

CrossRef DOI of original article:

1 Prevalence and Coping Strategies of Work-Related
2 Musculoskeletal Disorders among Healthcare Workers in Douala,
3 Cameroon: A Cross-Sectional Study

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5 Received: 1 January 1970 Accepted: 1 January 1970 Published: 1 January 1970

6
7 **Abstract**

8 Background: Work-related musculoskeletal disorders (WRMSDs) poses a major problem
9 among Nurses and Laboratory technicians (LTs) today, affecting the quality of services
10 offered, and may lead to long term disability and job abandonment. Although there is
11 evidence that many Nurses and LTs suffer from WRMSDs, there is no sufficient data on its
12 prevalence, possible risk factors and the coping strategies at the LDHD, NDH and NDHD, 4th
13 category hospitals in the city of Douala, Cameroon. Objective: To determine the prevalence,
14 occurrence of associated risk factors and the coping strategies of WRMSDs among Nurses and
15 LTs at the LDHD, NDH and NDHD. Methods: This was a cross-sectional study conducted in
16 three 4th category hospitals in Douala from February to April 2023. A total of 250
17 questionnaires were distributed to LTs and Nurses who gave their consents to participate in
18 the study, 133 returned the questionnaires, giving a response rate of 53

19
20 ***Index terms***—

21 Work-related musculoskeletal disorders (WRMSDs) poses a major problem among Nurses and Laboratory
22 technicians (LTs) today, affecting the quality of services offered, and may lead to long term disability and job
23 abandonment. Although there is evidence that many Nurses and LTs suffer from WRMSDs, there is no sufficient
24 data on its prevalence, possible risk factors and the coping strategies at the LDHD, NDH and NDHD, 4 th
25 category hospitals in the city of Douala, Cameroon.

26 Objective: To determine the prevalence, occurrence of associated risk factors and the coping strategies of
27 WRMSDs among Nurses and LTs at the LDHD, NDH and NDHD.

28 Methods: This was a cross-sectional study conducted in three 4th category hospitals in Douala from February
29 to April 2023. A total of 250 questionnaires were distributed to LTs and Nurses who gave their consents to
30 participate in the study, 133 returned the questionnaires, giving a response rate of 53%. A total of 84 nurses
31 and 49 LTs participated in the study. Data on demographic characteristics, and associated factors were collected
32 using a structured questionnaire while the Nordic questionnaire was used to obtain the prevalence of WRMSDs.

33 Musculoskeletal pain intensity was assessed using the visual analog scale (VAS) where 0 = no pain, 1-4 = mild
34 pain, 4-6 = moderate pain, and 7-10 = severe pain. The data collected was entered into Microsoft Excel, verified
35 for consistency then analyzed using SPSS version 23

36 **1 I. BACKGROUND**

37 Work-related musculoskeletal disorders (WRM-SDs) are conditions in which the work environment and perfor-
38 mance of work contribute significantly which may persist longer due to work conditions [1,2,3]. They cause an
39 alteration in the quality of life, a drop-in productivity at work, early withdrawal from the workplace represent a
40 high cost for the health system [5].

41 Musculoskeletal disorders (MSDs) are among the largest contributors of disabilities among health workers [6].
42 In Europe, out of every five workers, three complain of MSDs [2]. Moreover, they are ranked first among the

43 conditions that lead to prolonged absenteeism from work [5]. The United States estimates that approximately \$45
44 billion is the annual expenditure related to these conditions [5,7]. Approximately 1.71 billion people globally live
45 with WRMSDs [8,9]. WRMSDs are also the biggest contributor to years lived with disability (YLDs) worldwide
46 with approximately 149 million YLDs, accounting for 17% of all YLDs worldwide [8,6]. In developed countries,
47 WRMSDs have been controlled thanks to a better assessment of the nature of work-related risk factors and
48 of protective factors, which has led to good preventive measures, which is not the case with most of Africa,
49 especially Sub-Saharan Africa (SSA) [5] According to Jacquier-Bret and Gorce, [10] Africa and Europe have
50 prevalence rates of MSDs three times higher than Asia and America for lower back. In Ghana, the prevalence
51 of WRMSDs among nurses reported was 94% with a significantly higher ($p=0.031$) prevalence in females (97%)
52 than males (87%) [12]. Similarly, a Ugandan study reported a 12-month period prevalence of MSD at anybody
53 site of 80.8% among nursing professionals with the most common site of MSD being the lower back (61.9%) [14].
54 Furthermore, Alwahaibi et al., [13] [17] observed a prevalence of 80.8% and 88.8% among nurses and laboratory
55 technicians respectively, in Douala, Cameroon and working on the same position (90.6%), stressful job (89.6%)
56 and repetitive tasks (85.9%) were the major risk factors. Despite the fact that several studies have reported coping
57 mechanisms of WRMSDs among nurses (help in handling a heavy patient, modification of nursing procedures
58 and patient/nurse position etc.) [18,19,20,21], most of the studies conducted in Cameroon were limited as they
59 focused on the prevalence and risk factors of MSDs and did not address coping strategies.

60 Therefore, this study will help identify priority areas for interventions in WRMSDs and will also serve as
61 a baseline for the decision-making processes of musculoskeletal health promotion, work safety measures imple-
62 mentations, and prevention programs at the workplace.

63 2 II. MATERIALS AND METHODS

64 3 Study Design, Period, Research Setting and Participants

65 A cross-sectional study was conducted within a 3-months period from February to April 2023 to assess the
66 prevalence, associated risk factors and coping strategies of WRMSDs among nurses and LTs in three 4th category
67 hospitals in Douala, Cameroon.

68 This design was chosen because it permits the collection of data on particular subjects in a specific period of
69 time, which is suitable for this study. Participants of the study were nurses and LTs in active service who have
70 been working for at least one year at the LDHD, NDH and NDHD.

71 These are 4 th category hospitals that receive several patients from more than five different neighborhoods,
72 including internally displaced persons from the northwest and southwest regions of Cameroon due to the ongoing
73 crisis.

74 4 Due to this, nurses and LTs at the LDHD, NDH and NDHD 75 receive hundreds of patients per day

76 Was included in the study all full-time working nurses and LTs of both sexes at the LDHD, NDH and NDHD
77 with at least 18 years of age and who consented to take part in the study and have been working for at least 12
78 months. Participants who had not worked for up to 12 months and who did not sign the informed consent forms,
79 students, part-time workers, visiting healthcare workers from other countries or hospitals, having a MSDs before
80 their commitment in to the healthcare profession or recent trauma, injury, surgery, motor vehicle accident, sport
81 related injury in the past two weeks were excluded from this study.

82 Judgmental sampling was used to select these 4 th category hospitals, as they receive many patients and also
83 have a higher number of health workers.

84 Lorenz's formula was used to estimate the sample size needed, and a prevalence of 88.8% obtained from the
85 study of Meh et al., [17] was used. $N = P (1-P) 2 2 / d 2$ Where: n = same size, $d = 0.05$, $z = 1.96$; Statistical
86 Corresponding level of confidence. After calculations the estimated sample size was $n = 152$. Finally, a total of
87 133 participants returned the questionnaires, giving a response rate of 53 %.

88 A semi-structured questionnaire was employed as the study instrument which was designed to collect socio-
89 demographic data (age, gender, specialty, work experience, academic qualification and marital status) as well as
90 factors associated with WRMSDs and coping strategies. The standardized Nordic questionnaire [22] was used to
91 obtain the prevalence of WRMSDs and consisted of questions referring to nine body areas. These are 03 upper
92 limb segments (Shoulders, elbows, wrists/hands/thumb), 03 lower limb segments (Hips/thighs, knees, ankles/
93 feet), and 3 trunk segments (Neck, upper back and lower back). Musculoskeletal pain intensity was assessed
94 using the visual analog scale (VAS)

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96 5 III. DATA ANALYZES

97 The data collected was entered into Microsoft Excel, verified for consistency and analyzed using SPSS version
98 23.0. Descriptive statistics was used to present the results on tables and figures, while the Pearson's chi square
99 test was used to determine associations within groups. Statistical significance was set at $p < 0.05$.

6 Ethical Consideration

Research authorization (0265/AAR/MINSANTE/ DRSP/BCASS) was obtained from the Douala Regional Delegation of Public Health and from the hospital's administration. All the participants gave their signed consent. The fundamental principles of medical research according to Helsinki's Declaration were strictly respected and the names of the hospitals were coded for ethical reasons.

IV. RESULTS 8). while the least was at the level hips (9.8%) (Figure ??). majority (42.9%; 57/133) felt severe pain (Figure 7). Furthermore, the intensity of pain was not significantly associated with specialty but LTs 2).

7 Socio-Demographic Characteristics of Study Population

8 Coping Strategies of WRMSDs

The study further assessed the coping strategies used by nurses and laboratory technicians in coping with WRMSDs, and it was revealed that, regular exercises (51.9%), praying and believing in God for divine healing (51.1%), seek for professional help from colleagues (60.2%), taking some days off from work (88.0%), going for physiotherapy (84.2%) and applying ergonomic techniques (85.0%) were the major strategies used to cope with WRMSDs. Majority (52.6%) of the nurses and laboratory technicians did not rely on pain medications as a means to cope with WRMSDs. (Table 3).

9 V. DISCUSSION

The objective of this study was to determine the prevalence of work-related musculoskeletal disorders, pain intensity, associated factors and coping strategies among nurses and laboratory technicians working in three 4 th category hospitals in the city of Douala, Cameroon.

This study revealed that the overall prevalence of WRMSDs for the past 12 months among nurses and LTs at the LDHD, NDH and NDHD was 69.9 %, with LTs having a higher prevalence rate (73.5%) compared to nurses (67.9%). With respect to the various body parts, the prevalence was highest at the lower back (48.1%), followed by the neck (41.4%) and upper back (32.3%). These findings are in line with the study carried out by Buh et al., [16], who reported a 12 month prevalence of 77.89% of WRMSDs among nurses working in a 4 th category hospital in the city of Douala. Most recently, similar results were also observed in a study by Meh et al., [17], in which nurses and LTs had a prevalence rate of WRMSDs of 80.0% and 88.8% respectively. Furthermore, our findings corroborate with that of Ngunde et al., [15] who revealed a 76.6% prevalence of WRMSDs among nurses in the Fako division of Cameroon, with the lower back (84.4%), neck (54.5%) and upper back (47.4%) being the most affected body parts. The prevalence of WRMSDs was not significantly different with respect to specialty, with LTs (73.5%) experiencing a higher prevalence compared to LTs (67.9%). This finding is in line with that by Meh et al., (17), where the prevalence of WRMSDs in nurses and LTs was 82% and 89% respectively. This high prevalence among nurses and LTs can be explained by the fact that these professionals often adopt prolonged positions either in standing or sitting, which has been identified as a key risk factor to WRMSDs [17] [12] and Meh et al., [17].

Findings from this study show that about 42.9%

of the participants had severe pain within the previous 7 days. This is not in line with the result obtained by Bryndal et al., [29] in Poland, where most of the nurses had moderate pain. This higher pain intensity observed in our study may be due to the fact that our study was conducted in a low income setting where little or no preventive measures of WRMSDs and their impact exist, compared to high income countries like Poland where work space exercises and risk identification and management are instituted, thus reducing WRMSDs and its effects among their healthcare workers.

With regards to the factors associated with WRMSDs among nurses and LTs, findings from the study revealed that; sitting for long in the same position was significantly associated (? Concerning the coping strategies of WRMSDs used by the study population; Praying and believing in God (51%), regular exercises (51.9%), seeking for professional help from colleagues (60.2%), taking some days off from work (88.0%), going for physiotherapy (84.2%) and application ergonomic techniques (85.0%) were the best coping strategies used by nurses and laboratory scientist in this study.

This study is not consistent with the study of Olutende et al., [25] in Kakamega Kenya where all the nurses (100%) who experience one or more WRMSDs took analgesics drugs during and after work as a means of coping with WRMSDs. The observed differences could be attributed to the difference in the coping strategies evaluated in both studies, including differences in sociocultural and religious beliefs among the studies populations.

The practice of regular exercise reported in this study as a coping strategy is supported by the study by ??ovacevic and Avdic,[26] who reported most physiotherapists performed regular exercises as a means of coping with WRMSDs. Furthermore, cognitive and behavioral strategies to cope with musculoskeletal disorders at work have been reported [27]. Cognitive strategies included techniques such as; distraction, visualization, self-talk, and blocking thoughts [27]. Seeking-social support, exercise/stretching, exposure management, self or accompanied treatment, eating/drinking were categorized as behavioral coping strategies [27]. This slightly differs with our findings because most of these factors were not assessed. Also, results from this study were in harmony with

11 VII. CONCLUSION

159 those of other studies where nurses used ergonomic techniques and modification of the nursing procedures as a
160 coping strategy of WRMSDs [27,28].

161 10 VI. LIMITATIONS OF THE STUDY

162 There were a few limitations to the study: the smaller sample size which may not be representative of the general
163 population of nurses and LTs. Also, the different units of work of the nurses were not considered in the analysis.
164 This may be essential as the work structure and work space in all the units are not the same. In future studies,
165 we seek to evaluate these risk factors into categories such as; environmental, work, and personal risk factors;
166 this will permit us to consider almost all factors susceptible to be associated with WRMSDs among nurses and
167 laboratory technicians.

168 11 VII. CONCLUSION



Figure 1:



1

Figure 2: Figure 1 :

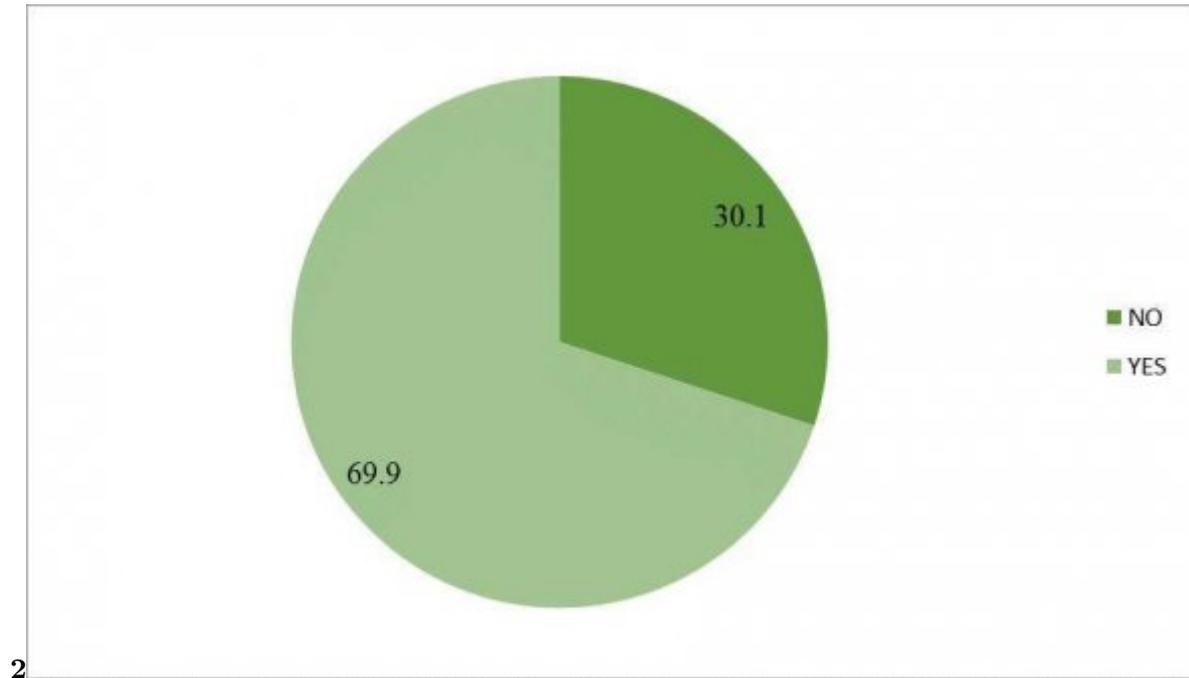


Figure 3: Figure 2 :

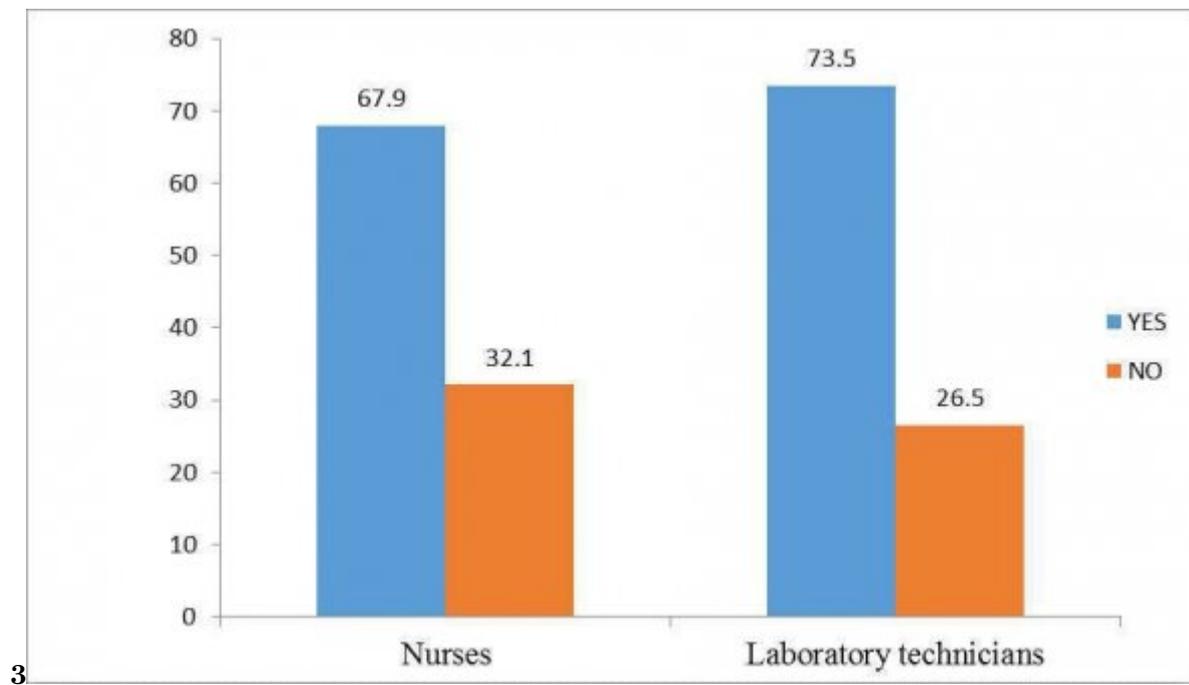


Figure 4: Figure 3 :

45618

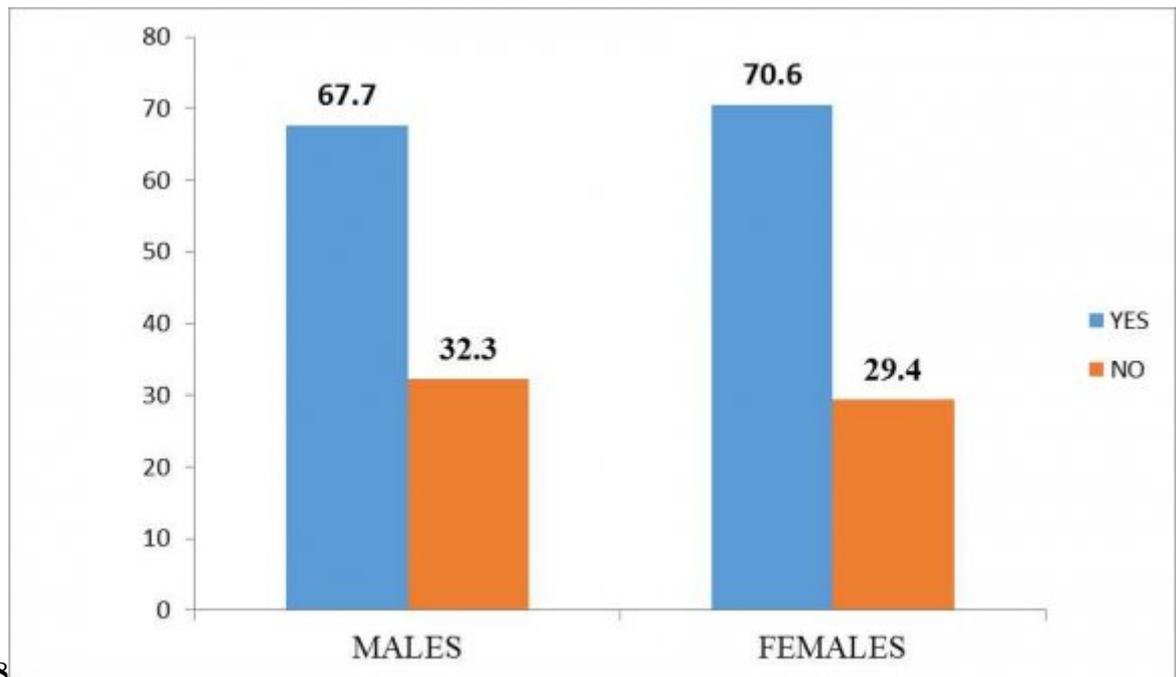


Figure 5: Figure 4 :Figure 5 :Figure 6 : 18 ©

7

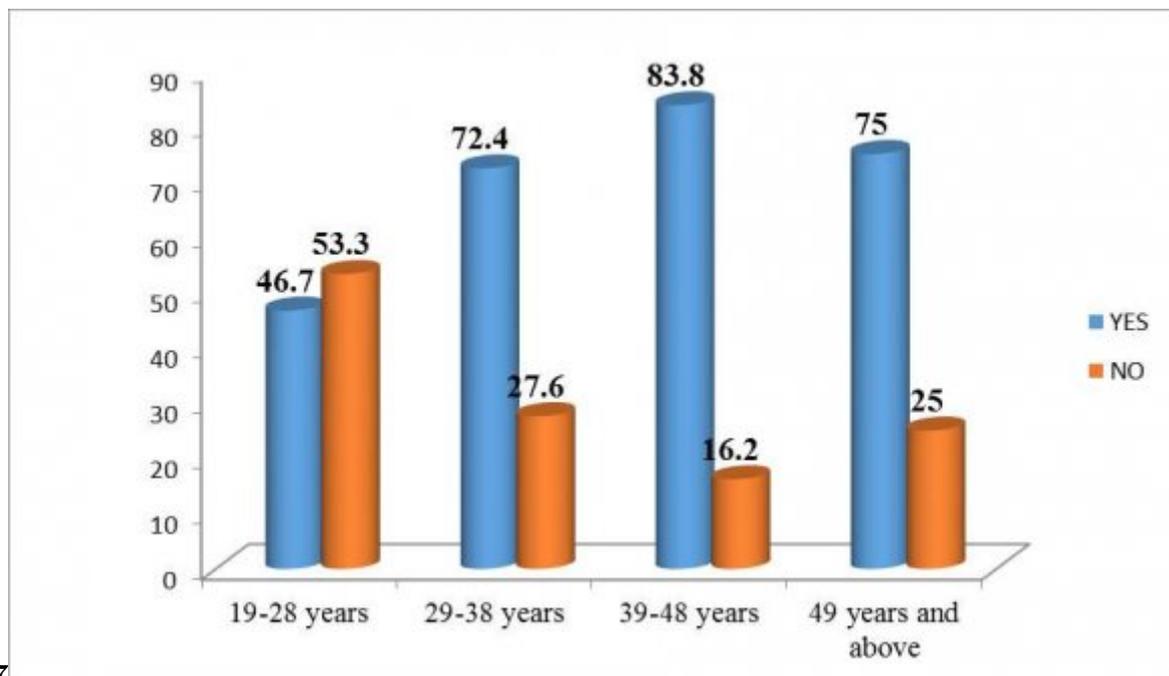
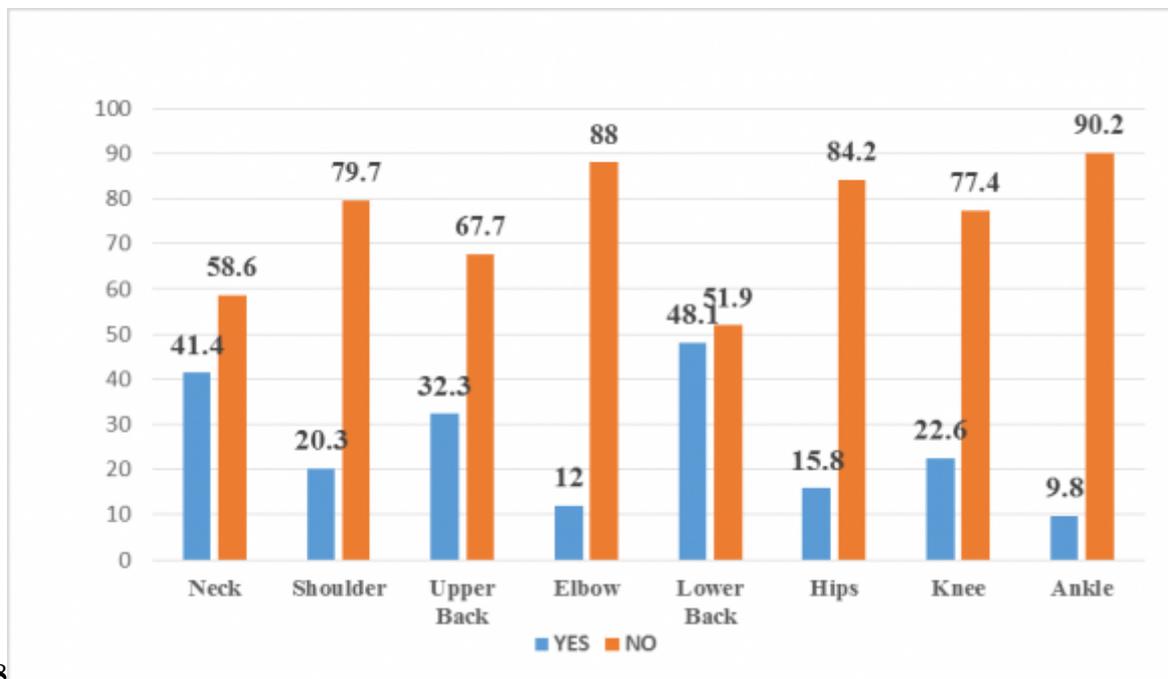


Figure 6: Figure 7 :



8

Figure 7: Figure 8 :

Results: The overall prevalence of WRMSDs among nurses and LTs was 69.9% (93/133). The prevalence of WRMSDs among Nurses and LTs was at 67.9% and 73.5% respectively. The lower back (48.1%), neck (41.4%) and upper back (32.3%) were the most affected body regions reported in this study. With respect to the intensity of pain, the majority (42.9%; 57/133) reported having severe pain within the past 7 days. Sitting for long on the same position ($\chi^2 = 4.894$; $p = 0.027$) and doing repetitive tasks (3.871; 0.049) were significantly associated with WRMSDs, while working one shift (74.4%), standing for long (72.2%), and working above eight hours (70.0%) were common among nurses and LTs, but not significantly associated with WRMSDs in the study. Praying and believing in God (51%), regular exercises (51.9%), seeking for professional help from colleagues (60.2%), taking some days off from work (88.0%), going for physiotherapy (84.2%) and applying ergonomic techniques (85.0%) were the best coping strategies used by nurses and laboratory technicians in this study.

Conclusion: The prevalence of WRMSDs was high among Nurses and LTs practicing in LDHD, NDH and NDHD, and LTs were the most affected. The lower back, neck and upper back, were more affected than other body regions. Sitting for long in the same position and doing repetitive tasks were significantly associated risk factors of WRMSDs. Praying and believing in God, regular exercises, seeking professional help

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Figure 8:

in Nigeria observed a lower prevalence of 71.1% at anybody parts and most affected body regions were the neck (50.6%) shoulder (49.4%) and lower back 43.4%. In Cameroon, a study among nurses in the Fako division of the Southwest Region reported a prevalence rate of WRMSDs at any given body region of 76.6% and occurred mostly in the lower back (68.2%), neck (54.5%) and the upper back (47.4%). Working in the emergency/accident wards and surgical ward, working for less than five days but more hours in week and not taking enough rest breaks during working shift were seen to be associated with WMSDs [15]. Furthermore,

Buh et al.,[16] reported a prevalence of WRMSDs among Nurses and physiotherapists of 77.89% and 78.26% respectively with repetitive task (88%) as major risk factors for Nurses and

Figure 9:

Entries ? SNQ ? VAS	Entries Demographic characteristic ? Sex ? Age ? Specialty ? Work experience
WRMSDS	
Associated Factors	Entries ? Number of shifts ? Standing for long ? Sitting for long ? Doing repetitive task ? Familiar with ergonomic ? Perform exercise after duty ? Had accident before
Coping Strategies	
Entries	
? Regular exercise	
? Seek help from colleagues	
? Take some days off from work	
? I pray and believe in God	
? I go for physiotherapy	
? I apply ergonomic techniques	
? I rely on pain killers	
A	

Figure 10: Nurses and Laboratory Technicians (LDHD, NDH and NDHD)

1

presents the socio-demographic characteristics of the study population. A total of 250 questionnaires were distributed to all the nurses and LTs of the study hospital, but 133 questionnaires were returned yielding a 53% response rate. Out of the 133 participants recruited into the study, the majority was from the age group of 29-38 years (43.6%), females (76.7%), nurses (63.2%), single (53.4%) and had between 1-5 years (65.4%) of working experience.

Figure 11: Table 1

1

Factor	Variable	Frequency	Percentage (%)
Age range (years)	19-28	30	22.6
	29-38	58	43.6
	39-48	37	27.8
	49 and above	8	6.0
Sex	Male	31	23.3
	Female	102	76.7
Specialty	Nursing	84	63.2
	Laboratory scientist	49	36.8
Marital status	Single	71	53.4
	Married	62	46.6
Work experience	1-5 years	87	65.4
	6-10 years	28	21.1

4.2 Prevalence of WRMSDs and Pain Intensity

The overall prevalence of WRMSDs among nurses and LTs observed in the study was 69.9 % (93/133) (figure 2). Although the prevalence of WRMSDs was not significantly associated ($\chi^2 = 0.464$; $p = 0.496$) with specialty, more laboratory technicians (73.5%; 36/49) experienced WRMSDs in one or more body part compared to nurses (67.9%; 57/84) (Figure 3).

WRMSDs was not significantly associated with sex but more females (70.6%; 70/102)

experienced WRMSDs than males (67.7%; 21/31) (figure 4). Also, there was a significant association ($\chi^2 = 11.365$; $p = 0.0010$) of WRMSDs with age group in which, majority of healthcare workers in the age group of 39-48 years (83.8%; 31/37) experienced WRMSDs in one more body parts

(figure5). Findings from the study showed that, within the past 7 days, most of the participants had experienced one or more musculoskeletal London Journal of Medical and Health Research It was revealed that a minority (11.3%; 15/133) of the total population felt mild pain while the (46.9%; 23/49) experienced severe pain more than nurses (40.5%; 34/84) (figure

Figure 12: Table 1 :

2

Factor	Variable	Prevalence of work related musculoskeletal disorders % (n) Positive Negative			
Number of shifts	One	74.4 (61)		52.5 (21)	
	Two	59.0 (23)		41.0 (16)	
	Three	75.0 (9)		25.0 (3)	
Hours per day	Below 8 hours	69.7 (23)		30.3 (10)	
	Above 8 hours	70.0 (70)		30.0 (30)	
	NO	66.7 (36)		33.3 (18)	
Standing for long	YES	71.1 (59)		28.9 (24)	
	NO	68.0 (34)		32.0 (16)	
	YES	78.8 (52)		21.2 (14)	
Sitting for long	NO	61.2 (41)		38.8 (26)	
	YES	72.5 (87)	46.2 (6)	27.5 (33)	53.8 (7)
	NO				
Doing repetitive task	YES	70.2 (59)		30.6 (15)	29.8 (25)
Using vibrating objects	YES	69.4 (34)		30.6 (15)	29.8 (25)
Stressfulness of job	YES	69.8 (44)	70.0 (49)	30.2 (19)	30.0 (21)
	NO				

Figure 13: Table 2 :

3

Factor	Variable	Frequency (n)	Percentage (%)
Regular exercise	YES	69	51.9
	NO	64	48.1
Seek professional help from colleagues	YES	80	60.2
	NO	53	39.8
Take some days off from work	YES	117	88.0
	NO	16	12.0
Pray and believing in God	YES	68	51.1
	NO	65	48.9
Going for physiotherapy	YES	112	84.2
	NO	21	15.8
I apply ergonomic techniques	YES	113	85.0
	NO	20	15.0
I rely on painkillers	YES	63	47.4
	NO	70	52.6

Figure 14: Table 3 :

Also, there was a significant association ($\chi^2 = 11.365$; $p = 0.010$) of WRMSDs with age group in which, majority of healthcare workers in the age group of 39-48 years (83.8%; 31/37) experienced WRMSDs in one or more body parts compared to the other age groups. This is in line with the recent findings reported by Abla et al.,

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. WRMSDs was not significantly associated with sex, but more females (70.6%; 70/102) experienced WRMSDs than males (67.7%; 21/31). This corroborates

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Figure 15:

169 .1 ACKNOWLEDGMENTS

170 We thank all the participants of this study for all their time and patience, which greatly contributed to the
171 completion of this work. Our gratitude also goes to the administrations of the LDHD, NDH and NDHD for
172 the authorizations to conduct this study in their hospitals. Equally, we thank Madam AKIH Victoire MANG
173 and Mr. MBACHAM FON Harry for proofreading this article and making relevant corrections that have greatly
174 ameliorated the quality of the article.

175 .2 Availability of data and materials

176 Most data generated or analyzed during this study are included in this article. Also, all findings that support
177 the result of this study are included.

178 Prevalence and Coping Strategies of Work-Related Musculoskeletal Disorders among Healthcare Workers in
179 Douala, Cameroon: A Cross-Sectional Study

180 .3 Funding

181 This research did not receive any grant from funding agencies.

182 .4 Declarations Ethical consideration

183 Research authorization and clearance (0265/AAR /MINSANTE/DRSPL/BCASS) was obtained from the Douala
184 regional delegation of public health which is in charge of reviewing public health research protocols. Also,
185 administrative authorization was obtained from the different hospital administrators. The names of the study
186 hospital were coded for ethical reasons, and all the participants gave their signed consent. This study respected
187 the ethical principles of the European Union. The fundamental principles of medical research according to
188 Helsinki's Declaration were strictly respected.

189 .5 Consent for publication

190 All the authors consented and accepted for this article to be submitted for publication.

191 The overall prevalence of WRMSDs was high among nurses and laboratory technicians. Laboratory technicians
192 had the highest prevalence of WRMSDs than nurses, and the most affected body parts were the lower back,
193 neck, and upper back. Sitting for long and doing repetitive tasks were significantly associated with WRMSDs,
194 meanwhile maintaining prolonged standing postures, doing repetitive tasks, working only one shift were high
195 in occurrence among the study population who had WRMSDs. In other to cope and manage these WRMSDs,
196 the participants mostly relied on praying and believing in God, regular exercises, seeking professional help from
197 colleagues, taking some days off from work, going for physiotherapy and applying ergonomic techniques. These
198 findings will help to inform National and local healthcare providers on the high prevalence of WRMSDs among
199 nurses and LTs and also on the predisposing factors. Also, the results obtained would help in risk management
200 which will in turn reduce the occurrence of WRMSDs among nurses and LTs. Thus, productivity of these
201 healthcare workers would be improved in Douala, and Cameroon as a whole.

202 .6 Conflict of Interest

203 The authors certify there is no conflict of interest.

204 .7 Abbreviations

205 .8 LT:

206 Laboratory Technician, MSDs:

207 Musculoskeletal Disorders, WRMSDs:

208 Work -related Musculoskeletal Disorders, VAS:

209 Visual Analog Scale, SNQ:

210 Standardized Nordic Questionnaire

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