



Research Article

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Prevalence of respiratory events at non-ambulating street sellers in the city of Douala, Cameroon

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Abstract

Background: air quality is a public health issue and air pollution is a major cause of morbidity and excess mortality. According to the World Health Organization, the consequences of air pollution are increasing in developing countries. Respiratory manifestations are among these consequences. Our aim was to assess the prevalence of respiratory manifestations among non-itinerant street vendors in Douala, the economic capital and headquarters of industries in Cameroon. **Materials and Methods.** It was a descriptive cross-sectional survey of non-itinerant street vendors selected from certain main streets in the city of Douala. From April 1st to May 31st, 2019, we enrolled vendors who were at least 18 years old and willing to participate in the study. General characteristics (age, sex, educational level), professional (professional category, seniority, daily working time,) and clinical data (respiratory symptoms and others) were collected, as well as the wearing of personal protection (use of a mask). **Results:** we recruited 64 non-itinerant street vendors (57.8% women; sex ratio = 0.7). The average age was 29.8 ± 6.7 years, with extremes of 19 and 53 years. The 25 to 35 age group represented approximately 2/3 (68.8%) of the workforce. More than half of salespeople (51.6%) had a higher level of education. Work experience of 1 to 5 years was mentioned for 30 of them (46.9%). The daily working time was more than 8 hours per day for 59 (92%) sellers. As for the professional category, 44 (68.7%) worked for their own account (self-employed). The clinical presentation was dominated by upper airway symptoms: nasal obstruction (67.2%), rhinorrhea (65.6%), laryngeal irritation (56.3%) and nasal pruritus (42.2%). Symptoms of the lower respiratory tract were dominated by cough (18.8%) and dyspnea (18.8%). Other symptoms: fatigue (89,1%); headache (84,4%) and dizziness (46,9%) occurred at the end of the day. None of our sellers used a protective mask. **Conclusion:** the prevalence of respiratory symptoms was high in this sample of non-itinerant street vendors in Douala. A correlation between these manifestations and air pollution should be sought given the high risk of pollution in this industrial city.

Keywords: Street vendors, Prevalence, Respiratory symptoms.

INTRODUCTION

Air quality is a public health issue. Air pollution, or atmospheric pollution, is defined as contamination of the indoor or outdoor environment by a chemical, physical or biological agent that changes the natural characteristics of the atmosphere. Health data show that air pollution is still a cause of morbidity and excess mortality. In a context marked by the fight against greenhouse gas emissions, air quality problems should not be underestimated [1].

The main sources of air pollution include dilapidated modes of transport, household fuels, waste combustion, coal-fired power plants and industrial activities. However, human activity is not the only source of air pollution. For example, sandstorms, particularly in areas near a desert, can affect air quality [2]. According to Charpin, forest fires are also a major source of pollution. The pollutants most harmful to public health include particulate matter, carbon monoxide, ozone, nitrogen dioxide and sulfur dioxide [3]. The susceptibility of each individual to air pollution varies according to age, socio-economic status, duration of exposure, the surrounding environment and pre-existing health conditions [4].

About 3 million deaths a year are linked to exposure to outdoor air pollution. Almost 90% of air pollution-related deaths occur in low- and middle-income countries [2]. In most cities in low-income countries, the main source of airborne particles is attributed to vehicle emissions [8]. As a result, street vendors, who are often located along major roads, are a vulnerable group of the population exposed to the harmful effects of this pollution [9]. Very few studies on the subject have been carried out in Cameroon, the objective of our work was to assess the prevalence of respiratory manifestations among non-itinerant street vendors in Douala, the economic capital of Cameroon and the headquarters of industries in Cameroon.

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METHODOLOGY

From April 1st to May 31st (2 months) we conducted a descriptive cross-sectional survey among non-itinerant street vendors on certain main streets of the city of Douala.

Description of the study site

Douala is the economic capital of Cameroon. It has approximately 2.8 million inhabitants. Its density is 2,999 inhabitants / km² [10].

It is a port city located at the bottom of the Gulf of Guinea, at the mouth of the Wouri river which crosses it, its average altitude is 13 m.

The climate is of an equatorial type; it is characterized by an almost constant temperature around 26°C, and very abundant precipitation. The air is almost constantly saturated with humidity: 99% relative humidity in the rainy season (June - October) and 80% in the “relative” dry season (October - May). Figure 1 shows a road network in Douala.



Figure 1: Road network in Douala – Cameroon.

Study population

The study was conducted with Street Sellers who are at least 18 years old, that have been operating in the same location for at least the past 12 months, and have agreed to participate in the study.

We excluded all those who had active smoking and known respiratory (Allergies, asthma, chronic bronchitis or tuberculosis) or cardiovascular diseases.

Sampling

The minimum sample size was estimated, using the size estimation formula for a cross-sectional study.

Data collection or procedures

The data were collected after informed consent of the participants based on a direct interview using a questionnaire. This questionnaire included:

- General characteristics: age, sex, level of school education,
- Professional characteristics: professional category (employee or self-employed), length of time in this job in years, daily working time in hours.
- Clinical data: upper respiratory tract (URT) symptoms, lower respiratory tract (LRT) symptoms and other symptoms (asthenia, headache, and eye symptoms)
- Wearing personal protective equipment: use of a nasal mask.

The interviews were carried out by a PhD student. They were made at the roadside near their display.

Statistical analysis

Data entry, processing and analysis was done with SPSS version 20.0 software. The quantitative variables were represented by the mean \pm standard deviation and the extremes. Qualitative variables were expressed in terms of number and percentage.

Ethical considerations

The ethical clearance was given by the Institutional Ethics Committee of the University of Douala. Total confidentiality was respected.

RESULTS

General and professional characteristics of the study population

A total of 138 street vendors were invited to participate in the survey. However, 28 (20.3%) did not meet our inclusion criteria and 46 (33.3%) refused to participate in the survey, due to their busy work hours.

Our study population consisted of 64 street sellers. There were 37 (57.8%) women; the sex ratio was 0.72. The mean age was 29.77 ± 6.71 with the extremes of 19 and 53 and the median of 28. The 25 to 35 age group represented approximately 2/3 (68.8%) of the workforce. More than half of these sellers 51.6% (33 sellers) had reached a higher level of education. The number of years of experience was between 1 and 5 years for 30 of them (46.9%). The hourly working time was more than 8 hours for 59 (92%) sellers. As for the professional category, 44 (68.7%) worked for their own account (self-employed). The general and professional characteristics of our study population are shown in Table 1.

Table 1: Baseline characteristics of subjects enrolled in the study on prevalence of respiratory events at non-ambulating street sellers in the city of Douala, April - May 31 2019. N=64. Continuous variables are presented as an average \pm standard deviation and categorical variables in terms of numbers (proportion in%)

| Characteristic | Modality | Values |
|--------------------|---------------------|------------------|
| Gender | Male | 27 (42.2) |
| | Female | 37 (57.8) |
| | Sex-ratio | 0.72 |
| Age (years) | Mean age | 29.77 ± 6.71 |
| | Extreme ages | 19 - 53 |
| Age groups | [18 – 25] | 09 (14.1) |
| |]25 – 35] | 44 (68.7) |
| | > 35 | 11 (17.2) |
| Education level. | Primary study | 04 (6.2) |
| | Secondary education | 27 (42.2) |
| | Higher education | 33 (51.6) |
| Working hour/24H | < 8 hrs/ day | 05 (07.8) |
| | > 8 hrs /day | 59 (92.2) |
| Years of exercise. | [1 – 5] | 45 (70.3) |
| |]5 – 10] | 07 (11.0) |
| | >10 | 12 (18.7) |

Clinical characteristics of the study population

Symptoms of the upper airway were nasal obstruction 42/64 (67.2%), rhinorrhoea 42/64 (65.6%), laryngeal irritation 36/64 (56.3%), nasal pruritus 27/64 (42.2%). Symptoms of the lower respiratory tract were dominated by chest tightness 21/64 (32.8%), shortness of breath 12/64 (18.8%), cough 12/64 (18.8%), sputum 10/64 (15.6%). The other symptoms were Tiredness 57/64 (89.1%), headache 45/64 (84.4%). The clinical characteristics are shown in Table 2.

Table 2: Clinical characteristics of subjects enrolled in the study on prevalence of respiratory events at non-ambulating street sellers in the city of Douala, April - May 2019. N=64. Categorical variables are presented in terms of numbers (proportion in%).

| Characteristics | Modality | Values |
|--------------------------------|----------------------|-----------|
| Upper respiratory tract | Nasal obstruction | 43 (67.2) |
| | Rhinorrhoea | 42 (65.6) |
| | Laryngeal irritation | 36 (56.3) |
| | Nasal pruritus | 27 (42.2) |
| Lower respiratory tract | Chest tightness | 21 (32.8) |
| | Cough | 12 (18.8) |
| | Shortness of breath | 12 (18.8) |
| | Sputum | 10 (15.6) |
| | Wheezing | 03 (04.7) |
| Other symptoms | Tiredness | 57 (89.1) |
| | Headache | 45 (84.4) |
| | Dizziness | 30 (46.9) |
| | Eye irritation | 19 (29.7) |

Regarding the use of masks, none of our participants used protective masks.

DISCUSSION

A third of guest sellers (33.3%) declined to participate in the study. Our inclusion criteria allowed us to enroll 64 participants. Among them, 37 (57.8) were women, the sex ratio was 0.72. This female predominance has been described in the literature [11]. Our population was young, the average age was 29.77 ± 6.71 and 68.7% was between 25 and 35 years of age.

More than half of our participants (51.6%) were graduates of higher education. We recorded 68.7% self-employed. Almost all our participants, 92% worked more than 8 hours a day. In his series, Noomnual reported an enrollment rate of 40% for primary and secondary and 57% of participants who worked more than 8 hours of time per day [11].

Air pollution poses a proven health risk in many cities around the world [12]. The respiratory system is a preferred route of exposure for airborne contaminants, which can have short-term or long-term harmful effects [9].

Many studies have shown the link between pollution and the occurrence of respiratory symptoms and other health disorders [4-7, 9]. Vichit-Vadakan and al., found associations between polluting particles and the daily occurrence of upper and lower respiratory symptoms in 3 different populations. Respiratory manifestations were more frequent in the population exposed more durably to the street [6], this observation is also made by Amaran in Malaysia [13].

Also, our survey finds that, the prevalence of symptoms of upper respiratory tract is higher than those of lower respiratory tract.

Nasal obstruction (67.2%), rhinorrhea (65.6%), laryngeal irritation (56.3%), nasal pruritus (42.2%) and symptoms of lower respiratory tract are dominated by chest tightness (32.8%), dyspnea, cough (18.8%) and sputum (15.6%).

Besides the attainment of upper respiratory tract, the existence of other symptoms such as eye irritation (29.7%) which could be justified not only by the importance of road traffic but also by the poor state of the roads responsible for the resumption in suspension of roadside dust, the preparation of food along the streets using fuels (wood fire, coal, gas), and the open burning of solid waste.

The lower prevalence rates of symptoms of lower respiratory tract: cough (18.8%), dyspnea 18.8%, sputum 15.6%, are close to those usually described in the literature when the smoking population was excluded [9]. Contrary to the rate of 45.2% for cough and 54.8% for dyspnea reported by Jones in Hong Kong in 2008 which included smokers in its study population [7].

The prevalence of other symptoms found in our serie; headache (84.4%) and tiredness (89.1%) is much higher than that of Kongtip's studies which reports proportions of (4.49%) for headache, (3.46%) for tiredness and of Noomnual, which reports proportion of headache (20%) and tiredness (37%) [9, 11]. These high rates could be explained on the one hand by the noise generated by the cars circulating along these highways but also by the high proportion of graduates of higher education 51.6% therefore subject to many questions as to their future in the short, medium and long term, because operating illegally because there is no law regulating street trade; unlike India, where a law governing this activity was promulgated in 2014 [4] although it does not address the problem of health care.

As for the wearing of protective respiratory masks, none of our participants used them. The Noomnual series reveals that 3% usually used respiratory masks and 53% had never used them [11]. A subsequent study of the impact of pollution on the respiratory health of professionals working on the street would allow us to assess the contribution of this preventive method in our context. Especially since Noomnual has shown that only the use of suitable masks (N-95 nasal mask) would reduce the incidence of respiratory and general symptoms [11].

CONCLUSION

The participants were mainly women, between the ages of 25 and 35. More than half had a higher level of education. the ¼ was independent and almost all worked more than 8 hours a day. Symptoms of the upper respiratory tract were more common.

The results of this study also reveal a lack of use of protective masks. A correlation between these manifestations and air pollution should be sought given the high risk of pollution in this industrial city.

Conflict of interest

The authors declare no conflict of interest.

Author contributions

Design of the study: Mbatchou Ngahane, Bitchong Ekono,

Analysis: Ekono Bitchong, Massongo, Elimbi Mbella.

Writing of the manuscript: Ekono Bitchong, Massongo, Ze, Azoumbou, Kone.

Revision of the manuscript: Mbatchou Ngahane.

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