

# Limitations of Activities in Patients with Musculoskeletal Disorders

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## Abstract

**Background:** Musculoskeletal disorders (MSD) are the major cause of morbidity throughout the world, having a substantial influence on quality of life (QOL). We studied QOL ascertained by limitations of activities of daily living, impact on family and social relationships, and sleep disturbances among patients with MSD. **Aim:** Ascertain QOL in MSD. **Materials and Methods:** A cross-sectional study among 2633 randomly selected subjects. The study was carried out in the field practice area of D Y Patil Medical College, Pune, India. In the first phase of the study, patients of MSD were identified by house-to-house surveys, by face-to-face interviews, and clinical examination carried out by trained interns in random samples of selected households. Subsequently, QOL in patients with MSD was elicited by measuring limitations of activities of daily living, impact on family and social relationships and sleep disturbances by structured instrument, using Likert/Dichotomous Scale. Statistical software EPI Info 2002 was used for estimation of sample size, data entry, and analysis. Data were summarized using proportions and percentages. Association of gender and rural-urban background with prevalence of musculoskeletal disorders was explored with odds ratio (OR) with 95% confidence intervals. **Results:** A total of 2633 subjects were examined. Out of these, 190 (7.2%) suffered from various types of MSD, with higher prevalence in females than males (OR=1.43, 95% CI=1.05 to 1.95). Prevalence was also higher in the rural population compared with urban (OR=2.02, 95% CI=1.45 to 2.83). However, the rural-urban difference may be due to the confounding effect of age, as prevalence was higher in the elderly (48.78%) and the mean age of the rural population was significantly higher than the urban population. Different degrees of limitations among patients of MSD in carrying out specific activities were: Dressing 9.5%, washing hair 11.6%, rising from bed 50%, feeding themselves 6%, walking 39%, taking bath 10%, toilet 37%, rising from chair 47%, rising from floor 55%, boarding bus 30%, and sleep disturbances 47%. These limitations also had impact on their family and social relationships. **Conclusions:** Patients of musculoskeletal disorders face appreciable limitations in their activities of daily living, which adversely impact their QOL.

**Keywords:** Activities, Disorders, Limitations, Musculoskeletal

## Introduction

Recent studies on musculoskeletal disorders (MSD) have focused on conventional measures such as prevalence to ascertain the burden of these disorders on the community.<sup>[1-4]</sup> As MSD do not feature as direct cause of mortality in death

certificates (they may be the underlying cause as prolonged immobility can predispose to fatal conditions such as pneumonia, particularly in the elderly), study of prevalence is definitely better than relying on mortality as a measure of public health problem due to MSD. However, besides morbidity, the social consequences of these disorders are appreciable and are difficult to quantify. MSD lead to varying degrees of limitations of activities of daily living, which adversely impacts the quality of life (QOL). These may perhaps be a better measure of the burden of MSD in the community.

The social consequences of MSD, due to disability, have not been studied extensively. A few studies, which have been carried out, focused on specific conditions such as

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osteoarthritis<sup>[5]</sup> or else were done in cultural settings of developed countries.<sup>[6]</sup> Because disability-related issues depend on the societal context, such as cultural factors and social support systems, cross-cultural comparisons cannot be made.<sup>[7]</sup> For example, among Indians, daily activities could involve lot of squatting as in using toilet or sitting down cross-legged for meals or religious functions. Such customs would cause more limitations in daily activities in case of involvement of lower limbs as compared to western customs.

In view of such cultural diversities, studies of limitation of activities and QOL among patients of MSD carried out in a particular population cannot be generalized beyond the cultural boundaries of that community. There is, therefore, need for studies tailored to the societal context.

The present community-based cross-sectional study was carried out in the field practice area of D Y Patil Medical College, Pune, India, to study the prevalence of MSD and their impact on QOL as ascertained by limitations of activities of daily living, impact on family and social relationships, and sleep disturbances.

## Materials and Methods

The study was conducted in the field practice areas of Pad. Dr. D Y Patil Medical College, Pimpri, Pune, India. The field practice area of the medical college comprises both urban and rural population. The urban field practice area is about 2 km from the college, located at Bhosari, comprising of a group of slums inhabited mostly by industrial blue-collar workers. For the study among urban slum dwellers, Balajinagar slum in Landevadi ward was chosen. Balajinagar slum has a population of about 6000, and from this a population of 2110 was selected by systematic sampling (every third house included for the house-to-house survey of inmates for MSD). For the rural part of the study, Markal village in Alandi Devachi was chosen. The village has a population of about 5000. A little over 500 subjects were selected by systematic sampling by house-to-house survey (every 10<sup>th</sup> house being surveyed for MSD). All age groups and both sexes were included in the study in both the locations.

### Study design

The study was a cross-sectional study undertaken in an urban slum and a selected village.

### Study population

Total population of Balajinagar slum and Markal village were taken as the actual study population from which the study samples were drawn.

### Inclusion criteria

All persons of both sexes who consented to participate in the study.

### Exclusion criteria

Persons who were not permanent residents (i.e., had come on holiday, etc, to meet their relatives or friends) were not included in the study.

### Sample size calculations

The following parameters were used for calculating sample size – prevalence 50%, worst acceptable 48%, and confidence interval 95%. Using these figures, the estimated sample size was 2,395. To achieve the required sample, target was set to enroll 2000 individuals from urban slum (Balajinagar) and about 500 people from rural population of Markal village at rural field practice area Alandi Devachi.

### Sampling technique

The total population of Balajinagar being 6000, a systematic random sampling population was used, i.e., surveying every 3<sup>rd</sup> house so as to aim for a sample size of above 2000. Similarly, as the population of Markal village was about 5000, every 10<sup>th</sup> house was surveyed to get a sample of 500. All eligible inmates of both sexes and all ages were included in the survey of the selected household. In this manner, a total of 2633 individuals were selected (2110 from the urban slum and 523 from the village).

### Principal outcome variables

Osteoarthritis, rheumatoid arthritis, low back pain, post-traumatic musculoskeletal conditions and QOL were taken as principal outcome variables in this study. Osteoarthritis, rheumatoid arthritis, low back pain, and post-traumatic musculoskeletal conditions were categorized based on the standard case definitions described below:

#### Osteoarthritis

Subjects giving a history of progressive pain, stiffness, and loss of function in weight-bearing joints, i.e., knees and hips.<sup>[8]</sup>

#### Rheumatoid arthritis

Subjects aged 30 years or more, giving a history of swelling, pain, and morning stiffness in and around the joints of hand or leg.<sup>[8]</sup>

#### Low backache

History of long-standing pain in lower back (lumbosacral region) with no history of trauma.<sup>[8]</sup>

#### Post-traumatic musculoskeletal condition

Subjects with history of pain and swelling of muscles, joint, or bone as a result of trauma.

#### QOL

This was elicited by structured instrument eliciting response on activities of daily living, sleep disturbances, and impact on family and social relationships.

### Activities of daily living

This was measured on a four-graded Likert Scale ranging from “No Difficulty,” to “Some difficulty,” “Much difficulty,” and “Unable to do” on following activities: dressing, washing and combing hair, rising from chair/bed/floor, lifting cup/feeding, walking, climbing stairs, bathing, using toilet, and boarding a bus.

### Sleep disturbance

Subjects suffering from MSD were asked to give a Yes/No answer to the question whether they had disturbed sleep at night due to pain and discomfort.

### Impact on family and social relationships

This was again measured on a three-graded Likert scale of, “No effect,” “Mildly affected,” and “Moderately affected.”

### Period of study

The study was spread over a period of 2 years, commencing from April 2008.

### Description of instrument

The instrument used in the present study was developed by Community Oriented Program for Control of Rheumatic Diseases (COPCORD). COPCORD was launched by the World Health Organization and International League against Rheumatism (ILAR) in 1981.<sup>[3]</sup> The COPCORD epidemiological model, which is socio-economically designed, targets the community MSD rather than specific diseases. The instrument used in the present study was based on a similar questionnaire and schedule of examination of subjects. The instrument was pre-tested and found well adapted to the survey population.

### Data collection

Data was collected by house-to-house visit of the selected households by interview method, supplemented with physical examination. Trained interns were used for data collection. About 20 to 30 subjects were covered every day. Help of medico-social workers employed in the rural and urban health centers of the medical college was also taken during the survey.

### Pilot study

Pilot study was undertaken among 50 respondents to pre-test and refine the questionnaire and data collection techniques. This period was also used to train the interns in history taking and examination so as to reduce inter-observer error. The respondents of the pilot study were not included in the main study.

### Data handling and statistical analysis

The Epidemiology and Statistical software developed by WHO and CDC Atlanta, i.e., EPI INFO 2002, was used

for data entry and analysis. Data were summarized using percentages. Associations were explored using odds ratio with 95% confidence intervals.

## Results

A total of 2633 subjects were covered by house-to-house survey.

### Gender, age structure, socioeconomic characteristics, and literacy

Males comprised 52.53% of the respondents while females constituted 47.47%. The mean age of the study population was 24.99 years (SD 16.53). The mean age of rural population was significantly higher ( $P < 0.001$ ), 28.4 years (SD 17.51), compared to urban population, whose mean age was 24.1 (SD 16.13), indicating rural-to-urban migration of young people. The mean family size was 5.08 persons (SD 1.87). Mean family income was ₹ 4190 (SD 3349). About 68% of the population could read and write, 28% could read only, and 4% were completely illiterate.

### Prevalence of musculoskeletal disorders

In the study population, 190 (7.2%) suffered from various types of MSD. The prevalence of MSD was 8.6% in females compared with 5.9% in the males. This difference was statistically significant (OR=1.43, 95% CI=1.05 to 1.95). The prevalence of MSD was very low in persons below 18 years (only five cases, all of them being post-traumatic disorders). The prevalence was high in the elderly retired people (48.78%). The prevalence was 18.18% in farmers, and slightly more in people with desk jobs (10.34%) compared with manual workers (9.12%).

### Rural-urban difference in prevalence

The prevalence was twice as high in rural areas (13.17%) compared with urban areas (6.51%), which was statistically significant (OR=2.02, 95% confidence interval 1.45 to 2.83), which may be due to the effect of confounding due to age, as the rural population was older than the urban population.

### Types of musculoskeletal disorders

Backache was the most common condition (34.21%) of all MSD. Other causes were osteoarthritis (23.68%), rheumatoid arthritis (1.25%), post-traumatic (10.53%), and non-specific disorders (30.53%) as shown in Table 1.

### Limitations of activities of daily living

The different degrees of limitations on daily activity due to MSD are shown in Table 2.

As will be seen from above table, limitations were more for activities involving mobility such as getting up from the floor, bed, or chair, walking, climbing stairs or boarding a bus.

### Impact on family and social relations

This is shown in Table 3. About 20–25% of the patients of MSD had varying degrees of adverse effect on family and social relationships.

### Sleep disturbance

Out of the 190 patients of MSD, 89 (47.8%) reported that they had disturbed sleep due to pain and discomfort caused by their condition.

## Discussion

Pain, stiffness, and other limitations imposed by musculoskeletal disorders (MSD) can make even simple household tasks and everyday activities a formidable challenge. As the Indian population ages in the next 25 years, MSD will increase with increasing longevity. *Pari passu* with this epidemiological transition in pattern of disease morbidity, the country is in a phase of rapid social transition. Traditional joint families are being gradually phased out by increase in number of nuclear families as a result of increased rural–urban migration. Increasing role of women in occupations beyond their traditional domestic commitments will reduce the coping strategies of future families to deal with increased dependency of an aging population as a result of MSD. The higher prevalence of MSD in rural areas may be due to the social transition brought about by the migration of young

people to urban centres in search of jobs, leaving behind an older population.

Healthcare services, already facing problems of inequity and poor accessibility among the less privileged in the country, will be facing severe financial pressures in the coming decades due to increase in the number of people with MSD. Bone and joint disorders, which account for more than 50% of all chronic disorders in people older than 50 years, are the most common cause of severe long-term pain and disability.<sup>[9]</sup>

Besides the direct cost of the burden of MSD, such as hospital inpatient care, outpatient care, doctor consultations, cost of drugs and surgical interventions, a large portion of indirect costs due to dependency of these patients on others for their daily activities, need to be considered, along with the consequent loss of productivity.

As there is considerable impact on QOL of people with MSD due to limitations in activities of daily living, as also brought out in the present study, the aim of long-term management should be to improve the quality of life of people with these disorders, and to improve understanding and treatment of these conditions through research, prevention, and education. As stated earlier, epidemiological studies, even descriptive epidemiology, on the limitations and QOL in MSD are limited, as researchers tend to focus on incidence, prevalence, and etiology. Moreover, since the limitations of activities of daily living have a cultural context, off-the-shelf data from studies done in other cultural settings would limit its application for intervention in a different societal context. A social epidemiology approach is indicated, stressing the impact of MSD on individuals, families, and society, unique for each cultural setting.

Developed countries face a larger burden of MSD due to an aging population. In these countries also, MSD are common, affect all age groups, and are associated with great deal of disability, impairment, and handicap. MSD impairments affect 14% of the population, with the spine being most

**Table 1: Proportional rates of different musculoskeletal disorders**

Type of musculoskeletal disorder	Cases	Percentage
Backache	65	34.21
Osteoarthritis	45	23.68
Rheumatoid arthritis	02	1.25
Post traumatic disorders	20	10.53
Non-specific disorders (Fibromyalgia, tendinopathies, soft tissue rheumatism, vague "aches and pains," etc.)	58	30.53
Total	190	100

**Table 2: Different degrees of limitations of activity of daily living**

Activity	No difficulty (%)	Some difficulty (%)	Much difficulty (%)	Unable to do unaided (%)	Total (%)
Dressing	172 (90.5)	14 (7.4)	2 (1.1)	2 (1.1)	190 (100)
Washing hair	168 (88.4)	16 (8.4)	4 (2.1)	2 (1.1)	190 (100)
Combing hair	170 (89.5)	11 (5.8)	7 (3.7)	2 (1.1)	190 (100)
Rising from chair	101 (53.2)	68 (35.8)	19 (10)	2 (1.1)	190 (100)
Rising from bed	95 (50)	72 (37.9)	21 (11.1)	2 (1.1)	190 (100)
Rising from floor	85 (44.7)	65 (34.2)	30 (15.8)	10 (5.3)	190 (100)
Lift cup/feeding	178 (93.7)	8 (4.2)	2 (1.1)	2 (1.1)	190 (100)
Walking	116 (61.1)	61 (32.1)	11 (5.8)	2 (1.1)	190 (100)
Climbing stairs	91 (47.9)	74 (38.9)	22 (11.6)	3 (1.6)	190 (100)
Bathing	170 (89.5)	15 (7.9)	3 (1.6)	2 (1.1)	190 (100)
Using toilet	119 (62.6)	52 (27.4)	17 (8.9)	2 (1.1)	190 (100)
Boarding bus	132 (69.5)	46 (24.2)	8 (4.2)	4 (2.1)	190 (100)

**Table 3: Impact of MSD on family and social relationships**

Relationships	No effect	Mildly affected	Moderately affected	Total
Family	151 (79)	33 (17.8)	6 (3.2)	190 (100)
Social	143 (75.26)	41 (22.2)	6 (3.2)	190 (100)

commonly affected (as in the present study), followed by the lower extremity or hip, and the upper extremity or shoulder.<sup>[10]</sup>

However, even in developed countries, MSD do not figure in the top 10 health conditions funded for research.<sup>[11]</sup> Globally, they remain unrecognized, under-appreciated, and under-resourced. There is a strong case for immediate and ongoing need to understand and support musculoskeletal conditions and reduce the burden they bring to the family and the community. Treatments and interventions that alleviate the long-term impacts of these disorders and rehabilitate the afflicted to full and active lives are needed.

In spite of limitations of the study, like including all age groups when susceptibility to MSD may vary in different ages, considering case definitions of only few of the well-known conditions and clubbing a vast group such as myofascial pain, fibromyalgia, tendinopathies, and “vague aches and pains” under non-specific conditions, the big picture, which emerges, points to increasing burden due to disabilities caused by MSD in developing countries like India. The study has also attempted to quantify the adverse impact on QOL as measured by limitations of various activities of daily living, sleep disturbance, and effect on social and family life of patients with MSD. Taking a lead from this study, future studies can refine the measurements.

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