Analysis of Work Performance By Selected Homemakers

By

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Introduction

I INTRODUCTION

The home is the cradle of human civilization, and the nation's micro unit for development. The home has a challenging role to play in promoting the welfare and progress of the nation through optimum utilization of all the resources available - human and physical.

As highlighted by Devadas (1985) the women of the home - the homemaker is the fulcrum around whom all the activities of the household are carried out. Women have a great responsibility in the management of resources in the farm, factory and home which lead to eradication of poverty. They should be relieved from drudgery in the farm and home for efficiently utilising their power. Working women both in urban and rural areas shoulder the double burden of home and outside work.

In modern society, women's work raises special problems of great importance. Although technical and social progress had led to a reduction in men's working hour and to a certain extent has made their work easier, it is not the same in the case of women who often fulfil the dual role of housewife and working woman. Even if their hours in paid employment are also reduced they

must still perform household tasks which technical progress has not yet succeeded in making much higher. Responsibility for bringing up the children falls almost entirely on them (Franklin, 1968).

Organisation for Economic Co-operation and Development (1968) and Khanna and Varghese (1978) indicate that the technological progress has already lightened household tasks and the process should continue (more comfortable dwellings, development of household appliances, pre-cooked meals etc.). Yet domestic and child rearing tasks are still bound to take much of the housewife's time.

If we want to make a success of singlehanded housekeeping, we must begin by doing everything we can to simplify our work. It is quite impossible for any woman to take pleasure in running her home by herself unless everything has to be done to help her to be as efficient as possible (Craigh, 1936).

One of the responsibilities of the homemaker is to plan household work in such a manner as to save time, energy, money and space (Rusk et al., 1961). Any one who is trying to lower time and energy expenditure soon learns the value of improving methods of work, since the time and energy required to do any task depend largely

on the hand and body motions used. Improvement in the performance of a task usually means that the work is made easier because new method is a convenient one, permitting smooth, natural and rhythmical motions (Gross and Crandall, 1973, Nickell and Dorsey, 1970).

The busy homemaker who wants to free more energy for certain activities, the employed homemaker who needs to lighten her home work load and the disabled homemaker who must learned to conserve her energy can use the principles and techniques of work simplification to attain these goals (Heiner and McCullough, 1986).

Work simplification is the technique of accomplishing a task by using the least amount of time and energy. In order to make her work easier and less time taking the homemaker becomes alert and seeks for the simplest, easiest and quickest way of carrying out any task (Gross and Crandall, 1973 and Ray, 1985).

The housewife should endeavour to think out improved methods where necessary, involving fewer movements and thus saving time. She should know exactly how long it takes to get through any one task and the best method of carrying it out (Binnie and Boxall, 1974).

There are many ways by which we can simplyfy our living and thus reduce the work required without

affecting the quality of life to any great extent. In each case thefamily members will need to decide what methods will be best for their group to use in simplifying the work of their home (Rust, 1947).

One of the pressing needs of modern society is to have wellllighted, well ventilated and well equipped kitchen. The kitchen is not only a work centre but also a social centre, a family room and the focal point around which several home activities revolve. The kitchen is the heart of the house, where the housewife spends three-fourths of her working time (Peet and Thye, 1965 and Devadas, 1970). It is important to the homemaker that her kitchen - or "workshop" - be so arranged that she can accomplish the maximum amount of work with a minimum amount of an effort in the shortest possible time (Scharff 1954).

Activities may be analysed in order that the quality of the product may be improved; skill in performing the task can be developed; the activity will be made more pleasurable, thus reducing stress and time, or that the individual himself will feel more effective. An activity may also be analysed to set up a procedure before performing it in a new situation (Nickell and Dorsey, 1970 and Gross et al, 1973).

Motion and time study helps in analysing the activities and makes possible the elimination of unnecesary steps in the best possible order, development of methods which are easy and of the optimum way to do the whole job (Barnes 1961. Gilbreth, 1959, Vijaya Shamier and Tharachandrika, 1970).

In the family, housewife who has to perform so many jobs each as important as the other, finds it hard to manage these within the limited period of time she has. Most of the homemakers have this pressing peakloads at morning between 6 A.M. and 10 A.M. (Hemalatha and Venmathi, 1988).

Information available in the aspects of household activity analysis in India is inadequate. Hence the investigator is very much interested to analyse the activities done by the homemakers during the peak hours and the methods of managing to complete the work within the specific time with the following objectives:

1. To find out the attitudes of homemakers towards household work.
2. To know the factors affecting work performance.
3. To analyse the activities done by the selected homemakers.

and 4. To modify the work performance of the selected homemakers.

Review of Literature

Experimental Procedure

II REVIEW OF LITERATURE

The available literature pertaining to this study is reviewed under the following aspects:

A. Need for Simplifying Household Tasks,

B. Work Simplification Principle,

C. Significance of Activity Analysis,

D. Techniques Used in Activity Analysis,

and E. Role of Kitchen in Work Performance.

A. Need For Simplifiying Household Tasks:

The home is a workshop where numerous household activities are carried out. For the homemaker, work in the home is a satisfying and creative activity, when work areas are correctly designed making the task pleasant. The use of proper work surface height and adoption of work simplification principles reduced human expenditure and prevent the onset of fatigue (Devadas, 1984).

One of the means of improving the quality of living is to help families break the fetters of poverty and its ills and live in dignity with their environment. This can be achieved through proper management of the resources with optimum utilization of science and

technology. Sound homes, well-knit communities and a well-founded nation are possible through effective management of family and community resources (Devadas 1984).

Mothers with atleast one dependent child spend as much time on household tasks and childcare as required by a normal working week of paid employment if not more . (Organization for Economic Co-operation and Development 1968).

Household equipment is a boon to the homemakers. Good working equipment is essential to secure leisure time comfort and efficiency. In India, the homemakers spend 70% of their time in the kitchen. In order to reduce this enormous expenditure of time and save energy, labour saving equipments are being increasingly needed by the homemakers (Devadas 1984).

The many labour saving appliances now on the market should aid in reaching the objective of doing household tasks the easy way, but motion will be wasted unless these appliances are efficiently arranged in kitchen (Peet and Thye 1965).

Work simplification can reduce time an a given

operation it can cut down the number of motions and improve type of motions on the specific tasks, hence probably reducing energy costs and it can reduce overall boredom resulting from long accustomed and routine habits of work (Gross and Crandall 1975).

Work simplification is the technique of accomplishing a task by using the least amount of time and energy. In order to make her work easier and less time taking, the homemaker becomes alert and seeks for the simplest, easiest and quickest ways of carrying out any task (Mann and Mann 1982, Binitaray 1985).

Work simplifica tion as the organized use of common sense to find and apply easier, quicker, cheaper and better ways of doing necessary work in order to save effoart or money (Spickler 1948, Simerson and Labrer 1959, Goodyear and Klohr 1962, Schmid and Subramaniam 1965, Nickell and Dorsey 1970).

Work simplification at reducing energy required for a job by the proper use of body or body mechanics and reduce the time required by establishing more suitable sequence of processes involved in the operation possibly by rearranging the necessary items to be used (Lehrer 1961, Goodyear and Klohr 1962 and Agan 1970).

Work simplification is the systamatic analysis of any type of work to eliminate unnecessary work, arrange remaining work in the best order possible and make certain that the right method is used (Nadler 1957, Cross et al 1973, Thomas 1959, McDermott and Nicholas 1966).

B. Work Simplification Principles:

Homemaker who wish to simplify their tasks can easily do so by making a careful study of their methods of work. Mundel has classified changes that can improve one's method of work into five levels. Beginning with the lowest, these classes are:

1. Change in body position and motions
2. Change in tools, work places and equipment
3. Change in production sequence
4. Change in finished product
5. Change in raw material.

Each class is based on the point where a change is initiated (Gross and Crandall 1954, Gilbreth 1959, Simerson 1959, Nickel and Dorsey 1970, Bennet 1970, Gross et al 1973).

Based on Mumdel's classes of change many have worked out on principles and arrived at the following

aspects which will help in simplifying the household task.

Work simplification principles as pointed out by Simerson 1959 and Schmid and Subramaniam 1965 are as follows:

1. If preventible, neither hand should be idle.
2. Hands and arms should begin and end their motions together.
3. Arm motions should be opposite and simaltaneous and in symetrical directions.
4. Hand and lower arm motions are faster and easier than upper arm, shoulder or trunk motions.
5. Freely curved motions are easier, faster and more accurate than restricted or straight line motions.
6. Use of the feet when possible reduces fatigue.
7. Momentum should be used to assist the worker wherever possible but should be minimised so as to overcome it.
8. Tools, materials and controls should surround the work area within easy reach of the workers.
9. Materials and work should be located to create natural automatic and rhythmic movement.
10. Each tool and fixture should have its own definite and fixed place.
11. Tools and materials should be prepositioned before use.

12. Tools should be located to promote a progressive sequence of motions. The hand's last motions should be near their first.

13. Most suitable tool should be chosen for each task.

14. Simultaneous hand operations of some complexity should be located together for easy eye supervision.

15. Workplace lay out should minimize shifts of vision from one area to another.

16. Adequate ventiaation, comfortable working temperatures and humidity and low noise level reduce energy drain by environment.

17. Good light and contrasting light aid fast and easy vision.

18. The height of the work place should allow either standing or sitting without basic posture change.

19. Every worker should have a stool or chair with a back support.

20. Bins or tools should permit sliding or hook grasps. Such grasps are faster and easier than pressure or get under grasps.

Accroding to U.S. Department of Agriculture Home and Garden Bulletin (1951), Thomas 1959, work simplification principles are:

I Decide on Activities:

The first step in planning any room is to decide on the activities to be carried on there.

Every kitchen should have adequate provision for meal preparation - which includes storing, preparing and serving food - diswashing and disposal of refuse. Most families want space in the kitchen for eating some family meals.

II Eliminate unnecessary activities

Good planning can eliminate much unnecessary work. Six ways to reduce the homemaker's expenditure of effort and time as follows.

1. Use modern labour savers

The use of modern labour saving utilities and equipment can take some jobs completely off your hands do the hands do the hardest part of other tasks.

2. Plan a definite place for each activity

Having a definite place planned to accommadate each activity eliminates much of theconfusion that makes work difficult. With good planning some centres can serve more than one activity.

3. Locate activity centres for logical sequence of work

Locate activity areas in relation to each other so that work progresses in a continuous, uninterupted path - without crisscrossing or backtracking of work paths. This cuts down on walking and the mental and nervous energy expended.

4. Plan work areas that are adequate but compact

To be adequate, a room must have space enough for the size and kind of equipment wanted and for the number of persons likely to be working in the room. It should also have enough counter space, working space and storage facilities needed for each task.

Planning adequate but compact work areas makes work go more smoothly and quickly with less tasks on the workers nervous energy. It also saves steps and reaches.

5. Design work centres for easy seeing and picking up of needed supplies and utensils

When we plan arrangement of storage space for each work centre let 3 rules guide us.

1. Plan enough storage for supplies and utensils at the centre where first used.

2. Locate storage for most-often-used items in the most acceptable places - between fingertip and shoulder height. This saves steps, stoops, reaches and time.

3. Design the storage facilities for the articles to be kept in them.

6. Select interior mill work and surface materials that are easy to clean and maintain

At best, the kitchen and workroom need a lot of cleaning. Simple design and easy to clean, long lasting materials lighten the work and cost of maintenance.

III Provide best conditions for necessary work:

The ways to make a room better, safer, more pleasant and more attractive place to work in.

(a) Comfortable work heights

The right heights for work surface add much to ease and comfort of work whether the homemaker is standing or sitting at work, a homemaker should be able to maintain good posture without muscular strain.

(b) Well lighted work surfaces:

Good lighting helps to prevent fatigue and promotes safety. Work surfaces need enough light for good seeing both day and night.

(c) Good temperature and ventilation:

For favourable temperature and ventilation, locate the kitchen on the side of the house.

(d) Safety:

As fatigue is one of the chief causes of accidents, a kitchen or workroom that is planned for simplification of work provides for safety to a great extent. Faulty equipment, poor lighting, poor arrangement all contribute to making a work place unsafe.

According to Barnes (1961) work simplification principles of motion economy are as follows:

Principles related to the use of Human body

1. The two hands should begin as well as complete their motions at the same time.
2. The two hands should not be idle at the same time except during rest periods.
3. Motions of the arms should be made in opposite and symmetrical directions and should be made simultaneously.
4. Hand motions should be confined to the lowest classification with which it is possible to perform the work satisfactorily.

5. Momentum should be employed to assist the work wherever possible and it should be reduced to a minimum if it must be overcome by muscular effort.

6. Smooth continuous motion of the hands are preferable to zigzag motions or straight-line motions involving sudden and sharp change in direction.

7. Ballistic movements are faster, easier and more accurate than restricted (fixation) or "controlled" movements.

8. Rhythm is essential to the smooth and automatic performance of an operation, and the work should be arranged to permit an easy and natural rhythm wherever possible.

Principles related to work place:

9. There should be a definite and fixed place for all tools and materials.

10. Tools, materials and controls should be located close in and directly in front of the operator.

11. Gravity feed of bins and containers should be used to deliver material close to the point of use.

12. Drop deliveries should be used wherever possible.

13. Materials and tools should be located to permit the best sequence of motions.

14. Provisions should be made for adequate conditions for seeing. Good illumination is the first requirement for satisfactory visual perception.

15. The height of the work place and the chair should be preferably arranged so that alternate sitting and standing at work are easily possible.

16. A chair of the type and height to permit good posture should be provided for every worker.

Principles related to Design of Tools and Equipments

17. The hand should be relieved of all work that can be done more advantageously by a judge a fixture or foot-operated device.

18. Two or more tools should be combined whenever possible.

19. Tools and materials should be prepositioned whenever possible.

20. Where each finger performs some specific movements such as in typewriting, the load should be distributed in accordance with the inherent capacities of the finger.

21. Handles such as those used on cranks and large screw drivers should be designed to permit as much of the surface to hand to come in contact with the handle as possible.

22. Levers, cross bars and hand wheels should be located in such positions that the

operator can manipulate them with the least change in body position and with the greatest mechanical advantage.

The housewife should try to understand how the human body functions. This equipment will not change in the future. It includes comfort or discomfort caused by the use of body mechanics as reviewed by Mary Catherine Starr (1956), Bratton (1961), Steidl and Bratton (1973), Mann and Mann [1982] are as follows:

1. Keeping parts of the body in Alignment,
2. Effective use of body muscles,
3. Considering the centre of gravity,
4. Taking advantage of momentum,
5. Rhythmic movement.

Williams (1956) classifies the advantages which result from correct body postures as

1. Hygenic value:

The erect, straight, vibrant body has its organs properly suspended so that bodily functions are more complete and perfect.

2. Economic value:

Good postures pay. They speak of the spirit within the body. The young man or woman seeking a

business position portrays his or her mental energy or alertness by the way he or she stands or walks.

3. Social value:

Despite the influence of pernicious and silly styles it may be said that personal attractiveness is more properly measured by a splendid carriage of the body rather than by a "debuntanate sloutch".

4. Spiritual value:

The spirit is uplifted with a physical uplift of the trunk. The glory of the rising sun is never seen by one walking with protruding head and abdomen and flat feet.

C. Significance of Activity Analysis

Work performance has different meanings in standardised and non standardised conditions of work. In the former it can be defined as either the response to work, as indicated by physiological indices such as changes in heart rate, oxygen consumption and blood lactate or the work accomplished for a given physiological response. In non-standardised task it is the work accomplished, which depends on factors such as the rate of work, motivation, skill etc. (Spurr, Ferroluzzi, Norgan, Reina, Shelty, Solamans, Torun 1987).

Changing conditions in the home are a factor in the apparent need for a better understanding of the various impacts of household work, more and more homemakers are pressured by dual occupations. New qequipment improvement in the old and advances in space and working situations affect work methods(Elliot, Mary Brown Patten, Mary Edna Singer 1963).

There is a variety of reasons for analysing household activities. The most frequent purpose in the past has been the reduction of work time. It has been assumed that if time were not reduced by working faster but by eliminating aspects of a task and/or by doing it more simply, energy too would be reduced (Gross et al 1973).

With the focus on the resources of time as one of the major resources in family life, improvement of work in the home has frequently emphasized reduction in time used for work activities there are however many other advantages in increasing effectiveness of work methods besides conservation of time. Also improvement in work methods may reduce overall boredom resulting from long accustomed and routine habits of work. It may reduce frustration fatigue that has arisen because of lack of effectiveness of a job. It may result in the creation of family resources such as increased, skill, helpful standing plans and more favourable attitude towards work.

The re are two ways of looking as housework; as something to get through as quick as possible to get on the something else, or as something to which concious thought, atleast at times, can be applied in working out new procedures. (Gross et al 1973).

Bratton (1961) Gross et al (1973) Ray and Bennet (1977) opine that the work saving methods are:

1. Shortening or reallocating time spent in different aspects of the work of the home
2. Reducing motions or improving the quality of motions used in performing a task.
3. Increasing the knowledge and understanding of the work or work methods.
4. Finding the relation of attitudes, interests or other personal attributes to choice of work methods and equipment design.

D. Techniques Used in Activity Analysis

Lehrer (1961) points out that the work simplification makes use of several technique. Basically they are simple and straight forw ard analytical procedures for gathering the facts of work perfermance.

Some of the pen and pencil techniques used for activity analysis are; the pathway chart, the process chast, and the operation chart. (Gross and Crandall 1970, Goodyear

and Klohr 1954, Gilbreth 1960, Gross et al 1973).

Micromotion film analysis is primarily a research technique and applies best to tasks that ca n be easily filmed. Motion pictures of tasks done under normal conditions make a permanent record that can be ana lysed and charted to show the work of the hands or other parts of the body used in the operation. By means of timing device the time of each movement of the worker can be accurately recorded.

The cycle graph, a photographic device is also used to study types of motions used in performing tasks. When this is attached to some portion of the body such as the hand; when ironing is being done, it registers the pathway of light projected by a small electric bulb. The resulting record shows whether the movements are smooth and rhythmic or non-rhythmic.

Pathway Chart is a simple device for making a motion and time study in the home. A floor plan drawn to scale and fastoned to drawing board or wall board, pins and thread are all that are needed to make such a study. Pins are put in on the floor where the worker turns and the line of travel as pathway is measure from thread wound around the pins as the works. After a study of this process, a revised plan can be made on another plan.

The Process Chart is a step by step description of the method used in doing the task. It shws the flow of movement in the task and is most helpful in calling attention to unnecessary steps and motions.

The symbols used for process chart

○--- Movement

◯--- Operation

▽--- Delay or storage

□--- Inspection.

The Operation Chart is used in making a more detailed study or some particular part of the process. In this chart the movement are broken down into the activities of both the right hand and left hand. The finger analysis shows where delays occur in work. Both process charts and operation charts are useful motion and time study techniques. The symbols used for operation chart are

○ --- Movement of the arm

◯--- Movement of the finger

▽ --- Idleness of finger and arms

E. Role of Kitchen in Work Performance

Kitchen has always been a matter of great importance of the ordinary housewife because it has been the vary cenre and care of her household concern from the cave age to the

present day. But a tacit acceptence of its importance is not the same as a lively interest in its possibilities, and it is this change from the old apothetic acceptance to present day intelligent and critical interest that has turned this room, once the drudge of the house into its mistress. (Braddell 1967).

A kitchen which has convenient and satisfying working area for its traditional function of food preparation and clean up and which also is designed for important family activities ordinarily does not just happen. (Ehren Kranze and Inman 1954).

A convenient and pleasant kitchen is of major interest to every family. The first step in acheving such a work shop is a good plan which fits the needs and individual preferences of the family. The best way to begin a plan is to think of the activities to be carried on there, and them work out the space needed and the arrangement of equipment and supplies which will require the fewest steps and motions in getting the work done. (Fitzgerald and woodruff 1956, Johnson 1961).

Kitchen that are convenient and satisfying have certain general characeteristic and certain special features as given below. (Ehren Kranze and Inman (1954) Johnson, 1961, Fitzgerald and Woodruff 1968, Starr, 1956, Lewis and Thompson 1978 and Carlson 1961).

1. They are safe
2. They are well ventilated
3. They are located to provide easy access
4. to a back or front entrance and to the dining area.
4. They have a working area reasonably free of cross traffic.
5. They have adequate wiring.
6. They are well lighted both natural and artificial sources.
7. They have adequate plumbing facilities.
8. They are pleasing in colour and pleasant to work in.
9. They are easily cleaned.
10. They utilize areas not needed for food preparation and clean up for activities appropriate to the family.
11. They have the working area organized into reasonably compact centre.
12. They have adequate storage and counter space in each centre.
13. They have convenient storage space and counters of convenient heights.
14. They have appropriate appliances in the different centres.

Types of Kitchen

According to Scharff, (1954), Ehren Kranz and

Inman (1954), Fitzgerald and Woodruff (1956), Stars (1956), Johnson (1961), Carlson (1961), Agan(1970), Steidl and Bratton (1973), kitchen are of four basic types:

1. U-shape kitchen:

The U-shaped arrangement for the kitchen is compact and provides for the easy flow of work and for traffic at the back of the worker. The dining area is away from the work centres. The order of work is from right to left with a low mixing surface (32" from floor to counter top) between the sink centre and the range.

2. The L-shape kitchen:

The L arrangement to the work centres along two adjoining walls, is especially desirable if the room is not too large. It may also allow more space for a rest area. Revolving corner cabinets provide accessible storage and are a feature preferred by many homemakers.

3. The Corridor kitchen:

If a room is narrow with doors at each and or a flue or window at one end, the two-wall or corridor arrangement is necessary. The chief disadvantage of this kitchen is the traffic between the work centres and the difficulty in including a planning or rest centre. Because of length it was

possible to include the dining center. This corridor type arrangement is more efficient because the traffic lane is at one end instead of through the kitchen.

4. The Half wall kitchen:

In a large square or rectangular room, a convenient U arrangement may be made by using a half wall or "island". This arrangement reduces steps and provides a well lighted dining center and rest area.

Kitchen Storage:

The old saying "use your head to save your heels" is a good guide in planning kitchen storage. When kitchen storage is designed with an eye to the jobs to be done, and when we keep things where they belong, we will find that we have to do very little moving about. (Colmbia, 1960).

Principles of storage:

Principle of storage as given by Deacon and Firebaugh, (1975), Steidl and Bratton (1973) and Beall (1962) are

1. Place items so they are easy to see, reach grasp and replace
2. Store items within the worker's limits of reach.

Methods of storing items for easy seeing, reaching, grasping and replacing include (a) storing unlike items one row and one layer deep.

(b) Stack only items with compatible dimensions.

(c) Leave enough clearance for grasping and replacing items.

(d) Organize items in the storage space to minimize searching and facilitate retrieval.

Storing items within the worker's limits of reach is appropriate for storage independent of work areas, but is probably more important in storage that is a part of a work area. In either case, placing frequently used and/or heavy items within normal reach lessens the likelihood of strain due to lifting.

Guide lines for kitchen storage are:

1. Check to see if you are making the best
2. use of the cupboard space you now have.
2. Get rid of any and all utenils and supplies you don't use.
3. Store utensils, dishes and supplies at places where you first use them.
4. Store together the things you use together.
5. Use the easy to reach and easy to see spaces for things you use most often.
6. Place utensils, dishes, cultery and food supplies so that you don't need to move one to get another.

7. Put only like kind of things infront of each other on a shelf.
8. Stack together only things of the same size and kind.
9. Plan to keep on the same shelf only things of about the same height.
10. Make storage space easy to clean.

III EXPERIMENTAL PROCEDURE

Ther experimental procedure for the study on "Analysing the work performance of Selected Homemakers" comprises of the following aspects:

A. Household Survey

B. Analysis of Work Performance of Selected Homemakers

C. Improved Methods of Work Performance.

A. Household Survey:

This aspect includes the following steps.

1. Selection of sample
2. Selection of method
3. Formulation of data collecting instrument
4. Pretesting and finalising the data collecting instrument
5. Conducting the survey
6. Analysing and presenting the data.

1. Selection of sample:

Fifty homemakers were selected in and around Gandhipuram area in Coimbatore city. So that it would be easy for the investigator to contact the families and collect necessary informations.

2. Selection of method:

The interview method was selected to collect information for the study. The first hand reliabl e and accurate informations can be obtained by the investigator herself through interview method by removing the doubts, if any, in the minds of the respondents regarding certain questions (Gupta, 1962). According to Devadas (1976) interview method is an effective tool in collecting data.

3. Formulation of data collecting instrument:

An interview schedule was formulated to gather information on the family background, paid help, attitudes of homemakers towards household work, effect of kitchen on work performance, methods of simplifying household activities and suggestions to modify the household activities.

4. Pre-testing and finalising the data collecting instrument:

When the interview is to be conducted on a large scale, it is absolutely essential to test the data collecting instrument by conducting a pilot study on small scale (Gupta, 1982). This testing on a small scale has been found to be extremely useful in practice. The schedule was pre-tested in five selected houses. With the results of the pilot study necessary modifications were made and the schedule was finalised (Appendix I).

5. Conducting the survey:

Sufficient rapport was established with the homemakers and necessary informations were collected.

6. Analysing and presenting the data:

The collected information were analysed and presented in the next chapter Results and Discussion.

B. Analysis of Work Performance:

Analysis of work performance of the selected homemakers includes the following steps:

1. Selection of sample
2. Selection of activity period
3. Selection of technique
4. Analysing the activities

and 5. Presenting the data.

1. Selection of sample:

Five full time homemakers without servants among fifty surveyed homemakers were selected for activity analysis based on the interest show n and co-operation extended by them.

2. Selection of activity period:

As studied by Shoba Rani and Rajalakshmi (1982)

and Hemalatha and Venmathi (1988) peak loads for majority of the homemakers seemed to be between 6 a.m. and 10 a.m. Cooking breakfast and lunch, serving, packing lunch and care of family members were found to be the most common activities done by thehomemaker. Hence the time selected for activity analysis was between 6 a.m. and 10 a.m.

3. Selection of Technique:

At the practical level simple techniques like flow process chart and pathway chart are useable by persons interested in work simplification (Gross and Crandall 1975). Hence the two of the pencil and paper techniques - pathway chart and flow process chart, were selected to analyse the activities performed by the selected homemakers.

Pathway chart:

The pathway chart is a simple device for doing activity analysis. It focusses the analysis on overall amount of travel and tracing of steps (Gross et al 1973). Hence the pathway chart was selected in order to record the distance travelled and trips and made between the work centres.

A floor plan was drawn to scale and fastened to a card board. Pins were put in where the homemaker turns and her pathway was measured from string wound around the pins as the worked. Distance travelled while performing the activities was found out by measuring the total length of the string used.

b. Flow Process Chart

The process chart is a device for recording a process in a compact manner, as a means of better understanding it and improving it. The chart represents graphically the separate steps or events that occur during the performance of a place of work, or during a series of actions calling attention to unnecesary steps and motions (Barnes, 1959). It helps to find out the number of activities, trips, delays and inspections involved as the homemaker performed the household activities. Hence the flow process chart was selected to analyse the activities. (Appendix II).

The investigator was analysing and observing the household tasks performed by the homemaker along with the process chart. An accurate record of time consumption of each of the household tasks as they were being performed was also recorded.

4. Analysing the activities:

The activities performed by the selected homemakers were analysed using pathway chart and flow process chart for three consecutive days.

5. Presenting the data:

The outcome of the activity analysis were discussed under Results and Discussion.

C. Improved Method of Work Performance:

The count of symbols after the original way indicated at a glance where improvements might be made in the flow of the work. Necessary modification were made by introducing new concept of work principles with the guidence of Mundel's classes of change.

One homemaker from the selected five homemakers was selected based on her keen interest and enthusiasm to perform the improved method of work. The homemaker was given orientation on the improved method. She was asked to follow the procedure for three consecutive days to get used to that change. After that the investigator recorded the work performance of the homemaker using flow process chart and pathway chart. The results are given in the next chapter.

Results and Discussion

IV RESULTS AND DISCUSSION

The results of the study on "Analysis of work performance by the homemakers" were analysed and presented under the following major areas:

A. Findings of Household Survey

B. Findings of Activity Analysis.

C. Improved method of work performance

A. Findings of Household Survey

The data collected on household survey are presented under the following headings.

1. Background information of selected homemakers
2. Activity plan
3. Time plan
4. Facilities in the kitchen

and 5. Concept of motion economy and body posture.

1. Background information of selected homemakers

Background information of the selected homemakers comprises of

a. Type of family

b. Age of family members

c. Educational status of the homemakers

d. Occupational status of the heads of the families

and e. Monthly income of the families.

a. Type of families:

Eighty per cent of the selected families belonged to nuclear family and 20 percent of the families belonged to joint family.

b. Age of family members

Tabe I shows the distribution of families according to the age of the family members.

TABLE I

DISTRIBUTION OF FAMILIES ACCORDING TO THE AGE OF THE MEMBERS

S.No.	Group	Percentage of members in the age group							
		0-5	5-10	10-20	20-30	30-40	40-50	50-60	above6
1.	a.Male	14	18	24	46	34	30	22	14
2.	b.Female	14	14	40	44	34	28	18	6

The age of the members ranged from 0-5 to 60 and above. The majority of the age of the male and female members ranged between 10 and 40 years.

c. Educational status of the homemakers

Educational status of women helps to develop better

citizens for the nation and it is an important instrument which changes the family life in all the fields. The analysis of the educational status of the homemakers is given in Table II.

TABLE II

EDUCATIONAL STATUS OF THE HOMEMAKERS

Educational status		Homemakers	
		Number	Percentage
Primary	0-6	3	6
High school	6-10	19	40
Higher secondary	11-12	7	15
College	(U.G.)	18	37
Profession	(Doctor)	1	2

It is cle ar from the above Table that 40 per cent and 37 per cent of the homemakers had studied upto high school and college level respectively. The remaining had studied upto primary or higher secondary level. Only one homemaker was a doctor.

d. Occupational Status of the Heads of the Families:

Occupational status of the heads of the families

decides the standard of living of the family. The occupational status of the heads of the selected families is given in Table III.

TABLE III

OCCUPATIONAL STATUS OF THE HEADS OF THE FAMILIES

S. No.	Occupational status	Heads of the families	
		Number	Percentage
1.	Business	21	42
2.	Bank	15	30
3.	Profession	8	16
4.	Others	6	14

Majority of the heads of the selected families (42 per cent) were businessmen. Thirty per cent of the heads were employed in Banks. The other occupations found among the selected families were lawer, engineer, doctor, auditor and medical representative.

e. Monthly Income of the Selected Families

The families were grouped based on the Housing and Urban Development Corporation (1985) classification as low income group upto Rs.1500, medical income group between

Rs.1500 and Rs.2500 and high income group above Rs.2500/- per month. The classification of the income of the families is given in Table IV.

TABLE IV

MONTHLY INCOME OF THE FAMILIES

S. No.	Income group	Families	
		Number	Percentage
1.	Low income (upto Rs.1500)	4	8
2.	Middle income (Rs.1500-2500)	20	40
3.	High income (above Rs.2500)	26	52

Fifty two per cent of the families belonged to high income group. Forty per cent of the families belonged to middle income group.

2. Activity Plan

Planning makes our work both enjoyable and profitable. Therefore it saves steps, time and energy. Through careful planning we can make our own small kitchen into a very convenient working place (Kamala, 1964).

This includes the following aspects:

a. Plan of work.

b. Type of plan

c. Paid help.

d. Attitude towards household work.

e. Classification of household activities.

and f. Factors affecting work performance.

a. Plan of work.

Thirty eight per cent of the selected homemakers were planning work in advance in order to complete the work quickly in time as pointed out by 75 per cent of the homemakers. The other reasons for planning work in advance were: to send the children to school in time, to ease the work and to spend more time on care of family members.

Sixty two per cent of the homemakers were not planning their work because they were not employed so that they could leisurely do the work throughout the day.

b. Type of Plan.

Those who were planning their work had only mental plan thought out daily. All of them were able to complete their plan as they planed.

c. Paid help.

Sixty four per cent of the selected homemakers were having part time servants. The remaining 30 per cent were not having any servant: only six per cent had two servants.

The main activities done by the servants were cleaning, washing, dusting and mopping.

d. Attitude towards household work.

Creating proper attitude towards household work will minimise the drudgery of doing household activities.

Table V shows the attitude of the homemakers towards household work.

TABLE V

ATTITUDE TOWARDS HOUSEHOLD WORK

S.No.	Attitude	Homemakers	
		Number	Percentage
1.	Interesting	17	34
2.	Mechanical	17	34
3.	Boring	14	28
4.	Strenous	2	4

Thirty four per cent of the homemakers expressed that performing household activities was an interesting job because they were free to do leisurely without outside work. Twenty eight and thirty four per cent felt that doing household activities was boring and mechnical respectively due to the repetitive nature of the work. Very few homemakers felt that it was strenuous because of lack of time and improper facilities in the kitchen.

e. Classification of household activities:

Attempts at classification into light, moderate and heavy work are important. The household work can be classified based on the accumulate physiological fatigue.

Table VI and figure 1 indicate the classification of activities as light, moderate and heavy as indicated by the homemakers.

TABLE VI

CLASSIFICATION OF HOUSEHOLD ACTIVITIES

S.No.	Activities	Classification of activities					
		Light		Moderate		Heavy	
		Number	Percent-age	Number	Percent-age	Number	Percent-age
1.	Cooking	7	14	29	58	14	28
2.	Washing	24	48	18	36	8	16
3.	Cleaning	33	66	13	26	4	8
4.	Dusting	37	74	9	18	4	8
5.	Mopping	32	64	15	30	3	6

A majority of the homemakers expressed that cooking is a moderate activity (58 per cent). Twenty eight per cent felt it as a heavy work. Majority of the homemakers expressed washing, cleaning, dusting and mopping as light because of employing servant for those activities. Those who had no servant expressed these activities were either moderate or heavy.

f. Factors affecting work performance

Efficient kitchen arrangements, tools, equipment, storage facilities and correct heights for work surfaces, chairs and stools have direct influence on the work

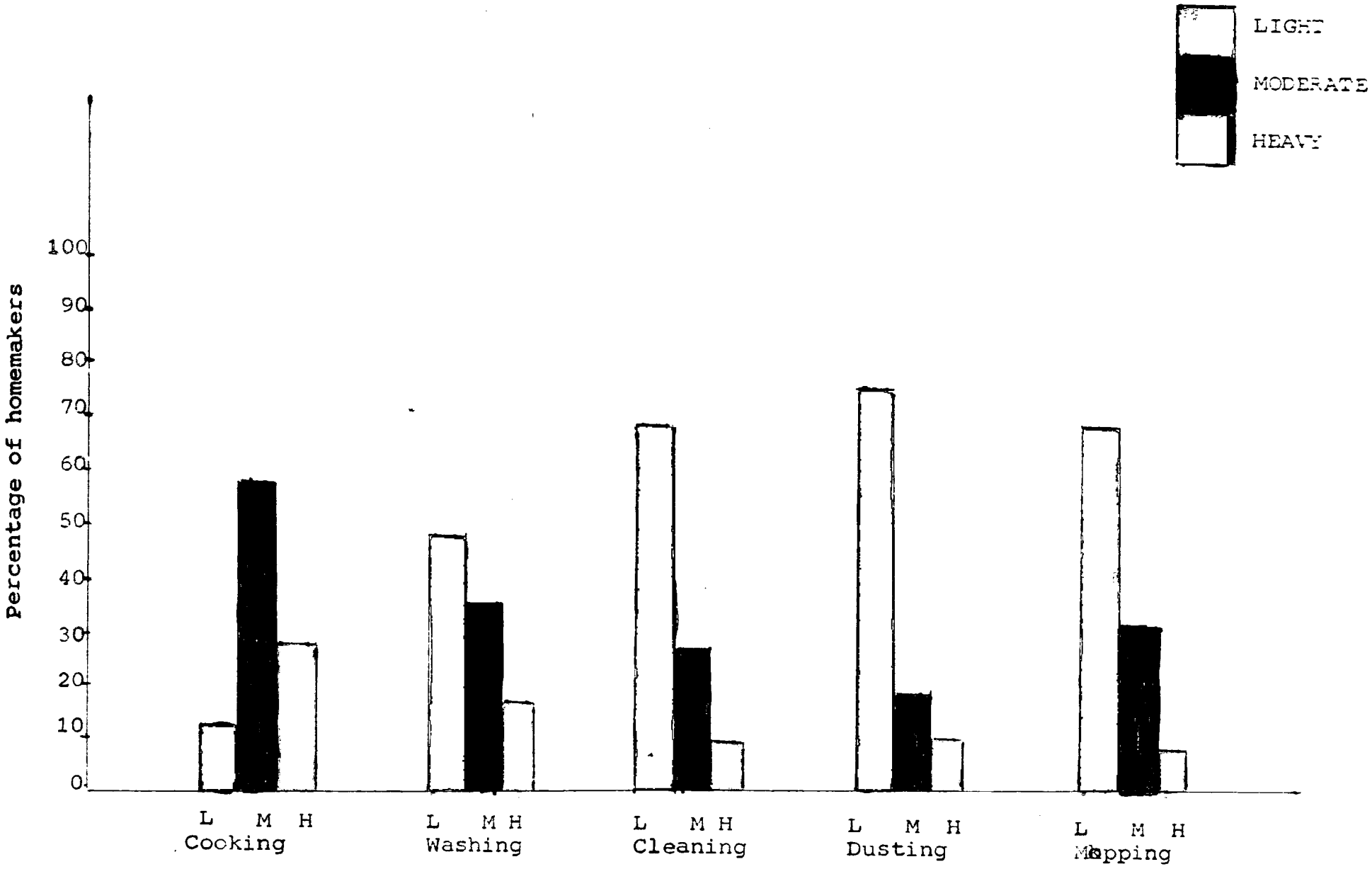


Figure 1

CLASSIFICATION OF HOUSEHOLD ACTIVITIES

performance (Nickell and Dorsey 1975). Hence various factors affecting work performance of the homemakers were analysed and the measures taken to overcome the difficulties were found out.

The following table VII clearly describes the factors affecting and the corresponding measures taken.

TABLE VII

FACTORS AFFECTING WORK PERFORMANCE AND MEASURES TAKEN

S.No.	Factors	Measures	Homemakers	
			Number	Percentage
1.	Uncomfortable working height	Sitting on a chair or stool	12	24
2.	Lack of proper lighting and ventilation	Using artificial light	11	22
3.	Lack of proper grouping	Dining in the kitchen during peak hours	8	16
4.	Lack of space for equipment in the kitchen	Kept the equipment in the store room	7	14
5.	In-adequate kitchen	Pre-preparation will be made in living room	6	12
6.	Lack of storage facilities	Only necessary items in the kitchen	6	12

Above Table shows that uncomfortable working height and improper lightning, and ventilation were the important factors which affect the work performance. The measures taken by the homemakers were using chair or stool, artificial light and using other part of the house for pre-preparation and keeping equipment.

3. Time Plan:

This includes the following aspects:

a. Time spent on various activities

b. Duration of time spent in kitchen.

a. Time spent on various household activities.

Table VIII presents the approximate time spent on various household activities by the homemakers.

TABLE VIII

TIME SPENT ON VARIOUS HOUSEHOLD ACTIVITIES

S.No.	Activities	Percentage of homemakers					
		Time Spent in hours					
		0-1	1-2	2-3	3-4	4-5	5-6
1.	Cooking	-	6	8	8	20	58
2.	Cleaning	24	58	18	-	-	-
3.	Washing	28	56	16	-	-	-
4.	Dusting	88	12	-	-	-	-
5.	Mopping	90	10	-	-	-	-

It is very clear from the above Table that fifty eight per cent of the homemakers spent 5-6 hours on cooking the three meals a day. Above fifty five per cent of the homemakers spent 1-2 hours per day for cleaning and washing. Less than one hour was spent on dusting and mopping.

b. Duration of time spent in the dkitchen.

Ninety four per cent of the homemakers spent more time in the morning inside the kitchen. Forty four per cent of the homemakers had spent 3-4 hours in the kitchen between 6 a.m. and 10 a.m.

4. Facilities in the kitchen.

Details recording the facilities available in the kitchen are discussed under the following criteria:

a. General facilities

b. Storage facilities

c. Sanitary condition

d. Comfortable working height

snf e. Comparison of kitchen plants.

a. General facilities

Unsatisfactory kitchen conditions prevailing in most of the families affect proper development of a family. Kitchen is the nerve centre of a house (Nag, 1980). This includes the following aspects:

(i) Location of kitchen

(ii) Adequacy of kitchen

(iii) Works centres

snd (iv) Working environment.

(i) Location of kitchen

Table IX shows the details on the location of kitchen in selected households.

TABLE IX

LOCATION OF THE KITCHEN

S.No.	Location	Homemakers	
		Number	Percentage
1.	Separate kitchen	22	44
2.	Kitchen cum dining	17	34
3.	Kitchen cum storage	11	22

The above Table shows that 44 per cent of selected households had separate kitchen. Thirty four per cent and 22 per cent of the households had kitchen cum dining and kitchen cum storage respectively.

ii) Adequacy of kitchen:

Eighty per cent of homemakers expressed that the kitchen was adequate enough for performing various activities.

Sixty two per cent of the selected households had three work centres with proper placement in the kitchen. The remaining 38 per cent of the households had any two of the three work centres.

(iii) Working environment

All the selected households had a kitchen without

any external factors disturbing the work. Eighty eight per cent of the kitchen had pleasing colour inside the kitchen.

b. Storage facilities

Storage is the most important factor in the creation of an orderly and attractive home. Storate in the right place saves time, saves stooping, saves stretching, saves steps, saves you! (Beall 1962).

Storage facilities prevailing in the selected households are given in Table X.

TABLE X

STORAGE FACILITIES

S.No.	Criteria	Percentage of households	
		Yes	No
1.	Adequate space	78	22
2.	Storage space with		
	(a) Open shelves	70	30
	(b) Enclosed shelves	88	12
	(c) Proper height	80	20
	(d) Proper width	76	24
3.	Enough space for		
	(a) Provisions	74	26
	(b) Vessels	98	2
	(c) Equipments	76	24

It is clear from the above Table that more than 70 per cent of the homemakers were satisfied with the storage facilities in their kitchen. Even the small kitchen had enough space for storing vessels.

c. Sanitary condition

There should beenough light to provide quick and easy seeing for the work to be done (Nickell and Dorsey 1975). Adequate water supply and effective drainage are to be added points to increase the efficiency of doing work.

The following Table XI shows the satisfaction of the homemakers regarding the sanitary condition of the kitchen.

TABLE XI

SANITARY CONDITIONS OF THE KITCHEN

S.No.	Criteria	Percentage of families	
		Yes	No
1.	Lighting and ventilation		
	a. Natural	78	22
	b. Artificial	100	--
2.	Adequate water supply	90	10
3.	Effective drainage	96	4
4.	Easy to clean		
	a. Floor	50	50
	b. Counter top	86	14
	c. Sink	72	28

It is clear that the homemakers (75 to 100 per cent) were fully satisfied with the prevailing ~~cent~~ sanitary conditions of their kitchen.

d. Comfortable working height

The height of kitchen works surfaces should be given careful attention because equipment of a comfortable height suited to the worker permits good working postures which is turn minimizes work and energy (Gilbreth 1960).

More than 80 per cent of the kitchen had cooking, washing and preparing centres of comfortable working heights. The rema ining kitchens were not having work centres of comfortable working heights.

Kitchens are of four basic types - U-type, L-type Corridor type, Side wall type.

Table XII shows the type of kitchen in the selected households.

TABLE XII

TYPES OF KITCHEN

S.No.	Type of Kitchen	Percentage of families
1.	U-type	36
2.	L-type	28
3.	Corridor	26
4.	Side wall	10

The common type of kitchens found in selected households were U-type, L-type and Corridor.

5. Concept of Motion Economic and Body Postures

This aspect includes:

(i) Motions involved

(ii) Effects on body parts

(i) Motion involved

Sixty per cent of the homemakers felt that the motion involved while cooking in the kitchen was minimum because of adequate space and proper grouping of rooms. Forty per cent of the homemakers had more number of motions while they worked in the kitchen because of inadequate

kitchen, improper grouping and inadequate storage facilities.

(ii) Effects on body parts:

Majority of the homemakers pointed out that the leg muscles and hand muscles were affected while cooking in standing position.

Back muscles along with hand and shoulder muscles were affected while doing cleaning, washing, dusting and mopping.

B. Finding of Activity Analysis:

The activities performed by the selected five homemaker were analysed using flow process chart and pathway chart for three consequtive days. The findings are presented under the following aspects.

1. Analysis of Flow process Chart
2. Analysis of Pathway Chart

1. Analysis of flow process chart.

The process chart is a device for recording a process in a compact manner, as a means of better understanding it and improving it (Barnes 1959). The chart represents

graphically the separate steps or events that occur during the performance of a piece of work during a series of actions.

Activities during the three consecutive days were analysed in non-standardised condition to know about the factors such as rate of work and work accomplished.

The flow process charts were analysed separately for each family under the following aspects:

a. Details regarding the kitchen:

The details regarding size of the kitchen, type of kitchen and the facilities like work centres, working heights, lighting and ventilation, water supply and drainage were given under each family separately.

b. Menu prepared:

The menu prepared during the three days of the study were given separately for each family. It comprises of two meals - breakfast and lunch prepared during the morning peak hours (6 a.m. - 10 a.m.).

c. Type of activities:

The type of activities during the three days of the study were examined and presented (Figures 2 to 6).

Figure 2 Cooking

Figure 3 Serving

Figure 4 Cleaning

Figure 5 Care of family members

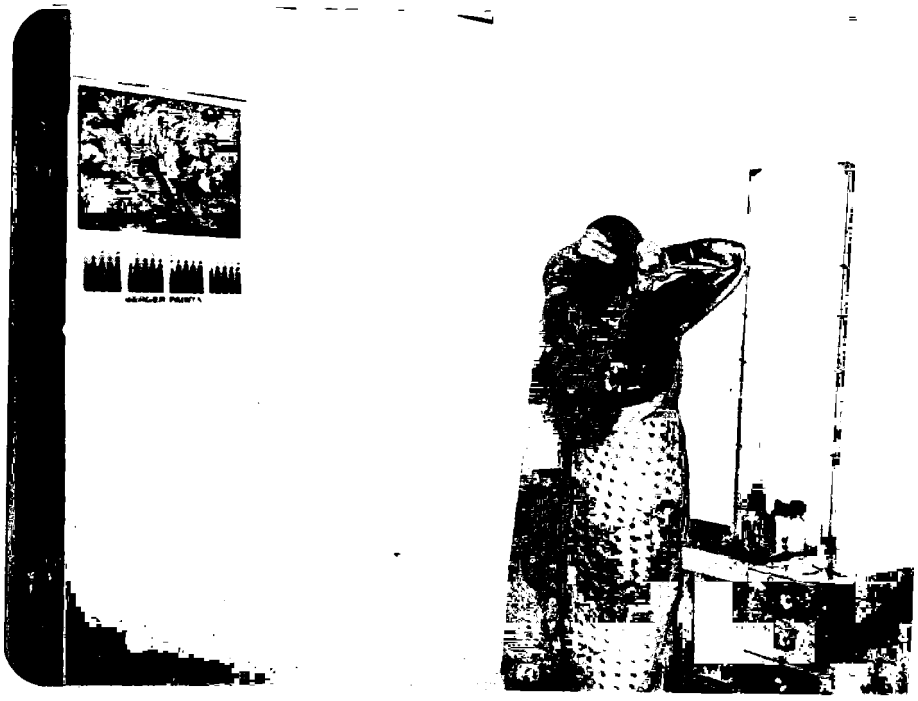


Figure 6 Personal Care

d. Analysis of process chart:

The work analysed using flow process chart for three days in each family. The charts were analysed and discussed to know about the motions occured (movement, operation, delay and inspection) and time used. This involves the following aspects:

(i) Time used for each activity

(ii) Motions occured

(iii) Comparison of average time used for various activities by selected homemakers.

(iv) Comparison of average motions occured in performing various activities by the selected homemakers.

2. Analysis of Pathway Chart:

This consists of the following aspects:

a. Distance travelled while performing different activities:

This includes total distance travelled during peak hours and the distance travelled to perform each activity.

b. Average distance travelled by the selected homemakers:

Average distance travelled to perform each activity by the selected homemakers was compared.

c. Trips between centres:

Total number of trips made between the centres while making pathway charts for each family are presented.

FAMILY I

There were three members - husband, wife and 6 year old boy. The head of the family had studied upto college and the homemaker had studied upto higher secondary. The age of the homemaker was 32 years.

(a) Details regarding the kitchen:

(i) Size of kitchen: 12' X 8'

(ii) Type of kitchen: L shape (Figure 7)

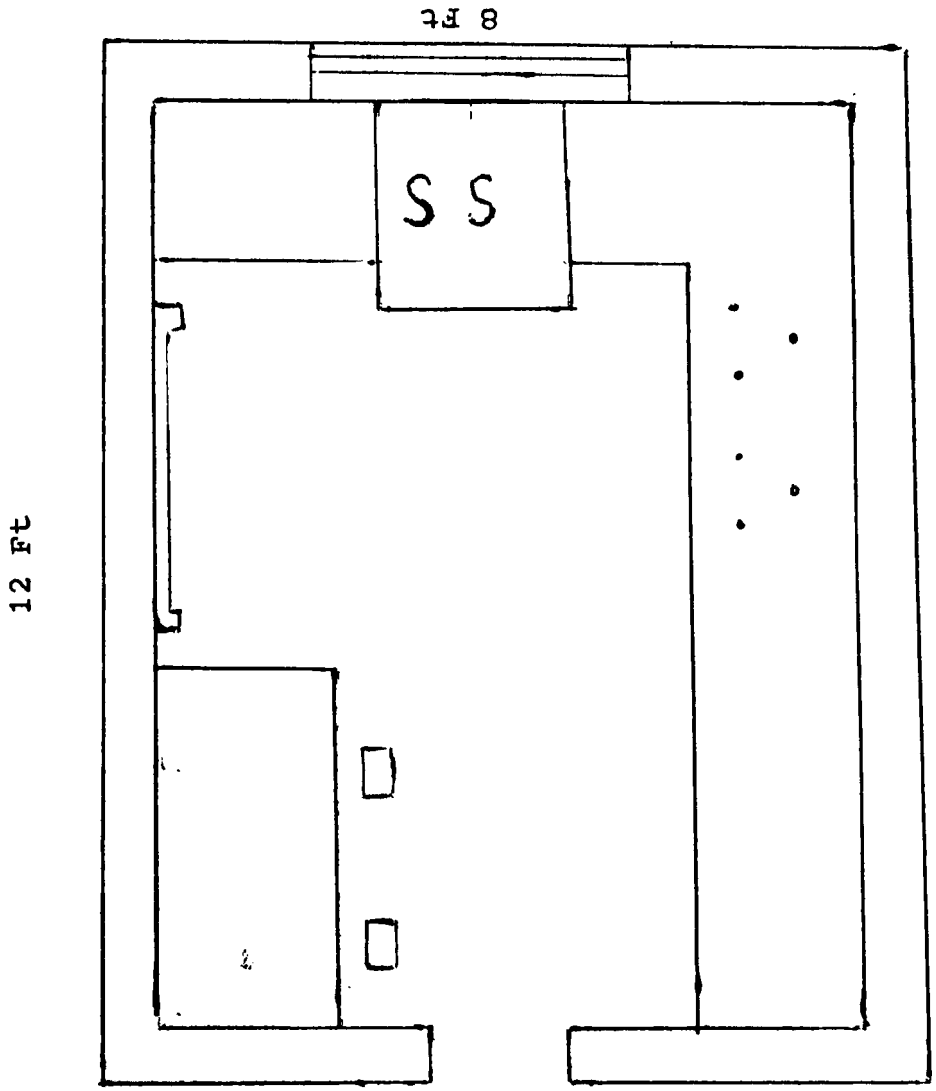
(iii) The following facilities were available:

- Three working centres with comfortable working heights
- Proper lighting and ventilation (Natural and Artificial)
- Enough water supply
- Effective drainage
- Easy to clean work surfaces

(b) Menu Prepared:

The menu prepared for three days are given in Table XIII.

1 c.m.= 1 Feet



Key

W - Window

.•.- Chulah

SS - Sink

B.C- Builtin Cupboard

P.P- Preparation centre

Figure - 7

TABLE XIII

MENU PREPARED

S.No.	Meal	Menu prepared		
		I day	II day	IIIday
1.	Morning	Coffee	Coffee	Coffee
2.	Breakfast	Uppuma	Idli, Groundnut chutny	Idli, Peas Kolumbu
3.	Lunch	Rice, Keerai masial, Rasam, Brinjal porial	Rice, Bitter-gourd kolumbu, Beans porial	Rice, Rasam, Peas kolumbu, Cabbage porial.

The change in the menu affected the time used and number of motions occured.

c. Type of activity:

It is clear that the activities performed during the past peak hours were cooking - breakfast and lunch, serving breakfast to the family members and packing lunch, cleaning vessels and kitchen, care of family members and personal care.

d. Analysis of process chart:

(i) Time used for each activity:

The time used for performing each activity during the three days is given in Table XIV.

TABLE XIV

TIME USED FOR EACH ACTIVITY

S.No.	Activities	Time used (in minutes)			
		Days			
		I	II	III	Average
1.	Cooking	140	130	120	130
2.	Serving	25	30	25	27
3.	Cleaning	20	30	30	28
4.	Care of family members	40	35	30	35
5.	Personal care	10	15	15	13

Except cooking all other activities consumed almost same amount of time on all three days. The time taken for cooking differed because of change in menu.

(ii) Motions occured

Motions occurred for performing activities on three days are given in Table XV

TABLE XV

MOTIONS OCCURRED

S.No.	Motion	Number of time eah motion occurred			
		Days			
		I	II	III	Average
1.	O-Movement	105	110	133	115
2.	◯-Operation	255	358	321	311
3.	▽-Delay	43	40	34	39
4.	□-Inspection	21	22	19	20

The above Table shows that there was variation in operation on three days because of change in the menu.

FAMILY II

There were four members - husband, wife, eight years old girl and seven years old boy. The head of the family had studied upto P.U.C. and the homemaker had studied upto high school. The age of the homemaker was 33 years.

(a) Details regarding the kitchen

(i) Size of the kitchen: 10' X 8'

(ii) Type of kitchen: Side wall (Figure 8)

(iii) The following facilities were available:

- Three work centres with comfortable working heights
- Proper lighting and ventilation (Natural and artifical)
- Enough water supply
- Effective drainage
- Easy to clean work surfaces.

(b) Menu prepared:

The menu prepared for three days are given in Table XVI.

2 cm = 1 Feet

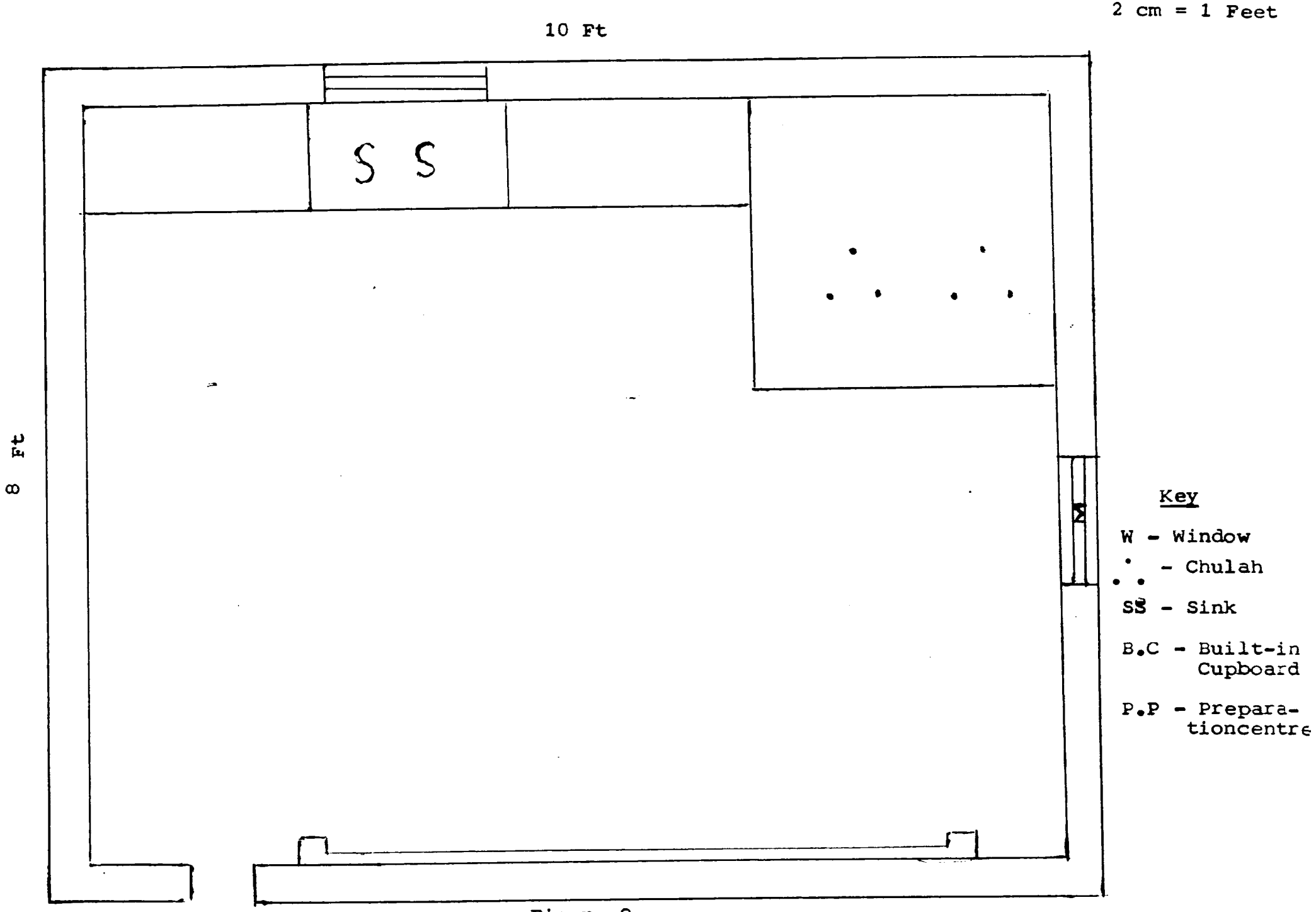


Figure 8

TABLE XVI

MENU PREPARED

S.No.	Meal	Menu prepared		
		I day	II day	III day
1.	Morning	Coffee	Coffee	Coffee
2.	Breakfast	Idli,chutny	Idli,chutny	Semiya uppuma
3.	Lunch	Rice, dhal, Rasam, Carrot Porial	Rice,Ladies finger kolumbu Avarakkai Porial	Rice, Green gram Dhal, Rasam,Beetroot Porial

The type of menu affected the time needed for cooking.

(c) Type of activity:

Cooking, serving, cleaning, care of family members and personal care were the common activities performed during the peak hours on three days.

(d) Analysis of process chart:

(i) Time used for each activity.

The time used for carrying out each activity is given in Table XVII.

TABLE XVII

TIME USED FOR EACH ACTIVITY

S.No.	Activities	Time used (in minutes)			
		Days			
		I	II	III	Average
1.	Cooking	155	150	130	145
2.	Serving	25	20	30	25
3.	Cleaning	25	20	40	28
4.	Care of family members	30	40	35	35
5.	Personal care	10	10	15	12

Because of change in menu on the third day the time taken for cooking was reduced when compared to the first two days.

(ii) Motions occurred

The motions occurred for doing different activities on three days are given in Table XVIII.

TABLE XVIII

MOTIONS OCCURRED

S.No.	Motion	Number of time each motion occurred			
		Days			
		I	II	III	Average
1.	○-Movement	93	73	116	94
2.	◯-Operation	202	170	196	189
3.	▽-Delay	48	35	41	41
4.	□-Inspection	11	11	17	13

Because of the easy breakfast on the third day extra time was spent on cleaning the kitchen involving more movement on that day when compared to other two days.

FAMILY III

There were three members - husband, wife and six year old boy. The head of the family had studied upto P.U.C. and the homemaker and studied upto high school. The age of the homemaker was 25 years.

(a) Details regarding the kitchen:

(i) Size of the kitchen: 8' X 8'

(ii) Type of kitchen:side wall (Figure 9).

(iii) The following facilities were available:

- Only two work centres - washing centre outside the kitchen.
- Proper lighting and ventilation
- No water supply inside the kitchen.

(b) Menu prepared:

The Menu prepared on three days are given in Table XIX

2 cm = 1 Feet

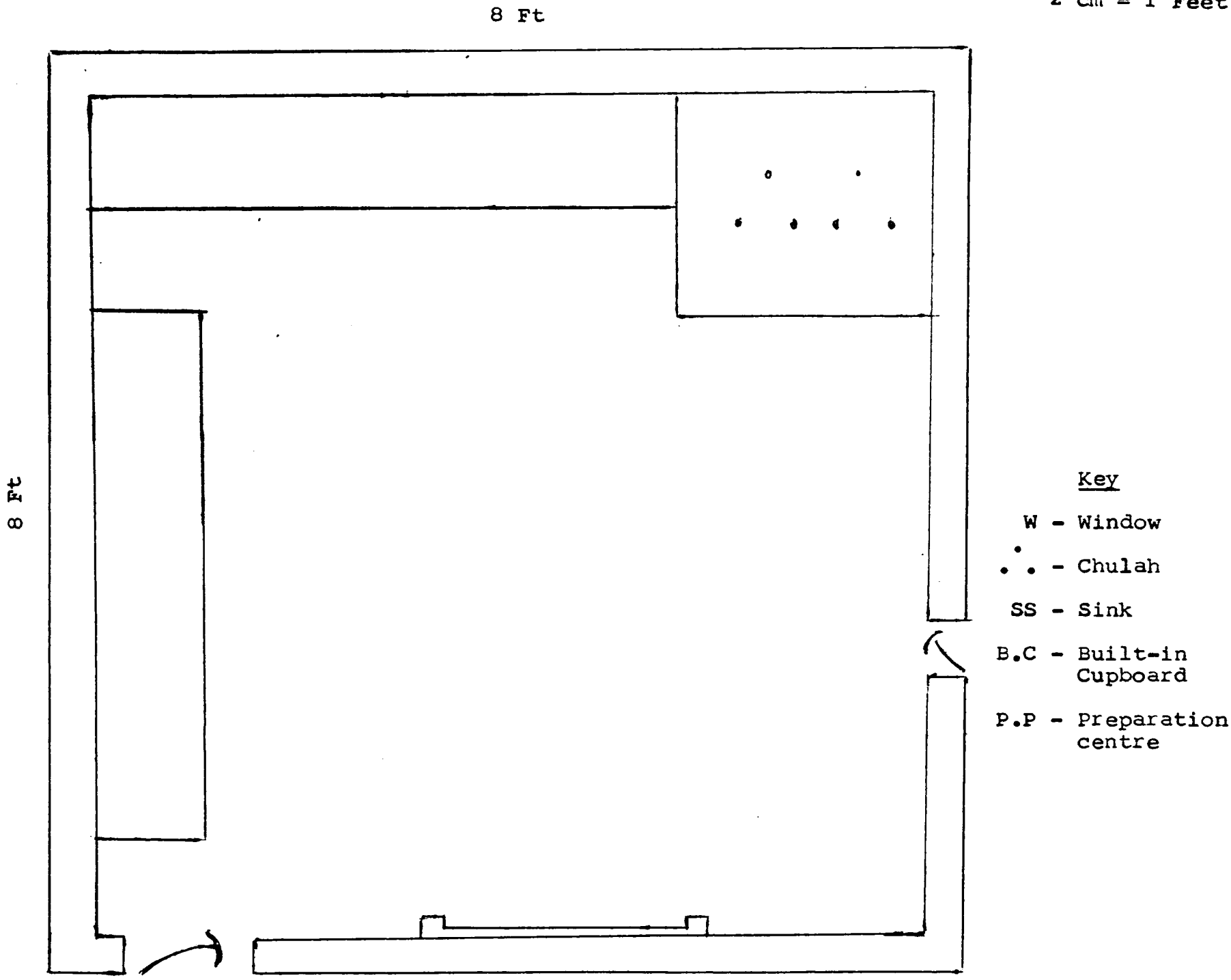


Figure - 9

TABLE XIX

MENU PREPARED

S.No.	Meals	Menu prepared		
		Days		
		I	II	III
1.	Morning	Coffee	Coffee	Coffee
2.	Breakfast	Idli, chutny	Uppuma	Tomato rice, Plainrice, Cabbage porial
3.	Lunch	Rice, drum-stick sambar Rasam	Rice, Dhal Rasam, Applam	Same as breakfast

Same items were prepared on the third day for breakfst and lunch the extra time was spent on other activities.

c. Type of activities:

Along with cooking, serving, cleaning, care of family members and personal care, coaching the child for the examination was also carried out.

d. Analysis of process chart:

(i) Time used for each activity:

Time spent on various activities on three days is given in Table XX

TABLE XX

TIME USED FOR EACH ACTIVITY

S.No.	Activities	Time used (in minutes)			
		Days			
		I	II	III	Average
1.	Cooking	110	105	85	100
2.	Cleaning	40	35	40	38
3.	Serving	20	25	35	27
4.	Care of family members	45	30	65	47
5.	Personal care	20	10	20	17

Time taken for cooking on the third day was less because same items were prepared both for breakfast and lunch. The extra time was spent on care of family members - preparing the child for the examination.

(ii) Motions occurred

The motions occurred for performing different activities on three days are given in Table XXI

TABLE XXI

MOTIONS OCCURRED

S.No.	Motion	Number of time each motion occurred			
		Days			
		I	II	III	Average
1.	○-Movement	84	76	111	90
2.	◯-Operation	182	175	164	173
3.	▽-Delay	33	25	33	30
4.	□-Inspection	8	8	14	10

More number of movements were involved on the third day since the homemaker had to give attention to the child prepare him for the examination.

FAMILY IV

There were four members - husband, wife, six year old boy and three year old girl. Both the head and the homemaker had B.Sc. degree. Age of the homemaker was 27 years.

a. Details regarding the kitchen:

(i) Size of the kitchen: 10' X 8'

(ii) Type of kitchen: L shape (Figure 10).

(iii) The following facilities were available :

- Three work centres with comfortable working height
- Proper lighting and ventilation (Natural and artifical)
- Enough water supply
- Effective drainage
- Easy to clean work surfaces.

(b) Menu prepared:

The menu prepared for three days are given in Table XXII.

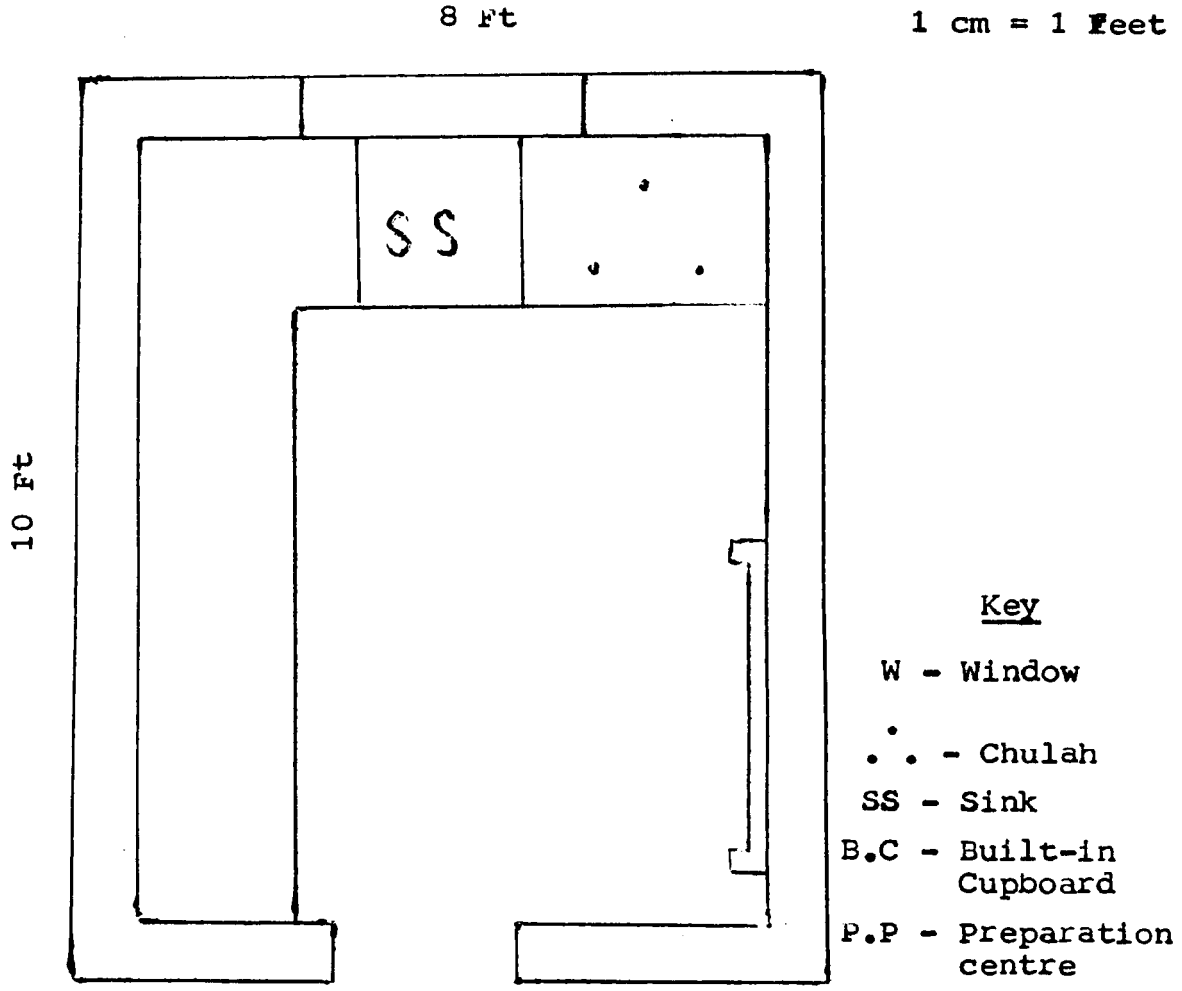

8 Ft
1 cm = 1 Feet
10 Ft
S S
Key
W - Window
. . . - Chulah
SS - Sink
B.C - Built-in Cupboard
P.P - Preparation centre

Figure - 10

TABLE XXII

MENU PREPARED

S.No.	Meals	Menu prepared		
		Days		
		I	II	III
1.	Morning	Coffee	Coffee	Coffee
2.	Breakfast	Ravauppuma	Idli, chutny	Vermicelli Uppuma
3.	Lunch	Rice, dhal, Rasam, plantain prial	Tamarind rice, Beetroot porial	Rice, brinjal Kolumbu, rasam, beans porial

The above Table shows that when they had simple breakfast more items were included in lunch and vice-versa.

c. Type of activity:

The activities performed during the peak hours were cooking, serving, cleaning, care of family members and personal care.

d. Analysis of process chart:

i. Time used for each activity

Time used for performing different activities. is given in Table XXIII.

TABLE XXIII

TIME USED FOR EACH ACTIVITY

S.No.	Activities	Time used (in minutes)			
		Days			
		I	II	III	Average
1.	Cooking	100	115	120	117
2.	Cleaning	40	25	30	32
3.	Serving	30	20	20	23
4.	Care of family members	45	35	50	43
5.	Personal care	10	5	10	8

There was not much difference in time used on three days since there was no variation in the menu.

(ii) Motions occurred

Motions occurred in performing different activities are given in Table XXIV.

TABLE XXIV

MOTIONS OCCURRED

S. No.	Motion	Number of time each motion occurred			
		Days			
		I	II	III	Average
1.	○-Movement	107	99	109	105
2.	◯- Operation	252	256	285	264
3.	▽-Delay	47	36	44	42
4.	□-Inspection	16	10	17	14

There was very little variation in all the motions involved on three days because of less difference in the three menu.

FAMILY V

There were four members - husband, wife, eight year old girl and six year old boy. The head of the family had B.Sc. degree and the homemaker had studied upto higher secondary. The age of the homemaker was 33 years.

(a) Details regarding the kitchen:

(i) Size of the kitchen: 10' X 11'

(ii) Type of kitchen: side wall (Figure 11).

(iii) The following facilities were available:

- Three work centres with comfortable working heights.
- Proper lighting and ventilation (Natural and artificial)
- Enough water supply
- Effective drainage
- Easy to clean work surface.

(b) Menu prepared:

The menu prepared for three days are given in Table XXV.

1 cm = 1 Feet

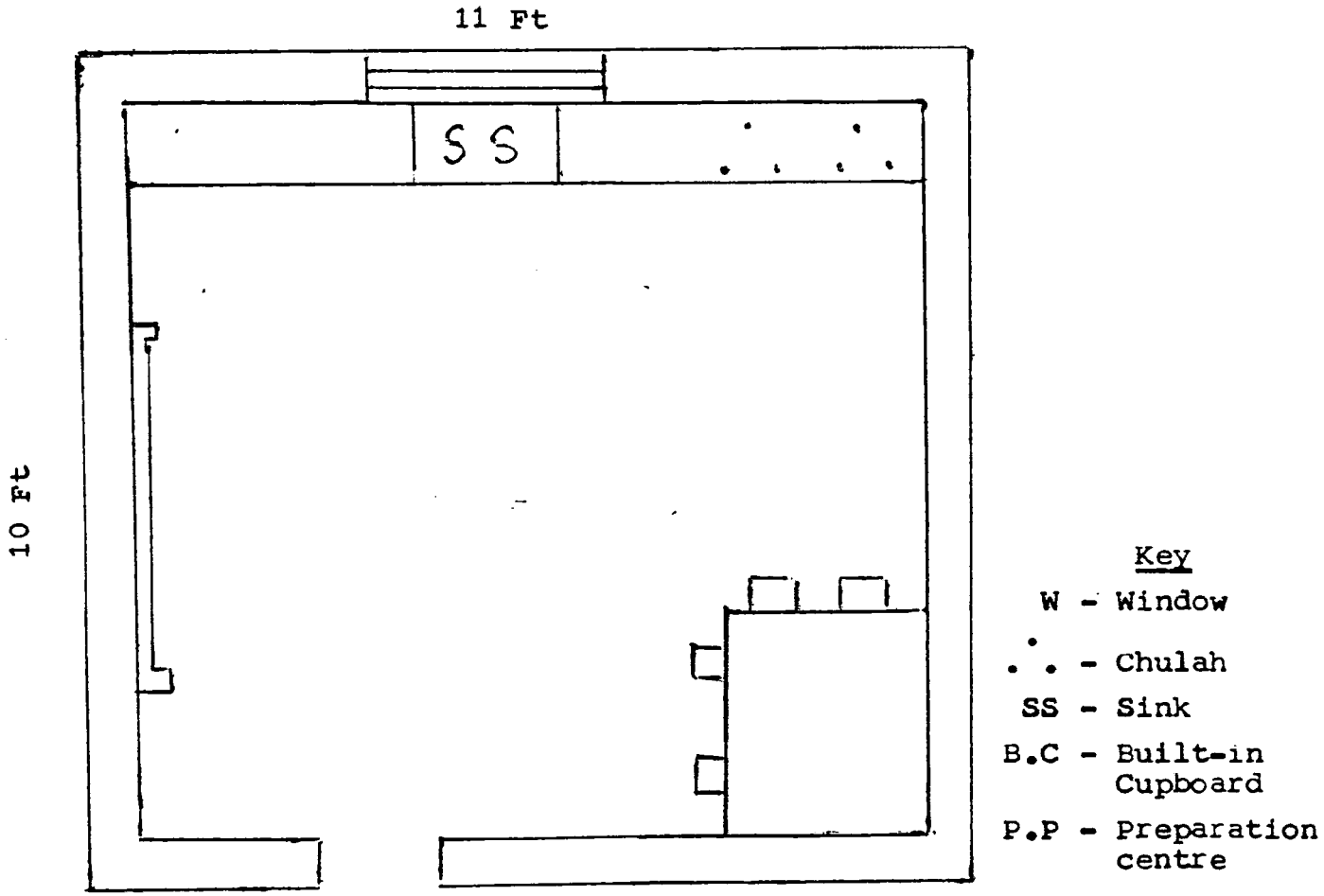


Figure - 11

TABLE XXV

MENU PREPARED

S.No.	Meals	Menu Prepared		
		Days		
		I	II	III
1.	Morning	Coffee	Coffee	Coffee
2.	Breakfast	Poori, Masal	Idli, Tomato kuruma	Idli, Chutny
3.	Lunch	Coconut rice, Carrot porial	Rice, Tomato kuruma, Rasam, Beans porial	Rice, horse gram dhal, Rasam, Appalam

In order to simplify the work on the second day same kuruma was made both for breakfast andlunch.

c. Type of Activities:

Cooking, serving, cleaning, careof family members and personal care were the common activities performed during the peak hours.

d. Analysis of process chart:

(i) Time used for each activity:

Table XXVI presents the time spent on various activities.

TABLE XXVI

TIME USED FOR EACH ACTIVITY

S.No.	Activities	Time used (in minutes)			
		Days			
		I	II	III	Average
1.	Cooking	120	110	130	120
2.	Serving	30	20	20	23
3.	Cleaning	35	40	30	35
4.	Care of family members	25	30	35	30
5.	Personal care	5	10	10	8

The time saved by using the same item for breakfast and lunch was utilised in cleaning and arranging the kitchen schelves.

(ii) Motions occurred

Motions occurred while performing the activities are given in Table XXVII.

TABLE XXVII

MOTIONS OCCURRED

S.No.	Motion	Number of time each motion occurred			
		Days			
		I	II	III	Average
1.	○ -Movement	115	111	110	112
2.	◯ -Operation	303	304	306	304
3.	▽ -Delay	44	42	57	48
4.	□ -Inspection	12	15	9	12

Movements and operations involved were nearly the same for three days. There was an increase in delays and decreases in inspection when compared to the previous days..

(iii) Comparison of average time used for various activities:

The average time used for performing various household activities by the selected homemakers during the peak hours is given in Table XXVIII and Figure 12.

Figure 12
TIME USED FOR EACH ACTIVITY

TABLE XXVIII

AVERAGE TIME USED FOR VARIOUS ACTIVITIES

S.No.	Activities	Time used (in minutes)				
		Homemakers				
		I	II	III	IV	V
1.	Cooking	130	145	100	112	120
2.	Serving	27	25	27	23	23
3.	Cleaning	28	28	38	32	35
4.	Care of family members	35	35	47	43	30
5.	Personal care	13	12	17	8	8

It is clear from the above Table that the first two homemakers spent more time on cooking because of the elaborate menu on all the three days when compared to other three homemakers. The third homemaker was very conscious about reducing time on cooking by cutting down number of items in the menu and preparing same item both for breakfast and lunch. She could spend more time on other activities like cleaning, care of family members and personal care.

(iv) Comparison of average motions occurred in performing various activities:

Average motions occurred in performing various activities by the selected homemakers are given in Table XXIX and Figure 13.

TABLE XXIX

AVERAGE MOTIONS OCCURRED

S.No.	Motions	Number of time each motion occurred				
		Homemakers				
		I	II	III	IV	V
1.	-Movement	115	94	90	105	112
2.	-Operation	311	189	173	264	304
3.	-Delay	39	41	30	42	48
4.	-Inspection	20	13	10	14	12

Movements involved, operation done, delay and inspection were less in the case of homemaker III when compared to other families.

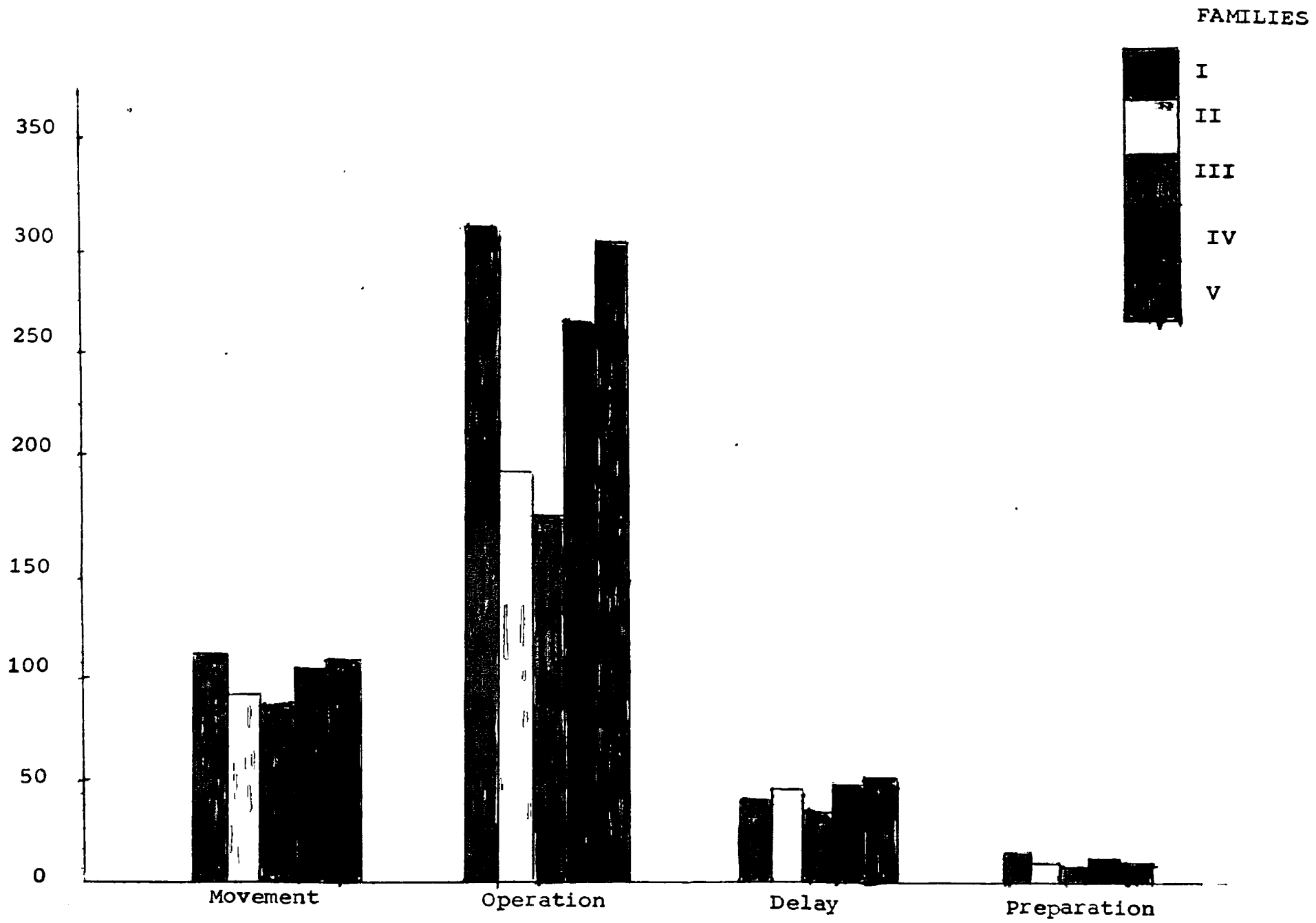


Figure - 13
AVERAGE MOTIONS OCCURRED

2. Analysis of Pathway Chart

a. Total distance travelled while performing different activities:

Table XXX shows the total distance travelled while performing different activities by the selected homemakers.

TABLE XXX

TOTAL DISTANCE TRAVELLED

S.No.	Families	Size of kitchen	Total distance travelled (in feet)			
			Days			
			I	II	III	Average
1.	I	12' X 8'	944	795	945	895
2.	II	10' X 8'	930	837	857	908
3.	III	8' X 8'	975	857	888	908
4.	IV	10' X 8'	925	890	955	923
5.	V	10' X 11'	970	940	962	957

The above Table indicates that the average total distance travelled by the homemaker in the fifth house was more because the kitchen was larger when compared to other houses. On an average upto 960 feet distance was covered while perfoming the activities.

b. Average distance travelled for each activity:

Average distance travelled for performing various activities by the homemakers is given in Table XXXI and Figure 14.

TABLE XXXI

AVERAGE DISTANCE TRAVELLED FOR EACH ACTIVITY

S.No.	Activities	Distance travelled (in feet)				
		Families				
		I	II	III	IV	V
1.	Cooking	654	716	705	773	738
2.	Serving	61	48	42	22	36
3.	Cleaning	75	64	68	32	54
4.	Care of family members	65	53	59	49	79
5.	Personal care	40	29	34	47	51

Average distance travelled for cooking varied from 654 feet to 773 feet. The first homemaker travelled minimum distance because of the compact and well set kitchen with all facilities inside.

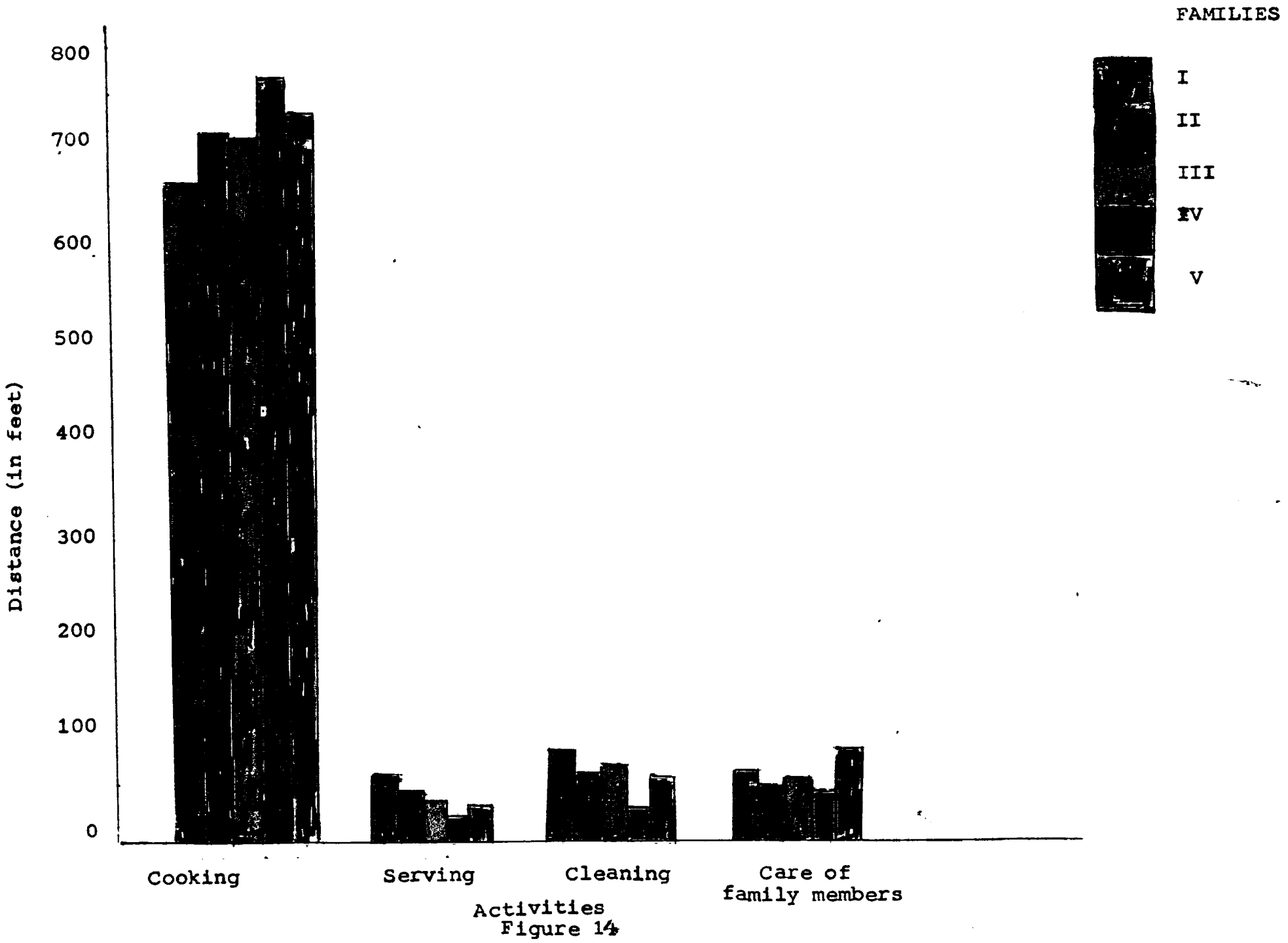


Figure 14

DISTANCE TRAVELLED FOR EACH ACTIVITY

c. Trips between centres.

The number of trips made between each work centre is shown in Table XXXII.

TABLE XXXII

TRIPS BETWEEN CENTRES

S.No.	Centres	Trips between centres				
		Homemakers				
		I	II	III	IV	V
1.	Cooking preparation	7	10	7	9	9
2.	Preparation be washing	7	8	6	7	9
3.	Washing to cooking	8	8	8	7	8

More number of trips were made between cooking and preparation and washing and cooking when compared to preparation and washing.

C. Improved Method of Work Performance

Necessary modifications were made after careful study of theflow process chart. The selected homemaker was requested to carry out the improved method of work performance after getting used to it. The findings are given under the following aspects:

1. Motions occurred in original and improved methods
2. Time used for each activity in original and improved method
3. Distance travelled in original and improved method.

1. Number of motions occurred in original and improved method.

Number of times each type of motion occurred is given in Table XXXIII and Figure 15.

TABLE XXXIII

NUMBER OF MOTIONS OCCURRED

S.No.	Motions	Number of times each motions occurred		Difference
		Original	Improved	
1.	o-Movement	115	48	67
2.	○-Operation	321	131	190
3.	▽-Delay	34	6	28
4.	□ Inspection	19	7	12
	Total	489	192	297

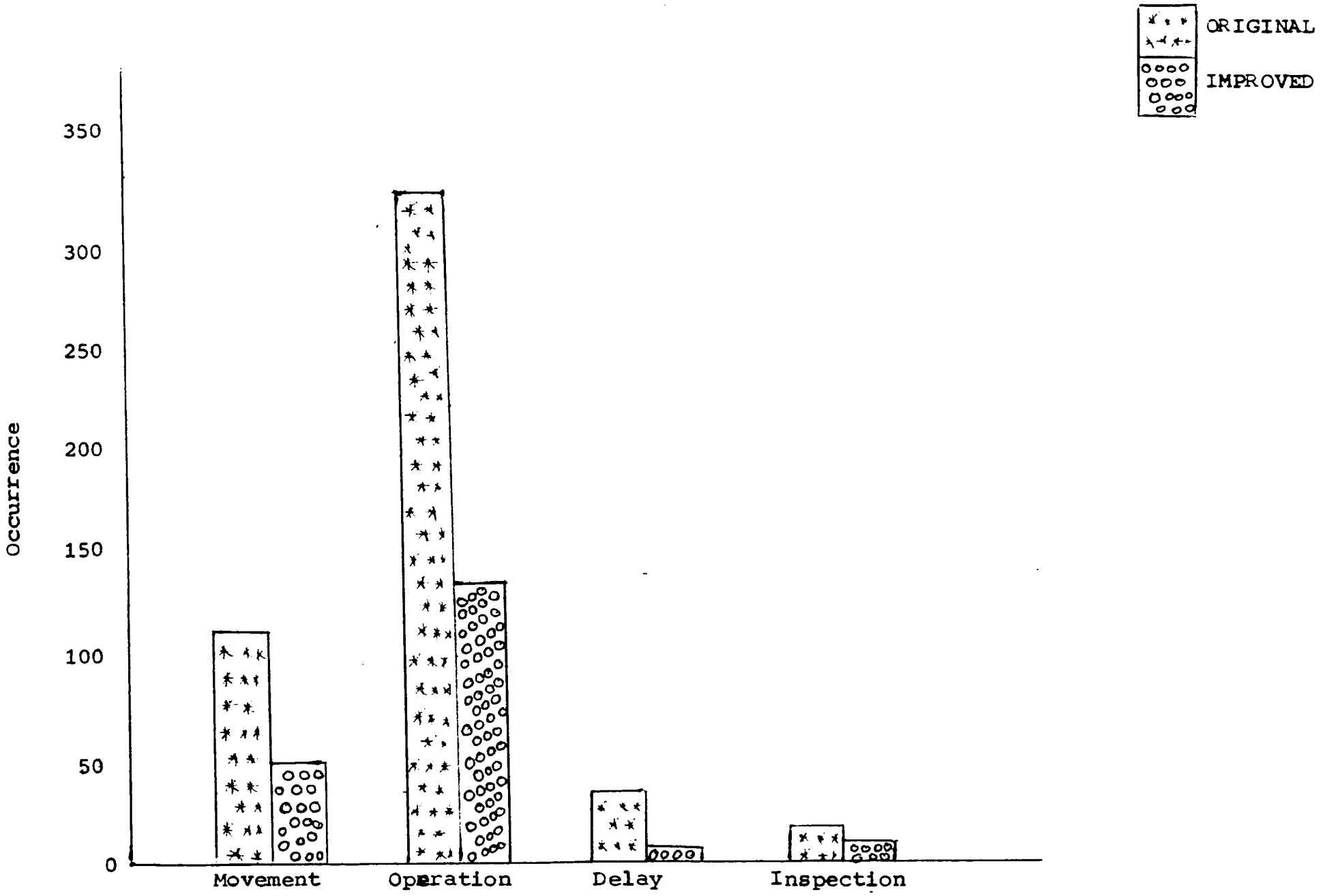


Figure 15

MOTIONS OCCURRED

Sixty seven movements were reduced by keeping necessary items in its place (Class II; change in work and storage space and equipment). For example water for drinking, salt and sugar were kept on the dining table before serving. Water for cooking and seasoning items were kept near the cooking range. The homemakers was able to save about 61 per cent of steps involved.

Insisting the homemaker to use the pressure cooker for cooking not only rice but also dhal and vegetables at a time, brought out dramatic results of reducing 190 operations.

Number of delays and inspections were also reduced by effective routing of logical direction of the sequence of steps from the beginning until the completion of the task.

2. Time used for each activity in original and improved method:

Time used for performing various activities in original and improved method is given in Table XXXIV and Figure 16.

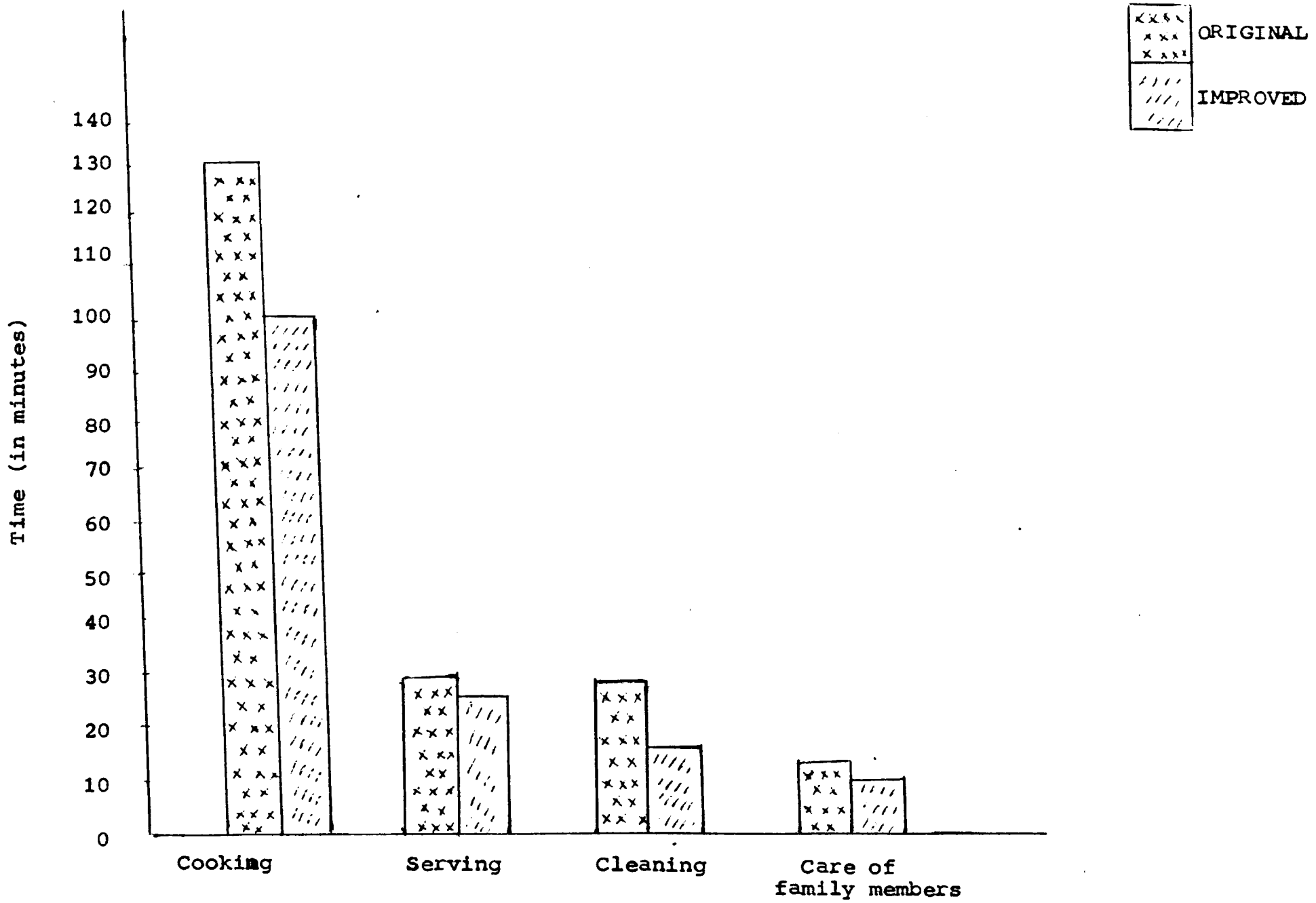


Figure 16
TIME USED FOR EACH ACTIVITY

TABLE XXXIV

TIME USED FOR EACH ACTIVITY

S.No.	Activities	Time used in minutes		Percentage of time saved
		Original	Improved	
1.	Cooking	130	100	21.5
2.	Cleaning	28	25	10
3.	Serving	27	15	47
4.	Care of family members	35	35	-
5.	Personal care	13	10	21.5
	Total	233	185	100.0

It is clear that more percentage of time was saved in cooking (21.5 per cent) and in serving (47 per cent). Use of pressure cooker for cooking dhal, rice and vegetables and cutting vegetables previous night reduced cooking time. Keeping necessary items on the serving table reduced unnecessary walking and serving time. The homemaker was able to save about 21 per cent of the total time.

3. Distance travelled in original and improved method

Distance travelled to perform various household activities in original and improved method is given in Table XXXV and Figure 17.

TABLE XXXV

DISTANCE TRAVELLED

S.No.	Activity	Distance travelled in feet		
		Original	Improved	Difference
1.	Cooking	654	235	419
2.	Serving	61	47	14
3.	Cleaning	75	57	18
4.	Care of family members	65	32	33
5.	Personal care	40	26	14
	Total	895	397	498

Considerable amount of difference in distance travelled was found out for cooking (419 feet) and serving (14 feet). The improvements made were to keep necessary items near by cooking range, using tray for carrying many items at a time to the serving table and keeping necessary items on the serving table. The homemaker was able to save about 56 per cent of total distance travelled.

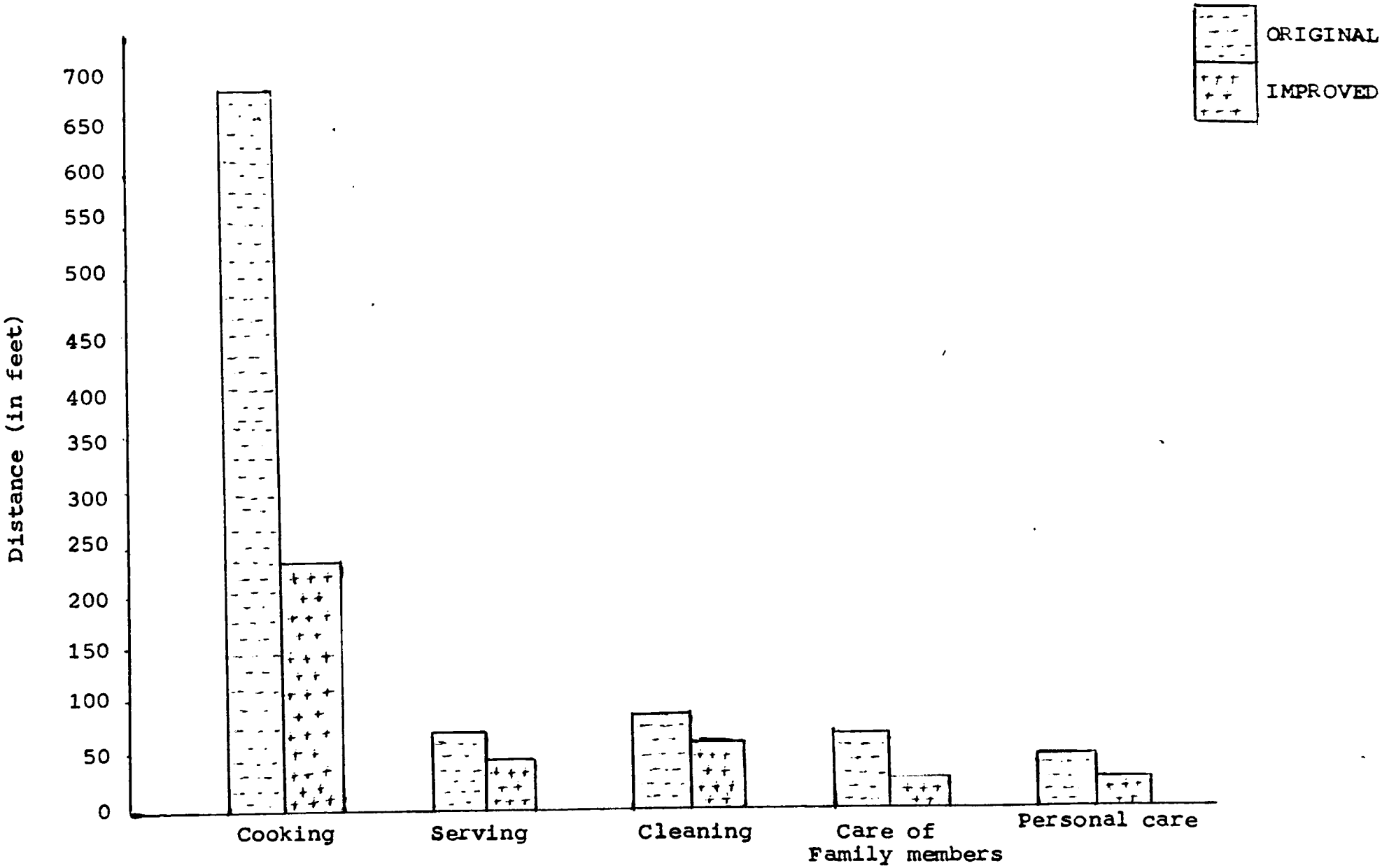


Figure 17

DISTANCE TRAVELLED FOR EACH ACTIVITY

Summary and Conclusion

V SUMMARY AND CONCLUSION

The study on "Analysis of Work Performance by the Homemakers" consists of three aspects:

A. The household survey was conducted in 50 families in the city of Coimbatore.

B. The various activities performed during the peak hours (6 a.m. to 10 a.m.) by the selected five homemakers were analysed using flow process chart and pathway chart.

C. Method of work performance was improved after careful study of flow process chart. One homemaker was selected to implement the improved method to perform household activities.

The study highlights the following major points:

A. Household Survey:

1. Eighty per cent of the selected families belonged to nuclear family. The majority of the age of male and female members ranged between 10 and 40 years. Forty per cent and 37 per cent of the homemakers were studied upto high school and college level respectively. Majority of the heads

of the selected families were business men. Fifty two per cent of the families belonged to high income group.

2. Thirty eight per cent of the selected homemakers were planning work in advance in order to complete the work quickly in time. Sixty four per cent of the selected homemakers were having part time servants.

3. Thirty four per cent of the homemakers expressed that performing household activities was an interesting job. Twenty eight and 34 per cent felt that doing household activities was boring and mechnical respectively due to the repetitive nature of the work.

4. A majority of homemakers expressed that cooking was a moderate activity.

5. Uncomfortable working height and improper lighting and ventilation were the important factors which affected the work performance.

6. Fifty eight per cent of the homemakers spent 5 to 6 hours on cooking ~~on~~ the three meals a day. Ninety four per cent of the homemakers spent more time (3 to 4 hours) in the morning inside the kitchen.

7. Forty four per cent of the selected households had separate kitchen. Eighty per cent of the homemakers had adequate kitchen. Sixty two per cent of the kitchen had three works centres with proper placement.

All the kitchen were free from external disturbing factors.

8. More than 70 per cent of the homemakers were satisfied with the storage facilities in the kitchen. The homemakers were fully satisfied with the prevailing sanitary conditions of their kitchen.

9. More than 80 per cent of the kitchen had three work centres with comfortable working heights.

10. The common types of kitchen found in selected households were U-type, L-type and corridor.

11. Sixty per cent of the homemakers felt that working in the kitchen involved minimum motions. The reasons for having more number of motions were inadequate kitchen, improper grouping and inadequate storage facilities.

12. The leg muscles and hand muscles were affected while cooking in standing position.

B. Activity Analysis:

The analysis of flow process charts revealed the following:

1. The activities performed during the peak hours were cooking - breakfast and lunch, serving breakfast to the family members and packing lunch, cleaning vessels and kitchen, care of family members and personal care.

2. Hundred to 145 minutes were spent on cooking. Time required for cooking varied based on the type of menu.

3. Number of time each motion occurred varied depending upon the type of activity, type of menu and method of performance of the activities.

The analysis of pathway chart revealed that total distance travelled during peak hours by the selected homemakers ranged from 895 feet to 957 feet. Size of kitchen, placement of work centres, height of the work centres, arrangement of things in the work centres, facilities in the kitchen and number and age of children were some of the factors which affect the distance travelled while performing household activities.

C. Improved Method of Work Performance:

There was a considerable amount of reduction in number of times each motion occurred (61 per cent) total time used for performing various activities (21

per cent) and distance travelled (56 per cent) while performing the activities. Arranging items in each centre using proper tools and equipment and planning work in advance were some of the modifications introduced in improved method of work performance.

The study reveals that the type and size of kitchen, facilities in the kitchen such as work centres, water supply, lighting and ventilation, type of menu, way of working and number of members in the family were affecting the work performance of the selected homemakers.

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Appendix

APPENDIX - I

AN INTERVIEW SCHEDULE TO ELICIT INFORMATION ON "ANALYSIS OF WORK PERFORMANCE BY SELECTED HOMEMAKERS"

1. Name of the Interviewer:

2. Name of the Interviewee:

Place:
Date :

3. House Address :

4. General family Background:

a. Type of family: Nuclear/Joint

b. Background information:

S. No.	Name of the members	Relation with head	age	Sex	Education	Occupation	Income per month

5. Do you plan your work?

Yes ☐ No ☐

Reasons:

6. Type of plan:

Mental ☐ Daily ☐

Written ☐ Weekly ☐

Another ☐

7. Are you able to complete your work as you planed:?

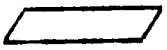
Yes ☐ No ☐

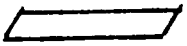
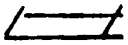
Reasons:

8. Do you employ servant?

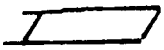
Yes ☐ No ☐

9. If yes:

Number 

Part time  Full time 

10. Activities done by the servant

11. Pay Rs. 

12. Attitude towards household work:

a. Interesting

b. Boring

c. Mechanical

d. Strenuous

Reasons:

13, Opinion of doing household work:

S.No.	Activities	Light	Moderate	Heavy
1.	Cooking			
2.	Cleaning			
3.	Dusting			
4.	Mopping			
5.	Washing			

14. As per experience list the factors affecting work performance measures taken to rectify.

S.No.	Factors	Measures

15. Approximate time spent on selected activities

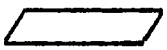
S.No.	Activities	Time spent

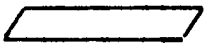
16. Which part of the day spent more time in the kitchen and approximate time?

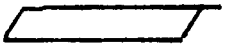
Part of the day	Approximate time

17. Details regarding kitchen

a. Do you have

(i) Separate kitchen 

(ii) Kitchen cum dining 

(iii) Kitchen cum storage 

b. Do you have the following facilities in the kitchen?

S.No.	Criteria	Yes	No
1.	Enough space		
2.	Three work centres		
3.	Proper placement of work centres		
4.	Adequate space for equipment		

S.No.	Criteria	Yes	No
5.	Adequate storage space with		
	(i) Proper height		
	(ii) Proper width		
	(iii) Open shelves		
	(iv) Enclosed		
6.	Proper lighting and ventilation		
	1. Natural		
	2. Artificial		
7.	Enough water supply		
8.	Effective drainage		
9.	Enough space for		
	(i) Provisions		
	(ii) Vessels		
10.	Proper plug points for equipment		
11.	Comfortable working heights for		
	(i) Cooking		
	(ii) Washing		
	(iii) Preparing		
12.	Pleasing atmosphere		
	(i) Color		
	(ii) Noise free		

S.No.	Criteria	Yes	No
13.	Easy to clean		
	(i) Floor		
	(ii) Counter top		
	(iii) Sink		

18. What is your general opinion of your kitchen?

(i) Adequate ☐

(ii) More space ☐

(iii) Very small ☐

(iv) Away from dining ☐

19. Do you feel that you are walking too much when you work?

Yes ☐ No ☐

Reasons:

20. Give suggestions to lessen your walking distance.

21. Which part of the body is affected when you do different activities?

Activities	Part of the body	Reasons	Measures to rectify
Cooking			
Cleaning			
Washing			
Dusting			
Mopping			

22. Kitchen plan with measurement.

APPENDIX II

PROCESS CHART

S. No.	Distance in feet	Time in minutes	Chart Symbols				Process description
			Movement	Operation	Delay	Inspection	