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Postural stress and work-related musculoskeletal disorders of female labors working in agricultural fields with traditional methods

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Abstract

The present study was undertaken to analyze the posture, intensity of body pain and drudgery experience of the female agricultural laborer working in vegetable farms using traditional methods. The study was conducted in vegetable farms of *Harnampura* village and *Malerkotla* town of Ludhiana district. Random sampling technique was used to select the 100 respondents of the study. Interview method was used to collect the relevant data from the respondents using an interview schedule. Results revealed that majority (33%) of the respondents were in the age group of 40-50 years. Respondents performed the activities of planting/sowing, hand weeding, cutting/plucking, sorting and cleaning in bending, sitting or squatting postures. Mean scores of intensity of pain felt by respondents in different body parts revealed that respondents felt very mild (score-1) to very severe pain (score-5) in various body parts due to working in awkward postures for long durations. Hand weeding and cleaning of vegetables were rated as very demanding (mean score- 4.6); and planting/sowing, hand weeding and cleaning activities were very exhausting (mean score- 4.7, 4.6 and 4.8 respectively). Respondents adopted very difficult posture while planting/sowing, hand weeding, cutting/plucking and cleaning (mean score- 4.7, 4.6, 4.7 and 4.8 respectively). Planting/sowing and cutting/plucking were very painful activities (mean score 4.6); cutting/plucking was perceived as very heavy activity (mean score 4.6).

Keywords: Awkward posture, body discomfort, drudgery, vegetable farm, work load

Introduction

In India, women are predominantly associated with agricultural work in rural areas. Due to their poor socio-economic conditions, they are forced to carry out a considerable number of manual, rigorous tasks in agricultural fields ^[1]. Women do many of the most difficult farm tasks in India such as transplanting, weeding, harvesting, and post-harvest processing of produce. All of these tasks are time-consuming and full of drudgery ^[2]. Women are involved in more strenuous activities as compared to men ^[3]. It is reported that men have adopted mechanized agriculture and women's work has remained predominantly manual. The typical work of the female agricultural laborer or cultivator is limited to less skilled jobs ^[4]. The root cause of women's suffering is ignorance, age old methods of doing the work, inappropriateness of the technology, attitudinal constraints such as innate conservatism and resistance to change ^[5]. The farm women perform agricultural tasks with the age old traditional tools since gender friendly appropriate tools are either not available or are insufficient in number or unawareness. Unsafe, hazardous, unhealthy and long hours of work with age old traditional and cumbersome tools accelerate health related problems of women farmers ^[6].

Agriculture is generally recognized as the nation's most hazardous industry that displays high rates of musculoskeletal disorders with evidence to suggest that ergonomic risk factors are involved ^[7]. Drudgery of farm women is an important aspect that has attracted wide attention of researchers. If measured by the intensiveness of their involvement, farm women shoulder much more burden than men. Therefore, the present study was undertaken to analyze the posture, intensity of body pain and drudgery experience of the female agricultural laborer working in vegetable farms.

Materials and methods

Locale of the study: The study was conducted in *Harnampura* village and *Malerkotla* town of Ludhiana district.

Selected production system: Vegetable production system.

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Selection of Sample: Purposive and random sampling technique was used to select the 100 respondents of the study.

Data collection: The interview schedule was constructed to collect the information needed for the objectives of the study. It consisted of two parts: general information and specific information. General information covered the socio- personal characteristics of the selected respondents. Specific information included: activity analysis by posture in production system; intensity of pain felt by respondents in different body parts and drudgery experience in production system. To calculate the mean score of intensity of pain felt by respondents in different body parts, respondents were asked to rate the intensity of pain felt on a five point scale (very severe-5, severe-4, moderately severe-3, mild-2, very mild-1). Drudgery experience in production system was worked out by considering six factors namely, work demand (very demanding-5, demanding-4, moderate-3, less demanding-2, very less demanding-1), feeling of exhaustion (very exhausted-5, exhausted-4, moderately exhausted-3, less

exhausted-2, very less exhausted-1), posture assumed in work (very difficult-5, difficult-4, moderately difficult-3, less difficult-2, very less difficult-1), perception on manual loads operative (score 5 for more than 20 Kg, score 4 for 15-20 Kg, score 3 for 10-15 Kg, score 2 for 5-10 Kg, score 1 for 0-5 Kg), difficulty perception (very painful-5, painful-4, moderately painful-3, light pain-2, no pain-1) and workload perception (very heavy-5, heavy-4, moderately heavy-3, light-2, very light-1).

Results and discussion

Table 1 presents the general information about the respondents. Majority (33%) of the respondents were in the age group of 40-50 years followed by 31 per cent of the respondents who were in 30-40 years of age. Ninety-six per cent of the selected respondents were married and 72 per cent were living in joint families. Family size of majority (65%) of the respondents was medium with 5 to 8 members and 72 per cent of the respondents were illiterate.

Table 1: General information of the respondents (n=100)

S. No.		Percentage of respondents
1.	Age (years)	
a.	20-30	17
b.	30-40	31
c.	40-50	33
d.	50 and above	19
2.	Caste	
a.	SC	83
b.	OBC	7
c.	General	10
3.	Religion	
a.	Hindu	12
b.	Muslim	64
c.	Sikh	24
4.	Marital status	
a.	Married	96
b.	Unmarried	4
5.	Family type	
a.	Nuclear	28
b.	Joint	72
6.	Family size	
a.	Small (up to 4 members)	28
b.	Medium (5 to 8 members)	65
c.	Large (above 8 members)	07
7.	Educational status	
a.	Illiterate	72
b.	Functionally literate	9
c.	Primary	11
d.	Middle	8

Chauhan and Saha ^[8] in a study reported that women have to perform almost all the field activities right from sowing to harvesting and while performing all these activities there is a risk of developing musculoskeletal disorders mainly due to the awkward working postures. Postural analysis of the respondents of the present study (Table 2) reveals that they were working in very awkward postures. Planting or sowing was done in bending posture by all the respondents, hand weeding in squatting posture and plucking or cutting vegetables in bending posture. Sorting of vegetables was done by 100 per cent of the respondents in either sitting or squatting posture, while 23 per cent of the respondents were

using kneeling posture while sorting the vegetables. Cleaning of vegetables before sending them to the *mandis* was also done in very awkward postures. Majority (83%) of the respondents were cleaning vegetables either in squatting posture or were using bending posture (78%) and 21 per cent respondents also used sitting-cum-twisted posture to clean the vegetables. Jyotsna *et al.* ^[9] stated that during the harvesting of wheat, women have to work in squatting posture from morning till evening. As they harvest wheat in this inconvenient position for long duration, there are high incidences of severe low back pain and pain in knees reported by these women.

Table 2: Activity analysis by posture in production system activities (The other activities are not performed by women) (n=100)

S. No.	Farm activities	Nature of posture					
		Standing	Bending	Sitting and Twisted	Sitting	Squatting	Kneeling
1.	Planting/sowing	-	100	-	-	35	-
2.	Hand Weeding	-	-	-	6	100	-
Harvesting							
	Cutting/ Plucking	-	99	-	-	38	-
	Sorting	-	-	-	100	100	23
	Cleaning	-	78	21	-	83	-

Note: Multiple Response

Elisjstom and Nachemson [10] in a study reported that unnatural postures lead to several musculoskeletal problems. Maiti *et al.* [11] also revealed that a large number of workers suffered from low back trouble (93.3%), neck trouble (86.6%), wrist trouble (80%) and shoulder trouble (75%) because of the strenuous postures adopted while performing post harvesting jobs. About 20-26 per cent of the respondents reported severe pain in different body parts. Nidhi and Kaushik [12] in a study also observed that farm women worked constantly in awkward postures during different agricultural activities and so they suffered from discomfort in various parts of their body. Table 3 unveils the mean scores of

intensity of pain felt by respondents in different body parts. Working for long hours in awkward postures resulted in pain in different parts of the body as reported by the respondents. Very severe pain was felt in Lower back, waist, hand, wrist and legs and severe pain was felt in neck, shoulders, upper arm, upper back and feet while performing different farm activities (planting/sowing, hand weeding, cutting/plucking, sorting and cleaning). Joshi *et al.* [13] in a study also revealed that in the weeding activity moderate to severe pain in all body parts was reported by farm women and during harvesting activity severe pain in shoulder and lower back was reported by the women.

Table 3: Mean of intensity of pain felt by respondents in different body parts (n=100)

S. No.	Farm activities	*Body part involved along with discomfort rating															
		Head	Neck	Shoulder	Upper arm	Low arm	Elbow	Hand	Wrist	Upper leg	Lower leg	Waist	Hips	Upper back	Low back	Knee	Feet
1.	Planting/sowing	3.2	3.6	3.9	3.9	2.5	3.2	4.8	4.1	4.6	4.6	4.8	3.2	4.1	4.9	4.2	4.2
2.	Hand Weeding	3.8	4.1	4.6	4.5	4.3	4.0	4.8	4.8	4.8	4.8	4.5	3.2	3.8	4.9	4.2	4.6
Harvesting																	
	Cutting/ Plucking	3.2	3.6	3.9	3.9	3.1	3.2	4.8	3.9	4.6	4.6	4.8	3.2	4.1	4.9	4.2	4.2
	Sorting	1.2	3.2	2.1	1.8	1.8	1.1	1.2	1.8	3.9	3.9	3.3	1.2	1.2	1.4	1.1	1.6
	Cleaning	1.2	3.6	3.6	3.4	3.3	1.4	3.6	3.5	4.1	4.1	3.9	1.6	3.3	4.1	3.1	2.2

*Discomfort rating: Very Severe-5, Severe-4, Moderately Severe-3, Mild-2, Very Mild-1

Table 4 reveals that respondents found hand weeding and cleaning of vegetables activities as very demanding (mean score: 4.6 for both); planting/sowing and cutting/plucking as moderately demanding (mean score 2.9 for both) and sorting as less demanding (mean score 1.8). While performing planting/sowing, hand weeding and cleaning activities, respondents felt very exhausted (mean score: 4.7, 4.6 and 4.8 respectively), for cutting/plucking they felt exhausted (mean score: 4.1) and while sorting vegetables, respondents reported very less exhaustion (mean score: 2.5). According to the respondents, the posture assumed by them while planting/sowing, hand weeding, cutting/plucking and cleaning

was very difficult (mean score: 4.7, 4.6, 4.7 and 4.8 respectively) whereas posture assumed while sorting vegetables was less difficult (mean score: 1.9). Results of difficulty perception of the respondents for different activities revealed that planting/sowing and cutting/plucking were very painful (mean score: 4.6 for both), hand weeding and cleaning were painful (mean score: 4.3 and 4.1) and sorting was lightly painful (mean score: 1.8). Respondents perceived cutting/plucking as very heavy activity to perform (mean score 4.6); cleaning, planting/sowing and hand weeding as heavy activities (mean score: 3.9, 3.8 and 3.7 respectively) and sorting as very light activity (mean score: 1).

Table 4: Drudgery experience in production system

S. No.	Farm activity	Mean score for Work demand*	Mean score for Feeling of exhaustion psychophysical**	Mean score for Posture assumed in work***	Mean score for Perception on manual loads operative****	Mean score for Difficulty perception*****	Mean score for Workload perception*****
1.	Planting/Sowing (Manual)	2.9	4.7	4.7	1	4.6	3.8
2.	Hand Weeding (Manual)	4.6	4.6	4.6	1	4.3	3.7
Harvesting (Manual)							
a.	Cutting/ Plucking	2.9	4.1	4.7	2.8	4.6	4.6
b.	Sorting	1.8	2.5	1.9	1	1.8	1
c.	Cleaning	4.6	4.8	4.8	1	4.1	3.9

*work demand (score 1-5) time: very demanding-5, demanding-4, moderate-3, less demanding-2, very less demanding-1

**Feeling of exhaustion psychophysical (score 1-5): very exhausted-5, exhausted-4, moderately exhausted-3, less exhausted-2, very less exhausted-1

***posture assumed in work (score 1-5): very difficult-5, difficult-4, moderately difficult-3, less difficult-2, very less difficult-1

****perception on manual loads operative (score 1-5): score 5 for more than 20 Kg, score 4 for 15-20 Kg, score 3 for 10-15 Kg, score 2 for 5-10 Kg, score 1 for 0-5 Kg

*****difficulty perception (score 1-5): very painful-5, painful-4, moderately painful-3, light pain-2, no pain-1

*****work load perception: very heavy-5, heavy-4, moderately heavy-3, light-2, very light-1

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