



Original research

Musculoskeletal disease in Nepal: A countrywide cross-sectional survey on burden and surgical access

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HIGHLIGHTS

- Despite its impact, the burden and pattern of MSDs in developing countries is not well known.
- A countrywide survey in Nepal showed an incidence of self-reported musculoskeletal disease of 14.8% with an unmet need of 60%.
- Based on this study, there are approximately 2.35 million people living with MSDs in Nepal.

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ABSTRACT

Introduction: Musculoskeletal disease (MSD) is a major cause of disability in the global burden of disease, yet data regarding the magnitude of this burden in low and middle-income countries (LMICs) are lacking. The Surgeons OverSeas Assessment of Surgical Need (SOSAS) survey was designed to measure incidence and prevalence of surgically treatable conditions, including MSD, in patients in LMICs.

Methods: A countrywide survey was done in Nepal using SOSAS in May–June 2014. Clusters were chosen based on population weighted random sampling. Chi squared tests and multivariate logistic regression assessed associations between demographic variables and MSD.

Results: Self-reported MSDs were seen in 14.8% of survey respondents with an unmet need of 60%. The majority of MSDs (73.9%) occurred between 1 and 12 months prior to the survey. Female sex (OR = 0.6; $p < 0.000$), access to motorized transport (for secondary facility, OR = 0.714; $p < 0.012$), and access to a tertiary health facility (OR = 0.512; $p < 0.008$) were associated with lower odds of MSD.

Discussion: Based on this study, there are approximately 2.35 million people living with MSDs in Nepal. As the study identified non-availability, lack of money, and fear and/or lack of trust as the major barriers to orthopedic care in Nepal, future work should consider interventions to address these barriers.

Conclusion: There is a need to increase surgical capacity in LMICs; in particular, there is a need to bolster trauma and orthopedic care. Previous studies have suggested ways to allocate resources to build capacity. We recommend targeting the alleviation of these identified barriers in parallel with capacity building.

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1. Introduction

Musculoskeletal disease (MSD) is a common and costly problem worldwide [1]. It encompasses a wide spectrum of diseases of the musculoskeletal system and multisystem connective tissues that range from traumatic injury to congenital malformation, including

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but not limited to various inflammatory, mechanical and autoimmune conditions. It has a profound global impact both in terms of morbidity and mortality. According to the Global Burden of Disease studies of 1990–2010, non-traumatic MSDs were estimated to account for 6.8% of all disability adjusted life years (DALY) lost while traumatic MSDs accounted for 11% [1]. The World Health Organization estimates injuries alone accounted for more than 5 million deaths in 2004, with nearly 3.9 million of these deaths accounted for by unintentional injury, a cause also responsible for more than 138 million DALYs lost in the same year [1]. More than 90% of the DALYs lost occur in low- and middle-income countries (LMICs), highlighting the disproportionate burden that injuries place on developing countries [2].

MSDs also place a heavy financial burden on countries. U.S. companies spent 50 billion dollars on direct costs of MSDs in 2011 [3] and the average MSD has a direct cost of almost \$15,000 according to the U.S. Bureau of Labor Statistics [4]. In Colombia, a middle-income country, the direct costs of MSDs in 2005 were \$63.5 million and the average MSD came with a direct cost of about \$1135 [5]. MSDs have been found to be the some of the costliest diseases, especially when considering the additional indirect costs associated with loss of work and disability [6]. In fact, while MSDs total 1.2% of GNP in direct costs, they cost an additional 1.3% of GNP in indirect costs in the U.S alone [7].

Despite its overall significance, the burden and pattern of MSDs in developing countries is not well known, and there have been a limited number of studies addressing this issue [2,5,8–22]. Most of the available data is extrapolated from hospital-based studies [8,9,11,13,15–17,19,21,22], which cannot be used to accurately generalize to the overall population; patients who present to hospitals are not representative of the burden in the population due to a variety of reasons including disparate access to care [23]. Thus, the use of hospital-based data, particularly in nations where surgical care is sparsely available, will exclude a significant proportion of patients with MSDs and underestimate their incidence, prevalence and morbidity. Understanding this burden is essential as a primary step in the management continuum so that proper allocation of already scant resources and manpower can be evidence based.

Despite efforts made to acquire data on the burden of MSDs in LMICs, there has been a lack of population based studies and resulting data on this condition in Nepal. Our objective was to estimate the prevalence of MSD in the Nepal and better understand the epidemiology of MSD in South Asia using a validated country-wide surgical needs assessment survey.

2. Material and methods

The Surgeons Overseas Assessment of Surgical need (SOSAS) is a validated cross-sectional, cluster-based population survey described in detail previously [24,25]. The countrywide SOSAS in Nepal was executed from May 25th, 2014 to June 12th, 2014. Two-stage cluster sampling was performed. In the first stage, fifteen of the 75 districts in Nepal were randomly selected proportional to population. For the second stage of sampling, three village development committees (VDCs) were randomly selected per district after stratification for urban and rural population according to the Demographic Health Survey methodology [26]. Sample size estimation was made based on a pilot study performed in Pokhara, Nepal in January 2014, finding an unmet surgical need of 5% [27].

A total of one hundred Nepalese medical interns, doctors and students conducted the surveys throughout Nepal. Interviewers began at a central location and sampled every fifth household within a selected VDC; thirty households per VDC were sampled, with a total sample size of 1350 households countrywide. All surveys were verbally administered in Nepali and the responses

recorded in English via paper surveys; appropriate verbal consent was obtained from each respondent.

For this analysis, we assessed the demographics of the respondents, particularly in regards to age wise distribution, gender, urban or rural dwelling and type of work done. Relevant questions regarding MSD in respondents were analyzed. This included nature of disease (traumatic or non-traumatic), affected body part, access to care, and reasons for not seeking competent healthcare. Novel to the Nepal SOSAS survey was the addition of a visual physical examination; which was helpful in validating the SOSAS tool [25].

Pearson's chi-square test was used to compare categorical variables and Student t-tests were used to compare continuous variables. Multivariable logistic regression was used to calculate the odds of having a musculoskeletal problem adjusting for age, sex, occupation, availability of motorized to transportation to a tertiary health center, and rural household. Statistical significance was set at a P-value 0.05 or less. Stata 13.0 (StataCorp, College Station, TX, 2013) was used to perform the analysis.

Institutional Review Board approval was obtained from Nationwide Children's Hospital in Columbus, Ohio and from the Nepal Health Research Council in Kathmandu, Nepal.

3. Results

A total of 1350 households were surveyed with 2695 respondents (1434 males, 1261 females), with a response rate of 97%. Out of all respondents, 400 (14.8%) had self-reported MSDs. Among them, 46 (1.7%) had back problems while 362 (13.4%) had problem in the extremities. The mean age of the respondents who had self-reported MSDs was 35.52 (SD 19.6). Among those who reported MSD, the mean age was 35.5 years, 250 (62.5%) males, 262 (65.5%), 284 (71.0%) with some education, and 186 (46.5%) employed outside the home. The most common cause of MSD was a wound by injury, reported by 211 (52.8%) (Table 1).

The majority of MSDs occurred between 1 and 12 months prior to the survey, 294 (73.9%), with the most common pathology as "other," 184 (80.0%). The most common location of MSD was the lower leg, 41 (24.7%) (Table 2). The average time to a primary care center was 42.4 (SD: 300.5) minutes, with 92 (23.1%) needing motorized transport. Average time to travel to a secondary care facility was 208.9 (SD: 499.0) minutes with 319 (90.0%) needing motorized transport. Average time to a tertiary care facility was 338.3 (SD 961.1) minutes with center with 379 (95.5%) needing motorized transport (Table 3).

On multivariable analysis, being a woman (OR = 0.6; 95% CI, 0.5 to 0.8, $p < 0.000$), and having access to motorized transport (for secondary facility, OR = 0.714; 95% CI, 0.549 to 0.928, $p < 0.012$) and for tertiary facility, (OR = 0.512; 95% CI, 0.312 to 0.840, $p < 0.008$) were both associated with lower odds of MSD (Table 4). Of the patients with an identified non-traumatic MSD with unmet surgical need (41.0%), there were a number of barriers to access. The most commonly voiced was fear or lack of trust of the healthcare system, 13 (33.3%) and non-availability of surgical care, 11 (28.2%) (Table 5).

4. Discussion

Musculoskeletal disease is a major cause of morbidity, chronic pain, disability, and rising health care costs globally [1,2,5,10,12,18]. This study, performed in a low-income country in South Asia found an MSD prevalence of 14.8% amongst whom there was an unmet burden of 60%. The estimated prevalence of traumatic MSD was 8.7% and non-traumatic MSD was 6.2%. Of the respondents with a non-traumatic MSD that had developed within the past year, 69.0% desired medical evaluation but were unable to receive it. Barriers to access to care is one the factors contributing to untreated MSD in

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