

Prevalence of Work - Related Musculoskeletal Disorders and Risk Factors amongst Nurses of Buea and Tiko Health Districts, South West Region, Cameroon

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ABSTRACT

Introduction: Nurses are the most available health care workers in most sub-Saharan nations. In Cameroon, the nurse patient ratio stands at 7.8: 10.000 populations, predisposing them to work under relatively difficult conditions. As frontline healthcare providers, nurses perform a major role in patient handling, a task which predisposes them to Work Related Musculoskeletal injuries especially injuries to the back, neck and shoulders. This often occurs because of the absence of an Occupational Health and Safety (OHS) team in most health facilities, to monitor the working environment. There is paucity of research work on this area in Cameroon. This paper seeks to determine the prevalence of Work-related Musculoskeletal Disorders (WMSDs), and also to identify potential risk factors amongst nurses working in four randomly selected health facilities in the Buea and Tiko health districts in the South West Region of Cameroon.

Methods: The study involved a cross sectional descriptive study on nurses from four (4) hospitals in different sectors in Cameroon, government hospital, two confessional hospitals and a parastatal hospital. In addition, we did an observational study in randomly selected hospital in the study area. The study was carried out during the months of October 2016 to March 2017. Administrative approvals were obtained. The study used a 12-month recall questionnaire adapted from the Nordic Musculoskeletal questionnaires on reported Musculoskeletal disorders (WMSD) amongst 110 nurses in these randomly selected four health facilities in Fako. Descriptive characteristics were analysed using a chi square test and logistic regression. The statistical software used was EPI Info version 7.0. The level of significance was set at 0.05 for all statistical tests.

Results: There was a 90% response rate from 110 nurses. The prevalence of WMSD at anybody site was 65%. Compared to 12 hourly shifts, those working in the 8 hourly shift systems were 3.66 times less likely to develop WMSDs with a (95% CI 1.15 - 11.84). Nursing Assistants were 3.30 times less likely to develop WMSD compared to Senior Nurses with a (95% CI 1.36 - 7.98) which were significant associated factors for WMSD in this study. Though not statistically significant, nurses working in the public hospital had the worst WMSD. Obsolete materials and awkward postures were some of the risk factors to WMSD. Conclusion: There is a high prevalence of WMSD among nurses in Buea and Tiko health districts, with predisposing factors being 12 hourly shifts, obsolete equipments and awkward postures. To improve conditions of work (ergonomics), the institution of an Occupational Health and Safety management team in all health facilities, is imperative to reduce WMSDs.

KEYWORDS: *Work related Musculoskeletal Disorders, Nurses, Occupational health and safety*

INTRODUCTION

Nursing in Sub-Saharan Africa has suffered severe brain drain to Europe and other western countries in search of better conditions (services and remuneration). This has

contributed to the problem of inadequate staffing, overtime and this has been associated with WMSDs among nurses [1]. A study identified 57 countries with critical shortages of

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health workers, 36 of which are in Africa [2]. In Cameroon it is reported that the shortage of nursing professionals currently stands at approximately 160 nurses per 100,000 populations compared to 773 nurses per 100,000 populations in the USA [3]. This shortage leads to increased workload which results in occupational stress among the nurses. Occupational stress has been identified as one of the leading causes of work-related injuries, including WMSD [4]. At first in (both private and public) hospitals in Cameroon, nurses worked in 8-hour shifts. In response to shortages in nursing staff most public health facilities have adopted a 12-hour shift, which has been associated with the development of various forms of stress, fatigue and altered body physiology [5-8]. Beyond the fatigue, research now demonstrates that the nursing staffs on these longer shifts are more prone to developing occupational injuries including WMSDs [9].

However, data on musculoskeletal health of nurses in Sub-Saharan Africa, particularly Cameroon are sparse.

This study sought to determine the 12-months period and point prevalence of WMSDs; the associated risk factors and to provide a workplace hazard analysis report. It also proposes potential safety recommendations for employers and nurses towards protection ensuring safety of nurses at workplace to prevent workplace-associated MSDs in the randomly selected hospitals in Buea and Tiko Health districts, South-West Region (SWR), Cameroon.

Methodology

This cross-sectional survey was carried out from October to January 2017 in four randomly selected health facilities from the Buea and Tiko Health Districts, South – West Region Cameroon (SWR), Cameroon. Work Related Musculoskeletal Disorders questionnaire was administered to each participating nurse from the theatre, maternity and emergency units of the randomly selected health facilities after s/he had signed the informed consent form. These health facilities cut across the different types of hospitals: one government, two confessional and one parastatal. The government hospital included the Buea Regional hospital (a referral hospital for the South West Region), confessionals were Mount Mary Hospital (MMH), Buea and the Baptist Hospital Mutengene (BHM), which are Catholic and Baptist hospitals respectively. The parastatal hospital used was the Cottage Hospital in Tiko, run by the Cameroon Development Cooperation (CDC), a state-owned cooperation. These health facilities were randomly selected through a multistage random selection. First for convenience, Fako Division was selected. To select the health districts in Fako, two health districts among the four were selected from a bag without replacement. The health facilities were chosen from three bowls without replacement; the first bowl consisting of all government health facilities in Buea and Tiko health districts, the second bowl confessional and the third parastatal. The study used a 12-month recall of reported WMSD amongst nurses.

Questionnaire design

The standardized Nordic Musculoskeletal questionnaires (NMQ) was used to gather data in an anonymous, self-reporting manner. The questionnaire has been used extensively in research studies on WMSD, among different occupational groups [10-12]. The use of these

questionnaires for assessing WMSD has also been validated in other publications and shown to be acceptable. The questionnaire required approximately 10 - 15 minutes to complete. Investigations were conducted in the workplaces (hospital wards).

A four-section questionnaire was employed as the survey instrument. Section A was to seek information on demographic profile such as age, height, weight, and gender. Section B was on occupational health in nursing practice and sought to elicit general information on years of practice, work status, work setting, practice specialty and nursing activities. The symptom-survey segment of the occupational health in nursing practice section was a modification of the standardized Nordic questionnaire [10] and consisted of questions referring to eight body areas. These are 3 upper limb segments (Shoulders, elbows, wrists/hands/thumb), 2 lower limb segments (knees, ankles/feet), and 3 trunk segments (Neck, upper back and lower back). The prevalence of MSD among participants was examined or tested which was adopted by the Nordic questionnaire. Agreement with some statements and disagreements with another was identified and considered to be the No= 1, and Yes= 2). The predisposing factors were examined. Its section C contained variables on perceptions on job risk factors that may contribute to development of WMSDs while section D gleaned data on coping strategies toward reducing the risk for development of WMSDs among nurses. A total of 110 questionnaires were distributed to the different hospitals in the Buea and Tiko.

WMSDs were classified according to the Nordic questionnaire criteria, which defines them as an ache, pain, discomfort or numbness in the defined area over a set period of time. MSD questions included an anatomical diagram with specifically shaded areas, which focused on the occurrence of symptoms at certain body sites over the previous 12-month period and whether sick leave had been taken or medical advice sought. A 12-month recall period was used for WMSD, as this has been shown to be an appropriate time-scale in other studies [11, 12]. Permission of the administrators of the selected research health facilities was obtained before the commencement of the study. Some data was collected using a risk assessment tool at the Buea Regional Hospital.

Data entry and analysis

All data was analyzed using Epi Info version 7.0. Descriptive statistics of the respondents' (nurses in Buea and Tiko Health districts), was reported. Demographic variables were analyzed using a univariate analyses. Bivariate analysis was done using the outcome WMSD and demographic variables, statements of predisposing factors. WMSD was linked to predisposing factors using the following predictor variables: hours of work or shift, grade of nurse. Results of the analyses were then summarized using frequencies and percentages for categorical variables, means and standard deviations for continuous variables, and presented using tables and charts. The level of significance was set at, (95% CI, error limit 0.05), for all statistical tests.

Results

From the human resource departments, the combined total population of nursing staff was 110 from the three units in the study as follows; theatre 41(41.00%), maternity 31(31.00%), and emergency unit 28(28.00%), in the 4

hospitals in the Buea and Tiko Health Districts in Cameroon. A total of 100 participants responded giving a response rate of 90.0%. The mean age was 30.95 years standard deviation (SD) 7.05 years (range 22 - 55 years), mean weight 77.5kg SD 13.11 (range 43 - 110 kg). The mean height was 1.63 SD 12.00cm (range 1.5 - 1.87) cm. The mean Body Mass Index (BMI) was 25.05 (range 19.11 - 31.51), the mean career

duration of 8.00 years SD 7.08 years. The mean working hours per week was 45.00 hours SD 11.00 hours. The prevalence of MSD on anybody part among the nursing staff of the three units was 65.00% (Table 1). Nursing Assistants were 3.30 times less likely to develop WMSD compared Senior Nurses with a 95% CI (1.36 - 7.98) which is statistically significant with p-value of 0.006 (Table 1).

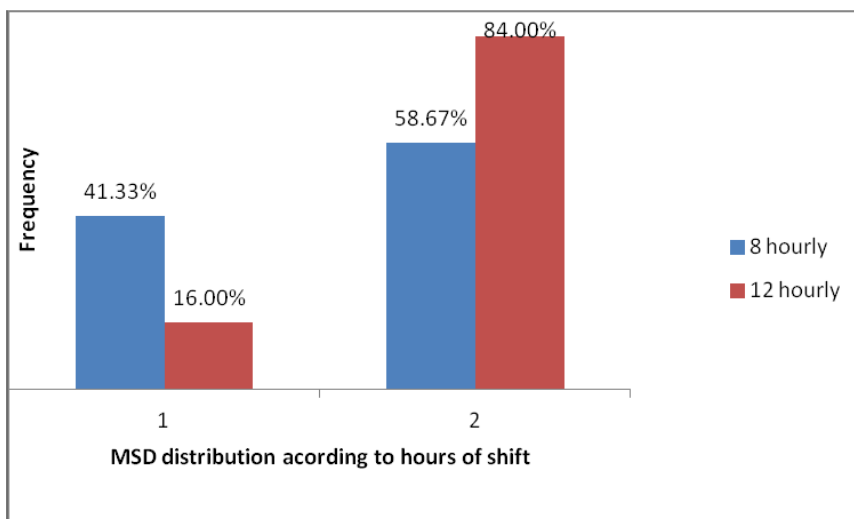
Table 1: Cross tabulation of grade of nurses with WMSD

Grade	Frequency (percentage) of nurses without WMSDs	Frequency (percentage) of nurses with WMSDs	OR (95%CI)	P-Value
Nursing Assistant	25 (47.17)	28 (52.83)	3.30 (1.36,7.98)	0.006
Senior Nurses	10 (21.28)	37 (78.72)		

Those working in the 8 hourly shift systems were 3.66 times less likely to develop WMSD compared to those working in the 12 hourly shift systems with a 95% CI (1.15 - 11.84) which is statistically significant with p-value of 0.022, (Table 2, Figure 1).

Table 2: Cross tabulation of shift work with WMSD

Shift work	Frequency (percentage) of nurses without WMSDs	Frequency (percentage) of nurses with WMSDs	OR (95%CI)	P-Value
8 hourly	27 (41.33)	38(58.67)	3.66(1.15,11.84)	0.022
12 hourly	10(16.00)	54(84.00)		



1 - Absence of MSD, 2—Presence of MSD

Figure 1: WMSD distribution according to shift of work

The most prevalent anatomical site was the lower back 20(45%) followed by upper back 15(39%) and neck 12(37%). Nurses working in the theatre had the highest prevalence of WMSD.

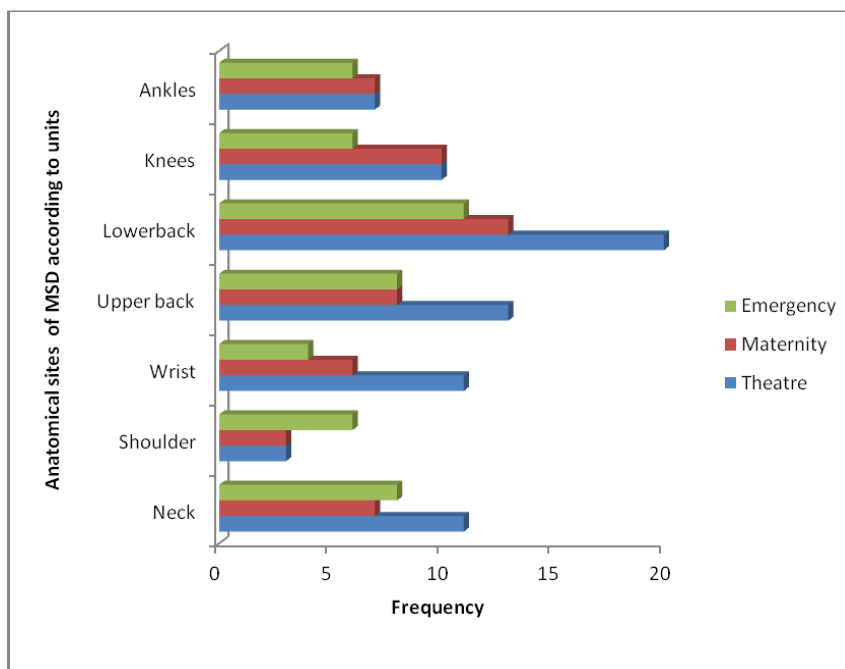


Figure 2: Anatomical sites of WMSD according to units

Comparing the different units of study in the various health facilities; in the confessional health facilities (MMH and MBH), the theatre had the highest prevalence (45.45%) of WMSD. In the para-public health facility (CDC Cottage Hospital), the emergency unit had the highest prevalence (60%) of WMSDs while in the government health facility; the maternity unit had the highest prevalence of 43.45% of WMSD (Figure 3).

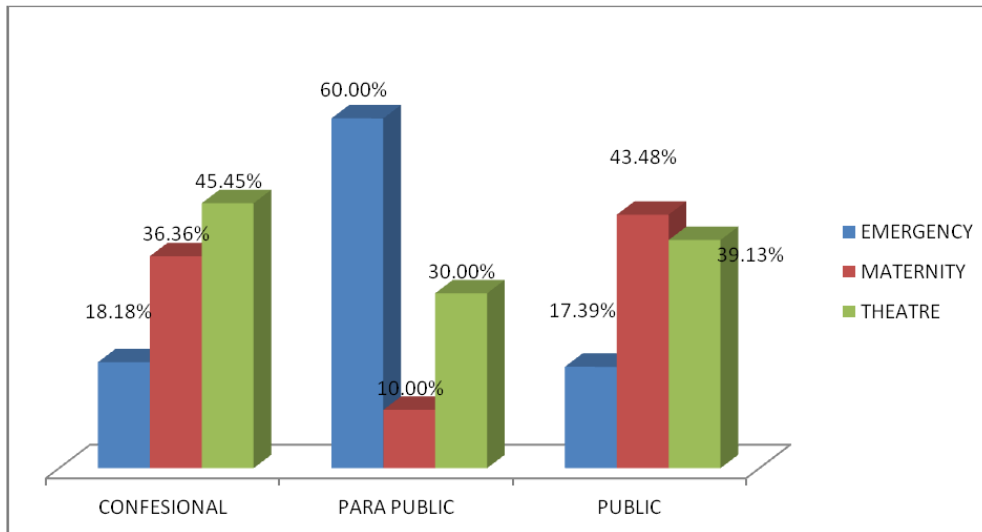


Figure 3: Comparing WMSDs of the health facilities according to units

According to the risk assessment done in one of the hospitals, the theatre is exposed to hazards of repetitive awkward postures (prolonged standing, bending and use of wrist and fingers in holding forceps) during surgery and post-operative washing of instruments, the use of inappropriate non-adjustable surgical beds and 12 hourly shifts (Figure 4, Table 2).



Figure 4: Observed awkward postures (during surgery).

WMSDs predisposing risk factors observed in maternity included; repetitive awkward postures (prolonged standing, bending and use of wrist and fingers) when conducting deliveries and progressive labour monitoring. Pushing of patients on a stretcher to the theatre, transfer of post-operative patients from stretcher to bed and the use of inappropriate non-adjustable delivery and labour beds and 12 hourly shifts puts the nurses in the maternity unit at risk of MSD (Table 3).

Table 3: Observed workplace hazards in the theatre, maternity and emergency unit.

S/N	Workplace	Hazard	Possible Harmful Effects
1	Theatre	<ul style="list-style-type: none"> ➤ Repetitive awkward postures (prolong standing, bending and use of wrist and fingers in holding forceps) during surgery and washing of instruments post operatively. • The use of inappropriate surgical bed. ▪ No gargets to ease transfer of patients from the operation bed to the stretcher 	<ul style="list-style-type: none"> ➤ Musculoskeletal disorders including lower back, upper back, ankle and wrist pains. • Musculoskeletal disorders including neck lower back, upper back.
2	Maternity	<ul style="list-style-type: none"> ➤ Repetitive awkward postures (prolong standing, bending and use of wrist and fingers) when conducting deliveries and progressive labour monitoring. ▪ Pushing of patients on a stretcher to the theatre. Transfer of post-operative patients from stretcher to bed 	<ul style="list-style-type: none"> ➤ Musculoskeletal disorders including: lower back, knees, upper back and wrist pains

3	Emergency Unit	<ul style="list-style-type: none"> ➤ Repetitive awkward postures (prolong standing, bending and lifting and transferring of patients from ambulance or vehicles to stretchers and finally to examination beds. • Inadequate and in appropriate observation bed to carry out resuscitation procedures 	<ul style="list-style-type: none"> ➤ Musculoskeletal disorders including : lower back, upper back, and wrist pains
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In the emergency unit, repetitive awkward postures (prolonged standing, bending and lifting and transferring of patients from ambulance or vehicles to stretchers and finally to examination beds) and the use of inadequate and inappropriate observation beds to carry out resuscitation procedures and 12 hourly shifts were observed predisposing factors which puts the nurses in the emergency unit at risk of WMSD. (Figure 5, Table 3).

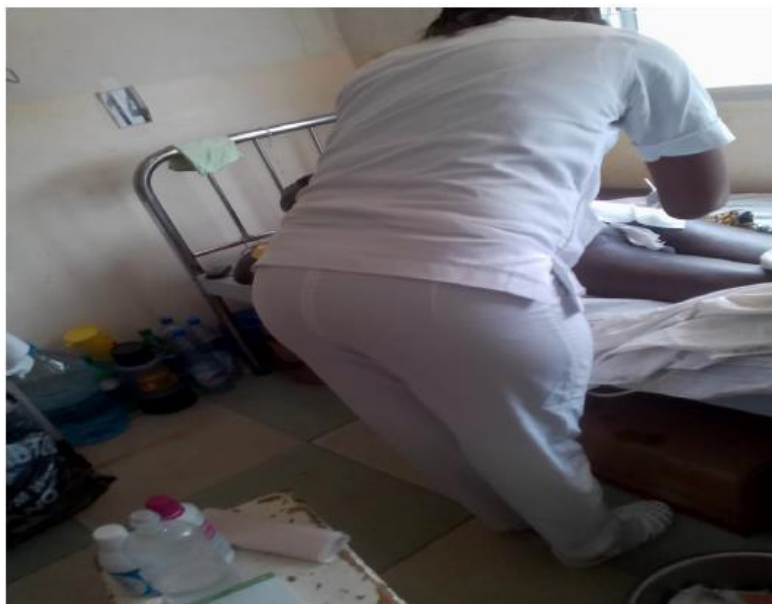


Figure 5: Observed awkward posture during wound dressing

Discussion

We recruited 110 participants, with a response rate of 90%. 100 nurses were used to investigate grade of nurse and hours per duty which were seen as predictors of WMSD.

The results proved that more than 65% of the respondents presented with WMSD. This is corroborated by a systematic review [12], where 71.85% of the nurses had WMSD. The most prevalent anatomical sites were the lower back followed by upper back and neck, reported in similar study in Japan and Uganda [13-14], where the most prevalent anatomical sites of WMSD were lower back, shoulder, neck as opposed to neck and shoulder in [12]. Those working in the 8 hourly shift systems were 3.66 times less likely to develop WMSD compared to those working in the 12-hourly shift. Twelve-hour shifts often have positive effects on employees' satisfaction, but can be disadvantageous for WMSD, health and performance [15]. This was observed with 2/3 of the nurses in this study, working in the public health facility on 12-hour shifts suffer from WMSD though not statistically significant compared to the confessional and parastatal health facilities that worked 8hours shift. Healthier schedules, less overtime and reduced work on off-days would minimize risk of WMSD and recovery time [17].

Beneficial health effects through the reduction of the regular workday in industry from 12 or 10 to 8 hours has been reported [15]. A study reported a one third decrease in the prevalence of neck-shoulder pain 1.5 years after reducing daily working hours from 8 hours to 6 hours. On a theoretical basis, a reduced duration of muscular strain can be expected to reduce the risk of musculoskeletal pain. Thus, the reduced work-hours may have reduced the prevalence of neck-shoulder pain through several pathways [16]. Also, shorter workdays reduce the total energy expenditure required in physically demanding jobs, which in turn, reduces fatigue and the risk of musculoskeletal injury [15]. According to a study, adverse working schedules are significantly related to nurse WMSD. Nurses working in the theatre had the highest prevalence of WMSD (Figure 1). This is similar to a study in Japan [13]. Most prevalent anatomical site of WMSD was lower back, shoulder and neck and working in the surgical department significantly increased WMSD among the nurses. However proportionately, nurses working in the emergency unit are more predisposed to WMSD (Table 2), where among the 28 nurses from the emergency unit only 8(28.5%) reported not to have WMSD compared to 16(39.0%) who did not have WMSD among the 41 nurses in the theatre. These findings are comparable to other research carried out, which reported that among health hospital care staff who worked on transfers and repositioning section, one-third of them showed WMSDs in the past 1 year of their work history [18-23]. This can also be compared to a study in China, which reported that manual handling of patient (transfer technique) predispose nurse to WMSD [24]. Another study, found that poor education and application of manual patient handling and transfer tasks predispose nurses to back injury WMSDs, caused by factors such as unnatural or unhealthy posture, reaching too far, when the lower back support is inadequate, continual repetitive movement, continuous sitting in the same position for extended periods of time and ergonomically poor set up of work station [25-26].

The risk assessment done in one of the hospitals (Regional Hospital Buea) shows that, the theatre is exposed to hazards of repetitive awkward postures (prolonged standing, bending and use of wrist and fingers in holding forceps) during surgery and post-operative washing of instruments, the use of inappropriate non-adjustable surgical beds and 12 hourly shifts (Table 3). In the maternity, the repetitive awkward postures (prolonged standing, bending and use of wrist and fingers when conducting deliveries and progressive labour monitoring) are responsible for WMSDs. Pushing patients on a stretcher to the theatre, transfer of post-operative patients from stretcher to bed, use of inappropriate non-adjustable delivery and labour beds and 12 hourly shifts puts the nurses in the maternity at risk of WMSD (Table 2).

Also, repetitive awkward postures (prolonged standing, bending and lifting and transferring of patients from ambulance or vehicles to stretchers and finally to examination beds, the use of inadequate and inappropriate observation beds to carry out resuscitation procedures and 12 hourly shift) were observed risk factors that put the nurses in the emergency unit at risk of WMSD (Figure 5 and Table 3). Thus, there is need to educate, train them to apply dexterity in manual lifting and transfer manoeuvres which makes the task lighter. Furthermore, nurses should be encouraged to use assisted lifting devices when required by making sure that enough lifting devices are obtainable or available to reduce WMSDs.

In comparison with WMSDs in MMH and BHM, the theatre has the highest prevalence (45.45% of WMSD). This could be attributed to orthopaedic surgeries, which usually take very long hours. These health facilities have orthopaedic surgeons and is widely used by the population. With these very long orthopaedic surgeries, the nurses are bound to assume awkward postures and positions for long periods per day and repeatedly exposing them to WMSDs.

In the para-public health facility (CDC Cottage Hospital), the emergency unit has the highest prevalence (60%) of WMSDs. This could be attributed to their routine activities to (receive, lift and transfer patients to and from ambulance to stretcher or wheelchair to the bed) as a referral Hospital to all plantation workers in the CDC which constitute a very large population of patients. Also, though the nurses work 8 hours a day, they have longer shift duration of 5 days before they rotate which is very demanding both psychologically and physically. Physically, they are involved in transferring patients for prolonged duration exerting isometric muscle contraction to maintain static posture or they slowly lower a heavier patient to the chair exerting eccentric muscle contraction. Psychologically, they suffer from prolonged intermittent sleep lost which wear and tear the nurses physically reflected in fatigue and signs of burnout. This is similar to a study carried out, where it was reported that adverse working schedules are significantly related to nurse WMSD [16]. The results of another study in Netherland states that shorter workdays reduce the total energy expenditure required in physically demanding jobs, which in turn, reduces fatigue and the risk of musculoskeletal injury [14]. It will be advisable for the nurses to acquaint themselves with the HSE guidance on MAC (Manual Handling Assessment Chart) and RAPP (Risk assessment in pulling and pushing) tool.

In the public health facility, the maternity unit had the highest prevalence of 43.45% of WMSD. The public health facility is one of the pilot health facilities with subsidised gynaecological services like delivery and caesarean section kits which attract a lot of obstetric and gynaecological cases. Secondly physical factors like obsolete equipment predispose nurses to awkward postures and positions repeatedly that increase the total energy expenditure required in physically demanding jobs, which in turn, increase fatigue and the risk of musculoskeletal injury coupled with the psychological factor like the long shift of 12 hours a day which is similar to a study in Netherland, [14].

The shortage of human resources, unhealthy working conditions and use of obsolete equipment in the health sector in Cameroon is a call for concern. Nurses routinely perform activities that require lifting heavy loads, lifting patients, working in awkward postures, and transferring patients out of bed and from the floor, ambulances or vehicles to the wards. These tasks put nurses at high risk of acute and cumulative work-related musculoskeletal disorders (WMSDs) and represent a significant occupational problem. There is a great need for an occupational Health and Safety (OHS) team in every organisation to build a more competent and committed workforce, maximize performance and reduce days and years of disability - Disability-Adjusted Life Years (DALYS). Most health facilities in Cameroon lack the OHS team, with negative consequences on health workers.

Conclusion

This study has identified that (65%) of the nurses were vulnerable to WMSD, especially lower back pain and injury. The predisposing risk factors of WMSD in this study are the use of obsolete materials and 12 hourly shift, long night shifts that lead to regular intermittent sleep disturbance, long period of awkward posture, poor patient transfer technique, high physical demand of the nursing profession, and poor conditioning status of the nurses. With these findings, the institution of a Health and Safety Management Team in health facilities in Cameroon, to alleviate WMSD among nurses like in other industries is imperative. Considering that the study was conducted only on nurses working in the theatre, maternity and emergency unit of the four health facilities in one region out of ten in Cameroon, there is need to conduct further studies in other regions to establish credible basis for generalisation of the results.

RECOMMENDATIONS

Table 3: Recommendations for possible preventive action by employers and nurses to prevent workplace injury

s/n	Workplace	Possible employer action to prevent injury / illness	Preventative action nurses can take to prevent injury / illness
1	Theatre	<ul style="list-style-type: none"> ➤ Do a risk assessment ➤ Train nurses on their work procedures to ensure they respect all health and safety rules. ➤ Replace present obsolete surgical equipment and provide operation beds with appropriate height/positions or adjustable. ➤ Provide gargets to ease transfer of patients from the operation bed to the stretcher. ➤ Increase workforce for possible task distribution or replacement when tired to avoid errors. 	<ul style="list-style-type: none"> ➤ Adopt regular general physical exercises ➤ Encourage team work and call for help whenever necessary ➤ Adjust surgery roster to have enough rest ➤ Adopt regular physical exercises especially of the affected anatomical sites. ➤ Change postures and positions especially during long surgeries. ➤ Call for help during transfer of patients from surgical beds to the stretcher. ➤ Reduce the number of long procedural surgeries per day.
4	Maternity	<ul style="list-style-type: none"> ➤ Do a risk assessment ➤ Train nurses on their work procedures to ensure they respect all health and safety rules. ➤ Reduce number of working hours per day to avoid stress and worn-out. ➤ Replace present labour monitoring beds with appropriate height and positions-adjustable labour beds ➤ Employ porters who can assist in pushing patients on a stretcher or wheel to the theatre. ➤ Provide gargets to ease transfer of patients from stretchers to bed 	<ul style="list-style-type: none"> ➤ Adopt regular physical exercises especially of the affected anatomical sites. ➤ Change postures and positions especially during labour monitoring and when conducting deliveries ➤ Always call for assistance during transfer of patients to the theatre and from stretcher to bed
5	Emergency Unit	<ul style="list-style-type: none"> ➤ Do a risk assessment ➤ Train nurses on their work procedures to ensure they respect all health and safety rules. ➤ Reduce working hours per day to avoid stress and worn-out. ➤ Employ porters who can assist in pushing patients on a stretcher to the other units after observation. ➤ Provide gargets to ease transfer of patients from vehicles to stretchers to bed and from bed to stretchers and to other units ➤ Replace obsolete stretchers and wheelchairs and observation beds with appropriate ones. 	<ul style="list-style-type: none"> ➤ Adopt regular physical exercises especially of the affected anatomical sites. ➤ Always call for assistance during transfer of patients from ambulance or vehicles to the stretcher or wheel chair. ➤ Adopt good postures and change positions during resuscitations.

Consent and Ethical considerations

Administrative clearance was obtained from the Regional delegation of public health for the South-West, the district medical officers of Buea and Tiko health districts. We also obtained approvals from the directors of all the four health facilities in the study. An informed consent form was signed by participants after haven read the purpose of the study.

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Competing interests

The authors declare no competing interests

Authors' contributions

All authors participated in the preparation of the manuscript. The study was designed by WA & ME. Field work was done by ME (with assistance from, CN, DMM,) under supervision of WA , PjN ,GEHE,. Manuscript was drafted by ME and reviewed by NFP and NAL.All authors. All authors read and approved the final manuscript.

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