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# The impact of physical work exposure on musculoskeletal problems among tribal women of Udaipur District

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**Work related musculoskeletal disorders are group of painful disorders of muscles, tendons and nerves. Work activities, which are frequent and repetitive or activities with awkward postures cause these disorders, which may be painful during work or at rest. In the home and farm where women performs tasks while sitting, standing, bending, twisting, awkward posture, duration of work and inadequate rest pause are associated with the occurrence of serious musculoskeletal problems and musculoskeletal disorders. In the current study, a sample of 30 tribal women was selected to draw the results of the study. Incidence of musculoskeletal symptoms, information on causes of pain, work load and severity of pain were assessed by self structured questionnaire and body map technique. Results indicated that work related musculoskeletal problems and disorders affect all the parts of body viz. hands, wrists, elbow, neck, shoulder and back in upper body region, hips, knees and calf muscles in lower body region.**

**Key words:** Musculoskeletal problems, musculoskeletal disorders, pain, tribal women.

## INTRODUCTION

It is estimated that during peak season women work every day for about 8 to 9 h in agriculture and 4 to 5 h in household activities, besides, for certain agriculture activities female workers are considered better than male workers (Bhople and Patki, 1998). Women do more work than men is a known fact. The daily work schedule of rural women is very demanding and arduous. In addition to agriculture and household work, the other time and energy demanding activity for woman is care of livestock. The resultant is that rural women are over burdened as well as at continuous health risk. The household, agriculture and animal care works are not only strenuous, but repetitive also. The rural women are exposed to continuous non-neutral postures. The non-neutral posture of trunk frequently adopted by workers is risk for low back pain.

The repetitive or prolonged exertion causes pain in the muscles, as a result causes weakness or spasm in the muscles. Long hours of work, continuous attention,

precision, variety in work, extreme postures, poor nutrition and health apparently indicate that the farm women whether tribal or non-tribal are under serious physical stress. Some of the factors, which influence an individual's capacity and have a bearing on musculoskeletal problems are age, strength and fitness. Physical stress combined with psychosocial stress produces a level of musculoskeletal strain, since the perception of pain or fatigue is modified by other psychological factors (Bridger, 2008). Overexertion and injury can cause inflammation of the bursac or bursitis. "Housemaid's knee" is a well-known type of occupational bursitis where the viscous fluid in bursac, that is situated at 150 different places in tissues in human body, is displaced leading to pain in that part of the body due to long hours of working. This nerve damage can cause loss of sensation or numbness or tingling known as neuritis in areas of the body supplied by the nerve. Overexertion can cause increased pressure in a muscle resulting in oedema or scar tissue formation, which results in impaired nerve function. Impaired nerve function, destruction of fibers or damage resulting in reduced nerve conduction velocity may cause muscle weakness.

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**Table 1.** Frequency and percentage distribution of respondents according to perceived pain in upper extremities.

S/N	Body parts	Severity of pain					Total
		Very Severe	Sever	Moderate	Light	Very light	
1	Neck	5(16.66)	13(43.33)	3(10)	2(6.66)	0	23(76.66)
2	Shoulder	0	7(23.33)	2(6.66)	5(16.66)	0	14(46.66)
3	Upper Arm	0	4(13.33)	0	3(10)	7(23.33)	14(46.66)
4	Elbow	0	7(23.33)	8(26.66)	4(13.33)	5(16.66)	24(80)
5	Wrist	4(13.33)	6(20)	3(10)	3(10)	4(13.33)	20(66.66)
6	Palm	0	0	4(13.33)	2(6.66)	0	6(20)
7	Fingers	0	0	0	4(13.33)	5(16.66)	9(30)

All these problems are more likely to occur if the joints are held in an awkward posture, which is unavoidable in agriculture, household or animal care jobs. The ability of the muscles to protect the joints against external forces is degraded and the joint itself is more easily damaged when the limb is exposed to high forces (Bridger, 2008).

The musculoskeletal problems are considered to be the most prevalent and costly of all work related injuries. Musculoskeletal problems are caused by over use or misuse of muscles, bones and nerves. These problems have been definitely associated with identified risk factors including highly repetitive task, awkward position of the body segments and awkward whole body posture heavy loads and avoidable material handling, sustained vibrations and other musculoskeletal hazards. Musculoskeletal Problems start as minor aches and pain, but left unaddressed can result in serious injuries that can be permanently disabling. In addition, these painful injuries require long recovery periods and severely injured women may never be able to return to their jobs. The present study is an effort to know the work related musculoskeletal problems of rural women.

## METHODS AND MATERIALS

The present study was undertaken in purposively selected six villages of Udaipur district namely kiyawtum ka falan, bhutia, khurabad, dharod, dal and gud. The data were collected between the months of October-November, 2005 and survey method was used to achieve the objectives of the study. A random sample of 30 rural tribal women ranged between the age group of twenty years to fifty years. The sample consisted of *Bheel* tribes. Information on symptoms of musculoskeletal problems was assessed by self developed and self administered questionnaire and by using body map (Verghese et al., 1994) technique to know the frequency and intensity of pain and discomfort. The gathered information from rural women were tabulated and analyzed by using frequency and percentage.

## RESULTS AND DISCUSSION

Work related musculoskeletal problems were identified in term of 'upper extremities', which included neck, shoulder joint, upper arms, elbows, lower arm, waist, palm, fingers, 'thoracic region' that included ribs, back and pelvic region

and 'lower extremities', which included buttocks, upper legs/thighs, knees, calf muscles, ankles, and feet. Pain reported in different parts of the body by respondents is thus explained.

### Upper extremities

It included neck, shoulder, upper arm, elbow, wrist, palm, and finger.

### Neck and shoulders

The pain in neck and shoulders is directly related to lifting loads on the head. Table 1 indicates that most of the respondents, that is, 76.66% tribal women reported pain in the neck and a total of 46.66% tribal women reported pain in shoulder. There is hardly any agricultural activity except ploughing where women are not involved (Menon and Seshadri, 2004), they perform all the activities like preparation of land, sowing, transplanting, watering, weeding, fertilizer application, pesticide spraying, harvesting, threshing, processing, and storage and all these may cause pain in neck and shoulder. Lifting, forceful action and load on the back is the cause of pain in the neck, shoulders and shoulder joints, repetitive task and bending are also related to shoulder pain. These risk factors are found in household, livestock care and agricultural activities (Table 1).

Lifting of head loads is a kind of static work wherein muscles of neck and seven top most spines of spinal cord are under continuous compression. The impact is gradually transferred to lower part of spinal column. The inactivity of muscles retards the blood supply to the area and causes deposition of waste resulting in pain extending to even thoracic region and lower body (Jonsson, Persson and Kilbom, 1988; Ohlsson et al., 1995; Jumah and Nyame, 2004).

The exertion in these body parts may lead to severe musculoskeletal problems. According to Bridger (2008), static relaxation is the cause of pain in the neck and cause of degeneration of spine. Degeneration of cervical spine sometimes known as cervical spondylosis

**Table 2.** Distribution of respondents showing perceived pain in thoracic region.

S/N	Body parts	Severity of pain					Total
		Very severe	Severe	Moderate	Light	Very light	
1.	Ribs	0	11(36.66)	4 (13.33)	5(16.66)	2 (6.66)	22(73.33)
2.	Upper back	0	7 (23.33)	3(10)	8(26.66)	0	18(60)
3.	Mid back	6(20)	7 (23.33)	5(16.66)	7(23.33)	0	25(83.33)
4.	Low back	8(26.66)	10(33.33)	2(6.66)	0	4(13.33)	24(80)
5.	Pelvic region	0	0	0	3(10)	5(16.66)	8 (26.66)

has serious consequences. The shoulder joint is the most mobile joint of the body and together with its related soft tissue is particularly prone to injury in any activity where the arms are held above the horizontal plane. Working with the hands above the shoulder height is stressful and may increase the risk of developing the so called impingement syndrome, otherwise known as “swimmer’s shoulder”, “pitcher’s arm” (Wieder, 1992), or rotatory cuff syndrome”. Sommerich et al. (1993) have reviewed the evidence for occupational risk factors in the development of shoulder pain syndromes, which are; awkward or static postures, heavy work, direct load bearing, repetitive arm movements, tasks requiring fast arm movements, working with the hands above shoulder height and lack of rest.

### Upper arms, elbows and wrists

Table 1 shows that a total 46.66% tribal women reported pain in the upper arm, whereas 80% tribal respondents reported pain in the elbow and 66.66% pain in the wrist. Hands are most active organs, while working thus over-work by these organs lead to pain. Due to static position of hands, while bearing load on head, for support to the loaded material, onset of fatigue in upper arm muscles and pain thereby is inevitable, lifting head load therefore is another cause of pain. Postural stabilization of the hands and arms are essential if they are to carry out all but the grossest movements in a purposeful way. This stabilization is provided by muscles farther up the kinetic chain muscles, which cross the elbow and shoulder joints and have their origin in the cervical spine and thoracic regions.

Wrist is another body part, wherein respondents reported pain. Activities like winnowing, weeding, milking, rolling chappati, brooming etc. require repetitive movements and are also known to be associated with discomfort or disability in wrist. Strictly speaking, it is incorrect to make a sharp distinction between repetitive and static work since most repetitive work includes a static component in the form of postural flexion of the body or of a limb. Any part of the musculoskeletal system may be affected, but most of the recent researches have concentrated on problems of the elbow, hands and wrists. High risk jobs require repeated, forceful

movements of body parts held at the extremes of their ranges of movements, such as with the wrist flexed, extended and promoted. Milking in static posture with flexed wrist is one of the causative activities of pain in the wrist. There are a number of well known pain syndromes to be associated with work at the same times. Carpal tunnel syndrome is a common ailment affecting the wrist and hand.

### Palms and fingers

Results indicated that some extent of pain in respondent’s palm was also found although the number was small. Repetitive work of gripping like working with sickle, peeling vegetables etc may be the reasons of pain. The result is a tingling sensation and numbness in the palms and fingers. Table 1 shows that 13.33% tribal women reported moderate pain and 6.66% reported light pain. Fingers are also associated with palm and wrist movements while working. Table 1 further reveals information about pain in the fingers. Small number, that is, 16.66% tribal women reported very light pain in fingers because of the use of small hand tools in agriculture and at home. An increased pressure in the carpal tunnel can cause carpal tunnel syndrome, it affects the median nerve. The carpal tunnel syndrome has its ultimate implication on finger after attacking palm. The extreme condition of carpal tunnel syndrome may lead to severe pain and total inactivity of the workers hand.

### Thoracic region

It includes ribs, upper back, mid back, low back and hips.

### Ribs and back

Shockingly a large segment of sample, that is, 73.33% tribal women reported pain in ribs and 76.66% tribal women reported pain in the back (Table 2). By excessive load, trunk may fail because when weight is lifted, the abdominal contents may be extruded through the abdominal cavity as a result of excessive intra-abdominal

**Table 3.** Distribution of respondents showing perceived pain in lower extremities.

S/N	Body parts	Severity of pain					Total
		Very severe	Severe	Moderate	Light	Very light	
1	Thighs	3(10)	2 (6.66)	4(13.33)	5(16.66)	3(10)	17(56.66)
2	Knees	0	3(10)	4(13.33)	4(13.33)	0	11(36.66)
3	Calf muscles	4(13.33)	5(16.66)	0	4(13.33)	5(16.66)	18(60)

pressure and may cause pain in the ribs. During heavy work, back is the most susceptible part of the body. It provides support and bear load of upper part of the body .

Pain in the lower back can restrict mobility and interfere with normal functioning. Low back pain is the most significant health problems. A big reason of pain in the back is the continuous bending of lumber spine. The women repeat this posture many times, while doing tasks like cutting crops, collecting fodder, weeding, brooming, lifting cow dung. Pain is unlikely to arise from the intervertebral disks themselves since they do not contain nerve ending in adult (Bridger, 2008). The lower part of the back bears the weight of the upper body plus any weight that is carried and it also twists and bends more than the upper back.

### Pelvic region

The pelvic joint is a ball and socket joint that allows motion and provides stability needed to bear body weight on legs. But its function (bearing the body's weight) makes it susceptible to arthritis due to excessive pressure. Pain in hip may involve injury to muscles, tendons or bursac.

### Lower extremities

These includes thighs, knees and calf muscles.

### Thighs, knees and calf muscles

The pain in thighs besides poor nutrition is associated with covering of long distances daily with head loads and other household, agricultural and animal care activities demanding different kinds of skill, and attention and extreme postures viz. kneeling and squatting for long hours. Table 3 shows the data on pain in thighs, 56.66% t tribal women had pain in the thighs.

Knee problems may occur in both young people and adults. About 36.66% tribal women had pain in knees. Several supporting and moving parts, inducing bones, cartilage, muscles, ligaments and tendons, help the knees to do their job. Any of these parts can be involved in pain or dysfunction. There are two general kinds of knee problems: Mechanical and inflammatory. Arthritis,

Chondromalacia (cartilage injury), injury to the Meniscus (caused by the force of relating the knee while bearing weight), Anterior and Posterior Cruciate Ligament Injury (ACL, PCL), Medial and Lateral Collateral Ligament Injury (MLL, LLL), Tendonitis and Ruptured (torn) Tendons (inflammation of tendon), Osgood- Schlatter disease, Ilioibial Band Syndrome, Osteochondritis Discerns, Plica Syndrome etc. can be the common knee problems to which the farm women may be exposed as a result of extreme postures lifting loads, long hours of work and poor nutrition (NIAMS, 2001).

A small segment had reported pain in calf muscles also. Thighs and calf muscles are both more related to walking and legs bear the weight of the whole body, and also of loads or weight on head. Ultimately legs are more prone to fatigue and pain. Tension in leg muscles is a very common problem. Other postures like bending, twisting squatting also affect the leg muscles.

### Conclusion

Rural women suffer from multiple musculoskeletal problems that significantly impair their activities of daily living. They rarely mention about musculoskeletal problems at the right time, "having learned to live with pain" they commonly report physical disability. Left unaddressed, musculoskeletal disorders can result in life long pain and permanent disability. As our understanding about them has grown recognition and diagnosis, it has literally exploded to make them the most frequent and most costly of work related injuries in most organized and unorganized sectors. In the home and farm where women performs tasks while sitting, standing, bending, twisting, awkward posture, duration of work and inadequate rest pause are associated with the occurrence of serious musculoskeletal problems and musculoskeletal disorders.

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