facing discomfort and musculo-skeletal disorders was less in an ergonomic kitchen because of good planning of effective reach zones in the kitchen area.

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