Occupational Diseases and Environmental Medicine, 2023, 11, 199-212
https://www.scirp.org/journal/odem
ISSN Online: 2333-357X
ISSN Print: 2333-3561

High Prevalence of Musculoskeletal Disorders and Self-Medication among Street Vendors in Bangui, Central African Republic (CAR)

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How to cite this paper: Mossoro-Kpinde, H.D., Kongbanda, P.A., Balekouzou, A., Diemer, H.S.C., Yabada, J.A.P.D., Nzobe, C.N.L.D., Grésenguet, G. and Ndiaye, M. (2023) High Prevalence of Musculoskeletal Disorders and Self-Medication among Street Vendors in Bangui, Central African Republic (CAR). *Occupational Diseases and Environmental Medicine*, **11**, 199-212.
https://doi.org/10.4236/odem.2023.114016

Received: July 1, 2023
Accepted: October 24, 2023
Published: October 27, 2023

Abstract

Introduction: Musculoskeletal disorders (MSDs) are a set of peri-articular conditions that result mainly in pain and functional discomfort. They represent a major occupational health problem in all areas of activity. The objective of this work was to determine the prevalence of MSDs among street vendors in the city of Bangui in the Central African Republic (CAR). **Methods:** A cross-sectional study was conducted from September 01 to October 31, 2021 in Bangui, the capital of CAR. The study population consisted of street vendors which were included at the entrance of 4 large markets of Bangui after giving informed consent. The sample size, calculated according to the Schwartz formula, was 384. Sociodemographic data (age, gender, level of education, marital status), professional data (the duration of sale in hours, the distance traveled per day); and health data (the health problems suffered by itinerant sellers and the means of dealing with them) were collected using a pre-established self-questionnaire. This collected data was processed using Microsoft Excel 2013 and Epi-Info version 7 software. **Results:** Among 384 street vendors included, women represented a quarter (24.9%). The average age was 27 years; the 25 - 34 age group was the most represented (50%). About two-thirds (64.8%) sold for at least 12 hours and traveled more than 10 km (69.3%) per day. The main health problems reported by street vendors were musculoskeletal disorders (95.8%). Their locations concerned the upper

limbs shoulder 65.36% (251), elbow 24.22% (93). Non-ergonomic postures that stress the back and joints all day long, causing pain are risk factors for MSDs. These MSDs were treated by self-medication with non-steroidal anti-inflammatory drugs (22.0%), mainly sold on the street. **Conclusion:** MSDs dominated the health problems of street vendors. These problems raise the need for recognition and support for these workers to optimize their performance while preserving their health through awareness and good management of MSDs whose chronicity generates a disability.

Keywords

Street Vendors, Musculoskeletal Disorders, Ergonomy, Self-Medication, Central African Republic

1. Introduction

Musculoskeletal disorders (MSDs) concern the muscles, tendons and tendon sheaths, nerves, bursae, blood vessels, joints, and ligaments, on the periphery of the joints of the upper limbs, spine and lower limbs [1]. These are a set of peri-articular conditions that mainly result in pain and functional discomfort that are often daily, the intensity of which can vary from one individual to another, but also over time for the same person [1]. They represent a major occupational health problem [2]. The seriousness of these disorders lies in their tendency to progress towards chronicity. They can lead to the loss of function of the musculoskeletal system. Without preventive measures, they can ultimately lead to incapacity at work and in daily life. The European Agency for Safety and Health at Work reports that 3 out of 5 workers in the European Union complain of MSDs and 60% of workers with a work-related health problem mention MSDs as their main more serious pathology [3]. In Lebanon, El Braidy *et al.* noted that 81% of their sample was victims of MSDs [4]. The countries of the North are increasingly considering the issue [5] but little data is available in Africa. A few African studies found a prevalence of 87.9% among Cameroonian dockers in 2019 [6], 80.65% and 81.99% respectively among drivers of motorcycle taxis and truck drivers in Cameroon [7], 100% among surgeons in Saint-Louis in Senegal [8]. Identified in several professions, MSDs could also be observed among itinerant sales professionals.

Street vending is one of the main ways to earn money and maintain the livelihoods of low-income people in resource-limited countries. In Africa, street vending accounts for at least 70% of all jobs and for more than half of informal sector activities [9]. Street vendors lack the technical means and resources to practice occupational health and safety and security measures for disease prevention and health promotion. They have no occupational health and safety support and labor laws do not yet regulate them in Africa [10].

In the CAR, itinerant sales are an imposing reality; street vendors meet on the

way in all the streets of Bangui. However, until 2021 no study has been conducted on street vendors either to estimate their economic weight or to study their health. The only study concerning street vendors dates from 2022, which looked at their state of health. This study showed that the health problems of street vendors are dominated by MSDs. Further work was required to study the characteristics of MSDs [11]. The objective of this work is to determine the prevalence of MSDs among street vendors in the city of Bangui in CAR and to identify the risk factors.

2. Methods

This is a cross-sectional study conducted from September 01 to October 31, 2021. This work was carried out in Bangui (the capital city of the CAR) and its surroundings. The data collection points were located at the entrance to the large markets where street vendors come to stock up while selling on the way. This is the downtown market, located at PK0 (kilometre marker 0, from which the distances between Bangui and the other localities of the CAR are measured), the administrative center of the capital, PK5 (or Km5), located 5 km from the city center but roughly corresponding to the geographical center of the city, the Combattant neighborhood market, located about 10 km from the city center and about 1 km from Bangui-M'Poko international airport, and the Gobongo market, located in the district of the same name, 9 km, towards the north exit of the city. In addition to these markets, there is the 20,000-seat stadium in Bangui. This is where many street vendors come to take their midday break or before returning home while selling along the way. The study population was made up of street vendors of all ages and genders, residing in Bangui and its surroundings. Included in the study were those who carried out their commercial activity in Bangui and who had given their informed written consent. On every day of the study, the investigators were positioned at the entrances to the markets indicated above. Street vendors, recognizable by the fact of holding the goods to the upper limbs, carrying them on the head in the back. When the investigators approached street vendors, they first asked them if they sold their wares in the market or if they came to get supplies to go out and sell in the street. Thus, all those who sold in the market were excluded. It is to those who came to get supplies that the investigators offer to participate in the study. As for the 20,000-seat stadium site, street vendors always go to one place. The interviewer will meet them directly at this location and suggest that they participate in the study. The sample size, calculated according to the Schwartz formula [12], was 384. Sociodemographic data (age, sex, level of education, marital status), professional data (duration of sale in hours, distance traveled per day, turnover) and health data, health problems suffered by street vendors, were collected. The health data collected concerned complaints, pains of all kinds and their location, difficulties in joint movement, swelling of the legs, varicose veins in the lower limbs, generalized asthenia, as well as other complaints to be specified, antecedents personal, the means used (modern drugs, pharmacopoeial products) to treat pain and

other problems. They had been asked to specify the doses of modern drugs used. The cleanliness of the outpatient hunter was assessed by observation in addition to the fact that he was asked the number of showers he took per day, the times of these showers, and the consumption of drugs or alcohol (type, volume, frequency of taking medicine). A pre-established self-administered questionnaire based on the synthesis of 3 self-administered questionnaires [13] [14] [15] was used to collect data. The data collection form was pre-tested on a sample whose size was one-tenth (40 street vendors) of that of the study sample and the content was adjusted before the start of the survey. The entire process of data collection, entry and analysis was carried out with strict respect for confidentiality. Microsoft® Word (Redmond, Washington, USA) software was used for word processing, Microsoft® Excel (Redmond, Washington, USA) for pre-coded data entry, preparation of tables and figures and Epi-Info version (DCD, Atlanta and WHO, Geneva). The study was descriptive, only the frequencies of the categorical variables and the means of the quantitative variables were determined.

3. Results

During the study period, 384 street vendors were included. Women represented a quarter of the participants, or 24.9% of the sample, or the sex ratio was 3.0. The average age of street vendors was 27 (range 15 and 52) years; the age group of 25 - 34 years was the majority (50.0%). The secondary education level was also predominant (55.2%), followed by the primary level which represented 37.8%. Almost all of the sellers were single, *i.e.* 98.4% (Table 1).

Table 1. Socio-demographic characteristics of street vendors (N = 384).

Characteristics Number Percentage (%)	Number	Percentage (%)
Age range (years)		
15 - 24	139	36.2
25 - 34	192	50.0
≥35	53	13.8
Sex		
Male	289	75.1
Female	95	24.9
Level of study		
No schooling	9	2.3
Primary level	145	37.8
Secondary level	212	55.2
University level	18	4.7
Marital status*		
Single**	378	98.4
Widowed	3	0.8
Divorced	3	0.8

*No street vendor is married considering the official marriage celebrated in civil status. **A significant proportion of street vendors, although claiming to be single, live together with their spouses and sometimes have children.

About 2/3 of itinerant vendors, or 64.8%, devoted at least 12 hours of time per day to their sales activity and traveled a distance of more than 10 km daily (69.3%). Almost all of them worked between 4 and 7 days a week (Table 2).

The main health problems reported by street vendors were dominated by musculoskeletal disorders (95.8%), followed by behavioral disorders (55.7%), infectious diseases (53.4%) and respiratory disorders (26.0%). The other categories of reported health problems had a proportion of less than 10% each.

MSDs were much more localized to the upper limbs: shoulder 65.4%, back 40.4%, elbow 24.2% and wrist 21.9%. Location in the lower limbs did not exceed 10%: knee 9.6% and ankle 7.3% (Figure 1). The clinical manifestations of MSDs were dominated by shoulder difficulty (251; 68.2%), followed by elbow difficulty (84; 22.8%) and cramps (hands or arms 25; 6.8%). The frequency sum of the other events is only 2.2% (8 cases). None of the street vendors complained of pain when climbing stairs or running. (Table 3)

For treatment, the drugs most consumed by street vendors were non-steroidal anti-inflammatory drugs (22.0%), antibiotics (14.6%) and herbal teas (13.0%). More than half (50.5%) of street vendors claimed to have taken 1 to 3 days off work due to illness.

4. Discussion

The objective of this cross-sectional study was to determine the prevalence of MSDs among street vendors in the city of Bangui, CAR. The 384 street vendors interviewed were on average 27 years old, mostly single (98.4%) with a male predominance; the sex ratio was 3.0. They mainly had a secondary education level (55.2%). Almost all worked between 4 to 7 days a week and 7 to 12 hours a day (64.8%). They traveled more than 10 km per day for 2/3 (69.3%). The main health problems reported were musculoskeletal disorders (95.8%) affecting mainly the upper limbs: shoulder 65.36%, elbow 24.22% and back 40.36%. Half of our sample sometimes suspended their professional activity for 1 to 3 days due to illness.

Itinerant vendors often carry their goods in postures that are untenable for the unaccustomed, not always respecting physiology and over long distances. These non-ergonomic postures are likely to cause MSDs. However, being from the informal sector, they do not benefit from the means of prevention which are at the heart of occupational medicine, despite the significant economic weight of itinerant sales which represents more than half of the informal sector in low-income countries [16]. Street vendors were mostly aged 25 to 34 was predominant (50.0%). These results are similar to those found by Owusu in Accra, Ghana with 58.3% where the predominant age group of his sample was 20-29 years [17] and Yosef in Ethiopia [18]. These results show that itinerant vendors are mainly young, they find themselves at an age where it is illusory to rely on parents and some already have a family to support, hence the need to work to earn money. The youth of the Central African population seems to largely influence this predominance. Men were also in the majority in our study with a prevalence of

Table 2. Occupational characteristics of street vendors (N = 384).

Characteristics Percentage (%)	By slices	Number	Percentage (%)
Distance traveled per day (Km)			
	<5 km	22	5.7
	5 à 10 km	96	25.0
	>10 km	266	69.3
Number of hours of sale per day (hours)			
	2 à 7 h	29	7.6
	7 à 12 h	249	64.8
	13 h et over	106	27.6

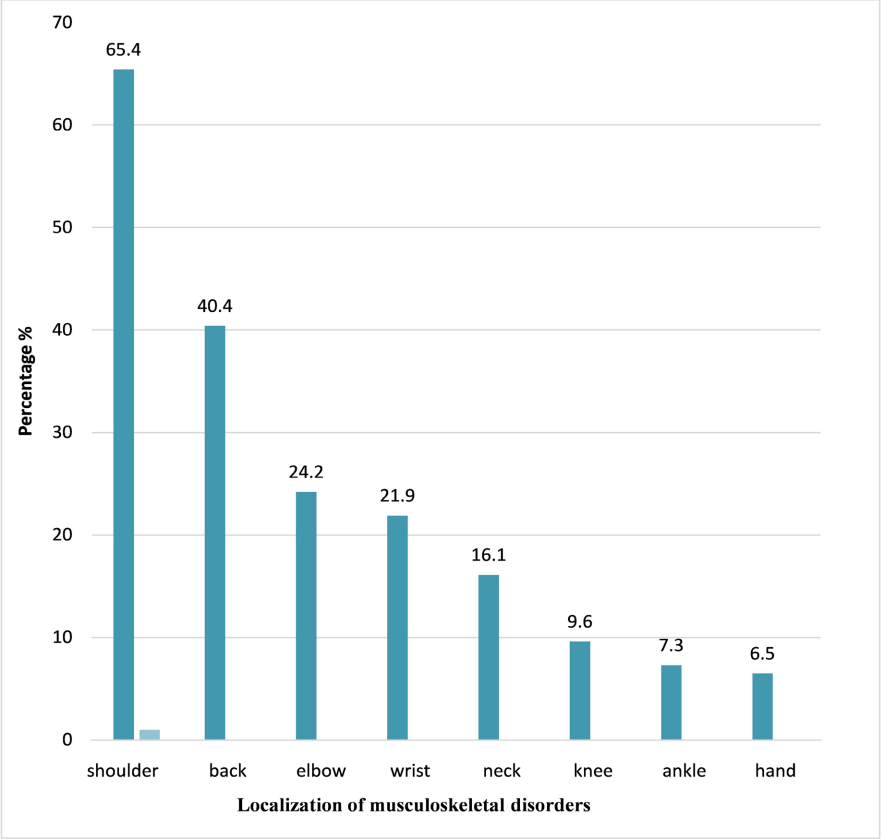

Figure 1. Distribution of musculoskeletal disorders according to location (n = 368).

Table 3. Manifestations of MSDs among the street vendors interviewed.

Musculoskeletal disorders	n	%
Shoulder difficulty	251	68.2
Elbow difficulty	84	22.8
Cramp (hands or arms)	25	6.8
Difficulty walking	3	0.8
Pain while sitting	3	0.8

Continued

Pain when standing	1	0.3
Pain on kneeling	1	0.3
Total	368	100.0

No street vendors complained of pain climbing stairs or running.

75.1%, *i.e.* a sex ratio of 3.0, unlike the Owusu series in Ghana where the female sex predominates: 65.3% [17]. This difference could be explained by the fact that women are increasingly financially independent in advanced countries, such as Ghana. In CAR, girls represent 80% of out-of-school children; women and girls are as numerous as not having financial autonomy [19]. Yet, according to the World Bank, they have the greatest potential to become the engine of a country's development [20]. The considerable proportion of out-of-school children has a definite influence on the educational level of street vendors.

In our study, the level of education most represented was the level of lower secondary education, *i.e.* 55.1%. Diatta in Cameroon noted that the majority of participants in his study had reached the secondary level 61.59% to 72.9% [7]. On the other hand, the prevalence of 55.1% obtained in our study is higher than those noted by Owusu in Accra in Ghana which was 43% [17] and by Zomalhéto [21] in Porto-Novo in Benin which noted that only 23.70% of motorcycle taxi drivers at secondary level compared to 61.48% at primary level. These results show that street vendors are people who generally have a low level of education even if the university level was 4.7% in our series against 0.4% in that of Owusu [17]. At this age, men are less under pressure from parents to go to school and are sometimes forced to enter working life because they may have family responsibilities. In CAR in 2004 the proportion of children not attending school (40%) and school failure (30%) was considerable [19]. In our series, about 2/3 of street vendors (64.8%) spend at least 7 to 12 hours on foot for their sale. This proportion was higher than that found by Owusu in Ghana in 2013, *i.e.* 56.3% [17]. This observation was made by Dembe *et al.*, in 2005 [22]. This observation was also made by Dieuboué *et al.* who noted that in their study more than half of the respondents had a daily activity lasting 8 - 12 hours (71.43%) [6]. This daily working time caused more than 2/3 (69.3%) of the street vendors in our study to travel more than 10 km per day. The distance covered was enormous because to maintain good health, it is necessary to walk about 8 km per day or 10,000 steps. This means that the distance of 10 km, corresponding to around 12,500 steps, is excessive, especially since itinerant vendors carry loads represented by the goods they sell while walking [23] [24]. Long working hours are known to cause stress and fatigue, weaken the immune system and increase the risk of disease [25] [26]. It should be noted that in the CAR the statutory daily working time is 8 hours per day including one hour break [27]. Long working hours also imply longer exposure of street vendors to harsh weather conditions as well as mosquito bites and other biological hazards, which may have repercussions on their

health [28] whose problems are dominated by musculoskeletal disorders.

Musculoskeletal problems were the most common health problems found among street vendors (95.8%). Our data are consistent with those of the Owusu study in Ghana in 2013 [17]. Dieuboue also noted a prevalence of 89.7% of MSDs among Cameroonian Dokers at the port of Douala [6]. The same is true for Diatta *et al.*, with a MSDs prevalence of 81.99% among taxi motorcycles and truck drivers in Douala [7]. These results show that musculoskeletal disorders are a real public health problem among workers in various sectors, as shown by reviews and meta-analyses [29] [30] [31] This finding could be linked to the demands of their job requiring them to carry objects or articles in their hands, on their shoulders, on their backs, on their heads in postures that an unaccustomed person cannot bear, and walk with them for a while long hours. The type of merchandise (often heavy), the duration of the sale per day and the time taken are the main factors that would predispose street vendors to the risk of MSDs. The MSDs in our study were more localized to the upper limbs, in particular shoulder 65.4%, elbow 24.2% and wrist 21.9% even if the back came in second position (40.4%). Diatta *et al.* in Cameroon, on the other hand, noted a prevalence of spinal MSDs of 66.89% among truck drivers and 64.52% among motorcycle taxi drivers. Moreover, 50.97% of motorcycle taxi drivers complained of MSDs in the wrist [7]. MSDs are due to the repetitive and prolonged use of a part of the body in an unergonomic way. In our series, it is mainly the upper limbs, shoulders, elbows, and back. Street vendors carry unexposed items in backpacks, straining the shoulders but also the back; the goods on display are worn on the upper limbs, particularly at the level of the elbow and the wrist, 2 joints which come in third and fourth positions after the shoulder and the back. The postures at the origin of MSDs must be the subject of ergonomic study in order to understand the mechanisms and to propose alternatives that respect ergonomics [32]. MSDs must be managed effectively to avoid the transition to chronicity, responsible for incapacity [32] [33]. However, street vendors have their own practices for relieving pain from MSDs.

These practices mainly involved the consumption of non-steroidal anti-inflammatory drugs (22.0%), antibiotics (14.6%) and herbal teas (13.0%). This is in a context of self-medication, a dangerous practice very widespread in Africa, to which even intellectuals lend themselves, up to 99% of students in Lubumbashi [34]. Certain drugs used in self-medication are not indicated for the disease; this is the case of antibiotics to treat doctors in our series, which could generate other health problems In our study, the street vendors only had recourse to a regular consultation when their condition did not improve despite self-medication, with sometimes stopping their professional activity for a period of 1 to 3 days in 50.5% of itinerant salespeople. These self-medication practices are due to the fact that street vendors are reluctant to go to regular medical consultations which, according to them, would cause them to lose a day of work. As Ouatara points out [35], self-medication practices are all the more dangerous

because in the CAR, unlicensed pharmacies known as "Minipharma" litter the streets, selling counterfeit drugs that have entered the country illegally. However, the results obtained in our study have a limitation.

The data documented here was collected through one-on-one interviews with each participant. The calculated sample size was 384 participants, which was achieved. On the other hand, we had no means of assessing the veracity of the comments made by the participants. However, the impact of this limit can be considered low given that the questions asked to the participants did not involve the disclosure of sensitive information by the latter, which could lead them to give answers far from reality to hide any embarrassment. Finally, this study, which used a self-administered questionnaire, did not make it possible to properly describe the MDSs. could not describe the MSDs with rheumatological or orthopedic accuracy. A study associating occupational physicians and orthopedists is required to characterize the MSDs found in street vendors.

5. Conclusion

Street vendors are informal sector workers who often travel long distances during extended working hours, carrying heavy goods. With a prevalence of 95.8% often treated by self-medication, MSDs were the dominant health problems among them, treated by self-medication with often non-indicated drugs. It is important on the basis of these results to organize itinerant vendors, raise their awareness and support them in order to optimize their performance while preserving their health, with the aim of entering into the principle of leaving no one behind health side. Further study of MSDs would be necessary to understand their mechanism and to propose alternatives that are more respectful of ergonomics [32].

Conflicts of Interest

The authors declare no conflicts of interest regarding the publication of this paper.

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Appendix

SURVEY SHEET

THESIS: Health status of street vendors in Bangui, Central African Republic

No. of survey form /……../

Date of completion of the questionnaire: /……. /……. / ……/

Meeting place: ……..……..

Sociodemographic characteristics

Q1- Gender: /…… / 1 = Male 2 = Female

Q2- Age: /……. / in years

Q3- Marital status: /……/

1- Married 2- Single 3- Divorced 4- Widowed

Q4- Place of residence: /……./

Neighborhood: ……

1- Urban 2- Peri-urban (Bimbo/Begoua) 3- Rural

Q5- Occupation: /……../

Q6- Level of education: /……../

1 = Never been to school 2 = Primary

3 = Secondary 4 = University

Q7- Level of income (monthly income): /……/

1- Very low (15,000 - 50,000 F)

2- Low (50,000 - 100,000 F)

3- Medium (100,000 - 150,000 F)

4- Satisfactory (150,000 - 200,000 F)

Q8- Nature of products sold: ……

Q9- The average daily turnover (recipe): ……

Q10- Daily profit: ……..

Q11- Daily expenses:……..

Q12- Work itinerary: ……

Q13- Estimated distance traveled (in km): ……

Q14- These health complaints:

1- Headaches: 1 = Yes /___/ No /___/

2- Polyartralgia: 1 = Yes /___/ No /___/

3- Foot pain: 1 = Yes /___/ No /___/

4- Pain in the lower back: 1 = Yes /___/ No /___/

5- Joint, neck and shoulder stiffness 1 = Yes /___/ No /___/

If yes, specify the joints concerned: ……

6- Sensation of temporary blockage of the joints: 1 = Yes /___/ No /___/ Which joints

7- Leg swelling: 1=Yes /___/ No /___/

8- Varicose veins: 1 = Yes /___/ No /___/

9- Generalized muscle fatigue: 1 = Yes /___/ No /___/

10- Other complaints to be specified: .....

Q15- This personal history: ….....….…

Q16- How does he deal with these complaints: Yes /___/ No /___ /

Traditional pharmacopoeia /___/ Modern medicine /___/

If Modern medicine, names of drugs:

Q17- The dose taken:

Q18- Is he a drug addict? (to be deducted from the previous question) If yes, specify

Alcohol consumption:

type: beer, liqueur, ngbako, kangoya, wine, or other

quantity:

Cleanliness:

How many times you shower per day

What time do you take your shower

clean dirty /___/