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Health Effect of Prolonged Standing Posture While Toiling in Kitchens

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ABSTRACT- Kitchen is an important part of house, healthy and nutritious food for family is prepared and cooked, which provides energy to family. It gives energy makes happy, if not, that receives negative energy starts to affect you physically and mentally. It also can affect health. In ancient times many activities were done, like washing utensils, preparing food, etc. Nowadays a kitchen has become a compact, efficient, safe, and easy place to work and is primarily based on sun and wind direction. The posture we adopt during daily cooking plays a vital role in our long-term musculoskeletal health. Traditional kitchens, where people often cook in a sitting position on floor, promote postures that reduce continuous stress on the back and knees, especially for those used it. The study implies that designers need to be educated about the importance of implementing design standards for better health, comfort, and convenience and to improve work efficiency.

KEYWORDS- Kitchen, Design, Good Posture, Standard, Health Effect, Better Health

I. INTRODUCTION

The posture we adopt during daily cooking plays a vital role in our long-term musculoskeletal health. Traditional kitchens, where people often cook in sitting position on floor, promote postures that reduce continuous stress on back and knees, especially for those who used it daily.
In kitchen need to have to move freely, all the materials are in hand, reaching easier cabinets and tirelessly which is not achieved satisfactorily by women. Repetitive movements effect on muscles stress.
The study was conducted in Maharashtra state observation were made in all kitchens to understand existing kitchen. It was found that all kitchens are place in right direction east and have good ventilation.
Designer takes into account the user's capabilities and finds methods that make task easier in kitchen area. Total 40 users participated in study. The questioner has been designed to give information as to how to standing posture effect on health while managing the daily routine activities.

II. EVOLUTION OF INDIAN KITCHEN

The study implies that designers need to educate about importance of implementing design standards for better health, comfort, convenience and to improve work efficiency [3].
The study was conducted in Pune Maharashtra state. Observation was made in all kitchens to understand existing kitchen are placed in right direction east and get good ventilation.

A. Traditional Indian Kitchens (Pre-20th Century)

Cooking posture was Sitting on the floor (cross-legged or kneeling).Fuel source are Firewood, cow dung cakes, and mud stoves (challahs).Kitchen Setups are Open or semi-open spaces often outside the main house. Storage is in Grain bins, earthen pots, hanging spice bundles, but having Smoke inhalation, poor ventilation, but less strain on knees and back due to flexible sitting postures.

B. Semi-Modern Kitchens (Mid-20th Century)

Fuel shifted from firewood to kerosene and then LPG.
Posture was Gradual shift from sitting to standing cooking positions. Design was Basic cement platforms added, with fixed stoves and sinks. Ventilation had Slight improvements, yet still minimal in rural areas. Health Impact was Reduced smoke exposure, but increased standing time led to fatigue and posture-related issues for homemakers.

C. Modern Modular Kitchens (Late 20th to 21st Century)

Posture during cooking is Full standing kitchens, platform height approximate 90 cm. Fuel are in the form of LPG, induction, electric chimneys, microwave ovens.
Layout design is Ergonomic "work triangle" like fridge, sinks and stove is in triangle form. Kitchen storage is in form of Overhead cabinets, pull-out drawers, pantry units. Health risk is long hours of standing which is impact on knee and back, especially affecting women with repetitive domestic roles.

D. Towards Ergonomic & Hybrid Kitchens

Design innovation is both sitting and standing work zones. Different types of materials are used as tools are Anti-fatigue mats, adjustable platforms, pull-out counters. Hybrid kitchens Focuses on Health, inclusivity, and ease of use for all age groups and also main objectives are Combining cultural values ea. space for rituals, traditional tools with modern comfort.

The questioner has been designed to give information as to how to standing posture effect on health while managing the daily routine activities.

III. PRESENT SCENARIO

Indian women spend about 4-5 hours a day in kitchen which may amount to approximately one fourth of her life span and this also is a reason for health problems [1]. working in kitchen in standing position is pain observed maximally at upper and lower back region. The posture we adopt during daily cooking plays a vital role in our long-term musculoskeletal health. Traditional kitchens, where people often cook in sitting positions on the floor, promote postures that reduce continuous stress on the back and knees, especially for those used to it.

IV. PROBLEM STATEMENT

modern kitchens are designed for standing, which may lead to knee pain, back pain, or varicose veins over time especially for elderly people, chefs , homemakers spending long hours in the kitchen [2].

Questionaries

Section A: Personal Information

1. Age:
   a. Below 25 b.26–35 c.36–45 d.46–60 e. Above 60
2. Gender:
   a. Female b. Male c. Other d. Prefer not to say
3. Occupation:
   a. Homemaker b. Working Professional c. Retired d. Other: _____
4. Daily Cooking Duration:
   a. Less than 1 hour b. 1–2 hours c. 2–3 hours d. More than 3 hours

Section B: Kitchen Design & Usage

5. What is the posture you usually cook in?
   a. Sitting on floor b. Sitting on chair c. Standing d. Both (alternating)
6. What type of kitchen do you have?
   a. Traditional (floor-based cooking) b. Semi-modern c. Modern modular kitchen
7. Do you feel your kitchen platform height is suitable for your height?
   a. Yes b. No c. Not sure
8. Do you have any aids for comfort while standing?
   a. Anti-fatigue mat b. Footrest c. None d. Not aware of any.

Section C: Health and Discomfort Experienced

9. Do you experience any of the following during or after cooking?
   a. Lower back pain b. Knee pain c. Leg fatigue d. Shoulder/neck pain e. None
10. How often do you experience discomfort while cooking?
    a. Daily b. Often c. Occasionally d. Never
11. How long have you been experiencing such pain or discomfort?
    a. Less than 6 months b.6 months–1 year more than 1 year d. Not applicable
12. Have you ever consulted a doctor or physiotherapist for cooking-related body pain?
    a. Yes b. No
13. Do you think prolonged standing in the kitchen is the main cause of your discomfort?
    a. Yes b. No c. Partly d. Not sure

Section D: Suggestions and Awareness

14. Would you prefer having a sitting option for some kitchen tasks (e.g., kneading, cutting)?
    a. Yes b. No c. Already have it
15. Are you aware of ergonomic kitchen design options to reduce cooking-related strain?
    a. Yes b. No

Would like to know more.

V. SOLUTION

- Hybrid kitchen platform design-
  Change the platform design solution can help in reducing some of fatigue level of women. Keep one section of kitchen at lower height to allow cooking preparation while seated on low chair or stool.
- Ergonomic counter top height-Instead of universal height 90cm (36inches)
- Use has low level platform, low sitting 45cm to 50cm.
- Kneeling/squatting friendly zone-
- Use Kneeling stool, padded mats and anti-slip flooring.
- Use smart ergonomic aids-Ant fatigue mats for standing, tilted chopping boards or adjustable shelves to minimize bending.
- Time saving smart layout-

  Storage, sink, fridge within easy reach design efficient work triangle. A goal of the changes was to reduce the unnecessary loading of muscles, improve the posture, and reduce the fatigue level [5].

VI. RISK CONTROL METHODS

Table 1: Risk Control Measures

Sr. No.	Control Level	Strategies	Expected Result
1	**Elimination**	Delegate or rotate kitchen work among family members	Reduce unnecessary standing time and reduce blood circulatory problem
2	**Substitution**	Replace hard flooring with cushioned anti-fatigue mats	reduces discomfort, pain, and strain on the body from standing for long periods on hard surfaces
3	**Engineering Controls**	Add pull-out stools, footrests, or adjustable counters	Switching postures changes the load on different muscle groups and joints, preventing any one area from being overworked.
4	**Administrative Controls**	Encourage posture switching (sitting + standing)	Avoid misalignment of the musculoskeletal system
5	**Personal Protective Equipment (PPE)**	Use orthopedic footwear, arch support sandals in the kitchen	To reduce vein stress

In the above Table 1, it shows risk control measurement through various strategies.

VII. CONCLUSION

This study aims to analyze existing kitchen through various aspects including posture, health impact, and comfort level. The data collected from 50 respondents, majority have standing kitchen, while small percentage have sitting type of kitchen. Out of 5 respondents with a sitting kitchen, 8 were students, 37 were homemakers, and all type preferred standing kitchen [4].

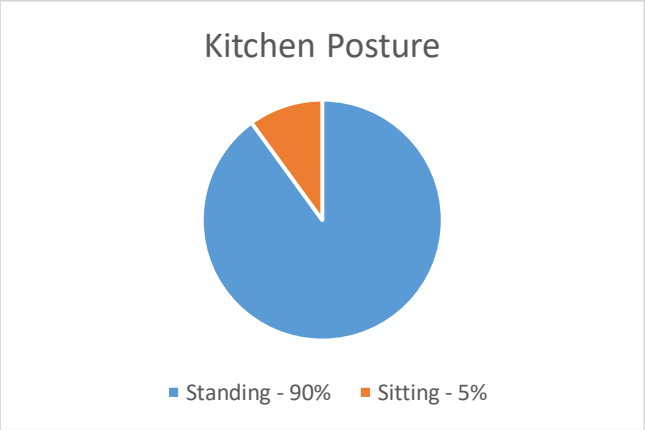

Figure 1: Analysis of Sitting and Standing Posture

In the above Figure 1 shows analysis of postures while cooking in kitchen. The survey study explores various aspects according to traditional and modern way. Data also shows duration of cooking time increases during different occasions.

Table: 2 Comparison between Traditional and Modern Aspects

Aspect	Traditional	Modern
Cooking posture	Sitting on floor and low-level stool	Standing for long duration
Platform height	Low level platform	90cm
Ergonomics	Natural posture for floor work	Ergonomic if used briefly
Health impact	Less stress	Risk of back or knee pain
Kneading or chopping	Done on floor	Done on platform
Storage	Floor level bins, hanging racks	Overhead and under counter

Table 2 shows Comparison between Traditional and Modern Aspects. It shows various tools to reduce discomfort.

In the below Table 3, it shows parameter of comfort and discomfort on the scale of 5 based on survey.

Table: 3 Sign and symptoms

Sr.no.	survey	No discomfort					Extreme discomfort
1	Neck	0	1	2	3	4	5
2	Shoulder	0	1	2	3	4	5
3	Low back	0	1	2	3	4	5
4	Arms	0	1	2	3	4	5
5.	Wrists and hands	0	1	2	3	4	5

CONFLICTS OF INTEREST

The authors declare that they have no conflicts of interest.

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