

Work Condition and Health at a Body Paint Workshop in Conakry

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Abstract

Context: Working conditions in the car repair sector are difficult in general. This leads to health risk factors for inexperienced staff. In the bodywork painting workshop, the staff seemed less interested in the risks probably due to negligence or by lack of knowledge. This work aimed to describe the working conditions and their impact on the workers' health in a workshop of bodywork painting in Conakry. **Material and Methods:** This was a cross-sectional study over 06 months (from July 01, 2021, to December 31, 2021). Were included the bodybuilders-painters, the painters and the bodybuilders. The data was collected during an interview. We analysed the personal data of the workers, the physical environment factors (lighting, noise, etc.) and, the clinical manifestations felt by the workers. **Results:** The average age was 37 years extending from 18 to 54 years and, they were all men. Over 80% of workers were exposed to more than 1000 lux and, 78.2% of workers were exposed to the vibratory intensity level of the cordless drill $> 2.5 \text{ m/s}^2$. The most frequent symptoms were back pain, headache, itchy eyes, and numbness of fingers and hands. The analysis of working conditions and clinical manifestations showed a significant relationship between the level of illumination and the tingling eyes ($p = 0.0007$), the vibratory intensity of the drill and the numbness of fingers and hands ($p = 0.01$). This study revealed that some of the complaints cited are related to the working conditions. **Conclusion:** Working conditions in a bodywork paint workshop are occupational risk factors that become dangerous if they are unknown. A longitudinal study on the assessment of working conditions could better enlighten us on this phenomenon.

Keywords

Working Conditions, Bodywork-Painting, Conakry, Health

1. Introduction

According to the International Organization of Work (OIT), working conditions include the time of work, the salary, physical condition and the physiologic demands at the workplace [1]. The World Health Organization (WHO) defines health as a complete physical, mental and, social well-being condition. It is not only the absence of illness [2]. The National Institute of Research Health and Security reports that the work in the bodywork paint sector exposes the staff to numerous chemical and physical risks for their health [3].

In France, in 2009, Barnig C *et al.* reported that out of 2178 cases of occupational asthma recorded by the National Observatory of Occupational Asthma (ONAP); 8.1% of affected subjects were body painters [4]. In Ethiopia, in 2020, Tamene A *et al.* reported that lumbar musculoskeletal disorders (MSDs) accounted for 62.8% of the most common complaints among body painters [5]. In Ivory Coast, in 2011, Kouassi YM *et al.* reported that of 37 workers performing paintwork in a car garage, 86.5% of the workers suffered from rhinitis followed by Cough (73%) and headaches (62.2%) [6].

Most body paint workshop in the car repair sector operate in the informal sector and do not meet the labour standards. Also the personnel working there, do not have the required training on protective measures, which exposes them to occupational hazards and, workers do not benefit from regulatory medical surveillance.

We aimed to study working conditions and their impact on workers' health in a body-painting workshop in Conakry.

2. Materials and Methods

The Simanbossia workshop was used as a framework for this study. The main activities are cosmetic repairs. This was a cross-sectional study over 03 months (from 01 July to 31 December 2021). All the coachbuilders and/or painters of the workshop present were included.

After a full consent of the workers to participate on the study and the workshop manager, data were collected during an interview. We included the workers present at the workshop during our period of study.

We collected and analyse the socio-occupational datas, parameters of ergonomic working conditions and, the impact of exposures on workers' health. We paid a particular evaluation on the lighting intensity (1000 lux), the vibratory intensity (2.5 m/s^2) and the sound level (80 dB) according to the mean recommended. The instruments used to measure these parameters were the vibrometer (for vibration intensity), the luxmeter (for light intensity) and the sound level meter (for sound intensity).

Variables was Using Epi info version 7.2.2.6., quantitative data were described by mean and standard deviation. Qualitative variables were described by frequencies. We use the Fisher' exact test to identify any health risk factor due to the working conditions. The statistic significant was noticed the P-value less than 5%.

3. Results

Sixty one workers meet our criterias. They were all men (100%) with a mean age of 37 ± 11 years and, the bodybuilders-painters were the most represented (31.1%). **Table 1** describe the workers characteristics.

Table 1. Caracteristiques of the workers n our study.

Socioprofessional characteristics	Effectif (n = 61)	Frequency (%)
Age (years)		
18 - 27	16	26.2
28 - 37	10	16.4
38 - 47	22	36.1
≥48	13	21.3
Mean: 37.0	Ecart-type: ±11	[18 - 54]
Job		
Bodybuilders	19	31.1
Painters	20	32.8
Bodybuilders-painters	22	36.1

Over 80% of workers was exposed to more than 1000 lux and, 78.2% of workers was exposed to the vibratory intensity level of the cordless drill higher than 2.5 m/s^2 . The most common postures were standing arms in front extension and standing arms curved (93.4%). The average sound level was $90.5 \pm 9.2 \text{ dB(A)}$. All the chemicals type (thin, filler, paint) available in the work environment were used by all workers. These parameters are described in **Table 2**.

Table 2. Assessment of worker exposure.

	Effectif (n = 61)	Frequency (%)
Lighting level (lux)		
>1000	49	80.3
<1000	12	19.7
Mean: 3421.3	Ecart-type: ±2422.9	[940 - 9450]
Vibrations intensity (m/s^2)		
Cordless drill	(n = 55)	
≤2.5	12	21.8
>2.5	43	78.2
Mean: 5.0	Ecart-type: ±1.0	[1 - 5.5]

Continued

Sound characteristics (dB)		
Paint Booth		
≤80	20	32.8
>80	18	29.5
Out of paint booth		
≤80	-	-
>80	23	37.7
Mean: 90.5	Ecart-type: ±9.2	[75.4 - 99.6]

The most frequent symptoms reported by the workers were back pain, headache, itchy eyes, numbness of fingers and hands. These manifestations are described in **Table 3**.

Table 3. Clinical manifestations according to the work condition.

Clinical manifestations according to the work condition	Effectif (n = 61)		Frequency (%)	
	Yes	No	Yes	No
Lighting				
Itchy eyes	49	12	80.3	19.7
Eyes erythema	32	29	52.5	47.5
Sound				
Tinnitus	3	58	4.9	95.1
Hearing difficulty	8	53	13.1	86.9
Vibrations				
Back pain	8	53	13.1	86.9
Numbness of fingers and hands	37	24	60.6	39.4
Posture and dynamic work				
Knee swelling	5	56	8.2	91.8
Back pain	59	2	96.7	3.3
Chemical products				
Headache	59	2	96.7	3.3
Abdominal pain	0	61	0	100

The bivariate analysis of working conditions and clinical manifestations showed a significant relationship between the level of lighting and the eyes

problems ($p = 0.0007$). We also found a significant relationship between the vibratory intensity of the drill and the numbness of fingers and hands ($p = 0.01$). These results are described in **Table 4**.

Table 4. The bivariate analysis findings.

Variables		OR	IC	P-value
Lighting level (lux)	>1000	34.2	3.4 - 338.4	0.0007
	≤1000			
Vibrations intensity (m/s^2)	>2.5	9.9	2.2 - 43.7	0.01
	≤2.5			

4. Discussion

In this study, we aimed to analyze the working conditions and their impact on workers' health in a body-painting workshop in Conakry.

All the workers were men as found in the literature [7]. Women seemed to be less interested in the industry maybe due to the working condition which could explain this result.

The average age of workers was 37 years. They were younger than those found by Bates MN *et al.* [8] in the USA in 2019. Reginald G *et al.* [9] in India in 2014 reported an average age of 30.8 years. The car repair sector requires certain physical conditions and aptitude. These criteria can explain the young age in this industry.

The bodybuilders-painters were the most represented with a proportion of 36.1%. This result could be explained by the fact that most workers are doing practice for a dual qualification to gain recognition in the labour market.

The average lighting exposure was more than the double found in the literature; 3421.3 lux and 2422.9 lux versus 1018 lux [10]. Among workers exposed to the drill, those exposed to an acceleration greater than $2.5 m/s^2$ were most represented. This result could be justified by the fact that the vibratory intensity level of the drills increases with the engine power and the strength of the body to be drilled.

In the paint booth, workers exposed to a noise level of 80 dB(A) or less are most represented with a proportion of 32.8%; outside the paint booth, workers exposed to a sound level of more than 80 dB(A) are the only ones represented with a proportion of 37.70%. Vallet S *et al.* [11] in France reported noise intensity levels ranging from 80 to 95 dB(A) for bodybuilders and painters in 2010. Regarding the sound level, these results could be explained by the fact that the paint booth is located far from noisy mechanical tools. However, outside the paint booth area, workers are in the vicinity of noisy tools such as the compressor.

All workers were found exposed to all chemical products. Velazquez L. *et al.* [12] in Mexico in 2013 and Petit A. *et al.* [13] in 2014 reported that 71% of

coachbuilders were exposed to isocyanate paint daily, and 7% of coach painters were exposed to isocyanate paint daily 1% of coachbuilders exposed to neurotoxic chemicals. This result could be explained by the fact that chemicals are part of the essential work equipment of coachbuilders and also the lack of personal protective equipment.

The most frequent symptoms were back pain, headache, itchy eyes, numbness of fingers and hands. Kouassi YM *et al.* [6] in Ivory Cost in 2011 reported 62.2% of headaches. These results could be explained by the regular exposure to noise and the adoption of restrictive postures during the working day.

We establish a significant association between working conditions and clinical manifestations. Workers exposed to a level of illumination above 1000 lux had 34.2 times more risk of experiencing eye tingling than those exposed to a level of illumination below 1000 lux (OR = 34.2; $p = 0.0007$). Workers exposed to a drill vibration intensity level greater than 2.5 m/s^2 had a 9.9 times higher risk of developing finger and hand numbness than workers exposed to a vibration intensity level less than or equal to 2.5 m/s^2 (OR = 9.9; $p = 0.01$).

These results can be applied to other body painting shops because the working conditions are identical. At the end of this work we had an ergonomic visit. The results of this work and the ergonomics report were presented to employers with a particular emphasis on risk factors and preventive measures.

However, other longitudinal studies on the impact of these working conditions on the health of a body shop-worker should be performed for better analysis.

5. Conclusion

The working conditions in a body-painting shop are multiple and practically the same for the staff regardless of the workstation occupied. They are occupational risk factors that can become hazards for workers if they ignore them. In their carelessness, workers perform risky tasks that may have an impact on their health. The study shows that some clinical manifestations are related to exposure to occupational nuisances in the body-painting workshop.

Conflicts of Interest

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

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