Occupational Diseases and Environmental Medicine, 2025, 13(1), 1-16
https://www.scirp.org/journal/odem
ISSN Online: 2333-357X
ISSN Print: 2333-3561

Prevalence, Medico-Legal Aspects and Cost of Occupational Accidents Occurring in a Cardboard Packaging Manufacturing Company in Abidjan from 2012 to 2019

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How to cite this paper: Tchicaya, A.F., Manga, J.O., Aka, I.N.A., Kra, A.A. and Wognin, S.B. (2025) Prevalence, Medico-Legal Aspects and Cost of Occupational Accidents Occurring in a Cardboard Packaging Manufacturing Company in Abidjan from 2012 to 2019. *Occupational Diseases and Environmental Medicine*, **13**, 1-16.
https://doi.org/10.4236/odem.2025.131001

Received: September 24, 2024
Accepted: December 9, 2024
Published: December 12, 2024

Abstract

Introduction: Work-related accidents constitute are a public health concern worldwide. The aim of our study was to assess a series of work-related accidents that occurred in a cardboard packaging manufacturing company in Abidjan from 2012 to 2019 and to determine the consequences for the victims and the company. We've carried out a retrospective study of all work-related injuries reported to the National Social Insurance Fund of Cote d'Ivoire from 2012 to 2019 using the company's work-related accidents' register and investigation reports. Results: The prevalence of work-related injuries among the workers was 84% for the manual workers and 16% for the supervisors. The trends in the prevalence of work-related injuries were upwards, with a slow and almost linear progression over the period of study. Most of the accidents (53%) occurred in the process area. The upper limbs were the most common location of injuries (46%) and almost all the cases were declared cured. The cumulative direct costs of the TAs over the 8 years were 46,185,533 FCFA, or 70409.39 euros. The average direct annual cost was 624,129 CFA francs, or 951.47 euros. The average annual indirect cost was 41,265,576 CFA francs. The cumulative amount of indirect costs was 330,124,611 CFA francs over the 8 years. The indirect costs accumulated over the 8 years represented 98.17% of the cumulative economic cost of work accidents. Discussion: The assessment of the socioeconomic impact of these work-related injuries revealed that indirect costs which are usually ignored nor underestimated by the employers represent a minimum direct/indirect ratio of 1/27. Conclusion: Prevention is the

best option to anticipate or mitigate the impact of work-related accidents among the victims.

Keywords

Work-Related Injuries, Prevalence, Impact, Côte d'Ivoire

1. Introduction

Workers are regularly exposed to occupational risks such as accidents on daily basis. The occurrence of these risks is favoured by the environmental and human factors which are present at workplace [1]. According to the International Labour Organization (ILO), the morbidity and mortality of occupational accidents are high worldwide, with more than 300 million cases recorded annually, of which 2.34 million are fatal [2]. In Africa, about one fatal accident in five (18%), occurs due to increasing industrialization and insufficient compliance with preventive measures [3].

In Côte d'Ivoire, work-related injuries occur every 2 hours [4]. According to the National Social Security Fund (NSSF), the average annual number of occupational accidents recorded from 2015 to 2017 was estimated at 6000 cases. The average direct cost of compensation for the aforementioned period was nearly 8 billion CFA.F (€12195918.68), with thousands of working days lost [5]. The indirect costs, which represent four to five times the direct costs, *i.e.* nearly 40 billion CFA.F (€6479593.4) were borne by companies [5].

Several studies have been devoted to work-related injuries in Côte d'Ivoire, but only few have assessed their economic impact, which is an indicator of the severity of this risk and a source of motivation for employers to invest more in the prevention of work-related injuries in order to reduce their prevalence and severity. Hence the aim of this study was to determine the epidemiological, clinical, medicolegal and cost characteristics of work-related injuries that occurred in a cardboard packaging manufacturing company in Abidjan from 2012 to 2019.

2. Material and Methods

2.1. Material

2.1.1. Type, Location and Duration of Study

This was a cross-sectional analytical study of work-related injuries that occurred in the aforementioned company from 1st January 2012 to 31 December 2019. Data were collected and processed between 03 September and 04 November 2020. The study was conducted within the company's health and environment departments.

2.1.2. Study Population

The study population consisted of all the workers with documented files of the work-related injuries that they suffered during the period of study. We included

all the cases that were declared to the NSSF during the period covered by the study, with exception to contract workers, trainees and victims with incomplete files.

2.1.3. Sampling Method

We carried out an exhaustive census of all the cases of work-related injuries recorded in the company's register and which were declared to the NSSF during the period of study.

2.2. Method

2.2.1. Data Collection

The questionnaire was designed by the authors. It was evaluated during the pre-survey in order to correct it, to clarify certain questions in order to obtain more precise answers, and to make it easier for victims of accidents at work to understand.

It was performed using data from the company's register of work-related injuries. The useful information were collected on a digitized survey form using Google Forms questionnaire software. The data was entered using an Excel spreadsheet.

The technological indicators for accidents at work were extracted from the various annual reports submitted to the NSSF and were calculated using the following methods

$$\mathrm{Tf} = \frac{\text{Number of OA with disruption}}{\text{Number of hours worked}} \times 1000000$$

$$\mathrm{Tg} = \frac{\text{Number of lost days}}{\text{Number of hours worked}} \times 100$$

$$\mathrm{If} = \frac{\text{Number of OA with disruption}}{\text{Number of employees}} \times 1000$$

To calculate these rates, we consider only accidents resulting in at least one lost day at work. The times at which the accidents occurred were grouped into 3 periods: Morning: 6.30 AM - 2.30 PM; Afternoon: 2.30 PM - 10.30 PM; Night-time: 10.30 P.M - 6.30 PM.

The economic cost of accidents based on sales (CA) was made up of direct costs (Dc) and indirect costs (Ic) [6].

The direct costs (Dc) here were made up of 2 parameters:

The expenses incurred by the employer for the direct payment of occupational injuries prior to declaration to the NSSF of Cote d'Ivoire, which had been collected from the annual financial summaries drawn up by the company's medical department;

The mandatory contributions paid by the company to the NSSF of Cote d'Ivoire in respect to the prevention and compensation of occupational accidents and diseases, which had been collected from the company's Human Resources Department.

CD = cost of expenses incurred by the company + cost of occupational health and safety contributions [6].

Indirect costs (Ic) or opportunity costs (Oc) represented the estimated financial loss to the company for each non-working day per year for the number of accidents.

They were calculated on the basis of the company's annual turnover and the annual daily contribution of each employee to this turnover. These financial data were obtained from the company's Finance Department.

The assumptions used for the evaluation were:

- sales spread linearly over all the days of the year;
- all months are counted as 30 days;
- all employees have an equal impact on turnover.

The following method was used to determine turnover:

$$= \frac{\text{Annual turnover}/360}{\text{Number of workers}}$$

Average daily turnover per worker

The method used to determine Ic was:

$$\text{Ic} = \text{average daily turnover per worker} \times \text{number of days lost} \quad [6]$$

This method of determination was an estimate of the value of the indirect costs of work accidents because it did not include certain parameters such as the wage cost of the injured person, the cost of the worker who replaces him during his absence (overtime) or the cost of external labour in the case of temporary recruitment [6].

We also reviewed the company's photographic data. The photographs presented the workshops on the production line, to reflect the reality of the descriptions.

2.2.2. Variables Studied

The variables studied related to the specific objectives of the study. They included socio-demographic data (age, sex), occupational data (occupational category, seniority), the characteristics of work-related injuries, the technological indicators of work-related accidents, medico-legal data of work-related accidents and the financial costs of work-related accidents.

2.2.3. Data Processing

Annual data of the key variables were compiled, then described and compared. Reliability between the key variables and other characteristics was assessed using Pearson's Chi-2 test and mean comparison tests. Error threshold value was & = 5%, significance fixed at 5% and confidence interval at 95%.

2.2.4. Ethical Considerations

We obtained the oral agreement of the company's Human Resources Department before the start of the research. We declare no conflicts of interest.

3. Results

3.1. Socio-Professional Characteristics of the Victims

- **Staffing, age and gender**

The workforce ranged between 315 and 350 employees over the period of study, with minimums of 231 and 274 workers noticed in 2013 and 2014 respectively.

The majority of participants were employees of the surveyed company. The average age was 39 ± 8.08 years [23 - 57 years], with the modal group constituted by those aged 30 - 40 (54%). Males predominated in the sample (94.6%).

- **Professional data**

In our series, the majority of victims (53%) had a maximum of 5 years' working experience, with an average of 8.5 ± 8.61 [1 month - 34 years]. We noted a predominance of manual workers.

These workers were assigned to different workstations, as shown in Table 1. Workers in the processing workshop accounted for 54% of accident victims, and those in the maintenance workshop for 29%. All These accidents resulted in lost time.

Table 1. Distribution of victims of AT with stoppage by workstation.

Workstation	Workforce	Percentage (%)
Maintenance	20	29
Shipping	3	4
Processing	36	54
Administrative services	4	6
Corrugator	3	4
Ink/glue preparation	2	3
Total	68	100

Workers in the transformation workshop represented 53% of AT victims and those in the maintenance workshop 29%.

3.2. Characteristics of Accidents at Work

- Prevalence

The cumulative prevalence over the study period was 74 accidents at work, with an annual distribution illustrated in Figure 1. We've noted two phases in the development of these accidents: a phase of growth from 2012 to 2015, marked by a peak of 17 cases, followed by a phase of decline from 2015 to 2019.

- Timing and indicators of work-related injuries

The organization of work was based on shift work. The majority of these work-related injuries (60.66%) occurred between 06:30 A.M. and 2:30 P.M, 9.9% between 10:30 P.M, and 06:30 A.M. Their frequency and severity indicators, shown in Figure 2 and Figure 3 respectively, revealed a peak of 36.3 work-related injuries per million hours worked in 2014, and a severity rate of 1.03.

- Consequences of accidents at work
  - Induced lesions

Lesions were located on the limbs, trunk, neck and head, or simultaneously at multiple locations. Their distribution is shown in Table 2. Nearly half of lesions (46%) were located in the upper limbs.

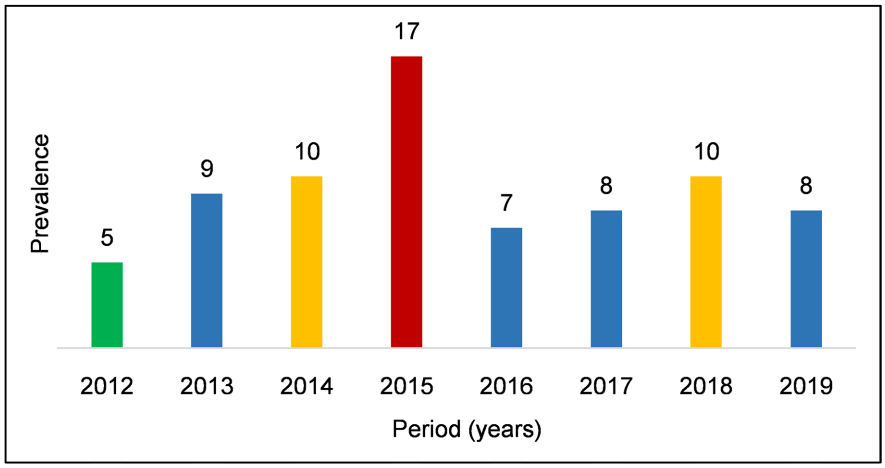

Figure 1. Distribution of ATs recorded between 2012 and 2019. From 2012 to 2015, we observed a growth in AT cases with a peak recorded in 2015.

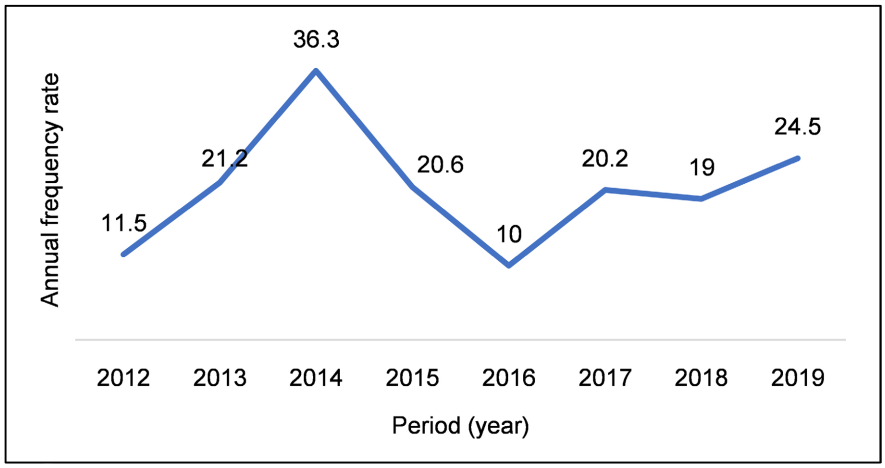

Figure 2. Evolutionary curve of frequency rates. There was respectively a frequency rate of 36.3 work accidents per million hours worked in 2014 and 10 work accidents per million hours worked in 2016.

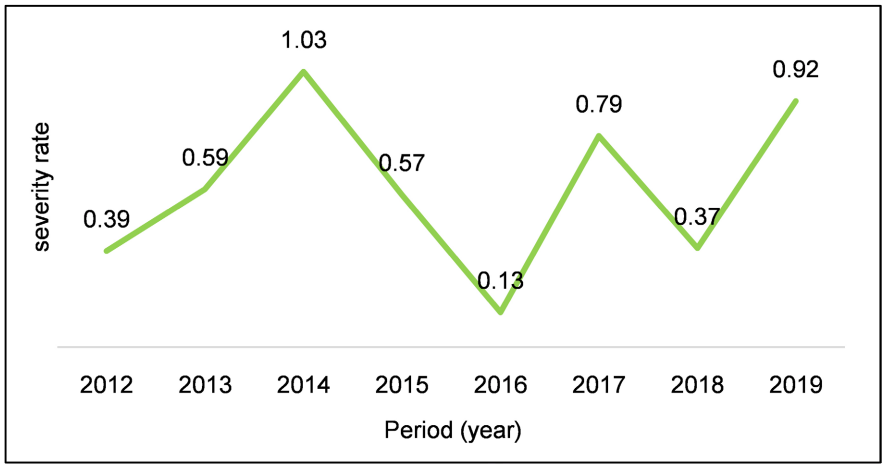

Figure 3. Evolutionary curve of severity rates. During the period of the study, the evolution of the severity rate reached the extremes of 1.03 and 0.13 respectively in 2016 and 2019.

Table 2. Distribution of work accidents according to lesion sites.

Location of lesions		2012	2013	2014	2015	2016	2017	2018	2019	Total
Head and neck	Face – Eyes	0	0	0	1	1	1	1	0	4
	Face – Others	0	0	1	1	0	0	1	0	3
	Skull	0	3	1	0	0	0	1	1	6
	Neck	0	0	0	1	0	0	0	0	1
Trunk	Back	1	1	2	1	0	0	1	0	6
	Spine	0	0	1	1	0	1	0	0	3
Upper limbs	Shoulders	0	0	1	2	0	0	0	0	3
	Arms	0	0	0	2	0	0	0	1	3
	Wrists	0	1	1	1	1	0	0	2	6
	Hands	4	3	1	4	1	3	4	2	22
Lower limbs	Hip	0	1	0	0	0	0	0	1	2
	Knees	0	0	0	0	1	0	0	0	1
	Legs	0	1	0	1	1	0	0	0	3
	Ankles	0	1	0	0	1	0	2	0	4
	Feet	0	0	2	0	1	1	0	0	4
Multiple locations		0	0	0	0	0	1	0	2	3
Total		5	11	10	15	7	7	10	9	74

In 46% of cases, the lesions were located in the upper limbs.

- Lost-time, medico-legal aspects

In our series, 1048 lost working days were attributable to work-related injuries. Their annual distribution is illustrated shown in **Figure 4**. Almost all the injuries (99%) got addressed to the social security system. All injuries progressed to recovery, with exception of a single case of consolidation.

- Economic aspects

The financial costs of these injuries have been assessed. They were broken down into direct costs (Dc) and indirect costs (Ic).

- Direct cost of work-related injuries (Dc)

The cumulative direct costs of the occupational accidents over the 8 years amounted to 46,185,533 CFA.F (€70409.39). The average annual direct cost was 624,129 CFA.F (€951.47) (**Table 3**).

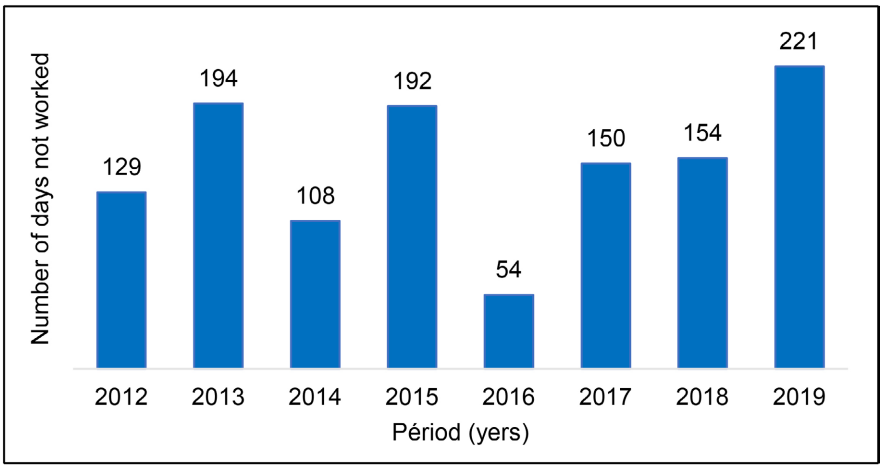

Figure 4. Annual distribution of non-working days. In 2019, ATs resulted in 221 non-worked days.

Table 3. Annual variation in direct costs of workplace accidents from 2012 to 2019.

Years	Dc (FCFA)	Number of cases of work-related accidents covered	Average cost per accident (FCFA)
2012	5,456,326	5	1,091,265
2013	4,781,422	9	531,269
2014	5,471,428	10	547,143
2015	6,509,966	17	382,939
2016	5,587,364	7	798,195
2017	5,797,220	8	724,653
2018	5,183,968	10	518,397
2019	7,397,839	8	924,730
Total	46,185,533 (70409.39 euros)	74	624,129 (951.47 euros)

The cumulative direct costs of work accidents over the 8 years were 46,185,533 FCFA. or 70409.39 euros.

- Indirect cost of work-related injuries (Ic).

Indirect costs amounted more than 15 million CFA.F in 2016, rising up to 68 million CFA.F in 2019 (€103665.35).

Average annual indirect costs were estimated at 41,265,576 CFA.F (€62908.98). The cumulative amount of indirect costs was CFA.F 330,124,611 (€503271.83) over the 8 years period (Table 4).

- Comparison of the direct and indirect costs of work-related injuries (Table 5)

The proportion of indirect economic costs of work-related injuries rose from 73.90% in 2016 to 90.70% in 2018

Table 4. Evaluation of indirect costs of work accidents from 2012 to 2019.

Years	Number of lost-time accidents	Days not worked	Workforce	Ic corresponding to the stop period	
				FCFA	Euro
2012	5	129	205	24,757,147	37742.02
2013	7	194	172	44,949,286	68524.74
2014	5	108	176	27,444,562	41838.96
2015	7	192	174	53,609,643	81727.37
2016	4	54	184	15,820,638	24118.40
2017	4	150	197	44,160,929	67322.90
2018	8	154	192	50,547,836	77059.83
2019	5	221	225	68,834,570	104937.62
Total	45	1202	1525	330,124,611	503271.72

Indirect costs were estimated at around 68 million FCFA in 2019. The annual average of indirect costs was 41,265,576 FCFA, the cumulative amount of 124,611 FCFA over the 8 years.

Table 5. Comparison of the direct and indirect costs of accidents at work.

Years	Direct costs (Dc)	%	Indirect costs (Ic)	%	Dc/Ic	Economical cost (Dc + Ic)	
						FCFA	Euro
2012	5,456,326	18.06	24,757,147	81.94	1/5	30,213,473	46060.14
2013	4,781,422	9.61	44,949,286	90.39	1/9	49,730,708	75813.97
2014	5,471,428	16.62	27,444,562	83.38	1/5	32,915,990	50180.10
2015	6,509,966	10.83	53,609,643	89.17	1/8	60,119,609	91651.75
2016	5,587,364	26.10	15,820,638	73.90	1/3	21,408,002	32636.28
2017	5,797,220	11.60	44,160,929	88.40	1/8	49,958,149	76160.70
2018	5,183,968	9.30	50,547,836	90.70	1/10	55,731,804	84962.58
2019	7,397,839	9.70	68,834,570	90.30	1/9	76,232,409	116215.55
Total	46,185,533		330,124,611			376,310,144	573681.11

In 2018, indirect costs represented 90.70% of the economic cost of AT and in 2016, 73.90%.

- Comparison of cumulative costs from 2012 to 2019 (**Figure 5**)

The Indirect economic costs cumulated over the 8 years period represented 98.17% of the total economic cost of the work-related injuries.

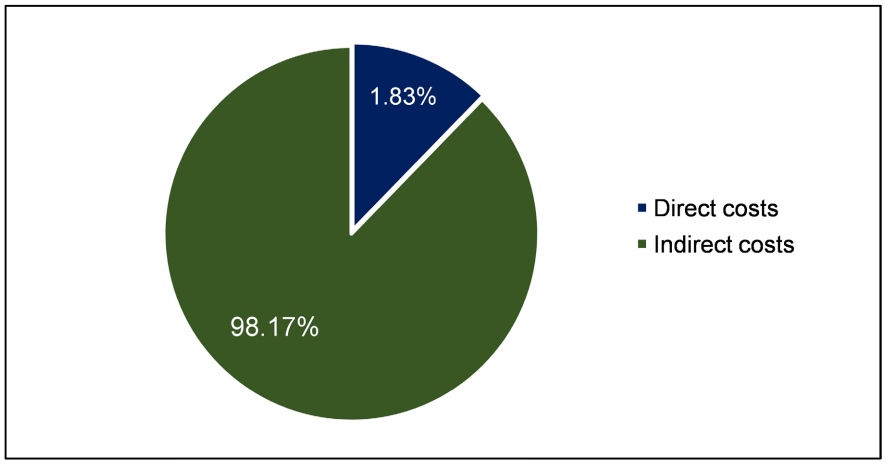

Figure 5. Comparison of direct and indirect cumulative costs of workplace accidents. The indirect costs accumulated over the 8 years represented 98.17% of the cumulative economic cost of work accidents.

4. Discussion

Limitations of the study

Shortcomings in the determination of indirect costs (opportunity costs) were noted because not all the calculation parameters had been evaluated by the competent departments of the company, in particular the costs of replacing the injured worker and reorganising the work during his absence. This led us to estimate part of these costs.

We were confronted with the great variability of the times at which accidents occurred, and to reduce this bias, we grouped the times of occurrence into 3 classes (morning, afternoon, night), which did not allow us to effectively assess their link with the occurrence of accidents.

Our study revealed an average age of 39 ± 8.08 years for the victims; 54% belonged to the 30 - 40 years old age group, with little age dispersion around the mean. Similar results have been reported by other international authors. In Côte d'Ivoire, Aba *et al.* [7] and Aké *et al.* [8] respectively described mean ages of 39.75 years +/− 1.2 [7] and 36.7 years +/− 8.6 [8] for the victims of their studies. Similar mean ages were also found amongst populations of workers in Senegal and Nigeria [8] [9]. The high proportion of relatively young victims of work-related injuries could be explained by the fact that they constitute the most active fringe of the population and the most exposed to work-related injuries [10] [11]. Other occupational factors could also be considered as potential risk factors for occupational injuries. More than half the victims (53%) had a longevity at work of 5 years or less. Studies carried out in Abidjan revealed similar results to ours, with proportions of occupational injury victims ranging from 40% to 65% in workers with less than 5 years' service [7] [8] [12].

The lack of professional experience could be considered as a risk factor of occupational injuries; moreover, some studies have described that the occurrence of work-related injuries is inversely proportional to the acquisition of professional

experience [13]. These work-related injuries were distributed in the workforce according to their categories so that 84% of the victims were manual workers or employees.

The evidence of a significant link between socio-occupational category and the occurrence of work-related injuries over the last 8 years was given by the Pearson's chi-square test. The high proportion of relatively young workers among the victims is probably associated with the nature of their work in a specific environment where they are exposed to mechanical risk factors when using machines and moving equipment's in the workshops, the way the work is organized, the conditions of work and the type of PPE that they used. The risk associated with the use of machines in companies is a problem that is well documented in several studies, particularly in Côte d'Ivoire, where the mechanical risk ranks 3rd among the causes of occupational accidents at the national level (25%), and in Senegal, where, the machinists were the most affected victims (18%) [9] [14]. From the results obtained, we suggest an ergonomic study to be conducted in the processing areas and the maintenance workshops, in other to identify the root causes of these work-related injuries and propose appropriate preventive measures. The injuries attributable to human-machine contact were mainly located in the upper limbs (46%) and lower limbs (19%) respectively.

Wangata *et al.* described similar injuries locations in their series [15]. This predominant location of lesions in the upper limbs could be justified by the main use of these parts of the body in the performance of tasks on machines and equipment's'. This finding was also mentioned in research published by the CNPS in Côte d'Ivoire, which revealed the hands as the main site of occupational injuries, accounting for 38% of cases [16]. Research published in Senegal corroborates these results, with the as the main locations of work-related injuries in 30.1% of cases [9]. An analysis of the technological indicators of the work-related injuries that occurred during the study period showed that changes in frequency rates are more or less proportional to changes in severity rates.

Over the 8 years period in general, the change in workforce numbers fell to 231 and 274 workers in 2013 and 2014 respectively, then rose to reach 319 workers in 2016. The fall observed in the workforce in 2014 could explain the peak in work-related accidents recorded that year. Conversely, the increase in the workforce in 2016 could explain the fall in accident frequency in 2016. This spike in work-related injuries, which coincided with a reduction in the workforce while production targets were maintained, led to a high workload and a failure to observe safety measures. On the other hand, a larger workforce could help to reduce the workload and minimize the occurrence of work-related injuries. This situation was also described in a study which revealed that the differences in the incidence of work-related injuries observed were statistically linked to the reduction in the workforce [12]. Depending on the severity of their injuries, victims of work-related injuries were given temporary medical leave from work to restore their health condition. A total of 1202 days off were recorded, with an annual average of 150.25 days lost

over the 8 years period. These figures are similar to those found in a study in which the average length of TIW was 236.7 days [9]. In 22% of cases, these accidents did not require days off work. On clinical evolution, these accidents were declared cured in 99% of cases, confirming the benign nature of almost all the work-related injuries recorded over the period of study.

This favourable trend could be linked to the efficiency of the management protocol, which was reflected by simple and pertinent procedures using simple, clear and concise notification sheet to alert and manage all emergency cases on site with the support of first aid responders, till their referral to appropriate references hospitals. The consequences of these accidents were human, professional, and socioeconomic. The direct costs incurred by the company for the medical care of the victims varied from one year to the next one. The cumulative amount of these direct costs slightly exceeded 46,000,000 CFA.F (€72.000). Concerning the indirect costs of the medical care, we noted a peak of 68,000,000 CFA.F (€104.000) in 2019. The combined indirect costs represented 88% of the overall economic cost of the medical care.

Years ago in 1931, Heinrich revealed his study entitled "Industrial Accident Prevention", that indirect costs of the medical care of work-related injuries were higher than the direct costs, with a ratio of 1 to 4 respectively [17].

In 1993, the edition of Health and Safety Executive agreed similar findings, with ratios ranging from 1/8 to 1/36 [18]. On the basis of other studies findings and statistical analyses, the direct costs financed by the employers represent a tiny fraction of the overall medical care. These studies led to the conclusion that direct costs, although the lowest, were the tip of the iceberg [19]. The socioeconomical consequences of work-related injuries are generally unknown in developing countries due to the lack of scientific evidences [20]. In fact, the only available economic data are provided by the private companies, and limited to the direct costs of work-related injuries. On the other hand, the hidden costs or indirect costs also known as opportunity costs, are often ignored or even underestimated by the employer [19].

Even though work-related injuries generate important financial losses, it's very difficult to assess their exact costs and the real on the business activities.

The results of this evaluation of the costs of accidents at work, although incomplete but sufficiently indicative of the extent of the seriousness of this risk in the workplace, should be consolidated by other studies concerning other sectors of industrial activity. The ratio of direct costs to indirect costs should motivate employers and institutions for the prevention and promotion of health and safety at work, in line with the two fundamental conventions on health and safety at work, to develop ambitious policies for the prevention of risks in the workplace in our countries.

5. Conclusions

This study revealed that the blue-collar/white-collar category predominated

among the victims of work-related injuries. The prevalence of work-related injuries increased slowly, almost linearly, peaking and then falling in 2016. The machines and moving equipment in the transformation workshop were the main causes of these injuries. Most of the injuries were located on the upper limbs, and most of them healed. However, they induced many lost working days. Indirect costs represented almost 88% of the overall medical care of these work-related injuries.

Controlling costs and financial consequences of the work-related injuries will determine the commitment of the employers to safety culture as of the prevention of work-related injuries.

Despite the limits of the study, due to the unavailability of data concerning the turnovers and replacement costs for injured workers, the results could help the management of the company to improve their health and safety management system, and contribute to a better quality of life at work and performance.

Conflicts of Interest

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

References

[1] Caisse Nationale de Prévoyance Sociale (1999) Code de prévoyance sociale de Côte d'Ivoire, Art 66. https://www.cnps.ci/wp-content/uploads/2020/08/Loin%C2%B0-99-477-du-02-ao%C3%BBt-1999-portant-modification-du-Code-dePr%C3%A9voyance-Sociale-Amendment-to-the-Social-Security-Code.pdf

[2] Rommel, A., Varnaccia, G., Lahmann, N., Kottner, J. and Kroll, L.E. (2016) Occupational Injuries in Germany: Population-Wide National Survey Data Emphasize the Importance of Work-Related Factors. *PLOS ONE*, **11**, e0148798. https://doi.org/10.1371/journal.pone.0148798

[3] Ben Khelil, M., Harzallah, H., Elmoulehy-Majed, H., Belghith, M. and Hamdoun, M. (2019) Workplace Traumatic Accidental Death in Northen Tunisia. https://pubmed.ncbi.nlm.nih.gov/31872404/

[4] Dida, N., Darega, J., Lemesa, F., Kassim, J. and Woldemichael, B. (2019) Occupational Injury and Its Correlated Factors among Small-Scale Industry Workers in Towns of Bale Zone, Southeast Ethiopia. *Journal of Environmental and Public Health*, **2019**, 1-8. https://doi.org/10.1155/2019/4987974

[5] Kouadio, K.N. (2005) Etude des facteurs explicatifs de la survenue des accidents du travail dans les entreprises du secteur privé en Côte d'Ivoire. Memoire Online. https://www.memoireonline.com/a/fr/cart/add/174

[6] Dia, S.A., Azhar, S.M., Sy Gaye, F., Ndoye, O., Gaye Fall, M.C., Soumah, M.N. and Ndiaye, M. (2018) Characteristics of Work-Related Injuries and the Fate of the Victims: About 133 Cases Reported to the Social Security Fund in Dakar, Senegal. https://www.ncbi.nlm.nih.gov/pmc/articles/PMC6235479/

[7] Aba, A.L.N. (2014) Caractéristiques épidémiologiques des accidents de travail survenus à l'atelier de filature d'une usine d'emballage à Abidjan en 2013 (Mémoire). Abidjan:Université Félix Houphouët-Boigny.

[8] Aké, A.H.H. (2019) Caractéristiques épidémiologiques des accidents du travail

reconnus par la CNPS de 2010 à 2015. Thèse de Médecine, Université Félix Houphouët-Boigny.

[9] Zadow, A.J., Dollard, M.F., Mclinton, S.S., Lawrence, P. and Tuckey, M.R. (2017) Psychosocial Safety Climate, Emotional Exhaustion, and Work Injuries in Healthcare Workplaces. *Stress and Health*, **33**, 558-569. https://doi.org/10.1002/smi.2740

[10] Goergio, M.T. (2018) Atousanté/La Santé au Travail/Definition of an Accident at Work, a Commuting Accident. https://www.atousante.com/accidentstravail/definition-accident-travail-trajet/

[11] ISO (2018) ISO 45001: 2018(en) Occupational Health and Safety Management Systems—Requirements and Guidance for Use. https://www.iso.org/obp/ui/fr/#iso:std:iso:45001:ed-1:v1:fr

[12] Braudo, S. (2020) Dictionnaire du Droit Privé Définition de Accident du travail. https://www.dictionnairejuridique.com/definition/accident-du-travail.php

[13] World Health Organization (1948) WHO Constitution. https://www.who.int/about/who-we-are

[14] WHO (1986) Ottawa Charter on Health Promotion. https://www.who.int/teams/health-promotion/enhanced-wellbeing/first-global-conference

[15] OHSAS (2009) Health and Safety Management. https://www.editions-tissot.fr/actualite/sante-securite/management-de-la-sante-et-de-la-securite-nouvelle-normeohsas-18001

[16] Sangaré, S. (2019) Comprendre les Accidents de Travail. https://souleymanesangare.com/comprendre-les-accidents-du-travail

[17] Collège des Enseignants Hopsitalo-Universitaires, de Médecine et Santé au Tr avail. (2011) Objectif 109 : Accidents du travail et maladies professionnelles—Définitions. université médicale virtuelle francophone support de cours. http://campus.cerimes.fr/medecine-dutravail/enseignement/medtravail_109/site/html/cours.pdf.

[18] TISSOT (2013) Editions. https://www.editions-tissot.fr/droit-travail/dictionnaire-droit-travail-st.aspx

[19] ILO (1996) Compendia of ILO Practical Guidelines, Safety and Health at Work, Occupational Accidents, Occupational Diseases. https://www.ilo.org/

[20] Caisse Nationale de l'Assurance Maladie des Travailleurs Salariés (2004) Statistiques nationales d'accidents du travail, des accidents de trajet et des maladies professionnelles: Annexes.

Survey Form

I. Socio-Demographic and Professional Information

Identification number.....

1) Age in years: <20 = 1; [20 - 30] =2;]30 - 40] = 3;]40: 50] = 4; >50 = 5

2) Sex: Male [1] Female [2]

3) Lifestyle: Narcotics [1] Excitants [2]

Alcohol [1] Tobacco [2] Alcohol and tobacco [3]

4) Marital status: 1 = Single [ ]: 2 = Married [ ]

5) Level of education: 1-No schooling [ ]; 2-Primary [ ]; 3-Secondary [ ]; 4-University [ ].

3-Secondary [ ]; 4-Higher education [ ].

6) Professional category: 1-Employee/worker [ ]; 2-Trainee [ ]; 3-Supervisor [ ].

3-Supervisory [ ]; 4-Executive [ ].

7) Workshop: .....

8) Workstation.....

9) Number of people at the workstation

10) Type of job: Temporary []; Permanent []; Contract []; Sub-contractor []

11) Length of time in post (in years): Less than 1 year []; 1 - 5 years []; 5 - 10 years []; 10 - 15 years []; more than 1 Year

12) Number of days worked per week:

13) Number of hours worked per day:

14) Do you have a lunch break? Yes/No []

II. Accident Details

1) Type of accident:

2) Circumstances of occurrence: .....

3) Date of occurrence: Day/month/year...../.....

4) Time of occurrence: 6:30am-2:30pm; 2:30pm-10:30pm; 10:30pm-6:30am

5) Material agent...

III. Characteristics of Lesions

6) Type of injury: Wound [] Contusion; Crushing; Amputation []; Fracture []; Luxation []; Abrasion Sprain; Other: Specify...

7) Site of injury: Head; Upper limbs; Lower limbs; Cervical spine; Dorsal spine; Lumbar spine; Eye: Hands []; Thorax []; Abdomen []; Neck.

VI. Medical and Medical-Legal Consequences

8) Was the victim hospitalised? Yes [] No

If yes, specify duration 1 - 2 days []; 3 - 7 days []; more than 7 days

9) If TIW Specify number of days: 1 - 7 days; 8 - 15 days []; more than 15 days []

10) Severity of accident: Without time off work []; With time off work; Fatal []

11) Professional future: Adaptation of post []; Change of post Reclassification; No change or adaptation of post; Redundancy []
12) Evolution of the injury: Recovery; Sequelae; Death; No information

V. Financial Consequences

13) Did the accident result in the company having to cover costs?
14) Were the costs reimbursed by the CNPS Yes; No
15) Has the amount of the TA costs been calculated Yes; No
16) Has the opportunity cost been calculated Yes; No
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