

## Occupation Related Musculoskeletal Disorders among Nurses at the National Referral Hospital, Mulago in Uganda

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### Abstract

**Background:** musculoskeletal disorders, musculoskeletal disorders, present a serious public health problem that affects productivity and work performance. Despite the physical and socioeconomic effects of musculoskeletal disorders, few studies have been carried out among nurses in Sub Saharan Africa and more so in Uganda. Nurses in Uganda are highly vulnerable to musculoskeletal disorders given the high workload and working under highly resource constrained conditions that demand a lot of physical and emotional exertion. This study aimed at assessing the prevalence and factors associated with musculoskeletal disorders among nurses at Mulago Hospital.

**Objective:** To assess the prevalence and factors associated with musculoskeletal disorders among nurses working in Mulago Hospital the National Referral Hospital in Uganda.

**Methods:** This was a cross sectional descriptive study of 266 respondents from different hospital departments within Mulago National Referral Hospital. Interviews were conducted using a validated questionnaire, data entry done using Epi data and analyzed using STATA 10.0.

**Results:** The prevalence of musculoskeletal disorders among nurses in Mulago hospital was 75%. Low back pain, 58.7% was the commonest musculoskeletal disorders, followed by knee pain, 38.5%. These were associated mainly with work related and factors.

**Conclusion:** Low Back and Knee pain are the commonest musculoskeletal disorders among nurses at Mulago Hospital and are mainly attributed to service/ work related factors and psycho-social stress. Despite the nurses being knowledgeable, musculoskeletal disorders prevention among nurses should largely focus on safe practices and more research regarding the knowledge and practice gap is needed.

**Keywords:** Knee pain; Low back Pain; Musculoskeletal disorders; Nurses

### Introduction

Musculoskeletal Disorders, musculoskeletal disorders present a serious public health problem affecting work performance with various personal, social and economic impacts on nursing. Those affected by these disorders experience difficulty in mobility and other work limitations; which reduces their productivity. According to the Center for Disease Control and prevention, musculoskeletal disorders are more severe than the average nonfatal injury or illness at work such as hearing loss occupational skin diseases like dermatitis. Studies have suggested Low Back Pain (LBP) as the commonest musculoskeletal disorders affecting nurses, closely followed by neck-shoulder and knee disorders [1,2]. musculoskeletal disorders can be either acute or chronic, in that it develops over time [3] and should be characterized as "work-related diseases" rather than "occupational diseases". The work environment and the performance of work contribute significantly but as one of a number of factors to the presence of disease [4]. An occupational disease is a disease for which there is a direct cause-effect relationship between hazard and disease (e.g. asbestos- asbestosis) [4].

Globally, the prevalence of musculoskeletal disorders is high at 91.9% in rural Japan, 84% in Sweden [5], 72.5% in the US and 70% in China [6,7]. musculoskeletal disorders cost substantial expenditures on worker's medical care and compensation costs annually as seen in the US where musculoskeletal disorders are responsible for an economic burden of about \$45 billion annually. Furthermore, musculoskeletal disorders account for nearly 70 million physician office visits annually and an estimated 130 million total health care encounters. Low back pain (LBP) is the most common of musculoskeletal disorders related

incapacity to nurses, and it is estimated that 200,000 nurses suffer each year (Royal College of Nursing, 2004) costing the National Health Service approximately £45 million [8]. Similar studies have been performed in Europe and Asia however very few studies have been carried out among nurses in few African countries [9]. In Uganda, nurses are very vulnerable to musculoskeletal disorders because they work under highly resource constrained conditions demanding a lot of physical and emotional exertion. The nurse to patient ratio of 6:100,000 in Uganda is among the lowest worldwide, against the recommended WHO of 2.5:1000 [10]. At Mulago Hospital, the recommended nurse to patient ratios are 1:40-50 patients (night time) and 1:25-30 patients (day time) [11]. Interestingly, at a 200 bed private hospital in Kampala the structural ratio is 1 nurse to 3 patients. According to the Senior Principal Nursing Officer, SPNO at Mulago hospital, musculoskeletal disorders are probably the commonest cause for lost work days and poor work performance among nurses. They account to 47% of lost work rate on average among health Ugandan workers majorly in larger health facilities such as Mulago Hospital [12]. Nurses are more susceptible to

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musculoskeletal disorders as evidenced by the more labor intensive time spent at work compared with other professions in general [13]. They work under perpetual cognitive and physical workloads. In 1994, the nursing profession was ranked first nationally in terms of the incidence of musculoskeletal disorders with rates of overexertion disorders four times higher than the average rate among all private industries [14,15]. Musculoskeletal disorders negatively impacts on health leading to incapacitation, poor performance and productivity at work. In addition, Incapacitation leads to work absenteeism and workload constraints; which in our case bear on the low nurse to patient ratio ultimately affecting quality of patient care [16]. The challenges are possibly the leading causes of poor patient outcomes, work demoralization, early retirement among nurses and shy away by prospective nurses from the health sector.

Despite the effects of musculoskeletal disorders indicated above, the magnitude of musculoskeletal disorders among nurses at Mulago Hospital and Uganda in general is not known. Findings from this study will give information about the prevalence of musculoskeletal disorders among fulltime nurses working in a National Referral Hospital in Uganda. Findings will be used to create awareness about musculoskeletal disorders by the relevant stakeholders. The study aims at determining the prevalence of musculoskeletal disorders among as well as the personal and work related factors associated with musculoskeletal disorders among nurses at Mulago National Referral Hospital

## Methods

A cross sectional quantitative study carried out at Mulago Hospital, the National referral hospital in Uganda located in Kampala district. According to the Senior Principal Nursing Officer, SPNO, the hospital was designed to accommodate 1500 beds and has a total number of 747 nurses currently working in eighty units. The eighty units that are generalized into 7 major Departments namely: Obstetrics and Gynecology, Surgery, Accident and Emergency, Medicine, Upper Mulago, Pediatrics and specialized services. Mulago Hospital has an annual in-patient turnover in excess of 140,000 patients and attends to over 600,000 out-patients in the Assessment Centre, general out-patients clinics, and specialist clinics and in the Accident and Emergency Department annually. Records show that the hospital performs over 30,000 deliveries per year.

We selected 290 full time nurses from a list of 747 full time nurses assigned to the various units and wards by the office of the Senior Principle Nursing Officer, SPNO. The study excluded all nurses with obvious structural physical disability were excluded. Respondents with known history of co-morbid conditions like systemic disease such as fibromyalgia, chronic inflammatory conditions that relate to the musculoskeletal system, obvious pregnancy and nurses with a febrile illness were excluded. The sample of 290 full time respondents was obtained after applying the Kish and Leslie formula, 1995 for proportions to prevalence of musculoskeletal disorders of 78% from a study performed in Nigerian [16] and considering a non response rate of 10%. The study classified the fulltime nurses into seven units/department depending on their work stations. The units included theaters, ICU, surgery wards, medical wards, Obstetrics and Gynecology wards, OPD, accident and emergency. Systematic sampling was used to select the respondents from the list of full time nurses that was provided by the Senior Principal Nursing Officer. The first nurse was selected randomly, followed by every third nurse (747/290), until we got the selected sample of 290 full time nurses. Those absent

were awaited until they returned or were followed up with a call; their phone numbers obtained from the unit in-charges. A standardized tool for assessment of symptoms of musculoskeletal disorders based mainly on the modified Nordic questionnaire was administered to the participants. Musculoskeletal disorders was classified according to the criteria of Kuorinka who defined having musculoskeletal disorders as the presence of ache, pain or discomfort with in the defined area over a period of time. We distributed questionnaires to 290 fulltime nurses however only 266 nurses filled and returned the questionnaires. Each questionnaire was entered into Epi INFO. 9. Double data entry was done at this stage for quality control and exported to STATA 10.0 for analysis. Descriptive, bivariable and multivariable analysis was done to compare both the outcome and predictor variables. The study was approved by the Institutional Review Board Makerere University College of Health Sciences and the SNPO, Mulago Hospital. Informed consent was considered Ethical principles were considered during recruitment in the study. Finally nurses who expressed concerns about musculoskeletal disorders disease were followed up for assessment and medical advice.

## Results

The nurses' socio-demographic characteristics were assessed in addition with those who reportedly had experienced a Musculoskeletal Disorder in the last 12 months and the findings are summarized in the Table 1 below. Most nurses were aged 41 years and above with majority being female (90%) and married. Whereas being older than 41 years and older was a significant predictor of musculoskeletal disorders (p-value=0.001), being married was not. Most of the nurses had an average of 3 children. Over 60% of the respondents were married while 45.5% were overweight with a Body Mass Index, BMI of 25-30. Most 69% of the nurses interviewed had at least 3 biological children. According to the results shown in the table above, being older and having more than three children were significant predictors of having musculoskeletal disorders (p-value=0.001 and 0.026 respectively). Results further show that most nurses were nursing officers with less than 15 years in employment and worked 8-9 hours a day. A mean duration of 15 years was considered as the standard for length in service for this study. Results show that most of the nurses interviewed had served for more than 15 years and this was significant predictor of having musculoskeletal disorders among nurses (p-value=0.001) unlike the average number of working hours per day. In addition to the above, having the role of supervision at work significantly contributed to the development of musculoskeletal disorders among nurses in this hospital (p-value=0.009). More so, highly qualified nurses were significantly more likely to have musculoskeletal disorders that lower cadre nurses (p-value=0.01). The relationship between musculoskeletal disorders and having complaints of pain and discomfort was significant; p-value=0.001. Despite the fact that daily work hours were not associated with musculoskeletal disorders, all nurses who worked nights only, reported musculoskeletal disorders symptoms. Out of the 266 nurses interviewed, one hundred and ninety nurses 199(75%) had musculoskeletal disorders at anybody site within the year.

Out of the one hundred and ninety nurses (199) who had musculoskeletal disorders at anybody site within the year, one hundred and fifty seven 157(79.8%) nurses were experiencing musculoskeletal disorders symptoms at the time of this study. Twenty nine nurses 29(11.5%) were on treatment for what they reported to be chronic diseases. Of these, eleven 11(38%) indicated being on treatment for musculoskeletal conditions such as, prolapsed intervertebral discs, low back pain and osteoarthritis. Other chronic diseases noted from

Characteristic	Presence of MSDs		p-value
	Yes n (%)	No n (%)	
<b>Age</b>			
20-40	88(45.8)	56(75.7)	0.001*
41 years and above	104(54.2)	18(24.3)	
<b>Length in service</b>			
≤ 15 years	92(48.94)	56(77.78)	0.001*
>15 years	96(51.06)	16(22.22)	
<b>Number of children</b>			
≤ 3	122(64.55)	59(78.67)	0.026*
>3	67(35.45)	18(21.33)	
<b>Qualification</b>			
Higher cadre (Degree/Registered)	147(71.05)	50(56.58)	0.010*
Lower cadre (Enrolled/Assistant)	43(12.63)	26(9.21)	
<b>BMI</b>			
Normal	14(25.93)	3(21.43)	0.61
Overweight	23(42.59)	8(57.14)	
Obese	17(31.48)	3(21.43)	
<b>Marital status</b>			
Single	45(24.46)	16(22.22)	0.161
Married	123(66.85)	55(76.39)	
Divorced	7(3.80)	0(0)	
Widowed	9(4.89)	11( 1.39)	
<b>Complained pain &amp; discomfort</b>			
Yes	142(75.94)	18(19.74)	0.001*
No	45(24.06)	61(80.26)	
<b>Treatment for illness</b>			
Yes	25(13.89)	18(5.56)	0.061
No	155(86.11)	68(94.44)	
<b>Current work status</b>			
Nursing officer	170(89.47)	54(72.00)	0.001*
Nursing aid	20(10.53)	22(28.00)	
<b>Work Hours per day</b>			
9-Aug	129(70.11)	49(60)	0.464
>10	51(27.72)	32 (40)	
Nights only	4(2.17)	0 (0)	
<b>Supervise at work</b>			
Yes	161(85.64)	50(71.43)	0.009*
No	27(14.36)	28(28.57)	
<b>Work unit</b>			
ICU	6(4.8)	10(7)	0.316
Emergency	4(3.2)	12(8.4)	
Obstetrics & gynecology	30(24.1)	9(6.3)	
Medical wards	10(8)	38(26.8)	
OPD	20(16)	24(17)	
Surgical wards	45(36)	34(24)	
Theatres	9(7.2)	15(10.6)	

**Table 1:** Socio demographics and prevalence of MSDs and - work characteristics (N=266).

responses included hypertension, allergic rhinitis and asthma. All the male nurses denied having any symptoms of musculoskeletal disorders ; these were only five 5(1.8%) out of all the two hundred and sixty six respondents. The study further investigated the prevalence of musculoskeletal disorders among the nurses by anatomical region as shown in the Table 2 below. One hundred and nine 109(57.5%) of all nurses affected by musculoskeletal disorders recalled having more than

Anatomical region	Prevalence of MSDs symptoms	Suffered temporarily Incapacitation due to MSDs	Made Physician visits Because of MSDs
	n (%)	n (%)	n (%)
Neck	64(24.1%)	11(4.1%)	18(6.8%)
Shoulder	55(20.7%)	14(5.3%)	13(5%)
Upper back	64(24.1%)	16(6.1%)	20(7.5%)
Elbows	29(11%)	6(2.3%)	13(5%)
Wrist/hands	66(24.8%)	17(7.1%)	12(4.5%)
Lower back	156(58.7%)	66(24.8%)	75(29.3%)
Hips/thighs	60(22.6%)	18(6.8%)	20(7.5%)
Knees	102(38.5%)	29(11%)	38(14.3%)
Ankle/feet	79(29.7%)	22(8.3%)	20(7.5%)

**Table 2:** Symptoms of MSDs in the different anatomical regions (N=266).

one body anatomical site simultaneously afflicted at a given time within the 12 months period.

Low Back Pain was the commonest form of musculoskeletal disorders and was found among 156/265 nurses (58.7%). Analysis showed that registered nurses; the majority within the whole sample size, were the most affected group by LBP overall. Considering age, low back pain affected mostly nurses within 41 and above age category. For the ages below this category, the proportion of those who had low back pain was less than that of the ones who had none. The study further analyzed the association between type of work or department and prevalence of low back pain and results showed that low back pain was found more among nurses working on the surgical wards, followed by OPD and medical wards in that order. Theatre, Intensive Care Unit (ICU) and labor-gynecological wards and emergency were the least affected.

On comparing proportions for knee pain alone; the occurrence was more in the 41 and above year age group. Knee pain was also higher among nurses with Body Mass Index above 30 (obese) however this was not significant. Surgical wards are where most nurses had knee pain compared to those who had none; ICU followed. The other areas had lesser proportions of nurses free of knee pain. Low back pain and knee symptoms respectively comprised the most common reason for incapacitation and visits to physicians by the nurses.

## Discussion and Conclusion

The overall prevalence of musculoskeletal disorders at anybody site among Mulago Hospital nurses was 75%. These results are consistent with findings from studies done in the USA and China 72.5% and 70% respectively. It is possible that musculoskeletal disorders ' incidence could be higher than 75% because some nurses may have feared to report musculoskeletal disorders because of job insecurity in some situations. Peer pressure, a common societal phenomenon can also contribute directly to a worker's decision to report a problem [17]. The gender difference was too wide. We interviewed only five males out of the total number of respondents. Studies in Mulago hospital have shown the male to female nursing ratio at Mulago hospital is about 1:35. None of the male nurses suffered musculoskeletal disorders symptoms similar findings to studies that have suggested that musculoskeletal disorders are more common among females than males [18,19]. The explanation may possibly be found in the physiological differences between the two sexes.

Previous studies have associated obesity to musculoskeletal disorders [20], however in this study, there was generally no significant

association. This may be because there were very few nurses who were able to ascertain their weights and heights, given that the tool was self administered as noted in the shortcomings of the study. In this study nurses with three or less children reported more musculoskeletal disorders than those with more children and this was significant. Studies have related having children or child bearing with musculoskeletal disorders [21], due to the stress of child birth [22]. However more research is needed concerning this relationship.

Performing supervisory work was also significantly related to musculoskeletal disorders and the assumption is that supervision entails more work load which therefore makes an individual susceptible to musculoskeletal disorders. Such range of work hours, averagely the standard by act of parliament in Uganda [23]; including in other countries, has shown a lesser risk of development of musculoskeletal disorders. All nurses who reported working nights only had musculoskeletal disorders. Working off hours (other than day shifts) and long work hours (more than 12 hours per shift, more than 56 weekly hours) have an increased risk of development of musculoskeletal disorders. It is common for nurses who work nights only in the hospital to spend the day working at health facilities elsewhere, exposing them to musculoskeletal disorders.

The 12 month prevalence in the different anatomical regions was highest in the lower back. In this study, LBP prevalence was 58.7% similar to other studies such as a rates of 44.1% in Ibadan [1] and 64% in Sweden [24]. This study found that LBP was higher with ageing but some studies have indicated that the risk is the same for all age groups [13]. Obesity was found to be common among nurses with LBP in this study and similar finding have been made by other studies [25]. Obesity imparts loading strains to the lower back. Cumulative or repetitive strain progressively compromises the structural integrity, resulting in repetitive pain. More so the nurse to patient ratios is low resulting in more workload leading to musculoskeletal disorders [8].

This study found that the anatomical disorders individually caused reasonable incapacitation to those affected along with contributing to physician visits within the 12 month period. This disability accounts for lost time or absenteeism and low work performance, leading to poor productivity. Indirect losses [7,11] may be viewed in form of increased out of pocket expenditure from their (nurse) meager income in seeking health care because of musculoskeletal disorders. This may but only add worker frustration and poor motivation. Work factors especially heavy work load (scope of job activities/demands *vis a vis* human resource limitations) were the most perceived as the cause of musculoskeletal disorders among the affected nurses. In literature, musculoskeletal disorders were attributed to a 'work incident/work factor by over 50% of the nurses investigated, these proportions did not differ significantly between the hospitals. Heavy workload may be a common problem in Mulago Hospital because of low nurse to patient ratios.

A few limitations of this study could be due to the fact that the self administered questionnaire tool was subject to respondent bias. Secondly the study investigated the 12 months experience of musculoskeletal disorders which may have led to recall bias in reporting symptoms. Finally, some nurses work in different work places other than Mulago Hospital and this could have influenced the incidence of musculoskeletal disorders. In conclusion, majority of the nurses at Mulago Hospital are affected by musculoskeletal disorders mainly lower back and knee pain, attributed to both personal and work-related factors most especially heavy work load. There is need for stakeholders to have a positive and supportive approach towards the health of nurses and their working conditions to prevent musculoskeletal disorders.

### Conflict of Interest

There is no conflict of interest for this study.

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