Original Research Article

Musculoskeletal disorders: A descriptive survey among 425 staff members of the staff of the University of Dschang

Abstract

Introduction: Work related musculoskeletal disorders (WRMSDs) are currently one of the leading causes of disability worldwide. However, information on their prevalence and associated factors remains insufficient in Cameroon.

Objective: Determine the prevalence and associated factors of WRMSDs among the staff of the University of Dschang (UDs).

Methods: We conducted a descriptive cross-sectional study from 05 February to 18 March 2020 during which a modified Nordic Musculoskeletal Questionnaire (NMQ) was administered face-to-face with participants. A convenient type non-probability sampling was used for the selection of participants. The data collected were analyzed with EPI info 7.2.2.6. A bi-variate analysis was conducted to determine factors associated with WRMSDs.

Results: We enrolled 425 participants. The 12-month prevalence of WRMSDs was 93.88%. Almost half of the participants (49.18%) were prevented from their normal activities due to WRMSDs in the past 12 months. The most affected body region was the lower back with a prevalence of 71. 53%. The occurrence of WRMSDs at the UDs was significantly associated with: stress ($P<0.01$; OR=5.96); intense physical exertion ($P<0.01$; OR=3.45) and repetitive movements ($P<0.01$; OR=2.98).

Conclusion: UDs staff is a high-risk population for WRMSDs. It is imperative to protect this human capital by preventing and treating WRMSDs.

Key words: Work related musculoskeletal disorders, prevalence, associated factors, University of Dschang

Introduction

According to the World Health Organization (WHO), work related musculoskeletal disorders (WRMSDs) are defined as disorders resulting from a number of factors where the working environment and the performance of the work contribute significantly to different extents to the causes of the disease [1]. WRMSDs concern all body segments allowing humans to move and work [2]. They are painful conditions that can affect the limbs and/or the spine (bones, joints, muscles, tendons, ligaments, vessels, nerves), secondary to excessive work-related stress [3, 4]. There are several etiopathological models of the occurrence of WRMSDs: biomechanical, ergonomic, epidemiological, bio-psycho-social, and intervention-oriented models, the list being non-exhaustive [5, 6].

WRMSDs remain a major source of pain and impaired quality of life, but also of prolonged absenteeism and work incapacity. Beyond the human costs, the economic and societal costs of WRMSDs remain considerable and could reach 2% of the gross national product of the European Union [7,8,9]. In 2013, in the European Union, WRMSDs were the most common work-related health problems [10, 11]. Contrary to what one might think, whether in developed or developing countries, no one is spared from the grip of WRMSDs which have an ever-increasing global impact [12,13]. WRMSDs affect several anatomical regions, the majority of which are the lumbar region and the upper limbs and represent the major causes of physical impairment and disability worldwide [8,9].

If studies and advances in the prevention of WRMSDs at work are remarkable, although not sufficient in developed countries [10], in Cameroon there are not enough epidemiological studies on WRMSDs. While some occupational diseases are well known, WRMSDs are much less so. Universities have several professional classes who might be exposed to these disorders. This is why we wanted to conduct this survey there, which aimed to determine the prevalence, distribution and factors associated with WRMSDs among the personnel of the University of Dschang.

Materials and methods:

Study design, setting, and population

We carried out a descriptive cross-sectional study from February 5 to March 18, 2020 (over a period of six weeks) on the main campus of the University of Dschang (UDs). The UDs had around 32,000 students in 2017, supervised by nearly 471 teacher-researchers and around 711 non-teaching staff. Since 2017, there has been no census of the UDs staff, hence the lack of recent figures concerning this population.

The target population of our study was teaching and non-teaching staff. Our study included UDs staff members working exclusively in the city of Dschang and who accepted to participate in our study. Were excluded from our study pregnant women and people living with a physical disability (02 pregnant women and 03 men living with a physical disability were excluded from our study).

For the calculation of the sample size, we used the Lorens formula. n= $[Z^2 \times P \times (1-P)]/d^2$With Z=1.96 (critical value) with a 95% CI (confidence interval), and a margin of error d=5%. Given the existence of a similar study previously conducted in Cameroon among dentists in Bafoussam and Douala in 2016, we used the prevalence value (P) determined by this study which was 78.75% [14].

We obtained n= 258 personnel and with a non-response rate of 10% we obtain: n= 258+26= 284 subjects. Our study finally worked with 425 staff from the UDs in Dschang in view of increasing the power of our study. We opted for a non-probability sampling of the convenience type because the participants were selected in the entire UDs campus, according to their availability and in a comprehensive manner.

Data collection:

We obtained ethical clearance from the National Ethics and Research Committee, the authorization of the Vice Chancellor and the informed consent of the participants. Data was collected using the "Nordic Musculoskeletal Questionnaire (NMQ)" from the work of Desjardins et al. [15] that we modified and adapted to our context and administered face-to-face. This questionnaire consisted of three parts. The first part included information on socio-demographic data and general data concerning the profession. The second part concerned information specific to the profession, namely the psychosocial aspect of work (assessment of professional stress, work atmosphere and decision-making capacity at work) and the biomechanical aspect of work. The third part allowed for the screening of WRMSDs in the 9 body regions investigated, during the last 12 months preceding the day of the investigation, then the impact of WRMSDs among UDs staff in Dschang. The 0 to 10 stress scale was used to determine the level of stress among participants, and they were considered to be stressed if score (≥6)

Data management and analysis:

A code was assigned to each questionnaire in advance. The data were processed strictly anonymously and compiled in the form of an Excel spreadsheet then analyzed with the EPI-

info 7.2.2.6 software and the level of significance was set at P<0.05. To determine factors associated with the development of WRMSDs, we performed a bivariate analysis with determination of the odds ratio.

Ethical consideration:

Ethical clearance for the study was obtained from the National Ethics and Research Committee (Ref No: 2020/03/156/L/CNERSH/SP). Administrative authorization was obtained from the Vice Chancellor of the UDs. Signed informed consent was received from all participants and all data collected were kept confidential by physical and electronic means.

Results:

General data concerning respondents

We investigated 465 personnel and 425 agreed to participate in our study. That is a participation rate of 91.39% and a non-response rate of 8.61%. The majority of participants (259 or 60.94%) were male. The average age of the participants was 42.26 [± 9.29] years and the age group ranging from 30 to 40 years was the most represented with 159 subjects or 37.68%. We investigated mainly the teaching staff, i.e. 195 (45.88%). The participants were collected from all departments and faculties of the UDs. The median years of service was 9 (IQR3-17) years, and the participants' median years of experience was 8 (IQR3-14) years. Most of the respondents (321 or 75.53%) were at least overweight, 227 (53.41%) participants did not practice regular physical activity; 307 (72.24%) did not practice pastoral activities (Table I)

General data concerning the work site.

There were mainly permanent workers, 404 out of 445 or 95.06%, who worked full time for 395 (or 93.16%) and on regular schedules for 289 (or 68.00%). The average working hour per week was 44.22 ± 14.84 hours per week. The average working days per week was 5.21± 0.81 days, 143 (33.73%) participants had no break during work. Regarding the biomechanical aspect, 298 participants (70.12%) perform repetitive movements on a daily basis in the practice of their work, closely followed by 259 (60.94%) of the participants working in a static position.

One hundred and sixty-three, (163 or 38.35%) participants were stressed. The most affected profession was that of Department of Infrastructure, Planning and Development **(**DIPD) agents,268 (63.06%). The majority of participants, 370 (86.12%) were supported by their colleagues when they encountered professional and extra-professional difficulties. Most (359

or 84.47%) of participants had the possibility of making suggestions concerning their work to their direct supervisor (Table I)

Prevalence and impact of WRMSDs

Out of 425 participants investigated, 399 admitted to having had symptoms of WRMSDs during the last 12 months in at least one of the 9 body regions investigated, indicating a prevalence of WRMSDs over 12 months of 93.88%. The lumbar spine was the most affected with a prevalence of 71.53%. In the upper limbs, the most affected region was the shoulder with a prevalence of 47.29%. In the lower limbs, the knee was the most affected with a prevalence of 38.21% (table I).

During the last 12 months only 155 participants had to consulted a health professional for WRMSDs problems for a prevalence of 36.47%. However, 209 (i.e. 49.18%) participants were prevented from going about their normal activities due to WRMSDs.

Distribution of WRMSDs within the staff personnel

With a 12-month prevalence of WRMSDs of 96.36% versus 92.28%, women were more affected than men. The age group [60 – 65[years had the highest prevalence of WRMSDs, i.e. 100%, followed by the groups of [30-40[and 40-50[years with 95.06% each. There were 4 occupations with a 12-month prevalence of WRMSDs of 100%: DIPD agents, cookers, cleaners and security agents.

Factors associated with WRMSDs

The risk factors significantly associated with the occurrence of WRMSDs during the last 12 months among UDs staff in Dschang were: stress which increased the risk by 5.96 times ($P<0.01$; OR=5.96); work requiring a lot of physical effort ($P< 0.01$; OR= 3.45) and the practice of repetitive gestures ($P<0.01$; OR= 2.98)

Discussion

Our study aimed to screen for WRMSDs in UDs staff, as well as their associated factors. To achieve our objective, we used a questionnaire from the "Nordic Musculoskeletal Questionnaire (NMQ)" which is suitable for screening for WRMSDs in the workplace since it can be used for any type of task and in all sectors of professional activity. [1,15,16] This study has the advantage of dealing with WRMSDs in a State University, making it possible to evaluate different types of professions and several subjects on one site. To avoid prevalence

bias, we assessed WRMSDs complaints over 12 months. This is a descriptive cross-sectional study.

We found a significant prevalence over 12 months of WRMSDs, 93.88%, which is similar to that found by a French study, 92% [17]. This result was significantly higher than the prevalence rates found by other studies conducted in the same field: 85.5% in Ghana [16]; 87.8% in Tunisia [18] and 78.75% in Cameroon [19]. Occupational health and safety services, intercurrent illnesses, data collection methods, and study participants could explain these differences. The prevalence of WRMSDs among UDs staff was predominant in the lumbar spine (71.53%), then in the cervical spine (54.59%), shoulders (47.29%) and knees (38. 21%). These results do not corroborate the results found in a study conducted among hairdressers in Brazil where the most affected region was the shoulder (49%), followed by the neck (47%), and lower back (39%). [20]. The difference in the professional biomechanical demands, the homogeneity of the study population and the working conditions could explain this difference in prevalence. On the other hand, similar studies have revealed a prevalence of predominant WRMSDs in the lumbar spine, substantially close to that found in our study in Ghana (67%) [21] and Nigeria (66.7%) [22]. This similarity, although the prevalence of low back pain among UDs staff is higher than those found in Ghana and Nigeria, could be explained by relatively similar socio-demographic conditions in the different study site countries.

Regarding the distribution of WRMSDs, our study determined a higher prevalence of WRMSDs in women (96.36%) than in men (92.28%). According to Isabelle Probst in 2009, women are more exposed to WRMSDs due to certain specificities linked to the female sex, namely hormonal variations at menopause, during breastfeeding and when taking contraceptive pills [23]. Another explanation for this difference would lie in the organization of work, because there are professions practiced mainly by women, which could explain the difference in the prevalence of WRMSDs in the 02 sexes. We found an increasing distribution of WRMSDs with age among UDs staff, ranging from 95.06% in the class [30-40[years to 100% in the age group [60-70] years. This distribution was similar to that found by Chiron et al. [24] in France and could be explained by senescence. Another explanatory factor for this distribution could be the accumulation of workloads on the musculoskeletal system with years of service. A prevalence of 100% of WRMSDs was determined in 4 professions within the staff of the UDs of Dschang: maintenance agent, security agent), DIPD agent and cooker ; this value is far superior to that found by other studies [15,17, 18, 25]. The difference in the study sites and the professionals investigated could explain these differences because none of these studies dealt with WRMSDs in academia. This could also be explained by the high

biomechanical constraints to which these professionals in the UDs are exposed on a daily basis, but also by the probable lack of knowledge on the practice of ergonomics in the workplace and the ineffectiveness of preventive actions.

The risk factors significantly associated with the occurrence of WRMSDs among the UDs staff in Dschang were: stress (P<0.01; OR: 5.96); work requiring a lot of physical effort (P<0.01; OR: 3.45) and repetitive movements (P<0.01; OR: 2.98). Repetitive movements and working with a lot of physical effort have been identified as significant risk factors in other studies, such as those carried out by Ojukwu et al. [26] in Nigeria in 2017 and Tawiah et al. [16] in Ghana in 2015 This similarity could be explained by the fact that these two factors are important biomechanical constraints found in the practice of several professions. These two factors have been approved as biomechanical risk factors for WRMSDs by the WHO [7]. Authors who have worked on psychosocial constraints at work have shown that stress is a very important risk factor in the occurrence of WRMSDs [27]. Our study was in agreement with these data because stress would increase by 5.96 times the risk of developing an WRMSDs among the staff of the UDs in Dschang. This similarity could be explained by the fact that professional stress is a universal phenomenon in the world of work and which tends to increase.

The main limitation of the survey study is memory and information bias. This study essentially concerns statistically significant associations whose validation of their causality requires prospective studies. Finding out about the knowledge, attitudes and practice of ergonomics at work would have been, given the results, more than necessary. Finally, there are also variations in the number of people recruited into each occupation of the UDs caused by a variable population of workers, which reduced the statistical power significantly.

Conclusion: The prevalence of WRMSDs among UDs staff very high. The most common associated factors to WRMSDs was stress, repetitive gestures, and physical constraint at work. It is imperative to protect this human capital by preventing and monitoring WRMSDs.

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Table 1 : Caracteristics of the participants and prevalence of Musculoskeletal desorders

SOCIODEMOGRAPHICS CARACTERISTICS	**NUMBER OF DE PARTICIPANTS**	
	Frequence	**Proportion (%)**
SEX		
Female	166	39.1%
Male	**259**	**60.9%**
SERVICES		
other services	20	4.7%
CMS	10	2.3%
DCOU	34	8%
DIPD	22	5.2%
Entretien	18	4.2%
FASA	48	11.3%
FLSH	65	15.2%
FMSP	30	7.1%
FS	**66**	**15.5%**
FSEG	52	12.2%
FSJP	39	9.2%
Security	21	4.9%
PROFESSIONS		
Agent (entretien and security)	38	7.8%
Agent DIPD	19	4.5%
Other professions	48	11.3%
Chef de bureau (CB)	70	16.5%
Cooker	22	5.2%
Lecturer	**195**	**45.9%**
Secretary	33	8.9%
Body Mass Index (BMI)		
Thinness	2	0.1%
Normal	105	24.7%
Overweight	162	38.1%
Obesity grade I	110	25.9%
Obesity grade II	35	8.2%
Obesity grade III	11	2.6%
LIFESTYLE HABITS		
Regular physical activity practice	Effective	Proportion(%)
Yes	198	46.6%
No	227	53.4%
Regular practice of farm activity		

Yes	118	27.8%
No	307	72.2%
PROFESSIONALS FACTORS	**NUMBER OF PARTICIPANTS**	
	Effective	Proportion(%)
Work type		
Permanent	404	95.1%
Occasionnal	21	4.9%
Working time type		
Plein	395	93.2%
Part time	29	6.8%
Type of working hours		
Regular	289	68%
Variable	136	32%
Position occupied during work		
Sitting	205	48.2%
Standing	83	19.5%
Sitting and standing	105	24.7%
Standing and bending	24	5.6%
Bending	7	1.6%
Standing and kneeling	1	0.2%
repetitive tasks		
Yes	300	70.6%
No	125	29.4%
Working in a static position		
Yes	261	61.4%
No	164	38.6%
Work requiring a high physical efforts		
Yes	158	37.2%
No	267	62.8%
Total	425	100%
BODY REGIONS INVESTIGATED	NUMBER OF PARTICIPANTS	
	Effective (n=399)	Prevalence of WRMSDs over12 months(%)
UPPER LIMB		
Shoulder	201	47.3%
Elbow	62	14.3%

Wrist and hand	120	28.2%
LOWER LIMB		
Tig and hip	128	30.1%
Knee	162	38.2%
Ankle and foot	136	32%
SPINE		
Cervical spine	232	54.6%
Dorsal spine	165	38.8%
Lombar spine	304	71.5%
Total	399	100%

List of abbreviations contained in Table 1

CMS : Medical-social center

DASA: Division of Sporting and Associative Activities

DCOU: Direction des Centres et des Œuvres Universitaire (Direction of University Centers and Works)

DIPD: Department of Infrastructure, Planning and Development

FASA: Faculty of Agronomy and Agricultural Sciences

FMSP: Faculty of Medicine and Pharmaceutical Sciences

FSEG: Faculty of Economic Sciences and Management

FS: Faculty of Science

FSJP: Faculty of Juridical and Political Sciences

FLSH: Faculty of Arts and Humanities

Table 2: Demographic and occupational profile of respondents

FACTORS	**WRMSDs OVER 12 LASTS MONTHS**	**OR**	**IC à 95%**	**P value**

	WRMSDsS + (%)	WRMSDs- (%)			
female					
Male	159 (96,36)	6 (3,64)	2,21	0,87-5,61	0,08
	239 (92,28)	20 (7,72)	_	_	_
AGE					
≥ 42	196 (93,33)	14 (6,67)	0,82	0,37-1,83	0,64
< 42	203 (94,42)	12 (5,58)	_	_	_
overweight	105 (92,59)	12 (7,41)	0,7	0,31-1,55	0,38
Normal	99 (94,29)	6 (5,71)	1,10	0,42-2,81	0,84
Obesity stade 1	106 (96,36)	4 (3,64)	1,98	0,67-5,90	0,2
Obesity stade 2	31 (88,57)	4 (11,43)	0,46	0,15-1,42	0,19
Obesity stade 3	11 (100)	0 (0)	ND	ND	0,39
PROFESSION					
lecturer	178 (91,28)	17 (8,72)	**0,42**	**0,18-0,97**	**0,03**
Non lectureur	221 (96,09)	9 (3,91)	_	_	_
WORKING POSITION	S				
Sitting		14 (6,83)	0,78	0,35-1,74	0,55
standing		4 (4,82)	1,35	0,45-4,05	0,58
sitting and standing		6 (5,71)	1,10	0,42-2,81	0,84
standing and bending		2 (8,33)	0,70	0,15-3,15	0,44
REPETITIVE TASKS					
Yes	287 (95,99)	12 (4,01)	**2,98**	**1,34-6,66**	**< 0,01**
No	112 (88,80)	14 (11,20)	_	_	_
WORK REQUIRING A HIGH PHYSICAL STRENGTH					
yes	154 (97,47)	4 (2,53)	**3,45**	**1,16-10,22**	**0,01**
No	245 (91,76)	22 (8,24)	_	_	_
STRESS					
yes	256 (97,71)	6 (2,29)	**5,96**	**2,34-15,20**	**<0,01**
No	143 (87,73)	20 (12,27)	_	_	_

PRACTICE OF PHYSICAL ACTIVITY **Yes** **No**	 214 (94,27) 185 (93,43)	 13 (5,73) 13 (6,57)	 - 1,15	 - 1,52-2,55	 - 0,71

Variable	cOR(IC à 95%)	P value	aOR(IC à 95%)	P value
Enseignant	0.42 (0.18-0.97)	0.03	0.42 (0.17-1,04)	0.06
repetitive gestures	2.98 (1.34-6 .66)	< 0.01	2 .84 (1.22-6.62)	**0.01**
Efforts physiques	3.45 (1.16-10,22)	0 .01	2.65 (0.86-8.21)	008
Stress	5.96 (2.34-15,20)	< 0 01	6.11 (2.33-16.03)	**< 0.01**