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Research Note

Musculo-skeletal pain and exertion felt by females while adopting awkward postures in kitchen

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■ **ABSTRACT :** Kitchen is the most intensively used space within home and demands a high degree of physical effort leading to fatigue. Moreover, home makers develop degenerative tissue changes and functional defects in the skeletal system due to muscular efforts and adoption of unnatural postures during work. The use of correct postures while performing any activity, the physiological stress on the body increases and leads to increase in energy expenditure band pulmonary rate of the worker. The awkward working postures for prolonged period of time due to poor designing of work area can lead to musculo-skeletal problems and injuries like feeling of pain, exertion and stiffness in various parts of the body. These problems result in decreased working capacity of workers. Therefore, organization of work surface and storage in the kitchen need special consideration of anatomical measurements of the users to reduce musculo-skeletal pain and exertion of the home makers. The present study was also conducted in the context only with the objectives to find out the most awkward postures adopted by females in kitchen and to assess their musculo-skeletal pain and exertion level by using subjective assessment scales (Corlett and Bishop Scale, 1976 and Varghese RPE scale, 1994). It was found that postures like full and half forward bending, side bending on knees, standing with stretched arm, standing with the raised feet and squatting postures were the most awkward postures adopted by females in their kitchen. Moreover, the respondents felt moderate pain in lower and upper back, shoulder joint and neck. They also felt exertion and stiffness in lower back, upper back and neck due to inappropriate dimensions of storage structures. Therefore, modifications were suggested regarding designing and arrangement of storage structures on the basis of storage principles to reduce their postural discomfort.

■ **KEY WORDS:** Musulo-skeletal pain, Exertion, Awkward postures

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The kitchen is the most intensively used space within home and it is the hub of any home that can most obviously be treated as a functional working area. A well planned and designed kitchen is that which provides for all the requirements of the work, worker and workplace with special reference to arrangement and dimensions of work areas, storage space and placement of equipment in the way that can reduce the temporal and physical efforts of the homemaker and may provide the basis for satisfactory working environment. According to Kaur (1991), a home maker spends about 11.56 hours in the household activities out of which about 6-7 hours of working time are spent in cooking only. Working posture becomes an important factor while designing ergonomically sound tools, equipment and workstation. The static muscular efforts and incorrect posture if sustained for a long period of time can give rise to various types of health and musculo-skeletal problems (Saha, 1999).It is observed that when a worker uses incorrect posture while performing any activity, the physiological stress on the body increases and leads to increase in energy expenditure and pulmonary rate of the worker (Sidhu *et al.*, 2005).Storage arrangements in the kitchen are affected by the activities carried out and frequency of activities. These activities demand a high degree of physical effort, leading

to fatigue. With the faulty design of kitchen and storage shelves, even normal person without primary anatomical or physiological defects may develop degenerative tissue changes and functional defects on the musculo-skeletal system resulting in decreased output (Verma and Oberoi, 2000).

Objectives:

- To find out the most awkward postures adopted by females in kitchen.
- To assess their musculo-skeletal pain and exertion level by using subjective assessment scales (Corlett and Bishop Scale, 1976 and Varghese RPE Scale, 1994).

The present study was conducted in Ludhiana district. Simple random sampling technique was used to select eighty respondents. For selection of respondents, Block-1 and Block-2 of Ludhiana district were randomly selected. For collecting the relevant data as per the objectives of the study, a pre-structured interview schedule was used to know the existing storage facilities and practices followed by both home makers and to assess the postural discomfort experienced by respondents while performing kitchen storage activities.The specific information was collected regarding the availability and dimensions of existing storage facilities in the rural and urban households. It also included information regarding assessment of the postural discomfort and problems faced by the respondents while performing kitchen storage activities.For subjective assessment of the postural discomfort experienced by home makers, two ergonomic scales were used *i.e*. Corlett and Bishop (1976) scale for postural discomfort and "Rating perceived exertion scale" by Varghese *et al.* (1994).

The three parameters were taken to find the most awkward postures adopted by respondents which were frequency, duration and difficulty faced during the adoption of various postures. For each parameter, mean scores were calculated on three point scale and ranked accordingly to find out most frequently used awkward postures as in Table 1.

It is clear from Table 1 that the most awkward postures adopted by respondents while performing kitchen storage activities (on three parametric approach) were forward bending, side bending and bending on knees as these postures got I, II and III ranks, respectively.The other frequently used postures included standing with stretched arm and standing with raised feet. The least frequently used postures included standing with arm at shoulder level and below shoulder level.

Intensity of perceived musculo-skeletal pain felt by respondents was recorded by administering body map of Corlett and Bishop (1976) scale along with questionnaire to know the intensity of pain in different parts of the body while performing kitchen storage activities. The mean scores for the intensity of pain in different body parts were calculated

Table 1 : Ranking of awkward postures adopted by respondents while performing kitchen storage activities (on three parametric scale)

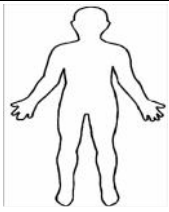
Postures adopted	Frequency score (Mean scores)
Forward bending	2.7 (I)
Side bending	2.5 (II)
Bending on knees	2.4 (III)
Standing with stretched arms	2.3 (IV)
Standing with raised feet	2.2 (V)
Standing with arm above shoulder level	2.1 (VI)
Squatting	2.0 (VII)
Standing with arm at shoulder level	1.9 (VIII)
Standing with arm below shoulder level	1.5 (IX)

Figures in parentheses indicates ranks

on a five point scale ranging from 1 – 5 *viz.*, 1 for very mild and 5 for very severe pain in the affected body parts. The mean ranks were assigned according to the mean scores calculated.

It is observed from Table 2 that the home makers felt moderate pain in lower and upper back for storing or restoring items in the kitchen storage units. Mild to moderate pain was felt by the respondents in shoulder joint and neck. This may be because of placement of storage shelves at uncomfortable reach due to which they had to adopt awkward postures.

Table 2 : Assessment of postural discomfort experienced by respondents (Corlett and Bishop 1976 scale)

Body map	Body parts	Intensity of pain Mean scores
	Neck	3.11 (III)
	Shoulder joint	2.80 (IV)
	Upper back	3.13 (I)
	Lower back	3.12 (II)
	Calf muscles	1.67 (VI)
	Ankle/feet	2.60 (V)

Figures in parentheses indicates rank

Postural discomfort experienced by respondents by using rating of perceived exertion scale (Varghese *et al.*, 1994).

Fig. 1 shows the rating of perceived exertion in different body parts felt by respondents while performing kitchen storage activities. It was observed that the respondents felt moderate to heavy exertion in lower back, upper back and neck. The probable reason to feel exertion may be due to improper dimensions or unorganized kitchen storage structure causing undue bending or over stretching of muscles which ultimate results in exertion.

Fig. 1 further reveals that respondents felt moderate exertion in shoulder joints followed by light to moderate exertion in calf muscles and ankle/feet. This may be due to the

muscles for maintaining a particular posture for a prolonged time get tired and leads to pain or ex affected body parts. Joshi (2006) also observed that incidences of mild to moderate pain were observed by users in neck, shoulder joint, upper back and lower back due to faulty postures adopted for long hours of work.

Fig. 1: Rating of perceived exertion experienced by respondents in different body parts on 5 point scale from very heavy exertion (5) to very light exertion (1)

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