Prevalence of Rheumatic Disorders and Related Disabilities in Bangladeshi Adults: A Cross-Sectional National Survey

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Subject Areas

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Keywords

*Rheumatic disorders, disability, prevalence, Bangladesh*
Abstract

Objectives: To determine the prevalence of rheumatic disorders and related disabilities in the adult population of Bangladesh.

Methods: A total of 2000 individuals aged 18 years or older were targeted where 1843 (92.1%) participated from 20 primary sampling units (urban and rural) of all former seven divisions of Bangladesh in 2015. Modified Community Oriented Program for Control of Rheumatic Disorders questionnaire was used to detect positive respondents. Standard criteria were used for diagnosing rheumatic disorders by residents of rheumatology and expert rheumatologists. A Bangla version of the Health Assessment Questionnaire was used to determine disability.

Results: Among the respondents, 892 men and 951 women participated from rural (n=716) and urban (n=1127) areas. Their mean age was 40.5 (standard deviation 14.7) years. Almost a third did not have any formal schooling. Overall, 30.4% (95% confidence interval, 28.3-32.5) had rheumatic disorders. Nonspecific low back pain (12.7%, 11.2-14.2) and knee osteoarthritis (7.3%, 6.1-8.5) were the two top-ranking rheumatic disorders followed by lumbar spondylosis 6.0% (4.9-7.1) and soft tissue rheumatism 3.8% (2.9-4.7). Rheumatoid arthritis (1.6%, 1.0-2.1), spondyloarthritis (1.2%, 7-1.8) and frozen shoulder (1.4%, 0.9-1.9) are relatively uncommon. Among those who had rheumatic disorders, 24.8% (21.3-28.6) had some degree of disability. Of them, 24.4% (21.0-28.1) had history of work loss during last 12 months. Being overweight, having history of physical trauma and diabetes mellitus, age and female sex were positively but education was negatively associated with rheumatic disorders.

Conclusions: The high burden of rheumatic disorders and related disabilities in Bangladesh warrants public health and clinical interventions.

Highlights

1. This is the first national level study using primary sampling units of Bangladesh Bureau of Statistics engaging rheumatology residents for data collection. The diagnoses have been validated or confirmed by rheumatologists in the field in partnership with divisional level medical college hospitals.

2. Prevalence of rheumatological disorders (low back pain, knee osteoarthritis and lumbar spondylosis are commonly prevalent), associated pain, disability (as determined using B-HAQ) and work loss are so common that warrants public health and clinical intervention.

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Introduction

Rheumatic disorders or musculoskeletal disorders are the most common cause of severe long-term pain, physical disability and early deaths [1, 2]. They affect hundreds of millions of people of all ages irrespective of social strata globally [3]. Rheumatic disorders affect patients typically by reducing skills and mobility thereby their ability to work and active participation in daily life activities. Among these disorders back and neck pain, osteoarthritis, rheumatoid arthritis and fractures are most disabling [2]. In addition, they may run parallel to the major non-communicable diseases (heart attack, stroke, cancer and chronic respiratory disease) and jointly augment disabilities and deaths.
Pain is a common manifestation of musculoskeletal disorders. This is the commonest form of chronic pain [4] for which commonly people seek medical help. In addition, the musculoskeletal disorders impact quality of life [5]. These are, however, under-recognized and under-treated because these are costly and incurable [6]. Globally musculoskeletal disorders affect almost one in four adults with some regional variations. Considering their significance [7, 8], WHO launched the Community Oriented Programme for Control of Rheumatic Disorders (COPCORD) in 1981. After it launching many countries in the Asia Pacific [9-21] and Latin-America [22, 23] completed the COPCORD surveys. Differences in prevalence between rural and urban areas and socio-demographic conditions [10, 11, 12, 14-17, 19, 20] were reported.

Studies in two South-Asian countries, India and Pakistan, have reported a little lower prevalence [16, 17]. One survey in Bangladesh conducted in two locations of Dhaka district reported a prevalence of 24% of rheumatic disorders combined [19]. Bangladesh is a country of 160 million people mostly living in rural area. There is no nationally representative data on these disorders. Related disability has never been studied at population level. We have done a national level survey to determine the prevalence of rheumatic disorders and related disabilities in Bangladeshi adult population.

**Methods**

This survey was designed to obtain national estimates on the burden of rheumatic disorders through a household level survey. Adults aged 18 years or more comprised the study population. [24]

**Sample size and sampling:**

Assuming a point prevalence of rheumatological disorders among Bangladeshi adults of 24% [19], at 5% precision level, 280 participants were required in each reporting domain. Considering four reporting domains (rural-urban, male-female), a design effect of 1.5, and a 85% response rate, the calculated sample size for the national level was 1,978. This was finally rounded to 2,000.

The primary sampling units (PSUs) in Bangladesh constitute the sampling frame of national or subnational surveys. We used the PSUs of 2001 Census stratified in to the then seven divisions and rural and urban areas [25]. These were Mauza and Mahalla in rural and urban areas respectively. Total and urban rural population of the division were considered for allocating number of PSUs. Finally, 20 PSUs (8 urban and 12 rural) were selected and 100 households were included from each PSU. In each PSU, 100 consecutive households were selected starting from the first household in the map. Households having even and odd numbers were assigned as male and female households to recruit one men and one women, respectively, using the Kish table [26].

**Field team and its training:**

Each team consisted of one research physician, one field organizer and two interviewers. The research physicians having at least one-year residency in rheumatology were selected. The field team underwent a three-day long training in Bangabandhu Sheikh Mujib Medical University (BSMMU). All investigators and WHO technical team coordinated and conducted the training using a manual specially prepared for this survey. All investigators were present at the training sessions to ensure uniform understanding of procedures. A dry run of the procedure was then performed.

**Survey instrument and data collection:**

The survey instrument was the modified COPCORD questionnaire [27]. The first part of the questionnaire aimed at detection of the respondents with musculoskeletal pain with some elaboration of the complaints, second part was a structured history and examination sheet (COPCORD examination sheet) used by the research physicians for the diagnosis of disorders and detection of disability. The English version of the first part of the questionnaire was translated to Bangla, then adapted and validated as per standard procedure [28].

**Field work:**
Data were collected in each PSU over a period of six days with engagement of the local community and health authority. The field organizer visited in advance and started household listing with the help of local health assistant on the first day. The field interviewers collected data, identified screening positive respondents, took physical measurements, and arranged interview with the research physician during remaining five days using the household listing prepared. The research physician interviewed and examined the positive respondents for making a diagnosis. In doubtful cases, opinion of a rheumatologist from divisional level medical college was sought. At least one such visit was ensured for each PSU for validation of diagnosis. Erythrocyte sedimentation rate, C-reactive protein, rheumatoid factor and anti-citrullinated peptide antibody were tested in a pre-selected laboratory located nearby to aid diagnosis.

Operational definitions:

Positive respondent:

A subject was considered a positive respondent if he/she reported occurrence of pain at muscles, bones, joints, or any part of the body (musculoskeletal symptom) during the preceding seven days. The respondents in whom musculoskeletal pain appeared, developed, or disappeared in the preceding seven days were also labeled as a positive respondent.

Rheumatic disorders:

All positive respondents were interviewed and thoroughly examined by the research physicians. Internationally accepted criteria [29-33] were used with adaptations whenever necessary. For conditions with no internationally accepted criteria and epidemiological definition, the clinical judgment of the research physician was used. Difficult cases, if any, were reviewed by the investigators (expert rheumatologist) during their routine visit to PSUs.

Disability and work loss:

Disability was scored with a validated Bangla version of the Health Assessment Questionnaire (B-HAQ) [34]. This tool assesses the subjects’ level of functional ability and included questions of fine movements of the upper extremity, locomotor activities of the lower extremity, and activities that involve extremities. The B-HAQ included 20 items referring to basic activities of daily living, grouped into eight categories of functioning, viz., dressing and grooming, arising, eating, walking, hygiene, reach, grip and activities. Each category contained at least two specific component questions. Respondents are asked to rate the degree of difficulty they experienced in carrying out each activity on a 4-point rating scale: 0 (without any difficulty), 1 (with some difficulty), 2 (with much difficulty), and 3 (unable to do). The highest response in each category was divided by 8, yielding a total disability score of 0-3, where zero is no disability and 3 is severe disability [35] Work loss was defined as duration of temporary cessation of work due to musculoskeletal pain or disability in preceding 12 month.

Statistical analysis:

The data were entered into Excel spreadsheet and transferred to EpilInfo (version 7) for analysis. Missing values were identified to confirm the denominators, consistency and distribution of quantitative data for normality were checked.

Economic status was assessed by constructing the wealth index using principal component analysis of ownership of 20 household asset items [24]. The sample was then divided into quartile from one (lowest) to four (highest).

All quantitative variables such as age, years of education, body mass index (BMI), B-HAQ score were categorized before analysis. Alfa was set at 5% for considering significance. Therefore 95% confidence intervals were calculated for all percent estimates such as rheumatic disorders, disabilities and related work loss. Results were presented for four reporting domains: rural, urban, residential locations and sex groups. Multiple logistic regression analysis was done to obtain adjusted odds ratios and their 95% confidence intervals of rheumatological disorders combined. All potential candidate variables were entered simultaneously into the
logistic model. Disability was defined as B-HAQ score of 0.8 or more [36].

ETHICS APPROVAL AND CONSENT TO PARTICIPATE

Ethical guidelines as outlined by the Declaration of Helsinki were followed throughout the study. Ethical clearance was obtained from the Institutional Review Board of BSMMU. Concurrence has been obtained from the local health authorities and elected representatives of the local government prior to data collection. Written (or thumb impression if unable to write) consent was obtained from the respondents in Bangla as per BSMMU Institutional Review Board (IRB) guidelines.

Results

Socio-demographic background:

A total of 1843 respondents (aged 18 years or older) could be interviewed and examined out of targeted 2000 (response rate of 92.2%). The response rate was a little higher in the rural (93.9%) compared to the urban area (89.5%). There were 892 (48.4%) men and 951 (51.6%) women respondents. Mean age of the participants was 40.5 (standard deviation 14.7) years. Background data are presented in Table 1. Nearly 3 in 10 did not have any formal schooling. Although the occupation of men was diverse, almost 8 in 10 women were home makers. One in 5 men were from occupational categories of day-labourer (23.4%), business (20.3%), and cultivation (18.9%). One in 5 (21.3%) were overweight or obese (BMI>=25.0 kg/meter²).

Table 1

Social and other risk factors (number, percent) among the cross-sectional survey of Bangladesh

| Risk Factors      | Urban          | Rural          | Men            | W              |
|-------------------|----------------|----------------|----------------|----------------|
|                   | n=716          | n=1127         | n=892          | n=951          |
| Age, years        |                |                |                |                |
| 18-34             | 296 (41.3)     | 415 (36.8)     | 217 (24.3)     | 45 (4.7)       |
| 35-54             | 306 (42.7)     | 468 (41.5)     | 422 (47.3)     | 38 (4.0)       |
| 55-99             | 114 (15.9)     | 244 (21.7)     | 253 (28.4)     | 109 (11.5)     |
| Occupation        |                |                |                |                |
| Homemakers        | 254 (35.5)     | 495 (43.9)     | 0 (0.0)        | 74 (7.8)       |
| Laborer           | 81 (11.3)      | 161 (14.3)     | 209 (23.4)     | 32 (3.4)       |
| Business professional | 111 (15.5) | 75 (6.7)       | 181 (20.3)     | 5 (0.5)        |
| Service holder    | 96 (13.4)      | 29 (2.6)       | 98 (11.0)      | 2 (0.2)        |
| Rickshaw/ Auto-Rick/ Van |          |                |                |                |
| Occupation         | puller | 27 (3.8) | 44 (3.9) | 70 (7.9) | 1 |
|--------------------|--------|----------|----------|----------|--|
| Cultivator         | 5 (0.7)| 164 (14.6)| 168 (18.9)| 1 |
| Others             | 142 (19.8)| 159 (14.1) | 166 (18.6) | 1 |

**Education Level**

| Education Level                              | puller | 27 (3.8) | 44 (3.9) | 70 (7.9) | 1 |
|----------------------------------------------|--------|----------|----------|----------|--|
| No formal education (0)                      | 143 (20.0)| 421 (37.4) | 267 (29.9) | 2 |
| Any primary education (1-5)                 | 131 (18.3)| 325 (28.8) | 233 (26.1) | 2 |
| Any secondary education (6-10)              | 232 (32.4)| 306 (27.2) | 246 (27.6) | 2 |
| Above secondary (>=11)                      | 210 (29.3)| 75 (6.7)  | 146 (16.4) | 1 |

**Wealth index quintiles***

| Wealth index quintiles*                     | puller | 27 (3.8) | 44 (3.9) | 70 (7.9) | 1 |
|---------------------------------------------|--------|----------|----------|----------|--|
| 1st                                         | 75 (10.5)| 401 (35.6)| 206 (23.1) | 2 |
| 2nd                                         | 108 (15.1)| 354 (31.4)| 220 (24.7) | 2 |
| 3rd                                         | 203 (28.4)| 245 (21.7) | 231 (25.9) | 2 |
| 4th                                         | 232 (32.4)| 306 (27.2) | 246 (27.6) | 2 |
| Body mass index (≥ 25 Kg/m²)                | 225 (31.4)| 167 (14.8)| 148 (16.6) | 2 |
| History of trauma                           | 78 (10.9)| 100 (8.9)  | 88 (9.9)   | 9 |
| Smoking, ever                               | 207 (28.9)| 392 (34.9)| 583 (65.4) | 1 |
| Diabetes mellitus**                         | 73 (10.2)| 36 (3.2)   | 50 (5.6)   | 5 |
| Extraneous physical activity#               | 124 (17.3)| 230 (20.4)| 336 (37.7) | 1 |

*The wealth index was constructed using principal component analysis out of a list of 20 household assets (See Methods section for details).

**Diabetes was defined as random capillary glucose level ≥11.1 or medication for diabetes; #MET minutes of fifth quintile

**Rheumatic disorders:**

There were 561 people with rheumatic disorders (225 men and 336 women). Prevalence of any rheumatic
disorder was 30.4% with 95% confidence interval (CI) 28.3-32.5, which was higher in women (35.3%, 32.3-38.4) compared to men (25.2%, 22.4-28.1) (Table 2). Nonspecific low back pain (12.7%) and knee osteoarthritis (7.3%), lumbar spondylosis (6.0%) and soft tissue rheumatism (3.8%) were the commonest disorders in sexes combined. The prevalence of rheumatoid arthritis was 1.6%. Among all disorders, only non-specific low back pain differed significantly between men (9.2%, 7.3-11.1) and women (16.0%, 13.7-18.3). Others were not significantly different. The prevalence increased with age, but it was inversely related to educational and economic states. Certain occupations (such as home maker, cultivator and manual vehicle puller) had higher rates, but no definitive trend was observed. Overall prevalence did not differ significantly between rural (31.1%, 28.4-33.8) and urban areas (29.5%, 26.1-32.8%). This was true for specific disorders also (Figure 1).

Table 2

| Rheumatic Disorders | Men (n=892) | Women (n=951) | Bt (n) |
|---------------------|------------|---------------|-------|
|                     | n | %     | 95% CI* | n | %     | 95% CI* | n |
| Rheumatoid arthritis | 6 | 0.7    | 0.1-1.2 | 23 | 2.4    | 1.4-3.4 | 25 |
| Spondyloarthropathy  | 13 | 1.5    | 0.7-2.2 | 10 | 1.1    | 0.4-1.7 | 23 |
| Knee osteoarthritis  | 60 | 6.7    | 5.1-8.4 | 74 | 7.8    | 6.1-9.5 | 13 |
| Lumbar spondylosis   | 45 | 5.0    | 3.6-6.5 | 65 | 6.8    | 5.2-8.4 | 11 |
| Cervical spondylosis | 14 | 1.6    | 0.8-2.4 | 11 | 1.2    | 0.5-1.8 | 25 |
| Soft tissue rheumatism | 23 | 2.6    | 1.5-3.6 | 47 | 4.9    | 3.6-6.3 | 7C |
| Frozen shoulder       | 10 | 1.1    | 0.4-1.8 | 16 | 1.7    | 0.9-2.5 | 26 |
| Connective tissue disorder | 1 | 0.1    | 0-0.3  | 5  | 0.5    | 0.1-1.0 | 6  |
| Nonspecific low back pain | 82 | 9.2    | 7.3-11.1 | 152 | 16.0 | 13.7-18.3 | 23 |
| Other noninflammatory | 31 | 3.5    | 2.3-4.7 | 31 | 3.3    | 2.1-4.4 | 62 |
| Other inflammatory    | 7  | 0.8    | 0.2-1.4 | 14 | 1.5    | 0.7-2.2 | 21 |
| **Any rheumatic disorder** | 225 | 25.2 | 22.4-28.1 | 336 | 35.3 | 32.3-38.4 | 56 |

CI indicates confidence interval; **Multiple diagnosis in 192 patients. Therefore, the total of diseases exceeds 561.

**Musculoskeletal pain:**

One-third men and women had musculoskeletal pain, although determined subjectively, and 9.1% of them had very severe pain. Low back (20.2%), knee (12.2%) and shoulder (6.2%) joints were the commonest site of pain.
Next common sites were elbow (4.9%) and wrist (4.3%) joints (Table: 3). We did not observe substantial difference in distribution of pain sites between rural and urban areas.

| Pain location          | Urban, (n=716) | Rural, (n=1127) | Both, (n=1843) |
|------------------------|----------------|-----------------|----------------|
|                        | %              | 95% CI*         | %              | 95% CI*         | %              | 95% CI*         |
| Whole body pain        | 1.0            | 0.3-1.7         | 1.4            | 0.7-2.1         | 1.2            | 0.7-1.7         |
| Shoulder joint         | 5.0            | 3.4-6.6         | 6.9            | 5.4-8.4         | 6.2            | 5.1-7.3         |
| Elbow joint            | 2.5            | 1.4-3.6         | 6.5            | 5.1-7.9         | 4.9            | 3.9-5.9         |
| Wrist joint            | 3.1            | 1.8-4.4         | 5.1            | 3.8-6.4         | 4.3            | 3.4-5.2         |
| Hand joints            | 3.4            | 2.1-4.7         | 4.3            | 3.1-5.5         | 4.0            | 3.1-4.9         |
| Hip joint              | 0.7            | 0.1-1.3         | 0.8            | 0.3-1.3         | 0.8            | 0.4-1.2         |
| Knee joint             | 10.6           | 8.3-12.9        | 13.2           | 11.2-15.2       | 12.2           | 10.7-13.7       |
| Ankle joint            | 2.8            | 1.6-4.0         | 4.1            | 2.9-5.3         | 3.6            | 2.7-4.5         |
| Foot joint             | 2.2            | 1.1-3.3         | 2.6            | 1.7-3.5         | 4.9            | 3.9-5.9         |
| Neck                   | 3.1            | 1.8-4.4         | 3.4            | 2.3-4.5         | 3.3            | 2.5-4.1         |
| Upper back             | 4.3            | 2.8-5.8         | 3.2            | 2.2-4.2         | 3.6            | 2.7-4.5         |
| Lower back             | 17.3           | 14.5-20.1       | 22.0           | 19.6-24.4       | 20.2           | 18.4-22         |
| Chest                  | 1.1            | 0.3-1.9         | 1.7            | 0.9-2.5         | 1.5            | 0.9-2.1         |
| Arm                    | 1.5            | 0.6-2.4         | 1.8            | 1.0-2.6         | 1.7            | 1.1-2.3         |
| Forearm                | 1.0            | 0.3-1.7         | 2.5            | 1.6-3.4         | 1.9            | 1.3-2.5         |
| Hand                   | 1.4            | 0.5-2.3         | 2.0            | 1.2-2.8         | 1.8            | 1.2-2.4         |
| Hip                    | 0.7            | 0.1-1.3         | 0.3            | 0.0-0.6         | 0.4            | 0.1-0.7         |
| Thigh                  | 1.1            | 0.3-1.9         | 2.9            | 1.9-3.9         | 2.2            | 1.5-2.9         |
*CI indicates confidence interval

**Disability and work loss:**

People with rheumatic disorders had a mean B-HAQ score of 0.63. One-quarter (24.8%, 21.3-28.6) had some or much difficulty in doing their daily works defined by B-HAQ score 0.8 or above (Table 4). None were in the ‘unable to do’ (B-HAQ score, 3.0) category. Their proportions were statistically similar between men (19.1%, 24.2-24.9) and women (28.6%, 23.9-33.8) with overlapping confidence intervals. The prevalence has shown an increasing trend with age, 14.9% in 18-34 years age group to 36.6% in 55+ year age group. Among the eight domains of B-HAQ disability index, the commonest problems were with daily works, walking and arising. Of those who had disability, 24.4% (21.0, 28.1) had work loss during last 12 months. Work loss in men (27.1%) and women (22.6%) was similar. They had 12 median days of work loss during those 12 months.

Table 4
Disability and work loss among subjects (percent, 95% confidence interval) with rheumatic disorders, cross-sectional national survey in Bangladesh, 2014*

| Disability indices | Men, (n=225) | Women, (n=336) |
|--------------------|--------------|----------------|
| B-HAQ** score, mean | 0.56 (0.47-0.65) | 0.68 (0.61-76) |
| Disability (B-HAQ Score =>0.8)#, % | 19.1 (14.2-.9) | 28.6 (23.9-33.8) |
| Any work loss (last 12 months), % | 27.1 (21.7-33.3) | 22.6 (18.5-27.4) |
| Duration of work loss (last 12 months), mean | 14.7 (6.8-22.6) | 9.7 (3.8-15.6) |

*Results in the parentheses are 95% confidence intervals; **B-HAQ indicates Bengali version of the Health Assessment Questionnaire.

#The cut-off point is according to Rosana Quintana (2016) [36].

**Factors associated with rheumatological disorders:**

Univariate logistic regression done for 11 candidate factors (age, sex, education, smoking, wealth quartile, urban-rural residence, very high level of physical activity, occupation, trauma, overweight and diabetes indicated contribution of all of them except sex, wealth and residence. However multivariate analysis adjusted for age and sex, the relationship of education (odds ratio, 0.9, 0.8-0.9), overweight (1.5, 1.2-1.9), trauma (1.9, 1.4-2.6) and diabetes (1.5, 1.0-2.2) persisted (Table 5).
Table 5
Results of multiple logistic regression for rheumatic disorders

| Variables                        | Unadjusted | Age adjusted |      |
|----------------------------------|------------|--------------|------|
|                                  | Odds ratio | 95% CI†      | P value | Odds |
| Age groups*                      | 1.7        | 1.5-2.0      | 0.000  | 2.1  |
| Sex (women=2/ men=1)             | 1.1        | 0.9-1.3      | 0.47   | 2.4  |
| Education groups‡                | 0.8        | 0.7-0.8      | 0.000  | 0.9  |
| Wealth quartiles                 | 0.95       | 0.9-1.0      | 0.27   | 1.0  |
| Urban residence                  | 1.1        | 0.9-1.3      | 0.47   | 1.0  |
| Smoking, ever vs never           | 1.4        | 1.1-1.0      | 0.002  | 1.1  |
| Extraneous physical activity§    | 0.7        | 0.5-0.9      | 0.002  | 0.97 |
| Occupational groups**            | 0.96       | 0.91-0.99    | 0.04   | 0.99 |
| Overweight (yes=1/ no=0)         | 1.5        | 1.2-1.9      | 0.000  | 1.5  |
| History of trauma/ injury (yes=1/ no=0) | 1.8      | 1.3-2.8      | 0.000  | 1.9  |
| Diabetes (yes=1/ no=0)           | 1.9        | 1.3-2.8      | 0.002  | 1.5  |

*18-34 y=1, 35-54 y=2, 55-99 y=3;

†CI: Confidence interval

‡no education=1, any primary=2, any secondary=3, above higher secondary=4

§Quintile 5 versus rest of MET minutes per week;

**See table 1 for groups

Discussion
Rheumatic disorders are among the most relevant health issues worldwide owing to the human suffering they impose, in addition to their increasing social and economic costs [37, 38]. Yet this problem remained under-addressed in terms of programmatic approaches, treatment and necessary evidences to back up necessary interventions. The current study is the first one in Bangladesh with national representation addressing equity issues related to age, sex and socio-economic status. We report here that three in ten Bangladeshi adults suffer from rheumatic disorders. Among them one in four has varying degrees of disability.
Musculoskeletal pain:

Pain was the commonest manifestation. Like our previous survey, we observed an increased frequency of pain with age. Women had higher frequency of pain compared to men, as was reported by most of the researchers. Similarly, the prevalence of musculoskeletal pain was greater in rural areas compared to urban areas. Commonest sites were low back (20.2%), knees and shoulders as in most other COPCORD studies including ours [19], except in India [17] and Iran [39]. There are many factors for high rates of low back pain. The most frequently reported factors are heavy physical workload such as lifting, awkward posture, lack of exercise and obesity [40] and age (especially above 35 years) [41]. Unidentified causes of high prevalence of low back pain in developing country may be vitamin D deficiency due to limited sun exposure and multiparity [42].

Rheumatic disorders:

The most common rheumatic disorder in the study was nonspecific low back pain (12.7%). The prevalence of low back pain was nearly similar to that of India [17], Vietnam [43] and Malaysia [44] but lower than in rural Iran [20] and urban Indonesia [11]. The social culture of domestic and professional activities in bending posture may be responsible for higher prevalence of low back pain in our community. A rapid urbanization, transition to sedentary work and weight gain might also have contributed [45].

Knee osteoarthritis (7.3%) was the second commonest rheumatic disorder. This prevalence was lower than that of the urban Iran 15.3% [39] and higher than that of India (4.42%) [17] and Lebanon 3% [46]. It may be related to more knee usage in our community during occupational and household chores, leisure and prayers [47]. Repetitive joint use and working in squatting position for prolonged time may be responsible for the high prevalence of knee osteoarthritis among homemakers, cultivators and manual vehicle (cycle rickshaw, cycle van, etc.) pullers. Climbing high stairs in urban areas might also be linked.

The prevalence of rheumatoid arthritis was 1.6%, women had significantly higher prevalence (2.4%) compared to men (0.7%). The prevalence reported in the previous Bangladesh COPCORD survey of 2005 was 0.9% [19]. Our current finding is close to that of Cuba (1.2%) [23] and Mexico (1.6%) [22]. The most contrasting findings have been reported from nearby Asian countries: India (0.5%) [17], Pakistan (0.6%) [16] [14], Thailand (0.1%) [15] and Malaysia (0.2%) [44]. The higher prevalence in our survey may be partly explained by the adoption of American College of Rheumatology/ European League Against Rheumatism (ACR/EULAR) 2010 classification criteria which has a higher sensitivity (97%). [29]. Prevalence of spondyloarthritis was 1.2%, which was also higher than in other COPCORD studies. Again this might be attributed partly to the adoption of the new ASAS classification criteria which has a higher sensitivity (83%) [30].

The prevalence of SLE, in Cuba [23] and Iran [20] was 0.06%. It is important to note that the power of our study was not enough to report the prevalence of rare diseases like SLE. Probably this was the case in other countries also, where the investigators could not identify subjects with SLE in Philippines [10, 14] and India [17] or could identify a single case in Pakistan [16].

Factors related to rheumatic disorders:

Occupations demanding heavy physical work like homemaking, cultivation and rickshaw pulling had higher rates of complaints. Musculoskeletal problems were more common in subjects who performed heavy physical work and, particularly, in those in jobs that involve kneeling and squatting [48]. High BMI (≥ 25) was associated with higher musculoskeletal pain. These subjects had higher prevalence of pain in joints, knees, limbs and lower leg compared with normal weight subjects [49]. Our result supports the studies done by others [50]. Diabetic patients had higher musculoskeletal pain than non-diabetics. Diabetes affects the musculoskeletal system in multiple ways. It is well-known that many rheumatologic disorders like frozen shoulder, trigger finger, carpal tunnel syndrome etc. occur more frequently in diabetics than in the general population.

Disability:

In the current study the prevalence of functional disability was 24.8%. In the urban Iran (28.3%) the disability rate was close to this study [21]. The disability rates were lower in the earlier Bangladesh COPCORD survey
(24%) [19], rural Philippines (1.8%) [10] and rural Thailand (3%) [15]. These large discrepancies may partly be explained by differences in definitions and methodologies used to detect functional disability [19], social custom, differences in occupation and workplace environment.

LIMITATIONS

It was sometimes difficult to distinguish closely resembling disorders with the field epidemiological definitions. Most of the recognized classification criteria demand some investigations which are sometimes not possible due to lack of facilities in nearby locations and subjects’ unwillingness to travel long distance. For example, ASAS classification criteria for axial spondyloarthritis demand few mandatory investigations, which were substituted by expert opinion in our survey. We used rheumatology residents as research physician who had received extensive training before their deployment to the field. All diagnosis made by them were double checked by the investigators. One visit of the investigators to each PSU was mandatory to validate their diagnosis and sort out confusing cases.

The sample size estimation for this survey was based on prevalence of rheumatic disorders combined. Therefore, caution had to be exerted in interpreting the results of individual disorders (specially the rare ones) especially when they are split in to four reporting domains (men-women and urban-rural).

Conclusions

We conclude that low educational status, obesity, diabetes mellitus, trauma are the factors to be targeted for intervention for rheumatic disorders. A large pool of patients with this disorders and disabilities alerts the health system to be tuned.

Declaration

AUTHOR CONTRIBUTION

AZAQ developed questionnaire and the manual; implemented the survey, analyzed data, interpreted the result and drafted the manuscript. MMZ designed the study, interpreted result critically, guided field implementation, guided manuscript writing and critically reviewed it. MRB developed the manual, trained field team, monitored field implementation and reviewed the manuscript. MMR, IP, BBD, SAH, SP, AS, and MR trained the field team, implemented the survey in their respective divisions and reviewed the manuscript. SAH jointly designed the study, coordinated survey implementation, revised the manuscript critically and approved submission. He is the guarantor of data.

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Figure 1

Prevalence (%) of rheumatic disorders in rural and urban areas of Bangladesh