

Evaluating the Necessity of a Poison Control Center in Cameroon: The Knowledge and Perception of Health Care Professionals in the Laquintinie Hospital and the Bonassama District Hospital in Douala

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Abstract

Introduction: A cross sectional study was carry out on the necessity of creating a poison control center in Cameroon, by evaluating the knowledge and perception of health care professionals in the Laquintinie hospital and the Bonassama District hospital in Douala, based on a 2 years (2014 to 2015) record files reviewed of poison victims.

Materials: A4 white sheets, Respiratory mask, Disposable gloves, A data analyzing tool (Microsoft Excel 2010), ruler and pens, Questionnaire.

Method: A Questionnaire was used in data collection to access the knowledge of health care professionals on poisoning and poison control center in regard to proper poison management (group I). To further evaluate group I, a 2 years poison victims files (records) were reviewed at the level of the emergency and paediatric units. The data obtained were analyzed using Microsoft Excel 2010 and the results were displaced on frequency tables, and in percentages and figures.

Results: The perception and knowledge of the 66 Health care professionals accessed in the study; revealed that none of the participants had a formal training on poison management and none of the hospitals involved, had established poison management guidelines. 23,182 patients' files were reviewed; of which 245 files were recorded as poison victims: 62% (152) as voluntary, 38% (93) as involuntary, 4% (10) death case recorded inclusive; with a prevalence of 1% been observed for poisoning from the sorted hospitals.

Conclusion: The relative low knowledge of health care professionals on poisoning and the absence of poison management guidelines in hospitals still make poison management in Cameroon a complex issue. Cameroon is therefore highly in need for policies on poison management.

Keywords: Poison; Health care professionals; Voluntary poisoning; Involuntary poisoning; Poison control center

Abbreviations AAPPC: American Association of Poison Control Centers; BDH: Bonassama District Hospital; EU: Emergency Unit; HCP: Health Care Professional(s); IRCHH-UD: Institutional Research Committee for Human Health of the University of Douala; LHD: Laquintinie Hospital of Douala; NLM: National Library of Medicine; PCC: Poison Control Center; PSS: Poison Severity Score; PU: Paediatric Unit; NPDS: National Poison Data System; WISER: Wireless Information System for Emergency Responders; WHO: World Health Organization

Introduction

Recognizing the problem of poisoning and the need for specialized facilities to deal with it is still a public health burden to many countries around the globe. Also the accessibility of knowledgeable health care professionals on the issue of poisoning and poison management is

another great controversy on poison management faced by facilities such as a poison control center (PCC) wherever they do exist [1,2].

The challenges face by health care professionals in the early 50's, in regard to chemical exposure after the 2nd world war gave birth to the creation of centers for poison and chemical exposure management, with a wide variety of fields including: pediatrics, intensive care, forensic medicine, occupational health, pharmacy, and pharmacology. The institution of such center first started in North America and Europe [3,4], since then numerous such centers had been created, principally in industrialized countries. The existing poison control centers still have some character of the early poison management units and there is thus considerable heterogeneity in their structure and organization. It was up to the early 80's that the necessities and importance of a poison control center were evaluated in a global study undertaken during the period 1984-1986 which indicated that, while most developed countries had well established facilities for poison control and poison management, this was rarely the case in developing countries[5-12].

According to WHO; a poison control center is a specialized unit that advises on, and assist with, the prevention, diagnosis and

management of poisoning [4]. This medical facility provide immediate, free, and expert treatment advice and assistance over telephone in case of exposure to a poisonous or hazardous substances [5,7]. On the other hand, they also offer health care professionals with guidelines on proper poison management while providing immediate treatment management procedures if necessary. The massive expansion in the availability and use of chemicals, including pharmaceuticals, during the past few decades has led to increasing awareness on the part of the medical profession as a result of an increase risks to human health and aquatic life posed by exposure to these chemicals [3]. In an individual sense, each country has a variety of natural toxins to which its population might be exposed to, this is a call for authorities to develop literature banks on such chemicals/substances and their immediate health impact to its local population by surveillance of local hospital records on patients that visit the hospital or health facility for medical reasons, or even accident cases recorded for proper confirmation of their population exposure to these toxicant or toxins common in their country or community [4].

A poison control center (PCC)-where it exists-may be the only source of information on toxic chemicals available 24 h a day [3]. PCC in developing countries may therefore have to provide a much broader toxicological information service than their counterparts in some developed countries [13-20]. A poison control centers may operate effectively with various types of organizational structure, the majority of such center depends on a hospital administration and to some extent are connected with a university and or the country's public health service at national or regional level. Close association with units that treat poison victims and analytical laboratories are essential to most poison control centers functioning, although the way in which this is organized depends on local legislations put in place [21-25].

For the case of Cameroon, this study will be the first of its kind to evaluate the necessity of a poison control center and portray a light on the toxico-demographic statue of poisoning in Douala-Cameroon since no study has ever been done in Cameroon to access and evaluate the necessity of such a center or poison related management [26-33].

Knowledge and perception of health care professional on poison management

The knowledge on poisoning can be refer to a theoretical or practical understanding of what poisoning is all about, whereas the perception on poisoning and toxicological sciences still remain a complex issue to many in the developing world. The issue on poisoning generally is always related to a tendency to 'die' or to 'kill' to those with limited knowledge on poisoning. Meanwhile for many health care professionals in Africa and especially Cameroon, the science of poisoning is still something that many are not verse with, despite the old nature of the science of toxicology, which is as old as human history. There exist no studies which assess or evaluate the knowledge and perception of health care professionals (HCP) on the necessity to create a PCC in Cameroon. Nevertheless, a related study was conducted in Kenya to assess the process of triage of poison patient that arrived the Accident and emergency department of the Kenyatta national hospital based on HCP knowledge, they incorporates in their study the gathering of information regarding the patient's current physiological status along with a history of the present and any previous episodes of poison exposure. According to their work, Healthcare workers have an individual and collective responsibility to reflect on their own performance based on their knowledge or skills as well as to evaluate any deficits in the strengths and weaknesses in

regard to poisoning and poison management. From their findings, they revealed that HCP should be aware of their attitudes and professionalism in carrying out their therapeutic role during poison patient management [34-40].

Assessing the general knowledge of HCP of the Kenyatta hospital, on poisoning, the mean general knowledge score for the participant was classified according to their professional qualifications and trainings especially on courses related to emergency care, it was revealed that all the HCP with higher professional qualifications had higher mean score compared with the ones with lower professional qualifications (Certificate) when it come to the knowledge of poison management. Furthermore, those who had done courses or trainings related to emergency care like BLS (basic life support skills), ACLS (advance cardiovascular life support), ATLS (advance trauma life support), had a higher mean score than those who had not done the same. Similarly, HCP with 5-9 years of experience had a higher mean scores than those with less or more than 10 years of experience. The result of the study was consistent that after implementation of a teaching package on poisoning, the general knowledge of HCP improved on the management of poison [21]. Showing that improvement of HCP knowledge on poison management is therefore necessary.

PCC are an essential tool in enhancing the sciences of toxicology especially when it comes to the management of poison. And are key tool that could be used by any nation for accessing knowledgeable information on poisoning and also to reducing its public health financial burden that may result from poor poison management guidelines [8].

Method

Sampling

Study site: The region to conduct the study and the hospital to participate in the study were obtained by a simple randomize sampling using the balloting method; the entire 10 region in Cameroon, were listed on small pieces of papers and a neutral person was sorted randomly to cast the ballot. When the region of study was known, a list of the entire category 1 and category 02 government hospitals in the chosen region was established and by means of a convenient sampling and considering their location in the town; the Laquintinie hospital of Douala and the Bonassama district hospital respectively were chosen for the study. From these two government hospitals, the unit of concern for the research was the emergency department and the paediatric (paediatric emergency unit) department, since these unit serves as a major port of entry when it comes to emergency for adults and children respectively.

Study design: A descriptive cross-sectional design was use in this study to evaluate the knowledge of HCP on poisoning and poison control centers in regard to poison management in the Laquintinie hospital and Bonassama District Hospital of Douala. This was through questionnaire administration and based on a two years record reviewed of poison victims that visited the sorted hospital in 2014 and 2015.

Study population: The study population included all HCP who were working in the emergency unit (EU) and the paediatric unit (PU) of the chosen hospitals during the 06 month data collection period. All the HCP who were engaged in patient reception and admission such as; medical specialists, medical doctors, senior nurses, and other type

of nurses were administered questionnaire so as to evaluate their knowledge and perception on poison management. A 2 years record review was used to evaluate their knowledge. As a result, the study had a sub-divided study population as such:

Group I (health care professionals): This included all HCP working at the EU and the PU of the LHD and the BDH of Douala; such as specialist, general medical doctor, nurses such as state register nurses, nursing assistances, senior state register nurse and all other staff who provide clinical health services.

Group II (Poison victims): This included all recorded poison victims that visited the emergency unit and the pediatric unit for the past two years 2014-2015 prior to the start of the study in the LHD and the BDH of Douala. The poison victims consider for the study were age from 01 month to 20 years of age and above, it was based on these information obtained from this group that group I (HCP) was evaluated.

Selection criteria

Inclusion criteria: All admitted cases of poisoning i.e. involuntary or involuntary cases in the hospital in 2014 and 2015. All patient or victims rushed to the hospital as a result of occupational hazard exposure, like explosion, suffocation and irritation etc during the study period. All HCP who were practising in the PU and EU of the Laquintinie hospital and the Bonassama during the study period.

Exclusion criteria: All HCP working in the EU and the PU who were unable to give their consent. All children and adult admitted in 2014 to 2015 for reasons other than poisoning. Poison patients admitted in the hospital in a comatose state or unconscious without any proof of poison exposure. New posted HCP posted to the hospital a month prior to the start of the study and during the study period. HCP on transit (e.g. researcher on seminars or workshop) in the hospital.

Sample size:

The sample size for this cross sectional study was well define as it considers all the HCP in the EU and the PU of the LHD and the BDH who gave in their consent to participate in the study. When their consent was given, questionnaires were provided in English or French to the HCP at the level of the paediatric and the emergence unit to be filled.

On the other hand, to evaluate the knowledge and perception of the HCP, a 2 years poison cases files were reviewed from 2014-2015, in the emergency unit; that is all poison cases ≥ 20 years and above. And the paediatric unit; that is all poison cases from 1month old to 19 years of age in the LHD and the BDH in Douala.

Study area setting

The study was carried out in Cameroon and was conducted in; one region (Douala), one category 02 hospital (3rd reference hospital) the LHD and one category 04 District Hospital (1st reference hospital) the BDH.

Background on study area

The LHD is a category 2/3rd references public health institution, which provides curatives, preventive, promotional and rehabilitative health care services. It was created in 1920 at Bonamoundourou Deido under the name Douala Indigenous hospital; it was later displaced to

Bonadibong and later to Bonamekengue in Akwa. In 1941 the hospital was named the Laquintinie Hospital of Douala in lovely memory of Dr Jean Augusta Laquintinie, a gendarme surgeon of the French military force who died on the 5th of March 1941. Currently at It actual site, it has a surface area of 09 Hectare and consist of 52 building and over 700 working staff of various category from professor, specialized physician, nurses and health technicians etc, who work hand to hand to render satisfactory health care services to an average inflow of about 6000 patient monthly.

The emergency unit

The emergency unit of LHD has an inflow rate of averagely 700 to 800 adult patient ≥ 20 years monthly. The unit has an effectiveness of 18 health care professionals (HCP) and a 10 bed capacity. This dynamic HCP are called daily to work hand in hand to provide better health care services to these demanding adult populations of which the two groups involved in this study; voluntary poison and involuntary poisoning cases are part of the population.

The paediatric unit

The paediatric unit of the hospital has an average patient inflow rate of 100 to 150 patients monthly from 1 month to 19 years. The unit has a capacity of 13 beds and a dynamic human resource of 12 health care professionals, who are called on a day to day base to handle health care challenges especially complex cases like those involving poisoning in children.

The bonassama district hospital

The BDH is a category 4th/1st reference public hospital, it assist other health care facilities in Douala in offering health courage to the 293, 561 inhabitant. The hospital has a surface area of 1 $\frac{1}{2}$ hectare with 09 outstanding building. The name Bonassama district hospital came into existence on the 27 August 1995 from it old appellation as the 'PMI'.

The emergency unit

The EU of the Bonassama district hospital is of average standard with a patient inflow rate of 20-30 adult patient ≥ 20 years monthly. The productivity of the unit is ensure by an effective dynamic staff of 14 health care professionals, who have a bed capacity of 9 beds at their disposal; to admit, observe and treat their various patients including the two form of poisoning cases involve in this study that is voluntary and involuntary poison victims.

The pediatric unit

The PU of the hospital has an average patient inflow of 80 to100 patient monthly from 01 months to 19 years. The unit has a capacity of 21 beds and a dynamic human resource of 22 health care professionals. The human resource of the BDH is called upon daily to provide satisfactory health care services to all it patient with special attention to the cases of poisoning which is a very controversial issue view the age group.

Study procedure

The investigator began by seeking an ethical approval from the Institutional Research Committee for Human Health (IRCHH-UD) of the University of Douala, then followed by seeking an administrative

authorization from the director of the Laquintinie hospital, the regional delegate of public health and the director of the Bonassama district hospital.

Data collection procedure

The tool used for data collection was a questionnaire which was administered to HCP and files reviewed of poison cases recorded in the two hospitals at the level of the paediatric and emergency unit.

Technique for data collection

After obtaining an approval from the head of institution, the hospital administration assigned a technical supervisor to assist the investigator in data collection. The technical supervisor assisted the investigator in identifying the HCP working in the PU and the EU in the hospital.

Group I

A written questionnaire was designed in English and then translated into French, so as to evaluate the perception of HCP on the necessity of a poison control center (PCC), while assessing their knowledge on poisoning and poison control center in regard to poison management. Subject to participate in the study included all the staffs working in the EU and the PU of the hospitals during the study period. With the help of the technical supervisor and the unit head, the investigator was presented to all the staffs of each shift and a brief summary on what the investigator would be doing in the unit was presented by the investigator to all the staff of the unit; shift by shift. After being put in contact with all the HCP, a common question was usually asked ‘which language will you like to use to participate in the study?’, based on the language chosen, an information notice form about the study was given to the participant or for those too busy, the information notice were read to them and at the end their consent was sought, for those who gave their consent a questionnaire was given to be filled.

Group II (poison victims)

On the other hand, to enable the investigator evaluate the knowledge and perception of the HCP on issue relating to poisoning and poison management. The archive zone was identified with the assistance of the unit head and with the aid of a mask to protect from dust particles inhalation, a protection glasses was also worn to prevent the eyes from any form of irritation, disposal gloves were worn to protect the nature of the archive from sweat and other possible archive fragility prone chemicals or substances, other materials used were; disposable laboratory jacket and a touch light (if area were too dark). The investigator then proceeded with a page by page examination of all the register provided, by doing a month to month review of all the cases of poisoning recorded in 2014 and 2015, while taking into account their sex, age, origin and the substance of exposure used by the various victims. The primary parameter used in separating data were the nature of poisoning, age groups and the action taken by the unit upon admission of the poison victim.

Data management

The investigator was the main data collector at the site of the study from a well-documented register that were filled by the HCP of the EU and PU of the two sorted hospitals. The registers were filled in accordance with the procedures put in place by the ministry of public

health. It should be noted that the questionnaire that was used, went through a pilot phase within the various units by some few volunteers so as to reassess the validity of the question before it was used in the study.

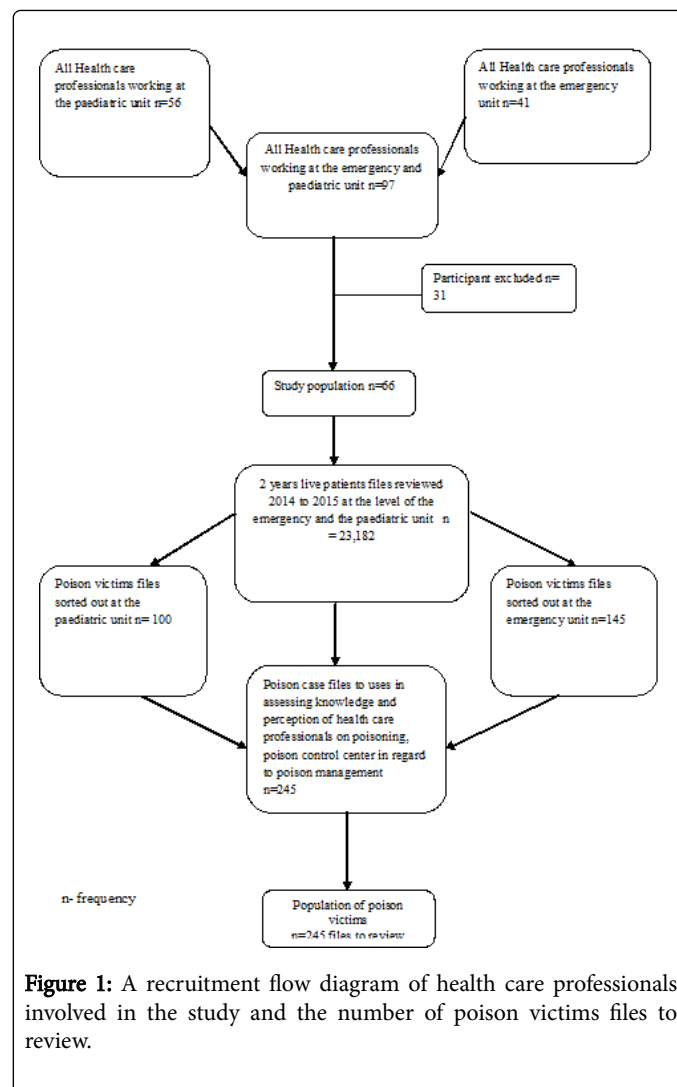


Figure 1: A recruitment flow diagram of health care professionals involved in the study and the number of poison victims files to review.

The questionnaire was divided into three sections: section A: which was on the socio-demographic characteristic which included profession, sex, level of education, working experience of the HCP; section B: which was assessing the knowledge of HCP on poisoning with the key predictors in this section been; “What is poisoning”, “types of poisoning” and “formal training on poison management” and lastly the third section, section C: which was evaluating the knowledge of HCP on poison control center in regard to poison management. The key predictors in this section included: “idea about a poison control centre (PCC)”, “knowledge on poison management”, “opinion on creating a PCC”, “expectation of a PCC” and “knowledge on antidotes in poison management”.

At the end of each day, the data collected were entered into a Microsoft excel 2010 sheet designed by the investigator for onward analysis and interpretations.

Results

The knowledge and perception of health care professionals on poisoning and poison control center in regard to poison management.

Questionnaires were used to evaluate the knowledge and perception of 66 HCP on poison and PCC in regard to poison management. These were based on some key indicator questions in each section so as to reveal the level of understanding of the participants on the poison management through a PCC and its importance in managing poison victims.

Analyzing all the questionnaires from the 66 HCP, more evaluations were needed to elucidate on the impact and knowledge and perception of the HCP on issues relating to poisoning in the two sorted hospitals. To demonstrate this, the investigator proceeded by conducting a 2 years (2014 to 2015) record review of all the patients that visited the hospitals. This was to further evaluate the results from the questionnaires filled by the 66 participants.

Description of the demographic and structural characteristics of poison victims based on recorded cases

At the end of the data collection phase, our findings were displaced in such a way as to follow our objectives. 245 cases of poisoning were sorted out from the 23182 patients that visited the LHD and BDH; adults and children inclusive. From the 245 poison cases sorted; 10 cases were poison victims that visited the units alive and died during the patient management process.

In 2014, 20085 patients visited the LHD emergency and paediatric unit; the EU received a total of 8367 (42%) patients; 4981 male and 3386 female from which a total of 61 cases of poison were sorted out from the 8367 patients who visited the hospital for health care reasons. And in 2015, 8739 (44%) patients visited the EU; 5163 male and 3576 female from which 79 cases were victims of poisoning and 5 cases were poison victims who died during the patient management process.

As for the PU of the LHD in 2014, a total of 1616 (8%) children visited the unit; 934 were male and 682 female, 51 cases were sorted as poison victims from the register in 2014 with a record of 03 death cases from poisoning. Whereas in 2015, a total of 1363 (7%) children visited

the PU of the LHD; 782 were male and 581 female, from which 37 poison cases were sorted out, of the 37 cases, 02 death cases were recorded as poison victims who died during the patient management process.

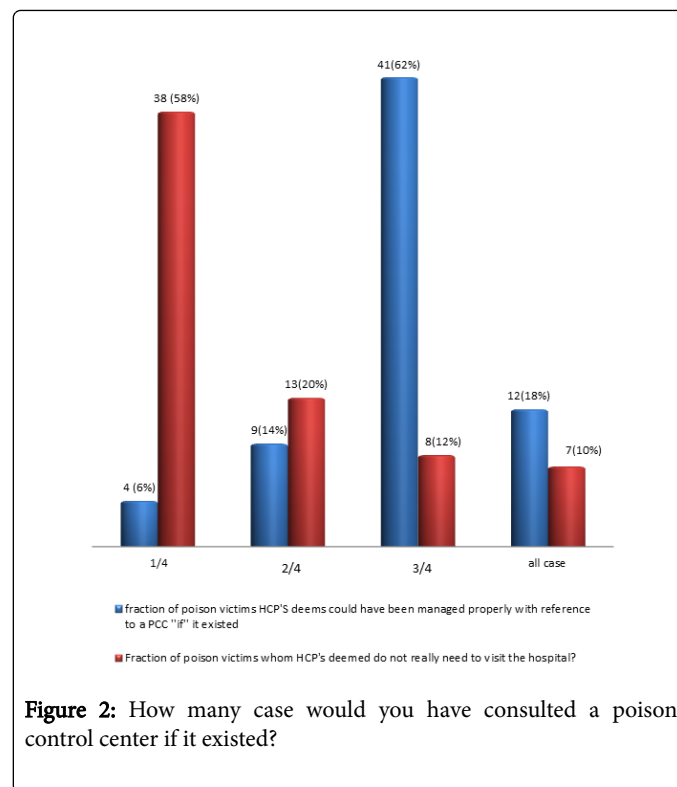


Figure 2: How many cases would you have consulted a poison control center if it existed?

The LHD recorded 122 poison cases in 2014 and 3 death cases from poisoning. While in 2015, 123 cases were recorded with 7 death cases recorded as victims of poison during the patient management process. It should be noted that the case of poisoning in children might seem voluntary but their intention was not voluntary, since the cognitive attitudes of children don't permit them to intentionally cause harm to themselves. These data's were then displaced as shown in table 1.

	Recorded cases of poison + suspected cases											
	EU and PU 14/15			Voluntary intoxication			Involuntary intoxication			DEATH	%poison victims	prevalence
	male	female	n	male	female	n	male	female	n			
January	1015	802	1817	4	0	4	5	7	12	0	0.9	
February	1024	648	1672	1	2	3	7	9	16	1	1.2	
March	992	692	1684	4	5	9	2	4	6	1	1	
April	1013	674	1687	1	5	6	11	3	14	3	1.4	
May	897	679	1576	9	6	15	9	3	12	1	1.8	1.14
June	909	520	1429	2	3	5	7	4	11	0	1.1	
July	934	659	1593	2	5	7	10	1	11	0	1.1	
August	1066	757	1823	4	3	7	5	6	11	1	1	
September	967	681	1648	6	6	12	5	8	13	2	1.6	

October	1053	756	1809	2	3	5	2	2	4	0	0.5	
November	965	654	1619	2	2	4	3	9	12	0	1	
december	1025	703	1728	2	5	7	9	3	12	1	1.2	
		sum	20085		sum	84		sum	134	10	ST	228

*poison cases sorted; were suspected poison case since no confirmatory test was done to certify these cases as poison victims,**voluntary poisoning involves all forms of self ingestion or willing exposure of an individual by another person to any toxic exposure agent ,***Involuntary poisoning involves all form of unwilling ingestion of any toxic exposure agent. n= frequency, %= frequency in percentage

Table 1: Poison case records in LHD 2014/2015.

On the other hand, the BDH recorded 3097 patients visit for health care reason in 2014 and 2015 based on the records reviewed at the EU and PU. For the EU in 2014; 424 patients were received from which 293 male and 131 female with a record of 3 poison cases. Whereas at the level of the PU in 2014 a total of 1178 patients visited the hospital for medical reasons, of these 1178 patients; 7 cases were sorted as poison victims.

Whereas in 2015, the EU of the BDH recorded a total of 293 patients; 196 male and 97 female, from these patients inflow in 2015, 2

cases were victims of poisoning. As for the PU in 2015, a total of 1202 children visited the unit for various health reasons; 626 as male and 576 as female from which 5 cases were sorted out as poison victims. Summarily, we had a total of 17 recorded poison cases from the BDH from the 3097 that visited the hospital in 2014 and 2015. These data's were then presented on table, as shown below in table 2.

				Recorded cases of poison *suspected cases						DEATH	% POISON VI	prevalence
	EU and PU 14/15			Voluntary intoxication			Involuntary intoxication					
	male	female	n	male	female	n	male	female	n			
January	151	118	269	0	0	0	1	2	3	0	1.1	
February	119	120	239	0	0	0	1	0	1	0	0.4	
March	167	128	295	1	1	2	0	0	0	0	0.7	
April	159	130	289	0	0	0	0	2	2	0	0.7	
May	139	130	269	1	0	1	0	0	0	0	0.4	
June	150	108	258	0	0	0	1	0	1	0	0.4	
July	128	114	242	1	0	1	0	1	1	0	0.8	
August	144	100	244	0	0	0	0	1	1	0	0.4	
September	109	90	199	0	0	0	0	0	0	0	0	0.55
October	147	114	261	0	0	0	1	2	3	0	1.1	
November	136	94	230	0	0	0	1	0	1	0	0.4	
december	174	128	302	0	0	0	0	0	0	0	0	
		total	3097			4			13	0		

*poison cases sorted; were suspected poison case since no confirmatory test was done to certify these cases as poison victims,**voluntary poisoning involves all forms of self-ingestion or willing exposure of an individual by another person to any toxic exposure agent ,***Involuntary poisoning involves all form of unwilling ingestion of any toxic exposure agent. n= frequency, %= frequency in percentage

Table 2: Poison cases recorded in BDH 2014/2015.

Nomenclature of toxic agent as noticed from the Hospital registers. From the registers, the substances of exposure that were mostly used for intoxication or poisoning were grouped under involuntary and voluntary poisoning as shown in tables 3 and 4.

Discussion

The influential role a poison control centers can play in a given health system has largely gone unrecognized, although poison control centers provide important health outcome in areas like: direct

consultation to the public and health care professionals; law enforcement bodies; product manufacturers; insurers; and the governments. A poison control centers provide real-time surveillance data, allowing for the identification and tracking of public health and environmental threats [7-9]. Moreover a poison control center has proven to play contributive roles in community educational outreach for poison prevention and safety, toxicology training to health care professionals, community monitoring, surveillance, assistance with emergency preparedness and response and providing the public information about current events of toxicological significance [5,10,29]. A significant case in Cameroon was the Lake Nyos disaster in 1986 which could have been notified earlier if such center existed in Cameroon. The actual value of health care savings attributable to poison control centers is difficult to quantify due to the preventive nature of their services.

The efforts of poison control centers have been shown to reduce unnecessary and costly health care utilization [7]. A number of studies have demonstrated that poison control centers reduce health care spending and that the amount of these savings far exceeds the cost of providing poison control center services.

Despite these demonstrations by other research works, Cameroon is still lacking when it comes to poisoning and poison management [42-45]. The absences of such centers in Cameroon and more particularly in highly urbanized towns like Douala in which this work was done are more handicaps to enable a proper quantification of the necessary as such a center in Douala and in Cameroon at large and moreover the lack of a PCC in Douala and Cameroon are deficiency to properly evaluate the cost effectiveness of a PCC in poison management and its possibilities of being a real disaster surveillance public health asset for its citizens [46-51]. This is a public health challenge that patient management on poisoning and poison related exposure would face in Cameroon [52-58].

In this study to evaluate the necessity of creating a poison control center in Cameroon, the knowledge and perception of HCP were evaluated based on their understanding of poisoning and a PCC in regard to proper poison management. What was remarkable in our finding was that [59] 89% of the HCP's who participate in our study had little or no knowledge on what a PCC was all about, with only 7 (11%) of the participants been knowledgeable on the subject. A reason we put forward to affirm their claim was to verify if any had ever had a formal training on poisoning or visited a PCC, from these questions it was revealed that all participants in both hospital had never had a formal training 66 (100%) or a continues training on poison or poison management. The absences of data's on poisoning management training and literature or research works in Cameroon are elements still rendering the management of poisoning in Cameroon a very controversial issue thereby making it a serious public health hazard, especially when it comes to managing a poison case without any recorded data's on pass related exposure in a given community [60-65]. This made our study the first of its kind to put forward the question on the necessity of a PCC in Cameroon by evaluating the knowledge of HCP on poisoning and PCC in regard to proper poison patient's management in Cameroon [66-71].

Moreover, relying on the [7] 11% who had a good knowledge on what a PCC was all about in poison management, we assess the possibility for antidote availability and accessibility at the level of the hospitals and it was revealed by the 7 participants that; antidotes were not available or accessible. The "not available or not accessible" of antidote was evaluated base on the pharmaceutical policies put in place

by the ministry of public health in Cameroon which state that; drugs (antidotes) should be available, accessible and affordable at low cost [72-80]. There is therefore a great need for consistent evidence-based recommendation and more importance to put in place sustainable access to antidotes in hospitals and pharmacies in Cameroon, so as to meet up with the regional report of WHO 1998 which state that; a drug (antidote) is accessible if the point of purchase of the drug (antidote) is at most 1hour one way walk for the citizen that is most far away from the dispensary point (public or private) in a given and well define health area. These makes it a ration of 1:10 HCP who could be able but limited in managing poison cases that might need further assessment and antidotal therapy, though this ratio still need further evaluate to know the appropriate level of knowledge of HCP in Douala and more specifically Cameroon, more research works in this area is needed to further back up these preliminary research findings [81-86].

However, It was further revealed by the majority of HCP who participated in the study that 57 (87%) will recommend a †suspected poison victim to rush to the nearest hospital for proper health care follow-up. Nevertheless, this 57 (87%) of HCP who recommended the hospital as a first choice after exposure, did so because of no alternative to turn to and also because of the health care services they believe the hospital or health facility can offer. Whereas, the hospitals in which the study was conducted lack established poison management procedures or guidelines, thereby making the hospital the participants recommend as first choice in case of suspected poison exposure a handicap site for proper poison management reasons why more training on poisoning management are needed by the HCP. However, 76% of HCP'S confirmed that they would have consulted a Poison control center if it existed in the management of 3/4 (74%) of their suspected poison victims see figure 2. These values were similar to a study in Kenya of 60 participants; 88% of the participants requested for more education on issue relating to poisoning and poison management as a result of limited poison guidelines in hospitals [81]. All the HCP who participated in the study recommend the putting in place of reforms and policies for proper poison management in hospital. And also these finding were very similar to that publish by the 13th annual report of the AAPCC [6] and a report presented by and independent group the Lewis group [8] which reports that 80% of poison case do not really need to visit the hospital since they could easily be handle on phone while at home by means of a PCC [7]. The request to improve on the management policies on poisoning in Cameroon is an urgent public health call both to the general population and to the health care professionals in general by capacitating them with more knowledge on what is poison, were to turn to as a suspected victim and what to do as a HCP when in a dilemma in managing a poison case. We could see a similar need from a study conducted on nurses on; Nurse's knowledge, attitude and practice on the initial management of acute poisoning among adult casualties in Kenya, it was revealed that 60 (88.2%) of the participant indicated that; they required more training on the various types of poisoning and poison management techniques such as; assessment, use of nomogram, use of flowchart to easy identification, clinical presentations and management techniques in gastrointestinal tract decontaminations and antidotal management [80,81]. In the same study, they was a call to offer more refresher courses to does who had already benefited on poisoning management training [84].

However to further elucidate on the knowledge and necessity of a PCC in Cameroon, by the 66 HCP, more evaluations were needed to portray the limited knowledge of HCP on the issue relating to poisoning in the two sorted hospitals in terms of public health benefits; like unnecessary hospital visitation, increase length of stay in the

hospital, lost in work days and increase on health care spending by poison victims. To demonstrate this, a 2 years (2014 to 2015) patient's records review was conducted on all the live patients files that visited the EU and PU of the Laquintinie and Bonassama district hospital in Douala. 23182 files were reviewed and a toxico-demographic profile was established to mirror the poison image of the two hospitals because of limited national referencing to the study; like on the prevalence of poison in Cameroon, the proportion of gender ratio on poison in Cameroon, poison management guidelines etc.

However, we documented that 1 person out of a 100 is a victim of poison, based on the prevalence of the 245 (1%) 'Suspected' poison cases that visited the Laquintinie hospital and the Bonassama district hospital. A prevalence of 10 (4%) was observed on the death suspected poison cases recorded, this 4% was evaluated from the 245 cases of suspected poison victims that visited the hospitals in 2014 to 2015, it should be recall that all the cases of death recorded were victims that were rush to the hospital as a result of a suspected intoxication or poisoning and died during the patient management process in the hospital, these to some extend were the impact or the consequence of HCP lacking in knowledge on poison management, absences of well elaborate poison management procedures. Or the lack of appropriate antidote or difficulties in accessing an antidote as was with the cases of drug abuse 'marijuana and banga' etc recorded but no use of naloxone an antidote for opiod intoxication was mention in any of the hospital records (2 drugs related death case were recorded). The 4% prevalence of death from poisoning was an affirmative response on the urgent need to put in place policies on poison management.

A significant observation from the patients files of all the 245 cases of poisoning or intoxication that visited the hospitals, most of these cases that survive the exposure, could still have overcome their toxic exposure difficulties while still at homes, the reasons been that the length of stay in the hospital (EU or PU) was rarely above 48hours (82%), the lack of appropriate guidelines on poison management to assist the victims and the treatment option provided by the units were observatory techniques and the management of poison adverse effect such as: salivation with atropine sulphate 1mg injectable, for nausea and vomiting with vogalene[®](metopimazine) 10 mg injectable/0.1% oral solution, convulsion or stiffness/rigidity with valium[®](diazepam) injectable, colic and cramps with spasfon[®](phloroglucinol) injectable and for inflammations with parenteral steroids; like dexamethasone injectable and if some relief, the patients were discharged.

Despite these lacking on appropriate poison management guidelines, the hospital had two common symptomatic methods used in tangling complicated cases of intoxication which were; gastric lavage and electrolytes replacement therapy. It was clearer that the elementary knowledge on poison management by the HCP's were not because poison cases are absents but the absences of proper poison management policies, poor higher institutional programs for the

training of HCP (medical and nursing training programs) and the absences of limited or no poison management protocols in hospitals in Cameroon.

Moreover, since we were not aware of any other studies that assess or try to elucidate the socio-demographic and toxico-demographic characteristic of poisoning in Cameroon, it was another phase we needed to look upon. But considering that no study portraying any data on such characteristic, we had to rely solely on our finding to bring out these characteristic in Douala-Cameroon, it should be recalled that of the 245 cases of poisoning that were sorted from the register at the level of the emergency and paediatric units of the two hospitals involve in the study, 52% of the total number of poison cases recorded in 2014 to 2015 were male and 48% were females. These high percentage encounter in male was as a result of the high incidence of involuntary poison in male children which could be as a result of their inquisitiveness in childhood, these high percentage in male children were similar to a study carryout in South Africa which shows that more males were victims of involuntary poisoning [34] and that children under 10 years represent up to 80% of all victims of poisoning [33]. Another study portray that more male than female children are victims of poisoning [46] Although mortality from acute poisoning is reportedly low, it is usually high in patients who are victims of suicide [59,79]. This high prevalence in male exposure could be public health consequences and are therefore area for more research.

It was noticed from our data that of all the 245 poison cases, 82% of these cases do not really need to visit the hospital for medical services as earlier mention above. These too was similar to a study carried out by the American association of poison control centers (APCC) [5]; which revealed that 80-85% of unintentional poison cases don't really need to visit hospitals for medical services after poison exposure. The reason they put forth was that in state were poison control center exist, the majority of poison cases could easily be handle safely on phone [5,7].

Revealing more on the toxico-demographic profile of poisoning, based on the substances commonly used by the victims from the files reviewed, the major substances used in poisoning by poison victims from 2014 to 2015 were are as such: sodium hypochlorite commonly called 'eau javel' 38 (41%), pharmaceuticals 30 (32%), drugs of abuse such as alcohol, Indian heme (banga) 14 (15%) and pesticide 7 (8%) were the major substances used by the majority of poison victims or voluntary poisoning respectively table 4.

Whereas for involuntary intoxication; substance like sodium hypochlorite 39 (39%), stings and bites 21 (40%), hydrocarbons 'kerosene', petrol-feegue'19 (19%), insecticides 'moontiger' 19 (19%) and phytosanitary product like traditional medicine...10 (10%) as shown in table 3 and Figure 3.

Involuntary poisoning exposure type									
Toxic agent	Adult		paediatric		Death cases			Total	%
	Male (n)	Female (n)	Male (n)	Female (n)	Children	adult			
Pharmaceutical drugs	3	1	6	3	0	0	13	9	
Chemicals: Sodium hypochlorite (eau javel), acide	1	0	21	16	2	0	40	26	

Hydrocarbon: petrol, kerosene etc	0	0	12	6	1	0	19	13
phytosanitary products e.g herbal concoctions, chinese traditional medicine etc...	2	1	7	2	1	0	13	9
Pesticides/insecticides: e.g. moontiger and herbicides : e.g. roundup etc	0	0	10	8	1	0	19	13
food poisoning	7	8	2	2	0	0	19	13
Bites and stings e.g. snake, bees, scorpion etc..	12	9	0	0	0	0	21	14
fumes and vapours	3	1	0	0	0	0	4	3
Others unknown	4	0	0	0	0	0	4	3
Total	32	20	58	37	5	0	152	

Table 3: Involuntary intoxication agents.

Voluntary Poisoning Exposure Type					
Toxic agent used	Adult		Death cases (n)	Total (n)	%
	Male (n)	Female (n)			
Pharmaceutical drugs	11	19	0	30	32
Drugs of abuse e.g. alcohol, "banga" etc	12	0	2	14	15
Pesticides	0	5	2	7	8
Hydrocarbon: e.g petrol, kerosene etc	0	4	0	4	4
Chemicals : soduim hypochlorite (eau javel), acids	14	23	1	38	41
Total	37	51	5	93	100

Table 4: Voluntary intoxication agents.

The reason behind the used of these groups of chemicals/substances could simply be as a result of their readily availability and accessibility in our homes and in the Cameroonian market, this is an area that needs more investigated in Cameroon for better clarification as to why there are most of the times used as poisoning agent and also why more women are victims of household substance. However, a related study on why these chemicals/substances are frequently used for intoxication was carryout in the USA, it was shows from the study that the above products or substances have long been proven to have beneficial use to man, but that putting in place quality programs to fight their accessibility and disposal is an issue of consent [15].

A typical example on how to limit illicit drug or accessibility of medicine of abuse was through the; "Drug take back" initiative program put in place by the Office of National Drug Control Policy in America [44,49]. The result of such program were to reduce the

majority of unused pharmaceuticals in home which are usually been stockpiled in first aid boxes of homes and might become serious toxic agent if wrongly used [50]. They further stated from their finding that the presence of an incidence on poisoning in any state or country is a call for the policy makers to establish tools that could assist in proper poison management, which in most cases have been ideal with the establishment of a poison control center. It should be recalled that the putting in place of such centers is in line with the request by Wealth Health Organization for each member state or country to render proper poison management and considering the priority of WHO on the necessity for a continues training for poison management professional [4]. A PCC as a tool in poison management had always portrayed marvelous public health financial benefits results because of the influential role it plays in their health system of any country in which there are present and operating.

The used of an anion and osmol gap values could easily be applicable in Cameroon since the laboratories in the two hospital sorted could easily put in place a technical platform to perform such analysis by conducting internal training for the laboratory technicians and the emergency units staffs on the use of electrolytes parameters to confirm a poison case and helping in defining a precise approach in managing the cases. But the issue of interpreting the analysis might still remain a problem if the HCP are have not been capacitated with knowledge on poisoning and poison management through basic formal training on poisoning or intoxication management and interpretation. Reason while we call upon the policies maker to put in place well elaborated policies on poison management to better patient management at the level of hospitals.

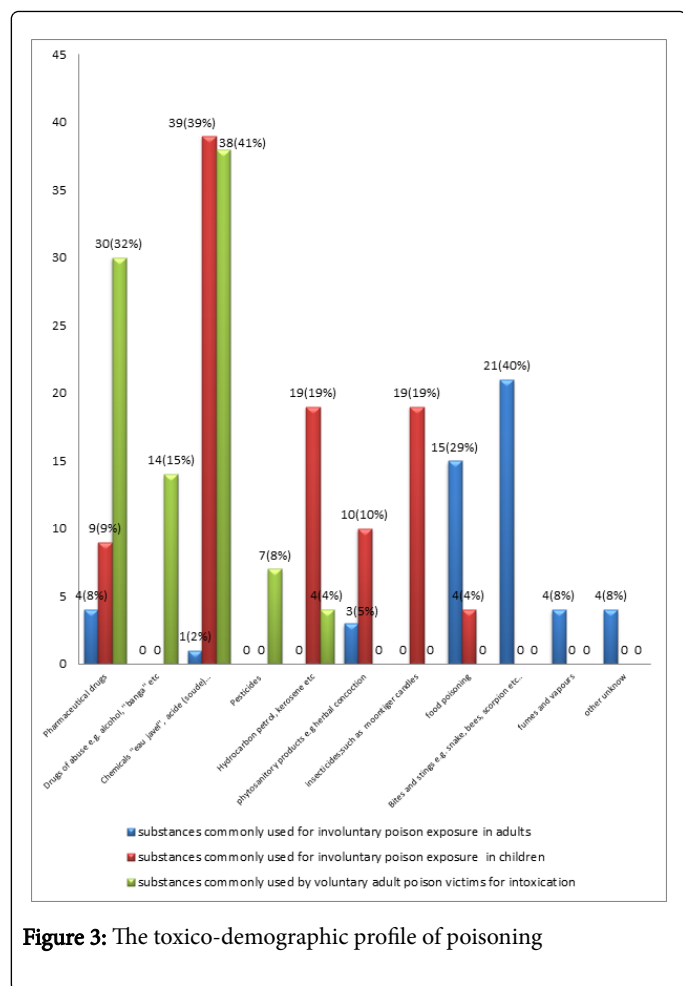


Figure 3: The toxico-demographic profile of poisoning

Conclusion

The objectives of the study were all attain due to the collaborative attitude and openness of the HCP who gave their consent to participate in the study. It was notice that in the two hospitals; the LHD and the BDH all lack guidelines on issue relating to proper poison management and that the level of knowledge and perception of the health care professionals was relatively low on issue relating to poison and poison management. However to further evaluate the impact of a PCC in Cameroon; a long term and a larger scale study is needed, which should include more regions and more hospitals so as to enable and properly orient policy makers on the necessity of establishing a PCC in Cameroon. Finally, view the existence of a prevalence of poisoning in Douala which is a representative of Cameroon in the study, it is clearer that Cameroon might be in need for strong policies on poison management of which the amelioration on training program of professional healthcare provider by including more professionalized oriented toxicological program and why not if possible the establishment of a poison control center in Cameroon.

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