

## Study into Problems Faced by Punjabi Housewives While Working on Existing Kitchen Work Spaces

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**ABSTRACT** Present study was conducted on 240 Punjabi women from approved and unapproved localities of Ludhiana to know the availability of kitchen work spaces in their houses, to examine suitability of these spaces and to analyse problems faced due to unsuitable work spaces. Results indicated that all the users from approved locality had most of the observed workspaces where as in unapproved locality the availability of these spaces was less. Minimum availability was seen for specified work spaces in kitchen. Minimum suitability was seen with the lowest kitchen storage shelf height by users of all height categories. Maximum respondents felt that highest shelf of dish stacking and kitchen storage was 'too high' for them and their lowest kitchen storage shelves to be 'too low' to handle. Few users (from short height category) agreed their sink to be 'too deep'. Some users from all height categories found their sink to be 'too wide', while on the other hand 20-40 per cent users from all height categories agreed to 'too congested' space on sink sides. One-fourth of all users 'felt pain' while working on cooking center. Very few (all height) users 'felt breathless', 'stress in neck, upper and lower back' while working on lowest kitchen storage and dish stacking shelves. Many users from all height category felt 'stress in shoulder and in arms' while using highest dish stacking and kitchen storage shelf. They also felt 'stress in leg' due to more height of cooking and kneading center.

### INTRODUCTION

Proper space for the storage and performance of routine activities, the correct positioning of equipment save a lot of unnecessary bending and other motions. It not only adds to the convenience and comfort of the homemaker but also enables the task to be performed quickly by her with the least cost. Grandjean (1988) pointed out that, static load are associated with a high risk of arthritis of joints, inflammation of the tendon and symptoms of chronic degeneration of the joints, painful muscle spasms and inter vertebral disc troubles. De looze *et al* (1994) reported that different aspects of working body postures are related to specific injuries. For instance the need to bend the torso is generally considered to be important factor in low back bending, repetitive or prolonged elevation of the arms above the shoulders resulting to shoulder injuries and knee injuries could be related to its repeated or prolong knee bending or flexion. Indian homemakers who usually spend most of their day's time in kitchen; can fall pray to these hazards if they ignore user friendly and ergonomically designed work spaces. Hence the present investigation was conducted with following specific objectives:

1. To know availability of selected kitchen work spaces in selected houses of Ludhiana city.

2. To examine to suitability of existing kitchen work spaces for selected users of different height categories.
3. To study the problems faced by selected users while working on unsuitable work spaces.

### METHODOLOGY

Study was conducted in Ludhiana city in 2005. A total sample of 240 females was selected from two approved and two unapproved localities of the city. Based on the reference height (153 cms) of Indian women, 3 height categories were formulated: short (143- 151 cms), medium (151- 159 cms) and tall height (159- 167 cms). Twenty respondents from each height category were selected from each selected colony. Based on the previous literature, all workspaces required for commonly performed kitchen activities were selected. An interview cum record schedule was prepared to collect the data. To analyze the data, percentages and suitability scores were worked out.

### RESULTS AND DISCUSSIONS

#### Availability of Extensively Used Work Spaces

Data pertaining to availability of existing kitchen work spaces most intensively used by

users of all 3 selected height categories are presented in Table 1. It is seen that all the users from all the height categories (from both the localities) had cooking, kneading and kitchen storage shelves in their houses. Sink and mixing center were available with 97.92 per cent users, refrigerator with 97.5 percent and dish stacking shelves with 83.33 percent users of all height category users. Users from all the height categories (both approved and unapproved locality) had minimum availability for specified space (of lower height) for rolling dough (7.08 percent), followed by space for beating (19.17 percent).

### **Suitability of Workspaces for Kitchen Activities**

Thorough perusal of Table 2 indicated that maximum suitability of tall height category users of approved locality was seen with cooking area, center height for beating, kneading, chopping, grinding and sink base with mean scores 1.43, 1.42, 1.35, 1.28, 1.20 and 0.85, respectively. Tall users from unapproved locality indicated maximum suitability with the height for sink top, range oven, cooking center, space in front of the refrigerator, space on left side of sink and highest shelf height of dish stacking center with mean scores 1.33, 1.31, 1.23, 1.23, 0.89 and 0.58, respectively.

In case of medium height category users from approved locality, maximum suitability was seen for depth of kitchen storage shelf, mixing center and depth of dish stacking center as indicated with their respective 1.28, 1.15 and 0.63 mean scores. Medium height category users from unapproved locality showed maximum suitability for center height and area for rolling out dough, area for beating and chopping centers, highest kitchen shelf height and width of sink (mean scores 2.00, 2.00, 1.27, 1.36, 0.88 and 0.87 respectively). Hanspal (1985) reported that 75 cms height for kneading, rolling dough and dish washing centers was highly suitable for medium height category respondents with mean score -0.17, -0.17, 0.00 respectively. She also indicated that kitchen storage space height of 120 cms was highly suitable (mean score 0.85) for this height category.

Short height category users from approved locality agreed for suitability with mixing area (mean score 1.13) they had in their houses. However, these users from unapproved locality

realized maximum suitability with lowest shelf height of dish stacking center and door knob height of refrigerator with same mean score of 1.50 followed by their suitability with area for kneading (mean score 1.35), lowest shelf height of refrigerator (mean score 1.00) and space on right side of sink with mean score 0.99.

Least suitability of tall height category users from approved locality was seen with the lowest kitchen shelf height followed by the highest dish stacking and kitchen storage shelf height, lowest shelf height of refrigerator and space in front of refrigerator door with mean scores -1.50, -0.54, -0.15, 0.38 and 0.85, respectively. Nil suitability of same height category users from unapproved locality was observed for space on the right side of sink. Deepest dimension of dish stacking center and kitchen storage shelf were also found least suitable with mean scores of 0.26 and 0.60 followed by less suitability of area for mixing, kneading, beating, chopping and cooking (mean scores 0.68, 0.78, 0.80, 1.04 and 1.05, respectively).

Minimum suitability was also seen among users of medium height category (approved locality) for sink width, lowest shelf height of dish stacking, door knob height of range oven and center height for rolling dough with mean scores 0.40, 0.68, 0.97 and 1.00, respectively. Hanspal (1985) found that rolling dough center of 80 and 84 cms was less suitable for medium height category users.. These users from unapproved locality had minimum suitability for height for cooking center followed by chopping center height, cooking area and door knob height of refrigerator (mean scores 0.75, 0.96, 1.05 and 1.10, respectively).

As regards the short height users category from approved locality it is evident from the table that there was no suitability for height of grinding center and space on left side of sink (mean scores -0.14 and 0.00) for them. Their suitability was also very less for sink base height, its depth and top height followed by area and center height for rolling dough (mean scores 0.15, 0.28, 0.55, 0.67 and 1.00, respectively). In unapproved locality these users had minimum suitability for kneading, mixing, rolling dough center heights and cooking area with mean scores 0.65, 0.67, 1.00 and 1.05, respectively.

### **Problems Faced by the Users**

***Problems Related to Height and Depth of Workspaces:*** Tall height category users (as seen

**Table 1: Per cent distribution of respondents according to availability of existing workspaces**

Work spaces	Tall		Medium		Short		Total N = 240
	AL	UAL	AL	UAL	AL	UAL	
Cooking center	100.0	100.0	100.0	100.0	100.0	100.0	100.0
Chopping center	92.50	70.00	85.00	60.00	57.50	57.50	70.42
Kneading center	100.0	100.0	100.0	100.0	100.0	100.0	100.0
Beating center	30.00	10.00	35.00	20.00	15.00	5.00	19.17
Mixing center	100.0	90.00	100.0	100.0	100.0	97.50	97.92
Rolling dough center	15.00	12.50	7.50	0.00	5.00	2.50	07.08
Grinding center	75.00	50.00	65.00	50.00	55.00	60.00	59.17
Sink	100.0	95.00	100.0	97.50	100.0	95.00	97.92
Kitchen storage shelves	100.0	100.0	100.0	100.0	100.0	100.0	100.0
Dish stacking shelves	97.50	77.50	95.00	82.50	92.50	85.00	83.33
Range oven	72.50	65.00	72.50	60.00	45.00	45.00	60.00
Refrigerator	100.0	100.0	100.0	95.00	100.0	90.00	97.50

AL-Approved locality; UAL-Unapproved locality;\*Multiple responses

**Table 2: Respondents suitability (mean scores) with existing workspaces for kitchen activities**

Workspaces	Tall		Medium		Short	
	AL	UAL	AL	UAL	AL	UAL
<i>Cooking Center</i>						
Height	1.18	1.23	1.05	0.75	0.85	1.02
Area	1.43	1.05	1.08	1.05	1.18	1.05
<i>Chopping Center</i>						
Height	1.28	1.00	1.06	0.96	1.04	0.98
Area	1.22	1.04	1.16	1.36	1.30	1.22
<i>Kneading Center</i>						
Height	1.35	1.13	1.08	0.90	0.90	0.65
Area	0.90	0.78	1.13	1.13	1.13	1.35
<i>Beating Center</i>						
Height	1.42	0.80	1.21	1.27	1.17	1.02
Area	0.92	0.80	0.93	1.27	1.00	1.11
<i>Mixing Center</i>						
Height	1.08	0.93	1.15	1.13	0.87	0.67
Area	1.05	0.68	1.08	0.88	1.13	0.99
<i>Rolling Dough Center</i>						
Height	1.33	1.00	1.00	2.00	1.00	1.00
Area	1.50	1.40	1.00	2.00	0.67	1.23
<i>Grinding Center Height</i>						
Sink width	1.20	0.75	0.81	0.79	-0.14	0.01
Sink base height	0.73	0.68	0.40	0.87	0.53	0.70
Sink depth	0.85	0.76	0.20	0.34	0.15	0.27
Sink top height	0.95	0.42	0.68	1.00	0.28	0.50
Space on right of sink	1.03	1.13	0.73	0.92	0.55	0.67
Space on left of sink	0.10	0.00	0.73	0.21	0.65	0.99
<i>Kitchen Storage Shelves</i>						
Lowest shelf height	0.28	0.89	0.73	0.58	0.00	0.57
Highest shelf height	-1.5	-1.25	-1.30	-0.75	-0.78	-0.95
Deepest dimension	-0.15	0.28	0.13	0.88	0.58	0.54
<i>Dish Stacking Shelves</i>						
Lowest shelf height	1.08	0.60	1.28	1.15	0.70	0.92
Highest shelf height	0.90	1.90	0.68	1.36	1.11	1.50
Deepest dimension	-0.54	0.58	-0.28	0.48	0.16	0.35
<i>Door Knob Height</i>						
Dish washer	0.41	0.26	0.63	0.55	0.59	0.54
Range oven	1.00	-	-	-	-	-
Refrigerator	1.03	1.31	0.97	1.13	1.00	1.15
<i>Refrigerator</i>						
Door knob height	1.30	1.50	1.35	1.10	1.28	1.50
Space in front of door	0.85	1.23	0.95	1.20	1.00	1.01
Height of lowest shelf	0.38	0.90	0.75	0.85	0.98	1.00

- = Non availability of dishwasher; AL-Approved locality; UAL-Unapproved locality

in Table 3) felt that highest shelf for stacking dishes and kitchen storage was 'too high' for them as disclosed by 30.80, and 25.00 per cent users respectively for these spaces. Maximum respondents from medium height category (28.75 per cent) agreed to dish-stacking top most shelf height to be 'too high' followed by 26.75 per cent users agreeing to same for top shelf of kitchen. Same trend was seen for users from short height category as 32.50, 30.50, 28.25 per cent respondents respectively agreed to it for above mentioned spaces. Prizeman (1966) also discussed in his paper that many accidents and

ailments are caused by awkward working height and badly placed storage items.

Table further revealed that maximum (91.25 per cent) users from tall height category felt their lowest kitchen storage shelf to be 'too low' for them. Same trend was seen for the users from medium height category (81.25 and 55.00 per cent users) and short height category users (77.50 and 47.50 per cent) for above mentioned spaces. Kaur (1993) too observed that storage shelf height at 6 cms above the floor level proved more taxing to human body because of frequent bending to pick up the things.

**Table 3: Problems related to height and depth of workspaces as faced by respondents (percentage)**

Workspaces	Too High			Too Low			Too Deep		
	Tall	Med	Short	Tall	Med	Short	Tall	Med	Short
Cooking center height	-	2.50	12.50	-	3.75	-	-	-	-
Chopping center height	-	-	-	-	3.75	-	-	-	-
Kneading center height	-	2.50	8.75	-	3.75	-	-	-	-
Beating center height	-	-	-	2.50	-	-	-	-	-
Mixing center height	-	2.50	10.25	7.50	6.25	-	-	-	-
Grinding center height	1.25	-	10.00	7.50	11.25	17.50	-	-	-
Sink base height	-	-	-	-	-	5.00	-	-	-
Sink depth	-	-	-	-	-	-	-	-	12.50
Sink top height	-	-	8.75	-	3.75	-	-	-	-
<i>Kitchen Storage Shelves</i>									
Lowest shelf height	-	-	-	91.5	81.25	77.50	-	-	-
Highest shelf height	25.00	26.25	30.50	-	-	-	-	-	-
Deepest dimension	-	-	-	-	-	-	3.75	2.50	2.50
<i>Dish Stacking Shelf</i>									
Highest shelf height	30.00	28.75	32.50	-	-	-	-	-	-
<i>Door Knob Height</i>									
Dish washer	7.50	-	-	-	-	-	-	-	-
Range oven	1.25	1.25	-	-	-	-	-	-	-
<i>Refrigerator</i>									
Lowest shelf height of refrigerator	-	-	-	1.25	-	2.50	-	-	-
	-	-	-	6.25	7.50	5.00	-	-	-

Med - medium

**Table 4: Problems related with dimensions of workspaces as faced by respondents (percentage)**

Workspaces	Too Wide			Too Congested			Too Shallow		
	Tall	Med	Short	Tall	Med	Short	Tall	Med	Short
Cooking area	-	-	-	5.00	8.75	-	-	-	-
Chopping area	-	-	-	5.00	1.25	-	-	-	-
Kneading area	-	-	-	12.50	3.75	5.25	-	-	-
Beating area	-	-	-	-	2.50	-	-	-	-
Mixing area	-	-	-	3.75	10.00	2.75	-	-	-
Sink width	17.50	8.75	12.50	3.75	15.00	10.00	-	-	-
Sink depth	7.50	-	-	-	-	12.50	12.25	10.00	-
Space on right of sink	-	-	-	31.25	26.75	27.50	-	-	-
Space on left of sink	-	-	-	17.50	50.00	42.50	-	-	-
Deepest dimension of kitchen storage shelf	-	-	-	-	-	-	1.25	5.00	4.75
Deepest dimension of dish stacking center	-	-	-	8.75	-	-	-	-	-
Space in front of fridge.	-	-	-	5.00	6.25	2.50	-	-	-

Med - medium

Only 3.75 per cent tall height category users felt kitchen storage shelf was 'too deep' followed by 2.50 per cent medium height category users who felt same. Maximum respondents from short height category (12.50 per cent) agreed their sink to be 'too deep'. Singh (1998) also reported that major problem faced by the respondents regarding storage structure was 'high or deep cupboard'.

**Problems Related with Dimensions of Workspaces:** It is clear from Table 4 that users from all the height categories found their sink to be 'too wide' as indicated by higher responses (17.50, 8.75 and 12.50 per cent respectively) given by tall, medium and short height categories users.

Table also revealed that majority of respondents from tall height category agreed with space they had on right and left side of sink was 'too congested'. This was reported by 31.25 and

17.50 per cent respondents respectively for above mentioned spaces. Respondents from medium height category agreed to space available to them on both sides of sink to be 'too congested'; as disclosed by 50.00 and 26.75 per cent respondents for these spaces. Short height category users also felt the space they had been 'too congested' on left and right side of sink. It was disclosed by 42.50 and 27.50 per cent respondents respectively for above listed spaces.

**Problems Related to Discomfort While Using Workspaces:** Tall height category users (21.50 per cent) as seen in Table 5a 'felt pain' while working on cooking center. Chaudhary (2004) indicated that kitchen centers' height was not according to the need of homemakers. As high work counter caused shoulder pain, low work counter caused back pain and if depth of the center is more, then it required more bending

**Table 5a: Problems related with discomfort while using workspaces by respondents (percentage)**

Workspaces	Feel Pain			Feel Fatigue			Feel Breathless		
	Tall	Med	Short	Tall	Med	Short	Tall	Med	Short
Cooking center height	21.25	6.25	5.00	8.75	5.00	5.00	-	-	-
Chopping center ht	2.50	-	7.50	-	-	2.50	-	-	-
Kneading center height	11.25	3.75	7.50	-	5.00	2.50	-	-	-
Kneading area	-	-	-	2.50	-	-	-	-	-
Beating center height	-	-	7.50	-	-	-	-	-	-
Beating area	1.25	-	-	2.50	-	-	-	-	-
Mixing center height	2.50	3.75	7.50	-	2.50	5.00	-	-	-
Rolling center height	-	-	2.50	-	-	-	-	-	-
Grinding center height	7.50	3.75	-	2.50	5.00	-	-	1.25	-
Sink base height	3.75	-	-	-	-	-	-	-	-
<i>Kitchen Storage Shelves</i>									
Lowest shelf height	12.50	8.75	-	2.50	3.75	-	5.00	22.50	5.00
Highest shelf height	-	-	3.75	-	-	-	2.50	1.25	-
Highest dish stacking shelf height	-	-	-	3.75	-	-	-	-	-
Lowest ref. shelf ht	2.50	-	-	-	-	-	-	-	-

Ref. – Refrigerator; ht – height; Med - medium

**Table 5b: Problems related with discomfort while using workspaces by respondents (percentage)**

Workspaces	Stress in Neck			Stress in Upper Back			Stress in Lower Back		
	Tall	Med	Short	Tall	Med	Short	Tall	Med	Short
Cooking center height	-	-	-	2.50	-	-	-	1.25	-
Chopping center ht	-	-	-	-	-	-	-	1.25	-
Kneading center height	-	-	-	-	-	-	-	1.25	-
<i>Kitchen Storage Shelves</i>									
Lowest shelf height	20.00	9.75	10.00	12.25	20.00	5.00	35.00	26.75	15.00
Highest shelf height	3.75	13.75	5.00	1.25	-	-	2.50	2.50	-
Deepest shelf height	-	-	-	-	-	-	-	2.50	-
Highest dish stacking shelf height	1.25	8.75	7.50	6.25	-	-	2.50	2.50	-
Lowest ref. shelf ht	2.50	-	-	3.75	-	-	6.25	-	-
Grinding center height	-	-	-	1.25	-	-	3.75	7.50	10.00
Space for bed making	-	-	-	-	3.75	5.00	-	3.75	2.50

Ref. – Refrigerator, ht – height, Med – medium

to reach the items. The table further indicated that 5 percent tall and short (each) and 22.50 per cent medium height category users 'felt breathless' while using lowest kitchen shelf.

Table 5b revealed that 20 percent users from tall height category felt "stress in neck" while using lowest kitchen shelf. Further the data indicated that 13.75 per cent users from medium height category felt "stress in neck". This may be due to improper height of highest kitchen storage shelf. Short height category users (10 percent) too felt same due to lowest kitchen storage shelves height. It was also observed that users from tall height category (12.25 per cent) felt 'stress in upper back' due to inconvenient height of lowest kitchen storage shelf. Medium height and short height category users (20 and 5 percent) felt 'stress in upper back' due to the same reason. Thirty five percent tall height category users and 26.75 percent medium height category felt maximum 'stress in lower back' due to working on lowest kitchen shelf.

Table 5c indicates that 9.75 percent tall height category user and 10 percent medium height users felt 'stress in shoulder' while using the highest kitchen storage shelves. Users from short height category (7.50 per cent) felt it while using highest shelf of dish stacking center. Tall height category users also felt 'stress in arms' due to more height of dish stacking and kitchen

storage shelf as depicted by 15.00 and 13.75 per cent users respectively for these heights. Respondents from medium height category (17.50 percent) felt it while using the highest kitchen.

Tall height category users (12.50 per cent) felt 'stress in legs' while using dish stacking shelf and working on cooking center. Medium height category users (13.75 per cent) felt same while working on kneading center. One-fourth short height category users felt the same problem while working on cooking center, 17.50 per cent also agreed to it while using kneading center. Saxena (1996) in a study revealed that women had to face problems like pain, headache, backache and eye problems due to poor kitchen conditions, which also supports present investigation.

## CONCLUSIONS

Minimum suitability was seen with the lowest kitchen storage shelf height. Most of the users felt lowest kitchen storage and dish stacking shelves to be too 'low' and highest kitchen storage and dish stacking shelves to be too 'high'. Short height users also found sink base to be too deep. Major problem faced by most of respondents was feeling of pain in back and legs with prolonged standing on cooking center. All users felt breadth of sink to be too deep for

**Table 5c: Problems related with discomfort while using workspaces by respondents (percentage)**

Workspaces	Stress in Shoulder			Stress in Arms			Stress in Legs		
	Tall	Med	Short	Tall	Med	Short	Tall	Med	Short
Cooking center height	-	3.75	-	-	-	-	12.50	12.25	25.00
Chopping center ht	-	3.75	-	-	-	-	2.50	8.75	7.50
Kneading center height	-	3.75	-	-	-	-	10.00	13.75	12.50
Beating center height	-	-	-	-	-	-	2.50	5.00	6.25
Beating area	-	-	-	-	-	-	1.25	-	-
Mixing center height	-	3.75	-	-	-	-	3.75	12.50	10.00
Rolling center height	-	-	-	-	-	-	-	2.50	2.50
Grinding center height	-	-	-	-	-	2.50	2.50	3.75	3.75
Sink base height	-	-	-	-	-	-	3.75	-	-
<i>Kitchen Storage Shelves</i>									
Lowest shelf height	2.50	-	2.50	-	-	-	2.50	3.75	-
Highest shelf height	9.75	10.00	5.00	13.75	17.50	-	7.50	5.00	5.00
<i>Dish Stacking Shelves</i>									
Lowest shelf height	-	-	-	1.25	-	-	-	-	-
Highest shelf height	5.00	-	7.50	15.00	4.75	5.00	12.50	10.00	5.00
Lowest ref. shelf ht	-	-	-	-	-	-	3.75	-	-
Stitching chair height	1.25	-	-	-	-	-	5.00	1.25	-
<i>Clothes Storage Shelves</i>									
Highest shelf height	19.75	10.00	-	8.75	11.25	7.50	10.00	2.50	3.75
Lowest shelf height	3.75	-	-	-	-	-	6.25	10.00	7.50
Cutting - drafting area	-	-	-	2.50	-	-	-	1.25	-

Ref. - Refrigerator; ht. - height, Med - medium

smooth functioning, and space on its side too less to keep washed utensils. They felt breathless, felt stress in neck, upper and lower back and in shoulder and arms while working on lowest and highest storage and dish stacking shelves. It is thus very important to design work areas of kitchen (according to height and body dimensions of the worker) where prolong working hours can make work uncomfortable and tiring.

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