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Prevalence and Risk Factors of Work Related Stress in the Medical Emergency Services in Douala, Cameroon.

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ABSTRACT

Background: Healthcare workers are exposed to work related stress in the course of their activities. We conducted this study to determine the prevalence of work-related stress and search for its associated factors among healthcare workers assigned to the emergency medical services of public hospitals in Douala.

Methods: The cross-sectional and analytical study was carried out from March 27th to June 30th, 2017 in 8 public hospitals in Douala. The sampling method was non-random, consisting of consecutive recruitment of volunteer healthcare staff working in the emergency departments of public hospitals who provided the framework for the study. The level of stress was measured using the French version of KARASEK's psychometric scale. The analysis was performed with SPSS 20.0 software. The study was authorized and obtained an clearance was granted.

Results: The sample consists of 51 men (33.55%) and 101 women (66.44%). The average age is 34.6 ± 5.4 years. Nurses (54.6%) and healthcare staff aged 30 to 39 years (61.2%) predominates in the sample. Day / night shift work is the main form of work done by $\frac{3}{4}$ staff (75.6%). The prevalence of stress is 78.9% and the associated risk factors are the following: belonging to a 4th category hospital ($p = 0.008$), medical professions ($p = 0.001$), nurses ($p = 0.0002$), work experience of less than 10 years ($p = 0.04$) and exclusive night shifts ($p = 0.02$).

Conclusion: Continuous improvement of the working conditions must be implemented inside the various facilities to mitigate the consequences of work related stress among the healthcare workers.


Keywords: work-related stress, prevalence, associated factors, hospital, Douala.

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INTRODUCTION

The medical emergency department constitutes the first line of intervention in the hospital care system¹⁾. Daily activities are punctuated by illness, suffering, urgency, unpredictability, indigence and death. The working conditions of healthcare personnel are characterized by changing work rhythms and increased physical and mental constraints during the work activities²⁾. Interactions between the healthcare workers (HCW) and hospital users are frequent during activities, exposing them to various nuisances³⁾, even to violence⁴⁾. All these constraints can affect the mental and physical health of caregivers, and impact the organization of work by increasing the rate of absenteeism, disrupting staff turnover, and lowering the quality of care⁵⁾. Regarding mental health, the crossing-over of resources and management strategies of a person in the face of the demands imposed on him can promote the occurrence of stress⁶⁾, which is defined by Hans Selye as the non-specific response of the organism to any external solicitation⁷⁾. General statistics of work-related stress are alarming in developed countries, with an average prevalence of stress of 22% in 15 European countries, and national prevalence's ranging from 12% in the UK to 55% in Greece, according to a European study conducted in 2005⁸⁾. In 2011 in the United States, 36% of workers reported daily stress, and insufficient wages (49%) being the main cause⁹⁾.

Social workers and HCW are among the main targets of work-related stress, with prevalence varying according to studies and countries. Thus, the prevalence of work-related stress among the HCW was 2.5% in England¹⁰⁾, while in France, 40% of HCW were in a situation of job strain and at elevated risk of burnout in day care hospitals of oncology and cytotoxic reconstruction units in 2014¹¹⁾. The impact of work-related stress is variable and can be extended to families, the community and the employers. For the employers, it can be the rise of absenteeism due to sickness, premature

renewal of staff, early retirement for health reasons, drop in the production and quality of services, as well as the deterioration of the social climate in the company^{5,12)}.

The management of medical emergencies is always associated with elevated expectations from the users, but their outcome depends on several factors such as the technical platform, the performance of the HCW, the availability of equipment and funds required for the management and especially the time to seek care. All these factors can potentially affect the mental workload and decision-making flexibility of the HCW and expose them to work-related stress. Given the difficult socio-professional conditions of the HCW in Cameroon³⁾, we've carried out this study to determine the prevalence of work-related stress and its associated risk factors among the HCW of the medical emergency services of the public hospitals in Douala.

MATERIAL AND METHODS

Study design

The cross-sectional analytical study was carried out from March 27th to June 30th, 2017 in 8 public hospitals based in Douala.

Study population

The study population is made up of the HCW of the public hospitals of Douala who serve as a framework for the study. These hospitals are central level hospitals (Douala Gyneco-Obstetrics and Pediatric Hospital, Laquintinie Hospital, Douala Military Hospital) and district hospitals (Bonassama, Deido, Logbaba, Cite des Palmiers, Nylon). They are multidisciplinary hospitals, equipped with medico-surgical technical platforms and offering quality care services that cover the complementary package of activities defined by the Ministry of Public Health in Cameroon. The sampling method is non-random, consisting of the consecutive recruitment of volunteer HCW. All the permanent or contracted HCW involved in the provision of daily care with a total of 6 months of continuous service in medical emergency

were recruited. Trainee HCW and medical students were not included in the sample.

Data collection

Prior to start the data collection process, we've obtained the authorization for research from the Littoral Regional Delegate of the Ministry of Public Health and the heads of the different hospitals hosting the study. Data was collected using a pre-tested mixed questionnaire summarizing the variables of the study. The process was carried out within the emergency department premises of the public hospitals that hosted the study. HCW were interviewed individually after informed consent. Variables were sociodemographic (age, sex, employment, marital status, monthly salary, number of dependent children) and related to the French version of the Karasek questionnaire¹³.

Work-related stress assessment

The occupational stress level of each participant was based on the Karasek questionnaire, which is a validated measurement scale used as a diagnostic tool to assess the constraints of the psychosocial environment at work. Karasek questionnaire which is described as the main instrument used to measure the psychosocial factors at work¹⁴, is made up of 3 dimensions of the relation of man to work that have been studied; this is the psychological demand (9 items), decisional latitude (9 items) and social support (11 items). These dimensions consisted of several items rated from 1 to 4 according to the 4-point Likert scale, which makes it possible to calculate the individual score of each participant.

The decisional latitude (LD) assesses the possibility of influence of each worker on his work activity; it covers two dimensions, including decision-making authority (DA) and autonomy of competence (CA). In total, the LD score = AD score + AC score.

The AD score = $4 \times [q4 + (5-q6) + q8]$ and the AC score = $2 \times [q1 + (5-q2) + q3 + q5 + q7 +$

$q9]$. In total, DL score = $4 \times [q4 + (5-q6) + q8] + 2 \times [q1 + (5-q2) + q3 + q5 + q7 + q9]$.

The reference value that we used is the French value of the median DL = 70. At the end of its evaluation each worker was considered passive when the DL score was less than or equal to 70, and relaxed when the DL score was greater than 70.

The psychological demand (PD) refers to the amount of work activity, the mental demands and the time constraints associated with this work activity. The PD score = $q10 + q11 + q12 + (5-q13) + q14 + q15 + q16 + q17 + q18$.

The reference value that we used is the French value of the median of PD = 21. At the end of its evaluation, the worker was considered tense if his PD was greater than 21 and passive if his PD was less than 21. Social support (SS) brings together all the social and practical interactions enjoyed by the worker during his activities. These are Collaborative Social Support (CSS) and Hierarchical Social Support (SSH).

SS score = CSS score + HSS score, with CSS score = $[q24 + q25 + (5 - q26) + q27 + q28 + q29]$ and HSS score = $[q19 + q20 + (5 - q21) + q22 + q23]$.

Hence SS = $[q24 + q25 + (5 - q26) + q27 + q28 + q29]$ and HSS score = $[q19 + q20 + (5 - q21) + q22 + q23]$.

The reference value that we used is the French value of the median SS = 24. Thus, a worker had a low SS if the SS score was less than 24 and a strong one if the SS score was greater than 24.

At the end of the evaluation, participants were ranked according to their cumulative scores:

- the subject was considered stressed if he combined a low decisional latitude and a strong psychological demand
- the subject was relaxed if he combined a weak psychological demand and a great autonomy of decision-making

- the subject was considered active if he combined a strong psychological demand and a great autonomy
- the subject was considered passive if he combined a weak psychological demand and a weak decision-making autonomy.

Data Analysis

On completion of data collection, we processed the data to check for filing errors and missing items, in order to produce accurate and good quality data. Data analysis was performed using SPSS 20.0 software. Quantitative variables were expressed according to the central position and dispersion parameters, while qualitative variables were expressed in graphical forms. The association between relevant qualitative variables and the work-related stress was measured using the Khi-2 test or Fischer test, with an error threshold $\alpha=5\%$ and a confidence interval equal to 95%. The results were considered significant for $P<5\%$.

Ethical considerations

The research protocol was approved by the Institutional Ethical Committee of the University of Douala and was issued the ethical clearance No. CEI-UDo/891/16/2017/T. On field, the study was conducted in alignment with the national and international ethical principles for research in human health. The protection and confidentiality of the collected data was ensured during the full process.

RESULTS

Socio-professional characteristics.

The participation rate was 81.38% (152/187), and the sample consisted of 51 men (33.55%) and 101 women (66.44%), with a sex-ratio of 1 man / 1.98 women. The sample was mainly made up of nurses (54.6%) and HCW aged between 30 and 39 years old (61.2%). The average age of HCW was 34.6 ± 5.4 years [25 years - 54 years] and the average occupational seniority in the emergency department was 102.3 ± 65.6 months (8.5 ± 5.5 years). The

other characteristics of HCW are illustrated in Table I below.

Working conditions.

The working conditions of the HCW are illustrated in Table II below.

Day / night shift work was the main work schedule, practised by $\frac{3}{4}$ staff (75.6%). Of the 133 HCW who estimated their monthly salaries, 41 (30.8%) received a monthly salary ≤ 100 thousand FCFA, 57 (42.8%) received a salary of 100 to 200 thousand FCFA and 35 (15.8%) received a salary > 200 thousand FCFA.

Characteristics of work-related stress

• Prevalence

The distribution of HCW according to their psychological state is illustrated in Figure 1 below. This figure shows that 120 staff were stressed (78.9%), 26 were active (17.1%), 5 were passive (3.3%) and 1 was relaxed (0.7%).

The distribution of work-related stress according to the socio-occupational characteristics and working conditions of the HCW is illustrated in Table III below; it reveals a higher level of occupational stress in the 30s (61.7%), women (65%), in the 1st, 2nd and 3rd categories hospitals (82.5%), in the nurses (62.5%) and physicians (15.8%), among the staff with seniority > 12 months in emergencies (58.3%) and staff performing shift work (75.8%).

• Dimensions of work-related stress in HCW

On completion of the analysis of the KARASEK questionnaire, we've identified strong psychological demand, low decisional latitude and strong social support as the main explanatory factors of work-related stress in our study. The mean score of the psychological demand was 27 ± 2.6 (14 - 34), thus higher than the median which was 21. The average score of the decisional latitude was 64.1 ± 7.9 (40 - 90), thus lower than the median of 70. The average social support score was 32.2 ± 3.8 (20 - 44), thus higher than the median of social support, which was 24.

Table I : sociodemographic characteristics.

Variable		N	%
Gender	Men	51	33.6
	Women	101	66.4
Age	< 30 years	29	19.1
	30 – 39 years	93	61.2
	40 – 49 years	29	19.1
	≥ 50 years	1	0.7
Academic level	Primary level	1	0.7
	Secondary level	24	15.8
	University	127	83.6
Marital status	Married	81	53.3
	Single	67	44.1
	Divorced	1	0.7
	Widow	3	2.0
Occupation	Medical Doctor	41	27.0
	Nurse	83	54.6
	Help nurse	15	9.9
	Others	13	8.6

Table II: work conditions of the healthcare workers.

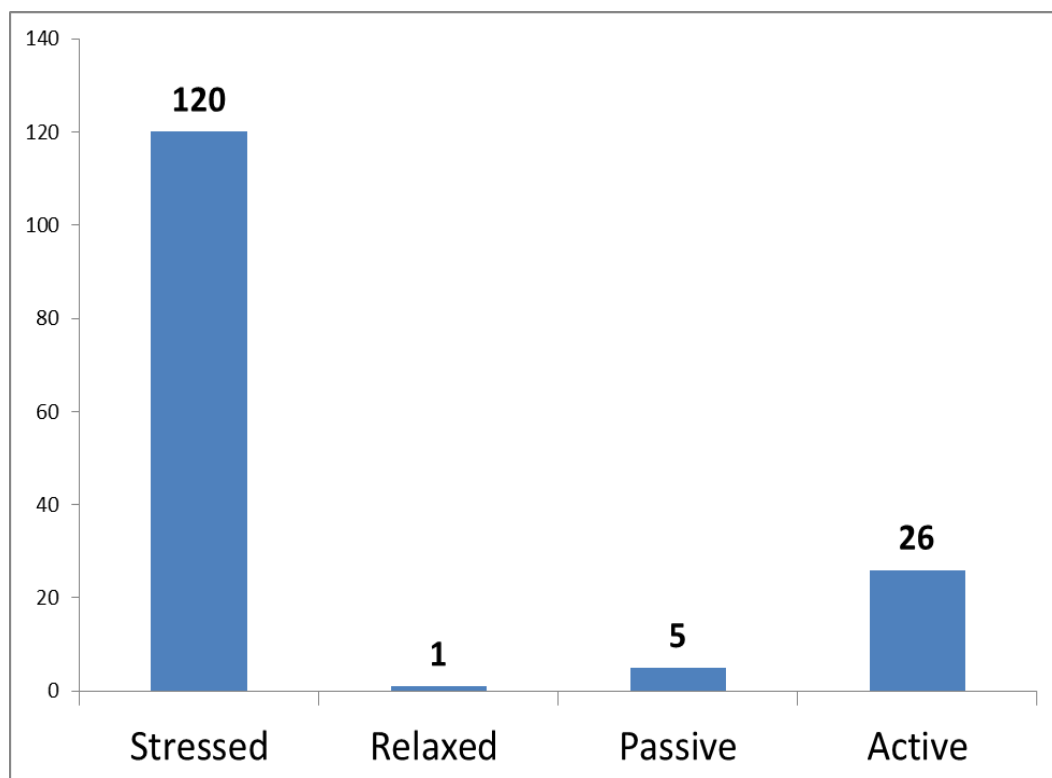
Variables		N	%
Monthly wage (n=133)	≤ 50.000 CFA.F	24	18.0
	50.001 – 100.000 CFA.F	17	12.8
	100.001 – 150.000 CFA.F	24	18.0
	150.001 - 200.000 CFA.F	33	24.8
	200.001 – 250.000 CFA.F	21	15.8
	> 250.000 CFA.F	14	10.5
Type of work shift	Day/Night work shift	115	75.6
	Exclusive night shift	16	10.5
	Exclusive day shift	21	13.8

Table III : sociodemographic & professional characteristics versus working conditions.

Variable		Stress (+) N (%)	Stress (-) N (%)	OR (IC à 95%)	p-value
Age (years)	< 30	19 (15.8)	10 (31.3)	0.4 [0.2 – 1.01]	0.05
	30-39	74 (61.7)	18 (59.3)	1.3 [0.6 – 2.8]	0.59
	40-49	26 (21.7)	3 (9.4)	2.7 [0.8 – 9.5]	0.14
	≥ 50	1 (0.8)	0 (0)	/	1.0
Gender	Men	42 (35.0)	9 (2.1)	1.4 [0.6 – 3.2]	0.46
	Women	78 (65.0)	23 (71.9)		
Category of the health facility	4 th	21 (17.5)	0 (0)	/	0.008*
	1 st , 2 nd , 3 rd	99 (82.5)	32 (100)		
Marital status	Married	65 (54.2)	15 (46.9)	1.4 [0.6 – 2.9]	0.46
	Single	50 (41.7)	17 (53.1)	0.6 [0.3 – 1.4]	0.24
	Divorcés				
	Widow	3 (2.5)	0 (0)	/	1.00
Occupation	Medical Doctor	19 (15.8)	22 (68.8)	0.09 [0.04 – 0.21]	<0.001*
	Nurse	75 (62.5)	8 (25.0)	5 [2.1 – 12.1]	0.0002*
	Assistant nurse	13 (10.8)	2 (6.3)	1.8 [0.4 – 8.5]	0.74
	Others	13 (10.8)	0 (0)	/	0.07
Academic level	Not educated				
	Primary level	1 (0.8)	0 (0)	/	1.00
	Secondary level	19 (15.8)	5 (15.6)	1.01 [0.8 – 1.3]	0.98
	University level	99 (82.5)	27 (84.4)	0.9 [0.3 – 2.5]	0.80
Monthly wage (CFA.F)	≤ 50.000	20 (16.7)	4 (12.5)	1.4 [0.4 – 1.1]	0.79
	50-100.000	14 (11.7)	3 (9.4)	1.3 [0.34 – 4.7]	1.00
	100-150.000	16 (13.3)	8 (25.0)	0.5 [0.2 – 1.2]	0.11
	150-200.000	42 (35.0)	12 (37.5)	0.90 [0.4 – 2.0]	0.07
	>200.000	0 (0)	0 (0)	/	/
Overall longevity	≤ 10 years	68 (56.7)	24 (77.4)	0.4 [0.2 – 0.9]	0.04*
	> 10 years	52 (43.3)	7 (22.6)		
Longevity at in the service	≤ 12 months	50 (41.7)	12 (38.7)	1.1 [0.5 – 2.5]	0.84
	>12 months	70 (58.3)	19 (61.3)		
Work shift	Exclusive day shift	19 (15.8)	2 (6.3)	2 [0.6 – 12.8]	0.25
	Exclusive night shift	9 (7.5)	7 (21.9)	0.3 [0.1 – 0.9]	0.02*
	Day-night shift	91 (75.8)	23 (71.9)	1.2 [0.5 – 3.0]	0.65

Table IV: predictive factors of work related stress.

Variables		Adjusted OR (95% C.I)	Adjusted <i>p</i> -value
Socio-professional characteristics	Age	0,7 [0,2 – 1,6]	0,62
	Medical Doctors & nurses	0,1 [0,04 – 0,43]	0,001
	Overall longevity	1,0 [0,9 – 1,1]	0,77
	Longevity in the service	2 [0,8 – 5,2]	0,11
	4 th category hospital	57x10 ⁷ [0 – 58x10 ⁷]	0,99
Working conditions	Monthly wage	/	0,61
	Work shift	1,0 [0,9 – 1,1]	0,55

**Figure 1: distribution of participants mental health.**

• **Strong psychological demand**

For almost all the HCW (96%), the psychological demand score was high regardless of age, gender and occupation. The high psychological demand was caused by a workload deemed excessive by almost all HCW (92.8%); this required high concentration (86.9%) and its execution was subject to frequent interruptions (92.8%) and contradictory orders in most of the cases (67.1%). Work activities were carried out quickly (92.1%), intensively (97.6%) and in a space of time deemed insufficient by most of the staff (88.9%).

• **Low decisional latitude**

The decisional latitude score was low for most HCW's (82.2%), slightly higher for women, and decreased with skill level and conversely with age. The low decision-making latitude was caused by performing work activities that required high level of skills (87.5%), which need to be developed (87.5%) by learning new things (71.1%). Work activities consisted of repetitive tasks (92.1%), varied (82.2%), whose execution allows the development of skills (95.4%). Almost all the HCW could influence their professional activities (90.8%), but they couldn't take initiatives (68.4%) nor decide (53%) during their implementation.

• **Strong social support**

Both hierarchy and the colleagues practiced social support. The score was high among HCW's (96.7%), regardless of age, gender and profession. Social support of the hierarchy was manifested by a non-hostile work climate (86.8%), collaboration (80.3%), facilitation of work (73.7%) and attention (61.8%). With regards to colleagues, they appreciated their skills, developed friendly relationships (90.8%), encouraged each other (92.1%) and helped each other (90.1%).

• **Factors associated with work-related stress.**

Table III shows significant association between work-related stress and some socio-

occupational factors. These factors were: belonging to 4th category hospital ($p = .008$), medical professions ($p = .001$), nurses ($p = 0.000$), having less than 10 years of professional experience ($p = .04$) and exclusive practice of night shift work ($p = .02$). According to the results of the multivariate analysis shown in Table II, medical and nursing professions were the only predictors of work-related stress in our study ($p = .001$).

DISCUSSION

Study limits

Despite the high participation rate (81.28%), the study was hampered by data collection difficulties due to the unavailability of participants during our visits.

Comparison of results

• **Socio-professional characteristics**

Women predominates in the sample (66.4%) as much as in the studies of Ba et al in Dakar (58.5%)¹⁵ and Laraqui et al in Morocco (53.9%)¹⁶. On the other hand, Chakroun et al found a male over-representation (66%) in Tunisia¹⁷. The average age of HCW is 34.6 ± 5.4 years and the majority of them are in their thirties (61.2%). The sample consists mainly of nurses (54.6%) and physicians (27%). It's almost the same situation in Dakar, with the groups of nurses and doctors making up the majority of the sample (51.8%)¹⁵. At the social level, the majority of HCW are married (53.3%), like their colleagues in Senegal and Morocco^{15,16}. Professionally, they are experienced workers with an average of 8.52 ± 5.47 years of seniority (102.3 ± 65.6 months) in the emergency department. Their professional experience is lower than that of their colleagues in Dakar which is 13.41 years old¹⁵. The difference observed between the levels of professional experience of the participants in the two studies could be explained by the rejuvenation of the health human resources that is in progress in the public healthcare facilities of Douala. In fact, many young graduates were recruited during the past years to compensate

the departures of experienced staff to the private sector.

- Working conditions.

The mission of the medical emergency services is to ensure the full and continuous provision of medical care to the patients; as a result, these services must operate without interruption and staffs are assigned to day and night activities. In our study, night-shift work is practiced on a part-time basis (10.5%) or permanently (75.6%); all the personnel concerned were exposed to the effects of night-shift work that could affect their social life as reported by Owona et al in Yaoundé¹⁸⁾, their health with the possibility of occurrence of sleep disorders, lower back pain, digestive disorders, arterial hypertension, cardiovascular diseases and peptic ulcers^{19,20)}. According to the other authors, night-shift work may also increase the risk of developing metabolic syndrome²¹⁾ and endanger the safety of HCW by disrupting the biological circadian rhythm and the sleep/wake cycle; it can also lower the work performance, and increase the risk of errors and accidents at work²⁰⁾. Some authors suggest that a specific type of personality may promote the onset of stress at work. Thus, stress would electively affect HCW with type D personality, which is described by Denollet, as an emotionally stable personality characterized by negative affectivity and social inhibition²²⁾. It is therefore possible that some staff with type D personality, perceiving their working environment more stressful than their colleagues could be part of our sample; but this aspect has not been studied, although the socio-professional conditions of health personnel in Cameroon³⁾ could influence their personality and behaviour. Salary is an important working condition that can sometimes lead to dissatisfaction, conflict and intention to leave or change of employment. Indeed, the salaries received by the HCW are average, forcing these staff to resort to other income-generating activities to improve their social condition³⁾.

- Prevalence and factors associated with job stress

In emergency medicine, interactions are frequent between the various stakeholders whose specific roles and organization is not always specified in our context, hence the possibility of tension between the members of the various work-teams. Indeed, certain factors such as the ambiguity or the conflict of professional roles that are related to the organization of work have been identified as potential sources of stress in emergency medicine²³⁾. Occupational stress is a reality among doctors and nurses in Douala based medical emergency services ($p = .001$). According to the results of a 2005 European multi-centre study, healthcare workers and education workers are the main victims of work-related stress with prevalence of stress ranging between 20% and 60%⁸⁾. The prevalence of work related stress was high in the study (78.9%) and among SAMU personnel in France²³⁾. In Northern Jordan, the prevalence of work-related stress is 26% with a female predominance²⁴⁾.

Preventing job stress is the best alternative to anticipate its consequences and minimize the economic and social burden associated with this psychosocial risk. Indeed, the persistence of professional stress exposes HCW to develop consequences such as organic pathologies, psychological disorders and specifically the burnout of emergency physicians which is characterized by a low emotional exhaustion combined with a high level of dehumanization of the relationship to patients²³⁾. The economic costs of dealing with occupational stress and related pathologies are not known in our context, but they are high in Europe according to the results of a study^{19,20)}.

High psychological demands, low decision latitude, and high social support are the main risk factors of stress in our study. A detailed analysis of these risk factors evokes the possibility of a causal link between the organizational constraints of work and the

exposure of nurses (1st line intervention staff). In healthcare facilities, nurses and Doctors usually work together and simultaneously. In services, the pace of activity was often accelerated, and unpredictability was frequent because of the rapid (92.1%) and intensive (97.6%) execution of work activities in a short period of time (88%). In these circumstances, nurses have little influence over how to perform certain tasks because they cannot take initiatives during their execution (68.4%), nor decide (53%). Ultimately, this could have created some frustrations or tensions over poorly managed situations in which their experience was confronted with the authority and inexperience of young physicians who often transmit conflicting orders (67.1%). The strength and stability of emergency medical teams is certainly linked to social support, which is high among almost all healthcare staff (96.7%); and this reflects the good quality of the social climate existing between the hierarchy and the HCW, and between the HCW themselves.

CONCLUSION

Work-related stress is a reality in the medical emergency services of the public hospitals in Douala. The profile of the healthcare workers is that of women (66.44%), nurses (54.6%), aged between 30 and 39 years old (61.2%), with an average professional seniority of 8.5 ± 5.5 years in the emergency department. Day / night shift work is the main work schedule performed by $\frac{3}{4}$ healthcare workers (75.6%). The prevalence of work-related stress is high (78.9%), specifically among the thirties (61.7%), women (65%), in the 1st, 2nd and 3rd category hospitals (82.5%), among nurses (62.5%) and physicians (15.8%), among HCW with seniority > 12 months in emergencies services (58.3%) and staff performing day & night-shift work (75.8%). To anticipate the evolution towards chronicity and repercussions on the quality of services, we advocate major improvements of the working conditions based on ergonomic methods.

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Disclosure of potential conflicts of interest

The authors declare no conflict of interest.

Contributions of the authors

- Dr. OWONA MANGA Léon Jules actively participated in all the phases of the study (research protocol, realization of the study, writing of the manuscript)
- Pr ADIOGO Dieudonne participated in the realization of the study and the writing of the manuscript
- Dr. DOUMBE Jacques Narcisse actively participated in all phases of the study (data collection, manuscript writing and translation)
- Dr. BEYE BEYE Il Buruce Charly participated in all phases of the study (research protocol, data collection, data entry, manuscript writing)
- Dr. ONANA NGASSIMI Marie Mathilde participated in all phases of the study (research protocol, data collection and data entry, manuscript writing, translation review)
- Pr BONNY Jean-Sylvain has participated in the conception of the study and the writing of the manuscript.

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