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Patterns of Musculoskeletal Diseases seen in Zambian Children

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ABSTRACT

Background: Musculoskeletal disorders are a common cause of long-term pain and physical disability affecting many people worldwide and have an enormous economic and social impact on the individual, society and national health systems. Although the burden of disease due to musculoskeletal disorders is said to be on the rise in the developing world, the full extent of this burden remains unknown.

Objectives: To describe the patterns of musculoskeletal disorders seen in Zambian children aged below 15 years as baseline for future orthopaedic research, training and health management policy.

Methods: Through a hospital-based cross-sectional study design, relevant data was collected onto an evaluation form from medical records of 1246 patients at the University Teaching Hospital (UTH), Zambian-Italian Orthopaedic Hospital (ZIOH) and the Flying-Specialist (FLYSPEC) nationwide orthopaedic outreach. The data was then entered into a spreadsheet and imported into SPSS for analysis.

Results: Congenital abnormalities, other non-congenital deformities, and traumatic fracture dislocations were the commonest conditions affecting the 1246 sampled children with prevalence rates of 0.49, 0.22 and 0.14 respectively. Most patients presented late (more than 3months from the onset of their condition) with 509 (42.2%) having travelled for more than 10 kilometres to get to their treatment sites. 561 (45.4%) had been treated conservatively prior to their presentation to orthopaedics with another 471 (38.1%) having received no treatment at all.

Conclusion: congenital abnormalities, non-congenital limb deformities and traumatic conditions were the commonest musculoskeletal disorders in that order. More males than females were afflicted though this distribution was different within the age ranges. Most of these patients presented late and distance to health facility was strongly correlated to late presentation. Furthermore, at first presentation these children receive little or no appropriate treatment from the first-line health workers at local health centres.

BACKGROUND

Musculoskeletal disorders have been reported as the commonest[1] cause of severe long-term pain and physical disability affecting hundreds of millions of people around the world. Their economic and social impact on the individual, society, and the national health care systems is enormous.[1] In the year 2001, according to the World Health Organisation (WHO), injuries of all sorts killed 5.1 million people and accounted for 12% of the disability-adjusted life years (DALYS) lost worldwide, which was more than that lost because of tuberculosis (2.5%) diarrhoea (4.3%) and malaria (2.9%) combined and was twice as much as that lost to either the human immunodeficiency virus (6%) or cancer (5.2%).[2] With increasing national populations and changing

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lifestyles in the developing world of sub-Saharan Africa, most agree that the disease burden due to musculoskeletal disorders is most likely to increase dramatically over the next decade and beyond.[3,4] This calls for more attention and resources to be applied to measures that are aimed at mitigating the impact of musculoskeletal disease as well as to raise awareness and adequately quantify this disease burden. To be able to measure this projected increase in musculoskeletal morbidity, there is need for establishing baseline information on the disease burden which can then be continually updated at regular intervals. However, there is little specific epidemiologic data about the extent of the burden of musculoskeletal disease especially in developing countries.[5,6] While there is considerable funding for control of communicable diseases, there has been little attention paid to either the documentation, prevention or the treatment of musculoskeletal problems in developing countries[2,7] in the face of a reported ongoing epidemiological shift in disease burden away from infectious diseases and towards chronic non-communicable diseases.[8] It is for this reason that the World Health Organisation, in the year 2000, launched the "Bone & Joint Decade (2000 – 2010) to raise awareness of the increasing societal impact of musculoskeletal injuries and disorders.[9] In this last year of the Bone and Joint Decade, the patterns and profile of musculoskeletal disorders affecting Zambian adults and children are yet to be documented and the disease burden is only an estimate[2] given by WHO. It was, therefore, the main objective of this study to describe the patterns of musculoskeletal disorders seen in Zambian children aged below 15 years. It is hoped that findings from this study will help raise awareness so that musculoskeletal disorders receive higher priority in health strategy, training, research and management among clinicians and health policy makers.

METHODS

This was a hospital-based cross-sectional study spanning the period April 1st 2005 to May 31st 2006. Relevant data was collected from patient medical records with the aid of an evaluation form. The study sites included the University Teaching Hospital's C21, C22 in-patient wards and out-patient clinic 3, the Zambian-Italian Orthopaedic Hospital (ZIOH) and outlaying hospitals visited under the Flying-Specialist (FLYSPEC) nationwide orthopaedic outreach (Kaleni-hill, Mukinge, Chitokoloki, Mongu, Kabwe, Monze, Katete, Chilonga, Mbala and Kasama). The attending orthopaedic surgeons were grossly the same in all these centers (i.e. orthopaedic consultants and registrars from UTH and ZIOH.

Included in the study were both male and female children aged less than 15 years who had been diagnosed with a musculoskeletal disorder by the orthopaedic team. Excluded were those aged 15 years or more, those diagnosed with disorders that were not purely musculoskeletal (e.g. joint contractures secondary to skin burns attended to by plastic surgeons) and those with a musculoskeletal disorder under the age of 15 but who had not yet been attended to by orthopaedic surgeons.

Specific identifiers such as patient names were omitted in the data entry on the evaluation forms to maintain confidentiality. The data was entered into a spread sheet in Excel and then imported into SPSS for analysis using descriptive statistics.

RESULTS

A total of 1,246 patients were included in this study. The data from the evaluation forms was grouped into two categories of variables (i.e. demographic information and clinical orthopaedic information).
Table 1 below describes the demographic information of the study population. This included the variables; gender, age, site where treated, patient category in terms of new patient or follow-up patient, distance covered from home to treatment site and the province within which the patient was treated.

Table 1. Distribution of the patients' demographic variables, *n = 1246*

Variable	*f*	*% of total*
· *Gender*		
Female	484	38.8
Male	762	61.2
· *Subject Age*		
<1yr	209	16.8
1 – 5yrs	497	39.9
6 – 10yrs	312	25.0
11-14 yrs	228	18.3
· *Pt.[1] place of treatment (site)*		
UTH	141	11.3
ZIOH	298	23.9
FLYSPEC	807	64.8
· *Pt. category*		
Follow up	267	21.4
New patient	979	78.6
· *Approximate Distance travelled by pt.[1]*		
<5km	227	18.2
5 – 10km	377	30.3
>10km	639	51.3
· *Province of pt. attendance*		
Copperbelt	0	0.0
Central	8	0.6
Eastern	146	11.7
Lusaka	401	32.6
Luapula	1	0.1
Northern	307	24.6
North-western	180	14.4
Southern	80	6.4
Western	118	9.5

Pt.[1]=patient

Clinical variables describing each patient's musculoskeletal disorder included the final diagnosis made by the attending orthopaedic surgeon (Table 2), time from onset of the musculoskeletal disorder to initial presentation at health facility (Table 3) and initial treatment by local health personnel prior to attendance by orthopaedic surgeon (Table 4).

Table 2. Distribution of orthopaedic pathology among patients. N = 1221

Musculoskeletal condition	*f*	*% of total*
Congenital	611	50.0
Trauma	171	14.0
Tumours	26	2.1
Bone & Joint sepsis	40	3.3
Inflammatory	64	5.2
Neurological	2	0.2
Other forms of Deformity	307	25.2

** 25 of the patients had missing information about their musculoskeletal condition (equivalent to 2.0% of the total number of patients, 1246). These were excluded from this analysis.*

The final diagnoses as made by the attending orthopaedic surgeons were then categorized as shown in Table 2. Congenital deformities 611 (50%), other non congenital limb deformities 307 (25.2%) and disorders arising from traumatic situations 171 (14.0%) were the top three among the study population.

The delays in management of these paediatric musculoskeletal disorders among the study population were assessed using the variable "time from onset of the musculoskeletal disorder to initial presentation at health facility". Results showed that 129 (10.4%) of the patients presented within less than one month, 125 (10.0%) within 1 to 3 months and majority of the patients, 955 (76.6%) presented after 3 months. This information is shown in table 3 below.

Table 3. Time from onset of condition to presentation of patient. N = 1,246

Time in months	*f*	*% of total*
< 1 month	129	10.4
1 – 3 months	125	10.0
>3 months	955	76.6
*Pts missing data	37	3.0

**Pts=patient (number of patients whose data on this variable was missing, a negligible % to Influence the overall result).*

Table 4 below, categorises the treatment received by the study population at home or from the local health workers at initial presentation. The study found that 471 (37.8%) of the patients received no form of treatment, 9 (0.7%) were treated traditionally at home by either tattooing or blood-letting, while 561 (45.0%) had some form of conservative treatment ranging from physiotherapy, manipulation under anaesthessia (MUA) with or without plaster of Paris (POP) application to non steroidal anti-inflammatory drug treatment. 195 (15.7%) had some form of minor surgical treatment while 10 (0.8%) had this data missing.

Table 4: Previous treatment received by patients. N = 1246

Type of previous treatment received	***f***	***% of total***
Nil	471	37.8
Traditional	9	0.7
Conservative	561	45.0
Surgical	195	15.7
*Pts missing Data	10	0.8

*Pts = patients ***Nil****=no previous treatment received,* ***Traditional****= different forms of traditional treatment such as tattooing & bloodletting,* ***Conservative****=physiotherapy, MUA+POP, antibiotics or NSAID,* ***Surgical****=different surgical operations.*

We were interested to see how the distance travelled by the patient from home to the treatment site related to time from onset of their condition to presentation. These results are presented in Table 5 below. Overall, in all the distance subcategories, most patients presented later than three months. Of note, however, is that most of the patients 509 (42.2%) travelled distances in excess of 10 kilometres to seek treatment and also presented beyond three months from the onset of their musculoskeletal disorder.

Table 5: Distribution of distance covered by patients to seek orthopaedic attention against time of onset of musculoskeletal condition to presentation for treatment.
N = 1,206

Distance covered	**Time from onset to presentation*(f)***		
	<1month	*1-3months*	*>3months*
<5km	36	21	161
5-10km	48	36	282
>10km	45	68	509

40 patients had data on either one or both of these variables missing

The distribution of some of the demographic variables (Age and Gender) and the clinical variable (previous treatment received prior to presentation to orthopaedics) was compared with the output results presented in Table 6 below.

Table 6: Distribution of demographic variables by musculoskeletal condition. N = 1221 for variable "Sex" & "Age" and 1212 for "Previous treatment"

Condition	Sex[1] *(f)*		Age[2] *(f)*				Previous treatment[3] *(f)*			
	Male	*Female*	*<1 year*	*1 - 5 years*	*6-10 years*	*11-14 years*	*Nil*	Trad[4]	*Con*[5]	*Surg*[6]
Trauma	112	59	6	29	72	64	83	2	73	12
Congenital	384	227	193	290	88	40	193	5	274	137
Tumours	12	14	0	1	13	12	17	0	9	0
**Sepsis*	21	19	1	8	15	16	24	0	14	2
Inflammatory	40	24	3	12	25	24	34	1	20	8
Neurological	1	1	0	0	1	1	2	0	0	0
Deformity	158	122	4	141	85	50	103	0	145	27
Degenerative	19	8	0	7	7	13	9	1	12	5

** Bone & Joint sepsis, Nil=no previous treatment, Sex[1](n=1221 with 25 missing), Age[2] (n=1221 with 25 missing), Previous treatment[3] (n=1212 with 34 missing), Trad[4]=traditional, Con[5]=Conservative, Surg[6]=Surgica*

DISCUSSION

A large nationwide representative sample of 1,246 patients was entered for analysis in this study drawn from all the health facilities offering specialized orthopaedic services in Zambia with the exception of the Copperbelt province which has resident orthopaedic surgeons employed by the mine hospitals. Only in a few instances were some of the data missing for a few variables as has been stated below. The percentages of the missing data was too small to affect the validity of the study results.

Age and Sex distribution

The age distribution among the four categories was grossly the same although most of the patients (64.9%) were between 1 and 10 years of age (Table 1). This could be due to late presentation (Table 3) because we expected that most of the patients would be below the age of one year considering the fact that most of the patients in this study had congenital musculoskeletal disorders (Table 2) which are detectable in the first year of life. More males, 762 (61.2%) than female, 484 (38.8%) children presented with these disorders (Table 1), with a male to female ratio of 1.6:1. This was an unexpected finding considering that the Central Statistics Office (CSO)'s Zambian census report of 2000 gives equal proportions[10] of males and females of this age group (<15yrs) in the general population.

Site of attendance by orthopaedic surgeons

The largest proportion of patients 1,105 (88.7%) were attended to in the private sector at the ZIOH 298 (23.9%) and through FLYSPEC 807 (64.8%) as opposed to those seen in the public sector at the UTH 141 (11.3%). Indirectly, this could be a reflection of

the reduced orthopaedic service provision in the Zambian public sector. Although there is need for further long term research to confirm the trends, the number of new patients 979 (78.6%) was clearly bigger than those being followed up 267 (21.4%). This finding is in line with the projected increase in the burden of musculoskeletal disorders in the developing world.[3,4]

Lusaka was the site where most of the patients 401 (32.6%) were attended to by orthopaedic surgeons (Table 1). This was as expected considering that this site has the largest projected population of 1,697,730 in the year 2008 as compared to the other sites.[11] Almost all the orthopaedic surgeons in Zambia are based in Lusaka and both the ZIOH and UTH are referral hospitals for the whole country. The differences among the remaining provinces could be due to the unequal number of sites visited under the FLYSPEC program with some provinces having more sites than others (e.g. Northwestern Province has Mukinge, Chitokoloki and Kaleni while the Eastern province only has St. Francis in Katete).

Distance travelled and Duration from onset to presentation

Distance does seem to be a factor affecting presentation of patients to health facilities with those living far away presenting relatively later than those in close proximity. However, Table 5. clearly shows that there are delays in presentation of more than three months at all subcategories of distance. This point to the possibility of other factor(s) that could be causing patients to present late. These need to be investigated further and adequately addressed because good outcomes of treatment depend on early presentation and management. In the case of trauma, most fractures would have healed as it is beyond the three months[12] period resulting in what we commonly see as *neglected trauma*[13] (mal-union, delayed or non-union) in clinical practice. The large distances covered by majority of the patients (509 or 42.21% travelled more than 10km), as shown in Table 5, highlights the central location of orthopaedic services in Zambia. This too is an issue that needs further attention from policy makers in the Ministry of Health to see how we could bring these essential services closer to the people in each province.

Distribution of musculoskeletal disorders

This study found that the three commonest musculoskeletal conditions affecting Zambian children aged less than 15 years are; congenital disorders, non-congenital deformities and trauma which is mostly neglected with prevalence rates of 0.50, 0.25 and 0.14 respectively (Table 2). This is different from what *Mijiyawa et al,*[14] found among Togolese children where bone and joint sepsis (prevalence rate of 0.43) was the commonest pathology.[14] The frequency of congenital musculoskeletal disorders was approximately equal among boys and girls (Table 6). Most of these children with congenital disorders presented to orthopaedic surgeons between the ages of 1 and 5 years (290 or 47.5%) and majority of these had received either no form of treatment (31.7%) or were treated conservatively (45.0%) by first-line health workers at initial presentation. Clearly there is a lack of skill among first line health workers especially in rural areas in management of musculoskeletal disorders that need to be addressed. Conditions arising from trauma affected boys (65.5%) more than girls with most of these aged more than six years. This distribution was as expected and could be attributable to the more risky behavior among the boys compared to the girls in this age category.

CONCLUSION

Congenital disorders, non-congenital deformities and traumatic conditions are the commonest musculoskeletal disorders affecting Zambian children aged less than 15 years. Most of these patients travel long distances of more than 10km to access healthcare and unfortunately the majority of the first-line health workers lack the skills to manage these conditions adequately. There is therefore, need to increase awareness and skill among trainee surgeons and first-line health workers in the management of these conditions. It is also necessary to streamline the referral system. Furthermore, there is need to increase awareness in the general population that musculoskeletal disorders are treatable and the sites where they could seek treatment. Finally, health policy makers in the Zambian Ministry of Health need to endeavor to bring orthopaedic services closer to the people so

that this could be accessed at provincial level for a start. This will help reduce delays in patient presentation and thus contribute to better outcomes so that we have fewer persons with disabilities in our general population as we come to the close of the Bone and Joint Decade.

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