ORIGINAL ARTICLE

Impact of musculoskeletal pain on physical function and health-related quality of life in a rural community in south India: A WHO-ILAR-COPCORD-BJD India Study

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Abstract Musculoskeletal (MSK) pain poses a major burden on individuals and health care systems. Assessing its pervasive impact has broadened the horizon of treatment strategies. The aim of this study was to determine the prevalence of MSK pain and its relationship with the health-related quality of life (HRQL) in a rural community. Individuals (>15 years) with MSK pain were identified by house–house survey from a population of 6,763 individuals. HRQL was assessed using the validated 'Modified Indian HAQ (CRD – Pune)', translated into regional language. Moderate and severe health assessment questionnaire disability index (HAQ-DI) scores were considered significant. Details regarding the impact of pain on their personal, family and social life were also studied. All individuals with MSK pain were evaluated clinically by a medical team and HAQ-DI was compared in different groups of disorders. Prevalence of MSK pain in the community (mean age, 52 ± 15.8 years) was 26.08% (95% CI 25.03–27.13). About 8% of the respondents reporting MSK pain had to stop work and 4% had chronic depression. A significant HAQ-DI was scored by 31% subjects. Level of education and intensity of work had significant associations with HRQL. Among the clinical diagnoses, non-specific MSK pain also scored a high HAQ-DI. MSK pain, both due to specific and non-specific disorders, showed an important impact on HRQL in this community study. Combined with ascertainment of risk factors and associations, this has implications on planning treatment and prevention. We plan to continue using HAQ in time to monitor the community.

Keywords Health assessment questionnaire · Health-related quality of life · Musculoskeletal pain · Physical dysfunction

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Introduction

The burden of musculoskeletal (MSK) pain, which has not attained its due importance among the medical fraternity and policy makers, has been a critical issue with the WHO-ILAR (International League of Associations for Rheumatology) COPCORD (Community-Oriented Programme for Control of Rheumatic Diseases) and the Bone and Joint Decade 2000–2010 initiative [1]. COPCORD was conjointly launched by the WHO and ILAR in 1981 to capture data on pain and disability in developing economies, and several completed population surveys have revealed an extensive burden of pain and disability in the community [2]. The complex factors of modernisation, socioeconomics and trans-cultural migration have substantially influenced the way individuals bear, adapt and manage pain, especially in the developing regions [3]. Musculoskeletal complaints have been shown to be the most common medical causes of long-term absence from work in developed nations [4]. COPCORD surveys in the Pune region of West India have unequivo-

cally established self-reported MSK pain and disorders to be the commonest morbidity in a community [5].

MSK pain is expected to impact the community in several ways. However, very few studies have addressed this issue in India. Based on a modified (for local use) and validated version of health assessment questionnaire (HAQ), Bhigwan (India), COPCORD has reported mild, moderate and severe grades of functional disability, respectively, in 74%, 15% and 6% of the MSK pain subjects identified during a rural survey [6].

Health-related quality of life (HRQL) is increasingly being used as a valid indicator of health in musculoskeletal disorders [7]. Several instruments like SF-36 [8], Stanford HAQ disability index (HAQ-DI) [9], functional assessment of chronic illness therapy (FACIT) [10] and Western Ontario McMaster (WOMAC) [11] have been used to measure the HRQL in musculoskeletal disorders. However, these questionnaires need to be modified, taking into account the cultural practices and activities of daily living of the indigenous people, which differ from region to region. Being self-reported, the questionnaires need to be translated into regional languages and validated. The maiden Indian COPCORD Bhigwan survey included a validated Indian version of HAQ in the core questionnaire (CCQ) and continued to use it effectively in the ongoing long-term COPCORD stages II and III. Subsequently, all the COPCORD studies in India completed under the auspices of BJD India have used the latter Indian HAQ (CRD Pune version) [12].

This COPCORD study was conducted in the southern region of India to measure the prevalence of MSK pain and disorders. Several other aspects of MSK were also recorded. The data on the impact of MSK pain and disorders on HAQ and some other issues connected with livelihood and living as perceived by the community is presented.

Materials and methods

This study was a COPCORD stage I cross-sectional survey of a rural population using the fast-track COPCORD Bhigwan model [5].

Location and selection

Ottoor village, situated about 25 miles from Trivandrum (capital city in the state of Kerala), was chosen at random from several villages in the regional health administrative block. Though farming was an important occupation, a large proportion of the population (mainly the menfolk) were found to be either employed in the service sector or working in middle-east Asia (Arab countries). High literacy rate (almost 80%) and capital inflow from abroad were noticed to have led to a somewhat affluent and sedentary life style.

Population sampling

According to the India census 2001, the village population was 15,359. Under the national Integrated Child Development Services Scheme, the village is divided into 17 well-demarcated centres, each with a known population. We selected eight centres by drawing lots, and this led to a target population of 7,650.

Methodology

COPCORD stage I is conventionally divided into three phases—phase 1 (house to house survey to identify respondents), phase 2 (record pain and HAQ and community perceptions) and phase 3 (rheumatology evaluation). These phases were carried out concurrently. Approval of the ethics committee was sought prior to the commencement of the study. Local health workers were trained to carry out house-to-house surveys to screen adults (>15 years) for MSK pain (past and/or present) during phase I. Prior to beginning phase I of the study, the health workers completed a pilot survey of 100 individuals at random to test the comprehension and feasibility of questionnaires. The respondents marked their pain sites on a mannequin and completed the 'modified Indian HAQ' in phase II. Phases I and II were started concurrently and completed in 6 weeks. All respondents in phase II were evaluated for rheumatic disorders by a team of doctors comprising of a rheumatology specialist and residents in internal medicine and physical medicine rehabilitation (phase III). The diagnosis was essentially clinical. However, reference was made to the criteria defined by the ACR [13]. Non-specific MSK pain was defined as that which could not be classified as part of any discrete MSK disorder defined by the ACR.

Instrument

The 'Modified Indian HAQ–CRD Pune' [14] is a validated, modified version of the Stanford HAQ-DI for Indian use. The Indian version includes questions on combing hair, cutting vegetables, breaking the Indian type of bread with hands, sitting cross-legged on the floor and squatting, and climbing into a bus. Some questions like cutting meat, opening milk cartons, opening car doors and wearing socks are excluded. This version (CRD Pune) was translated into the regional language (Malayalam) and back-translated. The latter two-step translations were performed by two different experts, second expert blinded to the original English version. Discrepancies were sorted out consensually by a third expert

(proficient in both languages) with the earlier experts. The local version was field tested in 30 patients attending the rheumatology OPD and found to be easily understood. Patients could complete the translated version in less than three minutes. Reliability of the local version was checked by administering the questionnaire to 14 adults living in 3 households in the COPCORD population, on two occasions with a 3-day interval.

The modified HAQ essentially consists of 23 activities of daily living, addressing dressing, arising, eating, walking, bathing, reaching, gripping and performing errands, grouped into eight categories, with four patient response options with numerical equivalents: without any difficulty (0); with some difficulty (1); with much difficulty (2); unable to do (3). The highest score (0–3) within each category is chosen and added to provide a total HAQ score (0–24). The minimum score in a category was 2 if an assist device relevant to that category was used or help obtained from another person. The total score was divided by eight (number of categories) to calculate a HAQ-DI [15] with a range from 0 to 3. An HAQ-DI≤1 was considered mild while >1 was moderately severe and considered significant in the current study.

Statistical analysis

The data was analysed using the SPSS version 17.0 (SPSS Inc, Chicago, IL, USA) for Windows Vista. Descriptive statistics are reported as means and standard deviation (SD) for continuous data or as percentage for counts. Comparisons of HAQ-DI between groups of rheumatic diagnoses were performed using Chi-square tests for categorical variables. Covariates chosen for multivariate analysis included sex (dichotomous variable; 0=male; 1=female); age (continuous variable); duration of pain (dichotomous variable; 0=<5 years, 1=>5 years), education level (years in school as a dichotomous variable; 0=<5 years, 1=> 5 years) and significant pain sites (0=absent, 1=present). All these factors were then introduced as covariates in multiple regression models in which significant HAQ-DI scores (>1) were dependent variables. All variables were entered simultaneously. The level of statistical significance was set at 0.05.

Results

Demography

Among the 5,277 adults (age>15 years) who were surveyed in phase I, 1,590 responded with complaints of present MSK pain, and were evaluated in phases II and III. The crude point prevalence rate of MSK pain in the community was 30.13% (95% CI 29.09–31.17). Demographics and disease characteristics of the respondents are shown in Table 1. Among the self-marked pain sites, knee was the commonest. Figure 1 shows the distribution of MSK pain sites, with prevalence rates of >20%, according to age bands and gender. In phase III, 1,476 respondents (92.8%) were examined by the medical team and the diagnoses were classified broadly into degenerative joint diseases, soft tissue rheumatism, inflammatory arthritis and non-specific symptoms (Fig. 2).

Health-related quality of life

Functional impairment

Respondents were asked to self-grade their functional impairment in assorted domains of life into none, mild, moderate and severe as per their perception. Subjective scores of moderate and severe were considered significant. Subjects (80% and 53%) perceived some grade of impact on their ability to work and financial position respectively. Eight percent of the respondents reported 'stoppage of their work' due to MSK pain. In response to a question 'do you often feel depressed?', 4% of the respondents replied in affirmation.

Health assessment questionnaire disability index

The distribution of the HAQ-DI, with a mean of 0.89 ± 0.06, and response skewed to the left indicated that the predominant group suffered from low or nil HAQ disability (Fig. 3). Significant HAQ-DI, observed for activities of arising, walking, hygiene and performing errands (Table 2), was present in 32% of the respondents. Among the

Table 1 Demographic profile and pain sites of the subjects

	Male (n=449)	Female (n=1,141)	Total (n=1,590)
Age (years)			
Mean (±SD)	56.53 (15.45)	51.58 (15.33)	52.98 (15.52)
Duration of pain, n (%)			
- ≤5 years	299 (66.6)	798 (69.9)	1,097 (69)
- >5 years	150 (33.4)	343 (30.1)	483 (31)
Number of years of education n (%)			
- ≤5 years	154 (34.3)	404 (35.4)	558 (35)
- >5 years	295 (65.7)	737 (64.6)	1,032 (65)
Nature of work n (%) (as perceived by subject)			
- Mild	238 (53)	654 (57.3)	892 (56.1)
- Moderate-severe	211 (47)	487 (42.7)	698 (43.9)

Fig. 1 Prevalence of common-
est MSK pain by age bands and
gender
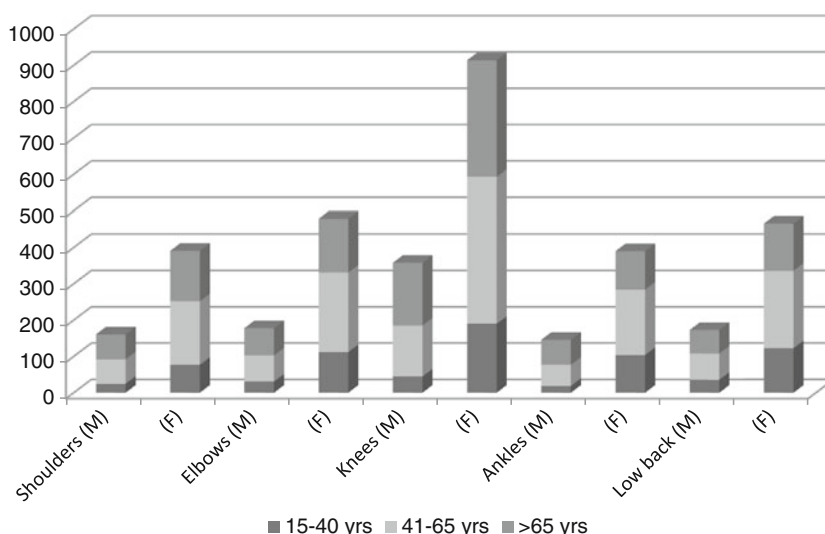
respondents, 571 (36%) subjects had other comorbidities. Variables from the demographic characteristics and self-marked pain sites were checked for their association with HAQ-DI scores in the group without any comorbidity, and then the significant HAQ-DI of this group was compared with that of the group with comorbidities for each of the variables (Table 3). The proportion of significant HAQ-DI in each category of the MSK conditions was calculated to check the impact of HRQL (Fig. 4).

Predictors of HRQL in MSK pain

Multiple regression models were constructed to adjust for factors likely to be associated with a significant HAQ-DI. Variables in the univariate analysis (Fischer's exact test) with p value of <0.2 were introduced as covariates in multiple regression models in which HAQ-DI score was the dependent variable. The independent risk factors for a significant HAQ-DI score were total duration of pain—OR 1.056 (95% CI 1.017–1.096), pain in the shoulders—OR 1.959 (95% CI 1.432–2.68), pain in the hands—OR 2.322

(95% CI 1.563–3.45) and low backache—OR 1.424 (95% CI 1.050–1.931).

Discussion

The real burden of MSK pain can be measured only at the community level, as rheumatology clinics and tertiary care setups capture only the tip of an iceberg. A good proportion of these pains is non-specific and forms the 'invisible portion' of the problem [16]. This COPCORD survey, carried out in a community in south India, demonstrates the prevalence of painful MSK and its important impact on various aspects of daily living. Although inflammatory arthritis topped the list, interestingly, a vast proportion of subjects with degenerative joint diseases, soft tissue rheumatism and non-specific MSK
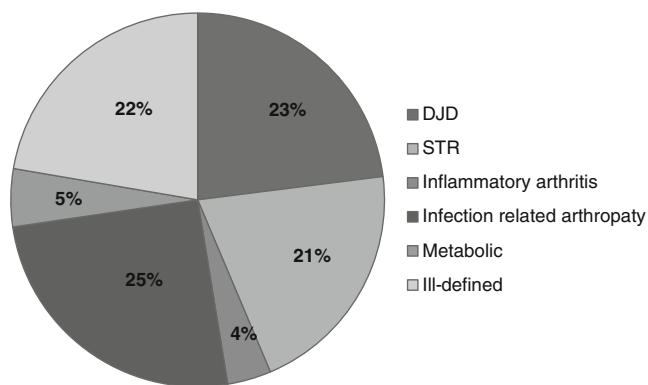
Fig. 2 Broad classification of diagnoses
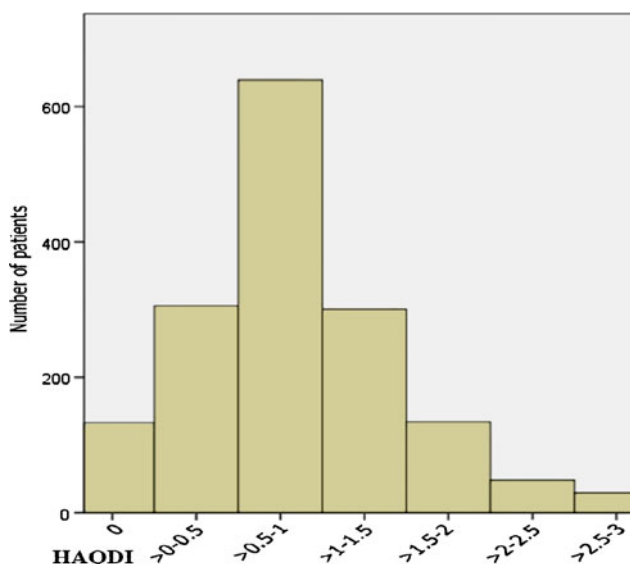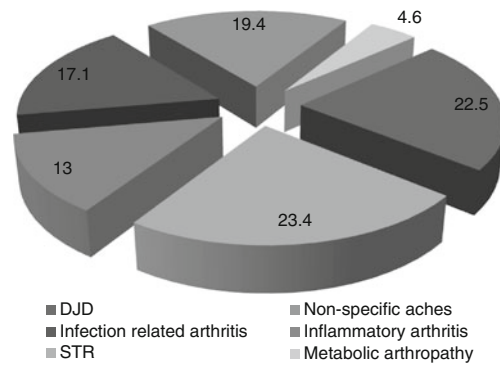

Fig. 3 Histogram showing the distribution of HAQDI

Table 2 HAQ-DI scores in different categories

Category	HAQ-DI score	SD
Dressing	0.3	0.641
Arising	1.46	0.945
Eating	0.33	0.665
Walking	1.23	0.864
Hygiene	1.24	0.959
Reaching	0.81	0.837
Grip	0.34	0.694
Performing errands	1.16	0.828

Fig. 4 Proportion of significant HAQDI in each of the MSK groups

pains also reported a moderately severe HAQ-DI. Acknowledging and combating these pains are pivotal, as they form a substantial cause of impaired physical function and HRQL. MSK pain has been projected as a major health problem in all the COPCORD surveys undertaken in both developed and developing nations [17]. Direct and indirect economic burden due to MSK pain needs to be addressed in a more systematic manner, as a good proportion of the population live below the poverty line and work for daily wages. The

attitude of people towards treatment of MSK pain is yet another area of interest in the developing regions, where people have believed in traditional practitioners for their ailments for ages. Studies conducted in the developed nations have also shown a high prevalence of MSK disorders and their negative effect on the HRQL, as compared to other chronic disorders [18].

One of the most interesting findings in this study was the modest effect of MSK pain on the HRQL, with a mean

Table 3 HAQ-DI scores in patients with and without comorbidity and their associations

	No comorbidity n=1,019			With comorbidity n=571	p value
	Nonsignificant (≤1)	Significant (>1–3)	p value	Significant (>1–3)	
Gender, n					
- Males	200	61		70	0.363
- Females	562	196	0.238	185	
Age, n					
- <40 years	216	52		17	<0.001
- >40 years	546	205	0.006	238	
Pain duration, n					
- <5 years	580	179		135	<0.001
- >5 years	182	78	0.025	120	
Years in school, n					
- <5 years	211	111		134	0.034
- >5 years	551	146	<0.001	121	
Nature of work, n					
- Mild	437	178		194	0.084
- Mod to severe	325	79	<0.001	61	
Pain sites, n					
- Neck	64	19	0.359	22	0.607
- Shoulder	213	119	<0.001	114	0.717
- Elbow	316	120	0.082	112	0.529
- Wrist	153	53	0.458	26	0.001
- Hand	80	63	<0.001	54	0.369
- Knee	567	213	0.003	229	0.023
- Ankle	244	102	0.016	95	0.571
- Lower back	279	114	0.017	93	0.069

HAQ-DI score of just about mild affection, though MSK pain was reported as the commonest ailment in the community. This observation was in concert with that of the Bhigwan COPCORD study [6] In contrast to this, in a study done in Ireland, 67% of the respondents had significant reduction in their quality of life due to MSK pain [19]. There was a remarkable gender variation in the present study, as most of the respondents were women (72%). A good proportion of the men in the community being employed abroad and errors in sampling may be the reasons for this observation. A lower threshold for pain and a mild nature of work as reported by majority of the respondents may be hypothesised to be the reasons for this inconsistency. Another possible explanation is that the rural community in this region was able to perform their usual activities overlooking the MSK pain. Perceived nature of their work was reported as 'mild' by 56% of the respondents, which throws light into the sedentary nature of life style among the people in this region. Knee was the commonest self-reported pain site in the community, followed by elbow and low back, as in the Bhigwan COPCORD study [5]. This matched well with the individual tasks of climbing stairs, squatting, sitting cross-legged, standing up from a chair and reaching for objects scoring high in the HAQ.

Following the exclusion of respondents with comorbidities in the analysis of HAQ-DI, the domains of 'ability to work' and 'financial position' were the worst affected in the functional impairment. In agreement with other studies, physical dimensions were affected more strongly by MSK pain than the psychosocial aspects of HRQL [6, 20, 21]. Increasing age was found to have a significant association with HAQ-DI. Surprisingly, mild nature of work, as perceived by the respondents, was significantly associated with moderately severe HAQ-DI. The high mean age distribution of this population (above 50 years in both sexes), with men being older than women, may be the reason for this paradox, as most of the people resort to light work above the age of 55 years (usual retirement age in this region). Musculoskeletal conditions other than occupation related ones may be contributing to the high HAQ-DI in this population. Majority of the respondents had pain of less than 5 years duration and this had a significant association with the quality of life. This observation brings into fore the ability of the rural folk to adapt to chronic pain with ease. Among the pain sites, shoulder, hand, knee, ankle and low back scored above the rest in terms of significant HAQ-DI, which co-related well with the other observations.

Among the 432 diagnoses which scored a significant HAQ-DI, inflammatory arthritis formed only 13%. Soft tissue rheumatism, metabolic arthropathies and non-specific musculoskeletal aches formed the predominant proportion of significant HAQ-DI in this community. This is a very cardinal observation, which highlights the importance of community rheumatology, and this has not been reported in any COPCORD studies before. Often, these groups of symptoms evade the eyes of the clinicians. In the haste of fitting all the symptoms of the patient to a particular diagnosis, often these ill-defined pains are overlooked. Unclassifiable symptoms do occur in a big way in the community and they need prompt attention. This further reiterates the fact that not every MSK pain should be classified into a diagnosis, strictly following the criteria.

The foremost limitation of this study was the unrepresentative sample of males, especially in the working age group, owing to the large numbers employed overseas. Another limitation was the time lag between phases II and III (clinical examination), which may have brought in some disparity between the self-reported pain sites and the final MSK diagnoses. Though with limitations, this population-based assessment of HRQL has clearly brought out the impact of MSK pain on the physical and psychosocial aspects in the community. This can have implications both for rheumatologists and public health planning. The importance of including HRQL in routine rheumatology practice to measure the true burden of MSK pain has been highlighted. Rheumatologists should be trained to screen for psychosocial aspects in all patients with MSK pain. A multidisciplinary, sensitive approach, involving the family in patient care should be encouraged and practiced.

Conclusions

Although MSK pain in the community is often ill-defined and is difficult to classify using standardised criteria, it has a significant negative effect on the quality of life and thus needs prompt attention. Physicians and rheumatologists should be trained to be sensitive to this pain and also to consider local traditions and health beliefs, which might affect the attitude of individuals seeking therapy in rural areas.

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