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Analysis of posture and carrying loads in agricultural activities performed by farm women

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Abstract

Women are major workforce of Indian agriculture. Women are involved in various types of agricultural and allied activities. While performing these activities, women adopt awkward posture which may lead to musculoskeletal disease. Hence, the present study was planned to analyze posture of farm women during performing various agricultural and allied activities. Present study was conducted in villages of Dantiwada Taluka in Banaskantha district, Gujarat. A representative sample of 200 farm women was selected randomly from four villages. Personal and socioeconomic characteristics of farm women, activities performed by farm women and posture were studied as independent variables and prevalence of musculoskeletal disorder/disease and pain amongst farm women was considered as dependent variable. An interview schedule was formed which comprised questions related to background information, personal and socio-economic variables and type of activities performed by farm women. OWAS technique was used to analyze posture of farm women. Body part discomfort scale was used to study pain or discomfort perceived by farm women during performing various agricultural and allied activities. Data were collected by personal interview technique. Descriptive type statistical tools were used such as percentage, frequency and chi-square value. Body part discomfort scale shows pain in lower back and knees amongst maximum farm women during performing weeding activity. In milking activity, palm, fingers and shoulders were affected the most. As far as cleaning of animal shed is concerned, seven and half per cent farm women had severe and very severe pain in their knees after the activity. Results of OWAS technique showed that farm women adopted poor posture while agricultural and livestock activities.

Keywords: Musculoskeletal disorder/disease, Posture, OWAS

Introduction

In rural India, almost half of rural female workers are classified as agricultural labourers and 37.00% as cultivators. About seventy per cent of farm work was performed by women. Thus, it aptly justifies that most farmers in India are women (Dash, 2000) [8]. Economic Survey 2017-18 says that with growing rural to urban migration by men, there is 'feminization' of agriculture sector, with increasing number of women in multiple roles as cultivators, entrepreneurs and labourers.

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 (Gupta and Bisht, 2018) [13]. Women workers contribute significantly in agricultural activities as compared to men. Besides their household work they are also involved in agricultural activities like weeding, transplanting, harvesting, threshing and carrying load manually. Carrying heavy loads regularly for long distance results the occurrence of musculoskeletal disorders. Over a period of time, these musculoskeletal disorders will result in deteriorating health of women agricultural workers.

In the developing countries women in the rural areas often

are considered as "invisible farmer" but women constitute almost half of the work force engaged in agriculture, such as production, processing, preservation and utilization of food. There are a number of agricultural tasks being performed by women such as cleaning field, sowing, weeding, threshing, winnowing, gap filling, transplanting, fertilizer application, harvesting, drying and storage of crop (Gupta *et al.*, 2004) [14].

Rural women in India are widely involved in livestock activities. Caring animals is considered as an extension of domestic activities in Indian social system and most of the animal husbandry activities like bringing fodder from field, chaffing the fodder, preparing feed for animals, offering water to animals, protection of animals from ticks and lice, cleaning of animals and sheds, preparing dung cakes, milking, ghee-making and marketing of produce are performed by farm women. Thus, involvement of farm women in farming activities is a common feature in Indian rural setting. Women perform a variety of roles, of which many are of greater economic significance (Bhopale and Palki, 1998) [3].

Most of the farm activities performed by women are drudgery prone and affect their health adversely. As women

are involved in many agricultural and allied activities, it leads to many health hazards mainly musculoskeletal disorders like strain/sprain, neck pain, shoulder pain, back pain, accidents like cut/wounds, scratches, injury leading to surgical treatment, fatal injuries, knee injuries, tendon disorders. Hence, the present study was planned with following objectives-

- To study the participation of women in agricultural and allied activities
- To identify prevalence of musculoskeletal diseases amongst farmwomen
- To do posture analysis for identifying risk factors of musculoskeletal diseases amongst farm women

Review of literature

Review of literature was collected and categorized as below-

Participation of women in agricultural and allied activities

Rural women spent long hours in performing various tasks at home, field, dairy and several other areas. They are involved in several household, agricultural and allied activities. The studies presented in this section give the work profile of rural women.

Ghosh (2007) stated that women in rural areas participate in the household work, animal care and agricultural work. The daily life of rural women in India is characterized by the search for water, fuel and inputs for agriculture, livestock production or household work. The girls with poor health status are generally required to carry heavy loads or to adopt unnatural postures for prolonged periods. Ultimately, the health problems of women at old age become non-manageable.

Kishtwaria *et al.* (2009) ^[16] conducted a study in Himachal Pradesh to assess the work pattern of farm women and found that majority of the women were involved in collection of fodder (35.81%) and bringing fodder (35.69%).

The time spent by women was maximum in the case of collection of fodder (254.68 hr. /year) and bringing of fodder (132.07 hr. /year). For collection of dung they spent 82.08hr. /year.

Gupta *et al.* (2004) ^[14], Cherian *et al.* (2000) ^[7] and Sharma *et al.* (2004) ^[24] opined that women of Indian society are fully occupied and overburdened with three-fold responsibilities of farm, home and livestock management since ancient time. There were a number of agricultural tasks being performed by women *viz.* cleaning field, sowing, weeding, threshing, winnowing, gap filling, transplanting, fertilizer application, harvesting, drying, storage etc.

Lata and Prakash (2004) ^[18] analyzed that 93.00% of male involved in preparation of field where 7.00% were involved in field preparation activity. In ploughing of fields 99.00% male were involved and only 1 per cent female were involved in ploughing. In weeding operation, male (20.00%) and female (80.00%) both were involved but then proportion of female was significantly higher than the male. In sowing/transplanting, 25.00% male and 75.00% farm women were involved. In harvesting, 50.00% male and 50.00% female were participated. In transplanting, 55.00% male and 45.00% female were involved.

Ghosh and Ghosh (2014) ^[12] has discussed women's workforce participation in the agricultural sector from 1961 to 2001. The ups and downtrend of female participation was due to discrimination which insisted women labour to shift from agrarian activities to non-agrarian activities.

Swaminathan, (2013) the famous agricultural scientist, described that it was women who first domesticated crop plant and thereby initiated the art and science of farming. While men went out for hunting in search of food, women started gathering seeds from the native flora and begun cultivating those of interest from the point of view of food, feed, fodder, fiber and fuel. Women have played and continue to play a key role in the conservation of basic life support systems such as land, water, flora and fauna. They have protected the health of the soil through organic recycling and promoted crop security through the maintenance of varietal diversity and genetic resistance.

Musculoskeletal disorders/diseases amongst farm women

Kroemer (1989) ^[17] defined the musculoskeletal disorder as a term that referred to the range of conditions characterized by pain, numbness or discomfort, impairment that involve the muscles, the nerves, tendons, the joints and other soft tissues of the body.

With repetitive motions and awkward postures, the tissues surrounding nerves become swollen and squeeze or compress nerves. Compression of a nerve causes muscle weakness, sensations of "pins and needles" and numbness. Dryness of skin, and poor circulation to the extremities, may also occur (Rizzo, 2007) ^[23].

Hagberg *et al.* (1995) ^[15] investigated that work-related musculoskeletal disorders (WMSDs) developed gradually as a result of repeated trauma. Nga (1995) conducted the study in Vietnam and found that heavy physical work was common and load carried on the head were found to have a detrimental effect on the vertebrae of workers especially in the neck region.

Walker-Bone and Palmer (2002) ^[26] assessed musculoskeletal disorders in farmers and farm workers. There was weaker, but suggestive evidence that farmers more often had knee OA (Osteoarthritis) and LBP (Low back pain) than workers in occupations with fewer physical demands.

Das and Gangopadhyay (2005) ^[11] stated that work-related musculoskeletal disorders (WMSDs) usually occurred when there was a mismatch between the physical requirement of the job and physical capacity of human body. Musculoskeletal disorders (MSDs) are important causes of work incapacity and loss of work days.

Lipscomb *et al.* (2008) ^[19] investigated upper extremity musculoskeletal problems among women employed in poultry processing. They identified difficulty to maintain work speed or quality due to musculoskeletal symptoms. The authors concluded from the results that the pattern of risk was consistent with onset of early musculoskeletal problems among women who were new to the industry followed by a later increase with continued exposure as age increased.

Gandhi *et al.* (2011) ^[10] conducted research on ergonomic evaluation for dung collection and transportation. A rural woman adopted unnatural body postures during the activity

putting undue stress on her body. On an average she fetched one iron basket as head load having its weight ranging from 18-25 kg each in the morning as well as in the evening. She spent 52 minutes in morning and 43 min in the evening for dung collection and transportation, travelling a distance of 1.49 km/day for a cycle. Physiological stress indicated that heart rate increased to 127 bpm over the resting HR (84 bpm) for the activity. Extreme postural deviation was observed while collecting dung and lifting dung as head load. Musculoskeletal problems exhibited severe pain in low back followed by mid back, upper back, upper arms, shoulder joints, head and neck.

Chandra and Parvez (2016) ^[6] concluded that continuation of work for long working hours was the main cause of MSD amongst farm women doing agricultural tasks. The results showed that the prevalence of MSDs was very high among the farm workers and the most affected area were back, knees, shoulder, neck, hand, wrist, thighs, legs and foot. It has been recommended that workers should avoid bad work postures, should take rest period in between the working hours and avoid long working hours as far as possible during their work for reducing job related health problems.

Naidoo *et al.* (2009) ^[20] investigated the prevalence and factors associated with musculoskeletal pain in 911 women working in small scale agriculture in rural northern KwaZulu-Natal. In total, 67.00% women reported any chronic musculoskeletal pain. The 12-month prevalence of pain ranged from 63.90% to 73.30% and the prevalence of specific chronic pain lasting more than 3 months ranged from 42.80% to 48.30%. Older age, carrying heavy loads, working with hands above shoulder height and frequently squatting and kneeling were the causing factors associated with chronic musculoskeletal pain.

Osborne *et al.* (2012) ^[21] examined prevalence of musculoskeletal disorders among farmers. Life time prevalence of any form of MSD among farmers was 90.6% while one-year MSD prevalence was 76.90%. Life time LBP prevalence was 75.00% while one-year LBP prevalence was 47.80%. The next most common regional MSDs reported were upper (range 3.6–71.4%) and lower extremities (range 10.4–41%).

Borah *et al.* (2001) ^[5] reported that 70.00% farm women experienced severe pain in the shoulder joints and 68.00% had low back pain due to long hours of bending while uprooting of paddy seedlings.

Singh and Arora (2010) ^[25] concluded that a considerable number of adverse health conditions, including musculoskeletal disorders are linked to agricultural work. Prioritization of researches based on prevention of farm women from musculoskeletal disorders, development of new technologies for women for critical field problems such as hand cutting of plant materials, stooped posture and lifting and carrying of heavy materials, funding and support for awareness and prevention programmes for musculoskeletal disorders are required.

Postural analysis of agricultural and allied activities performed by farm women

Posture is the position of a part of the body relative to an adjacent part as measured by the angle of the joint

connecting them. Postural stress is assuming an extreme posture at or near the normal range of motion. Posture is one of the most frequently cited occupational risk factors (Banerjee and Gangopadhyay, 2003) ^[1].

Chandra and Parvez (2016) ^[6] conducted the study on farm women doing agricultural tasks. The sample size comprised of 75 farm women engaged in harvesting of wheat. In farming activity, squatting, stooping, standing, walking, bending were the main postures adopted by farmers.

Pal *et al.* (2017) ^[22] analyzed postural stress by OWAS method, and indicated that the workers had to adopt different stressful postures during performing different post-harvesting jobs. The prevalence of MSDs was very high among the workers and the most affected areas were the lower and upper back, shoulder, wrist, knee and calf. Postural analysis Postural stress might be the reason of the occurrence of MSDs.

Fathimahhayati *et al.* (2021) ^[9] analyzed posture of oyster mushroom farmers using OWAS method in Lempake, Samarinda, East Kalimantan, and result showed that 10% of farmers' working posture was classified in the 4th risk level category, categorized as highly dangerous for the musculoskeletal system, so direct improvement was needed. Furthermore, 10% of working postures were classified in the 3rd risk level category, and 60% of working posture was in the 2nd risk level category, which is categorized as dangerous for the musculoskeletal system and could cause significant tension so that improvement in the future as needed. On the other hand, 20% of working posture was classified in the 1st category which was safe for the musculoskeletal system.

Beheshti *et al.* (2016) ^[2] studied on Risk assessment of musculoskeletal disorders by OVAKO Working posture Analysis System (OWAS). Risk level in pistachio and wheat gathering tasks was lowered significantly after the ergonomic interventions and required training compared to before the intervention ($p < 0.050$).

Research methodology

Multistage random sampling was used for selection of respondents. There are fifty-six villages in Dantiwada Taluka. Out of these, four villages were selected randomly. From each village, fifty respondents were randomly selected. Hence, total sample size was 200. Ex post facto research design was used to conduct the present study. Personal interview technique was used to collect information on personal, socio economic profile of the respondents and type of activities performed by them. Incidences of musculoskeletal problems of the female workers were identified by using the body map viz. neck, shoulder, joint, upper arm, elbow, hand/wrist, calf muscles and ankles/feet. The incidence of pain was recorded after the completion of the activity. The intensity of pain in the above stated parts of the body was recorded on a five point scale, called Body part discomfort scale. OWAS technique was used to do posture analysis of farm women while performing agricultural and allied activities.

Results and Discussion

Table 1: Distribution of farm women on the basis of agricultural activities performed by them (n=200)

Types of activity	Mostly		Frequently		Sometimes		Never	
	f	%	f	%	f	%	f	%
Ploughing of field	01	0.50	10	5.00	15	7.50	174	87.00
Cleaning of field	0	0	07	3.50	10	5.00	183	91.50
Sowing	24	12.0	40	20.00	41	20.50	95	47.50
Transplanting	0	0	0	0	0	0	200	100.00
Fertilizer application	02	1.00	14	7.00	26	13.00	158	79.00
Weeding	141	70.50	42	21.00	10	5.00	07	3.50
Gap filling	01	0.50	0	0	0	0	199	99.50
Irrigation	0	0	1	0.5	0	0	199	99.50
Harvesting of crop and cutting of grass	140	70.00	42	21.00	8	4.00	10	5.00
Picking	94	47.00	38	19.00	25	12.50	43	21.50
Threshing	0	0	2	1.0	0	0	198	99.00
Grading	5	2.50	9	4.50	17	8.50	169	84.50
Storage	29	14.50	41	20.50	53	26.50	77	38.50
Marketing	0	0	0	0	0	0	200	100.00
Processing	0	0	0	0	0	0	200	100.00

Analysis of data presented in Table 1 shows that eighty-seven per cent farm women were not involved in ploughing of the field while a few of them (7.50%) did it sometimes. Majority (91.50%) of the farm women never did cleaning of field. Sowing was done sometimes by almost twenty per cent farm women while less than half (47.50%) farm women never did this activity. No farm woman was involved in transplanting. Only thirteen per cent farm women were engaged in fertilizer application while weeding

activity was mostly done by majority of the farm women (70.50%). Gap filling and irrigation activities were not done by almost all farm women. Seventy per cent farm women were harvesting crops and cutting grass mostly. Picking activity was mostly done by less than half (47.00%) farm women. Threshing, processing and marketing activities were never performed by majority of the farm women. Grading activity was also not done by majority (84.50%) of the farm women.

Table 2: Distribution of farm women on the basis of perception of drudgery in agricultural activities (n=200)

Types of activity	Very drudgery prone		Moderately drudgery prone		Less drudgery prone		Never	
	f	%	f	%	f	%	f	%
Ploughing of field	2	1.00	9	4.50	15	7.50	174	87.00
Cleaning of field	0	0	2	1.00	15	7.50	183	91.50
Sowing	41	20.50	57	28.50	07	3.50	95	47.50
Transplanting	0	0	0	0	0	0	200	100.00
Fertilizer application	1	0.50	4	2.00	37	18.50	158	79.00
Weeding	77	38.50	69	34.50	47	23.50	07	3.50
Gap filling	0	0	01	0.50	0	0	199	99.50
Irrigation	0	0	01	0.50	0	0	199	99.50
Harvesting of crop and cutting of grass	95	47.50	79	39.50	16	8.00	10	5.00
Picking	5	2.50	34	17.00	82	41.00	43	21.50
Threshing	0	0	0	0	02	1.00	198	99.00
Grading	1	0.50	3	1.50	27	13.50	169	84.50
Storage	54	27.00	49	24.50	20	10.00	77	38.50
Marketing	0	0	0	0	0	0	200	100.00
Processing	0	0	0	0	0	0	200	100.00

Table 2 illustrates that weeding activity was cited as very drudgery prone by 38.50 per cent farm women while 34.50 per cent farm women perceived weeding a moderately drudgery prone activity. Harvesting of crop and cutting of grass activities were perceived very drudgery prone by nearly half of the farm women (47.50%). Sowing was done by 52.00 per cent farm women, amongst them, 20.5 per cent stated it a very drudgery prone followed by moderately drudgery prone (28.50%) activity. Likewise, storage activity was performed by 61.00 per cent farm women and amongst them

27.00 per cent perceived it very drudgery prone activity whilst about one-fourth reported it a moderately drudgery prone activity. It can be concluded that harvesting of crop and cutting fodder was the most drudgery prone activity

followed by weeding activity.

Table 3: Distribution of farm women on the basis of Livestock activities performed (n=200)

Types of activity	Always		Sometimes		Never	
	f	%	f	%	f	%
Milking	188	94.00	10	5.00	2	1.00
Selling milk	130	65.00	24	12.00	46	23.00
Fodder collection	170	85.00	25	12.50	5	2.50
Animal health care	153	76.50	42	21.00	5	2.50
Feeding of animals	134	67.00	58	29.00	8	4.00
Maintenance of animal shed	103	51.50	84	42.00	13	6.50
Cleaning of animal shed	143	71.50	54	27.00	3	1.50
Dung Collection	179	89.50	19	9.50	2	1.00
Disposal of Dung	165	82.50	31	15.50	4	2.00

It is depicted in Table 3 that all the farm women were involved in milking and majority (94.00%) of them was doing it always. Sixty five per cent farm women were selling milk. Fodder cutting was done always by majority (85.00%) of the farm women; 12.50 per cent used to do it sometimes and a few (2.50%) farm women never performed this activity. Animal health care was taken care by majority of the farm women (76.50%) always. Feeding of animals was done always by sixty seven per cent farm women followed by twenty nine per cent who performed this activity sometimes.

Maintenance of Animal shed was done always by nearly half of the farm women (51.50%) followed by 42.00 per cent farm women who performed this activity sometimes. Cleaning activity was done always by 71.50 per cent farm women followed by 27.00 per cent who performed this activity. Dung collection and disposal of dung were done always by majority of the farm women, i.e. 89.50% and 82.50% respectively. It is evident from the data that farm women were more involved in livestock activities and all the livestock activities were performed by majority of the farm women.

Table 4: Distribution of farm women on the basis of perception of drudgery in various livestock activities (n=200)

Types of activity	Very drudgery prone		Moderately drudgery prone		Less drudgery prone		Never	
	f	%	f	%	f	%	f	%
Milking	3	1.50	59	29.50	136	68.00	2	1.00
Selling milk	0	0	1	0.50	153	76.50	46	23.00
Fodder collection	131	65.50	54	27.00	10	5.00	5	2.50
Animal health care	2	1.00	23	11.50	170	85.00	5	2.50
Feeding animals	0	0	13	6.50	179	89.50	8	4.00
Maintenance of animal shed	23	11.50	68	34.00	96	48.00	13	6.50
Cleaning animal shed	59	29.50	78	39.00	60	30.00	3	1.50
Dung Collection	106	53.00	57	28.50	35	17.50	2	1.00
Disposal of Dung	68	34.00	80	40.00	48	24.00	4	2.00

It is depicted in Table 4 that maximum (68.00%) respondents perceived milking activity as less drudgery prone followed by moderately drudgery prone (29.50%) and only 1.50% respondents perceived it very drudgery prone activity. Selling milk was found less drudgery prone by 76.50% respondents. Fodder collection was perceived a very drudgery prone activity by 65.50% respondents followed by moderately drudgery prone (27.00%) and only five per cent respondents perceived it less drudgery prone. Animal health care and feeding animals were also reported as less drudgery prone activities by majority of the respondents, i.e. 85.00% and 89.50% respectively. Maintenance of animal shed was perceived as less drudgery prone (48.00%) followed by

moderately drudgery prone (34.00%) activity. Cleaning animal shed was reported as moderately drudgery prone by 39.00% respondents followed by less drudgery prone (30.00%) and very drudgery prone activity by 29.50% respondents. Dung collection was reported as very drudgery prone activity by 53.00% respondents followed by moderately drudgery prone (28.50%) and less drudgery prone activity (17.50%). Disposal of dung was perceived as moderately drudgery prone, very drudgery prone and less drudgery prone activity by 40.00%, 34.00% and 24.00% respondents respectively. It can be inferred from the data that fodder collection and dung collection were very drudgery prone activities performed by farm women.

Table 5: OWAS score during various activities (n=200)

Posture analysis of farm women		
Weeding		
OWAS score	f	%
2 (Corrective actions required in the future)	10	5.00
3(Corrective actions should be done as soon as possible)	179	89.50
4(Corrective actions for improvement required immediately)	11	5.50
Total	200	100.00
Fodder cutting		
2 (Corrective actions required in the future)	8	4.00
3(Corrective actions should be done as soon as possible)	169	84.50
4(Corrective actions for improvement required immediately)	23	11.50
Total	200	100.00
Milking		
2 (Corrective actions required in the future)	46	23.00
3 (Corrective actions should be done as soon as possible)	136	68.00
4 (Corrective actions for improvement required immediately)	18	9.00
Total	200	100.00
Cleaning of animal shed		
2 (Corrective actions required in the future)	183	91.50
3 (Corrective actions should be done as soon as possible)	17	8.50
Total	200	100.00

The results presented in Table 5 revealed that the OWAS score of maximum (89.50%) farm women was 3 during weeding that means corrective action should be done as soon as possible. The OWAS score of 5.50 per cent farm women was 4 that denotes high risk for musculoskeletal diseases. Likewise, the OWAS score of majority (84.50%) of the farm women during performing fodder cutting activity was assessed 3 that means their posture should be improved as early as possible to prevent from any musculoskeletal disease. The OWAS score of maximum 68.00% farm women was calculated 3 followed by 2 OWAS score of farm women (23.00%). Milking is also strenuous activity which is done in squatting position with elevated shoulders. Majority of the farm women got 2 OWAS score for cleaning of animal shed. This activity is done in bending position. The corrective actions in this activity are required in the future. In the nutshell, all the activities were done in poor posture with high OWAS score. If the posture will not be improved by applying ergonomic interventions, there are the chances to suffer from musculoskeletal diseases in near future.

Association between OWAS score and body part discomfort score in various agricultural and livestock activities

Table 6: Association between OWAS score and body part discomfort score in weeding activity

Sr. No.	Independent	Chi-square value	Sign. (P)
2	Shoulder	1.371 ^{NS}	0.999
3	Upper back	4.853 ^{NS}	0.563
4	Upper arms	0.602 ^{NS}	0.963
5	Elbows	3.586 ^{NS}	0.166
6	Lower arms	0.118 ^{NS}	0.943
7	Lower back	3.809 ^{NS}	0.956
8	Wrist	0.602 ^{NS}	0.996
9	Palm/Fingers	0.357 ^{NS}	0.836
11	Knees	14.832 ^{NS}	0.138
12	Legs	18.050*	0.021
13	Ankle/feet	0.237 ^{NS}	0.888

*Chi-square significant at 0.5 level of significance

There was found no association between pain in various parts of the body with OWAS score while performing weeding activity except legs. Weeding activity is done in squatting position with loads on legs and OWAS score is calculated considering leg position. Hence, OWAS score is significantly found associated with pain in legs.

Table 8: Association between OWAS score and body part discomfort score in fodder cutting activity

Sr. No.	Independent	Chi-square value	Sign. (P)
1	Neck	0.184 ^{NS}	0.912
2	Shoulder	2.347 ^{NS}	0.969
3	Upper back	8.443 ^{NS}	0.207
4	Upper arms	0.749 ^{NS}	0.688
5	Elbows	0.184 ^{NS}	0.912
6	Lower arms	0.184 ^{NS}	0.912
7	Lower back	14.493 ^{NS}	0.152
8	Wrist	0.941 ^{NS}	0.988
9	Palm/Fingers	8.443 ^{NS}	0.207
10	Thighs	0.371 ^{NS}	0.985
11	Knees	16.374*	0.089
12	Legs	7.510 ^{NS}	0.276
13	Ankle/feet	0.184 ^{NS}	0.912

*Chi-square significant at 0.5 level of significance

Significant association was found between knee pain and OWAS score during fodder cutting activity. Likewise weeding, fodder cutting is also done in squatting position hence, the affected body parts are knees of farm women.

Table 9: Association between OWAS score and body part discomfort score in milking activity

Sr. No.	Independent	Chi-square value	Sign. (P)
1	Neck	0 ^{NS}	0
2	Shoulder	6.298 ^{NS}	0.391
3	Upper back	0 ^{NS}	0
4	Upper arms	0.473 ^{NS}	0.789
5	Elbows	5.136 ^{NS}	0.274
6	Lower arms	3.828 ^{NS}	0.430
7	Lower back	12.988 ^{NS}	0.112
8	Wrist	5.208 ^{NS}	0.735
9	Palm/Fingers	15.776 ^{NS}	0.108
10	Thighs	0 ^{NS}	0
11	Knees	8.685 ^{NS}	0.562
12	Legs	5.022 ^{NS}	0.541
13	Ankle/feet	3.365 ^{NS}	0.186

There was found no significant difference between pain in various parts of the body while performing milking activity. Milking was reported as moderate drudgery prone activity by maximum farm women. This may be a reason of no significant relationship between body part discomfort score and OWAS score. Less drudgery prone activity will induce less discomfort in different body parts.

Table 10: Association between OWAS score and body part discomfort score in cleaning of animal shed activity

Sr. No.	Independent	Chi-square value	Sign. (P)
1	Neck	0 ^{NS}	0
2	Shoulder	1.936 ^{NS}	0.586
3	Upper back	0.188 ^{NS}	0.910
4	Upper arms	0.188 ^{NS}	0.665
5	Elbows	0.495 ^{NS}	0.781
6	Lower arms	0.093 ^{NS}	0.760
7	Lower back	5.301 ^{NS}	0.647
8	Wrist	0.283 ^{NS}	0.963
9	Palm/Fingers	0 ^{NS}	0
10	Thighs	0 ^{NS}	0
11	Knees	4.842 ^{NS}	0.435
12	Legs	2.321 ^{NS}	0.508
13	Ankle/feet	0.188 ^{NS}	0.665

There was found no association between pain in various parts of the body while performing cleaning of animal shed activity. OWAS score is lesser in this activity as compared to other activities. Hence, no significant difference was found in pain in body parts.

Conclusion

The present research was conducted to study prevalence of musculoskeletal diseases amongst farm women, postural analysis during different agriculture and livestock activities. Arthritis was the most common diseases among farm women. Majority of farm women suffered from back and knee pain. Poor posture of farm women during farm and livestock activities leads to pain in their body parts and joints. OWAS score was found high in almost all agricultural and livestock activities performed by farm

women. It is necessary to analyze the posture of farm women while performing these activities and to make necessary corrections for improving the posture.

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