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Poisoning Investigations in the City of Bukavu and the Effects of Antidotes Administered by Traditional Healers

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Abstract:- Currently, there are cases of poisoning in Bukavu without any form of proof. The purpose of this study is to verify the belief of the inhabitants of this city on the existence of cases of poisoning which would be at the root of several deaths attributed to cardiac arrest. A questionnaire was sent to 200 people from different socio-professional categories. The Statistical Package of Social Sciences software was used to process the data and the Chi-square test was used to test statistical dependence between variables. It appears from our various investigations that : (a) cases of poisoning were confirmed in the city of Bukavu which we ourselves confirmed by a qualitative test (b) hatred or jealousy was recorded as the major cause of the poison. As for the sources of the poison, Gecko was considered as the basic raw material for manufacture, (c) vomiting and diarrhoea are the two most frequent antidotal effects in patients. After statistical analysis, we noticed a significant relationship at the threshold (α = 1%) between the measured variables. Moreover, at the level of each socio-professional category, competition linked to the attainment of a high rank would justify these cases of poisoning, thus stirring up hatred or jealousy. It is therefore obvious that poisoning exists in Bukavu and that recourse to traditional medicine is a priority in cases of suspicion before going to hospital.

Keywords:- *Antidotes, Bukavu, Poison, Symptoms, Treatment.*

I. INTRODUCTION

In medicine, toxicology is considered to be a science of toxins, i.e. the science that studies toxic substances, including poison [1-2]. A poison is a substance capable of destroying certain vital functions of the organism. The victim can absorb the poison through three routes, among which are: the digestive route, through food digestion, toxic or medical products; by air, toxic products by inhalation and through the skin, which gives rise to some inflammation [3]

Some poisons have direct effects (direct killing poison: lethal poison) and others have indirect effects (slow killing poison: slow-acting poison) [4]. Even in antiquity, cases of poisoning had been recorded, but the cause remained unknown. In most cases, the cause of poisoning is mainly hatred or jealousy related either to inheritance or succession to the throne, or promotion in a service, etc. [5]

According to recent research conducted in Goma by Kyolo, Bbosa, Odda, Lubega, Edmond in 2018 in the eastern part of the Democratic Republic of Congo, four types of poison were used in this environment (OMGKRP, DLNKRP, CHKRP and BHKRP) whose toxicity was justified by the presence in their composition of venoms contained in the mucous membranes of certain animals used among the raw materials including: chameleon, gecko "blue head", toad etc. [6, 11].

To neutralize the effect of poisons, prevent their absorption or counteract their effects, substances called "antidotes" are used [6]. In many African countries such as Nigeria, Senegal and South Africa, for example, and other countries around the world, traditional antidotes play a key role in suspected cases of poisoning [4,6]. In most cases, the population resorts to traditional treatment whenever laboratory tests are negative, people think directly of the poison and they are treated traditionally [7]. In fact, traditional medicine is not bad, but the problem is that most of these traditional practitioners are not educated [8].

They may have received, here and there, short training courses on the preparation and use of medicinal plants but they do not have sufficient knowledge on the subject especially since most of them do not have specific scientific knowledge in phytotherapy [9]. Experience has shown that in some African countries, traditional healers inherit practical knowledge from their great-grandfathers and keep it secret. [8, 9].

Moreover, in this medicine, the population has more confidence in phytotherapy compared to antidotes that would come from other sources such as animal or mineral matter because they are rarely used. Signs and symptoms attributed to poisoning such as weight loss, lack of appetite, abdominal pain, bloated belly, are often confused with those of other pathologies such as HIV/AIDS, hepatitis, typhoid fever, etc. [10].

In fact, many people infected with the virus are late in getting tested thinking that they have been poisoned because the symptoms and signs are almost the same. For

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example: weight loss, high fever, change in skin colour to black, which also occur in people living with the virus [11].

For their treatment, in Bukavu where we conducted this study, they drink antidotes administered by traditional healers that cause vomiting and diarrhoea [9]. Dehydration caused by vomiting and diarrhoea leads to water loss, sometimes leading to death. The aim of this study is to verify the existence of poisoning cases in Bukavu on the one hand and to confirm the effects of antidotes administered by traditional healers on the other hand.

II. METHODOLOGY

A. *Description of the study area*

Our study took place in the city of Bukavu, capital of the South Kivu Province, in the east of the Democratic Republic of Congo (DRC). The city of Bukavu borders the Rusizi District of neighbouring Rwanda. With this proximity, the mobility of the population of both parties is frequent, which leads to exchanges of mentalities as well as habits. There is therefore a certain importation of cultures with people coming from elsewhere, by some inhabitants of Bukavu.

Because of its geographical situation, the inhabitants of the city of Bukavu carry out economic exchanges with those of neighbouring countries and some even prefer to settle in these countries to carry out various activities including trade and vice versa. This sometimes uncontrolled mobility of the population in both directions leads to the export and import of cultures, traditions and habits.

B. *Type and period of study*

Our study is of the cross-sectional type which took place over a period of sixty days, i.e. two months from July to September 2019, the period during which we conducted our surveys.

C. *Study population*

The size of our sample is 200 people consisting of adults of all kinds, aged at least 18 years, met in the city of Bukavu. This population was mainly composed of students/students (112 or 56%), traditional practitioners (5 or 2.5%) and teachers/traders (83 or 41.5%). There were no criteria for selecting our sample. This was done randomly.

D. *Variables Considered*

- Socio-demographic variable: the following variable was measured during our study: socio-professional category (CASP)
- Variables related to poisoning cases: in this case we considered the following variables: belief in the existence of poisoning cases (CEP), causes of poisoning (CE), types of poisons used (TPU), symptoms and signs of poisoning (SSE), treatment of poison by modern medicine (TPMM), poison testing by traditional healers (TPT) and effects of antidotes in patients (EAP).

Regarding TPU, the testimony of a woman indicated that a woman selling poison from the city of Goma ended up dying after consuming a doughnut poisoned by her own poison without her knowledge by an unknown person, (Results of our own investigations, 2019), these types of poison used in the city of Bukavu, consist essentially of the powder obtained after drying certain organs of animals such as : chameleon, toad, gecko, as well as human placenta, crocodile bead, some rare medicinal plants such as Datura stramunium and some heavy metals such as mercury, arsenic, cadmium etc.. [9-11]. In Bukavu, among the COEs, there is hatred or jealousy. The most frequent SS among the inhabitants of Bukavu city are generalized fatigue, incurable headaches, feeling a lump in the throat that does not go down etc. (Results of our own survey, 2019). As for TPMM, it turned out that most cases of poisoning treated by modern medicine do not treat the cause (the poison itself) but rather its consequences, among which we note: hypertension, high fever, acute headache. For TPT, the most commonly used method is that of spitting on a powder that floats on water contained in a clear glass. The test is positive if, after contact of saliva with this powder, a viscous liquid precipitates towards the bottom of the glass. Otherwise the test is considered negative. Finally, EAPs are often noticed by vomiting and diarrhea after consumption of the antidote by the patient, the way out of the poison according to the Tradipractitioners.

E. *Materials*

In the course of this study, we used the material listed below:

Questionnaire, Pen, Lap top, Students, Teachers, Shopkeepers, Tradipractitioners

F. *Methods*

A survey questionnaire consisting mainly of questions related to poisoning cases was sent to the study population. For this purpose, we visited various institutions of higher education and some secondary schools in the city of Bukavu to distribute questionnaires to students and/or pupils, after raising their awareness.

The same approach had been used in the case of teachers and shopkeepers. On the other hand, for the case of the traditional practitioners, we turned into a sick person to familiarize ourselves with them. After that, we came back for the second time to do the check-up. It was only after becoming familiar with some of them that we explained to them that we would like to have some information about poisonings in our community. Some categorically refused, others accepted with difficulty, and a few were happy to learn that there were scientists interested in traditional medicine because they often noticed a certain mistrust on the part of the intellectuals who have always considered them as adventurers when their wish is to complement each other.

During the analysis, we proceeded to the following coding: the number 1 designated the class of students/students, the number 2, the traditional practitioners

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and the number 3, the teachers/traders. For data processing, we used the Statistical Package for Social Sciences (SPSS) software, in which the statistical Chi-square test was used to check for statistical dependence between variables.

Ethical considerations were taken into account during this research as no form of influence peddling was used to obtain the responses of the respondents. They were free to accept or refuse our questionnaire.

III. RESULTS

Table 1 below shows the profile and level of knowledge of our various respondents regarding poisoning, including their belief in poisoning, its cause, the treatment by modern medicine, the method of poison testing and the effects of antidotes administered by the Tradipraticiens of the city of Bukavu. The numbers of respondents were transformed into percentages and cumulative percentages to facilitate the interpretation of the results obtained. Each answer in this table was coded using an Arabic number starting with 0 and rising to a higher number depending on the number of answers provided by the respondents.

Variables	Number	(%)	(%) cumulative
Existence of Poisoning Cases			
0 : None	0	0	0
1 : Yes	200	100,0	100,0
Total	200	100,0	
Poisoning causes			
0: None	78	39	39
1 : hate/jealousy	117	58,5	97,5
2 : More than one cause	5	2,5	100,0
Total	200	100,0	
Poisoning treatment by Modern Medicine			
0 : Not yet	198	99,0	99,0
1 : Already	2	1,0	100,0
Total	200	100,0	
Testing of poisoning by traditional healers			
1 **:** Patient's saliva spit into a glass of clear water	171	85,5	85,5
2 **:** Make the patient drink his own urine "urenotherapy".	15	7,5	93
3 **:** Make the patient drink the liquid extract of alchornea cordifolia.	9	4,5	97,5
4 **:** Patient's saliva spit on duplicator paper	5	2,5	100,0
Total	200	100,0	
Antidotes fromTradituional healers effects			
1 **:** vomiting and diarrhea	173	86,5	86,5
2 **:** Aboulimie	27	13,5	100
Total	200	100,0	

Table 1:- Frequency of respondent responses in relation to poison testing and Treatment

Table 2 below shows the results on the statistical dependence between variables. Indeed, during the statistical analysis of certain variables, including poisoning causes (CE); Signs and symptoms of poisoning (SSE) and antidotes from traditional healers effects(EAP), we set ourselves the objective of verifying whether there is a certain dependency between two variables considered, i.e. between EC and SSE or CE and EAP and between SSE and EAP.

Variables	CASP	
	Chi square	Significance
CE	271, 289	(0,000)***
SSE	311, 555	(0,000) ***
EAP	44,0	(0,000) ***

***** :** *Significance level α = 1%*

Table 2:- Results of statistical analysis of the data using the Chi-square test

Figure 1 below shows the frequency of respondents' knowledge of the types of poisons assumed to be used in the city of Bukavu.

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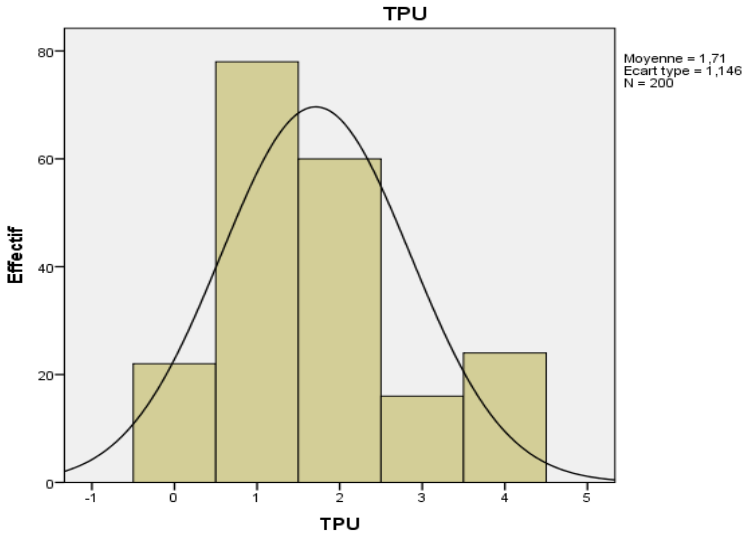

Fig 1:- Frequency of respondents' responses on their knowledge of the types of poisons used

The following figure illustrates the percentage of each symptom and sign of poisoning

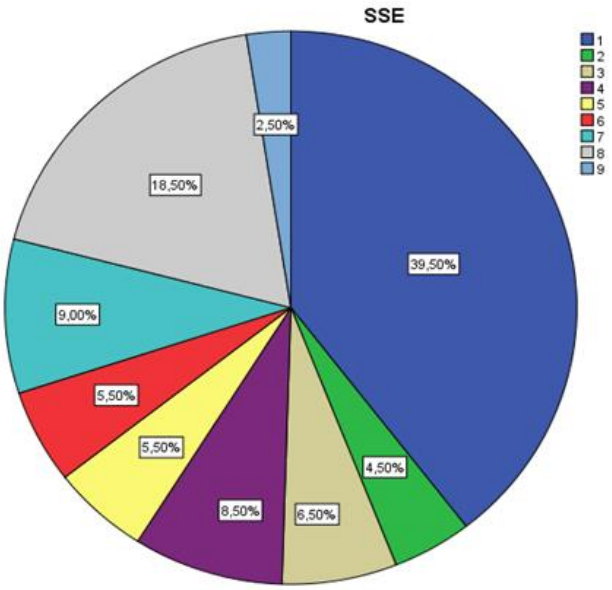

Fig 2:- Graphical representation of the frequency of respondents' beliefs about symptoms and signs of poisoning

In the search for the relationship that exists between certain variables, the use of the Khicarré test has led to the results illustrated in Figures 3 and 4 below:

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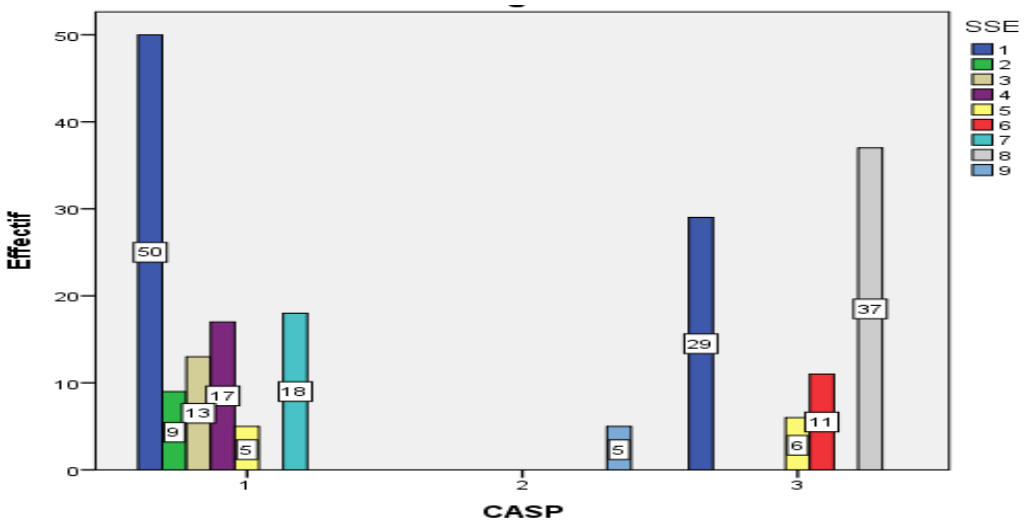

Fig 3:- Graphical representation of the relationship between CASP and SSE

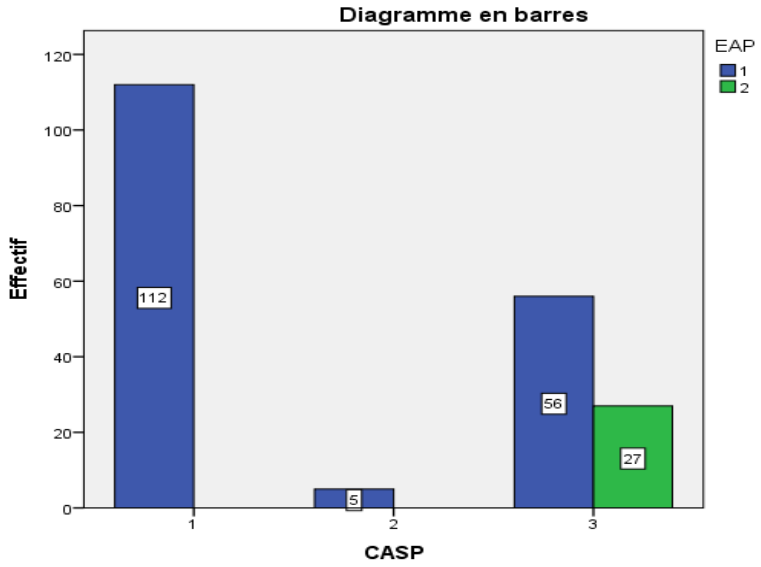

Fig 4:- Graphical representation on the relationship between CASP and EAP

IV. DISCUSSION

The results in Table 1 show that 85.5% of the respondents answered that the technique "patient saliva spit into a clear glass of water" is used to test for poison when the other three proposed techniques "make the patient drink his own urine", "make the patient drink the liquid extract of Alchornea cordifolia" and "patient saliva spit into a duplicator paper" accounted for 14.5%. These results are only, that by working on the degree of toxicity of the four types of poison known as Karuho in Goma revealed that the traditional practitioners of Goma perform a test similar to the one we performed where they ask patients to spit on a black powder contained in a glass of transparent water and conclude in the same way [11]. The question that remains unanswered is the chemical composition of the black powder and that of the saliva. Furthermore, the results of this same Table I indicate that 100% of respondents believe that poisoning cases exist in the city of Bukavu, more than half of the people surveyed, i.e. 58.5%, indicated that the cause of poisoning would be mainly hate/jealousy and the type of poison most used in the environment would be the gecko. These results are in agreement with those found by Miss Souley, who in 2005, had conducted a thesis on the ethnotoxicological study of a gecko commonly called Salamander in Mali [12]. Indeed, this author had concluded that the gecko constitutes one of the sources of poisoning by its saliva, which contains a certain number of toxins harmful to health. Kyodo, Bbosa, Odda, Lubega and Edmond, in 2019, concurred with this conclusion when they conducted a study on the impact of Karuho toxicity on the chemical composition of animal blood. They concluded that cameleon, which is a reptile like the gecko, participates with 11% of the 100% in the preparation of a Karuho solution from other materials including human placenta, glass fragments, mercury, sulphuric acid from old car batteries etc. [13]. Taking into account the responses provided on the treatment of poisoning cases by modern medicine, 99% of respondents stated that modern medicine has not yet made available a medicine against poison. This

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result is similar to the one obtained by Aliyu, who, in his research on the use of ethnomedicinal plants in western Nigeria, concluded that after visiting the hospital and receiving negative test results from the medical laboratory, the population no longer trusted modern medical treatments and preferred to go to traditional healers for consultation and treatment [4]. For the effects of antidotes prescribed by traditional healers, vomiting and diarrhea were more frequently cited by respondents compared to abulimia (86.5 versus 13.5). In 2000, Simisi reported similar results, confirming that patients in the community of Bwisha, Rutshuru Territory, were given palm extracts for diarrhea and vomiting to remove poison from their bodies [10]. Compared to the distribution curve of the results on the types of poisons used in the city of Bukavu (Figure 1), this curve has a normal gauss curve pattern. This means that all respondents showed the same tendency in the selection of the types of poisons used in the area. This suggests that the majority of respondents have heard of the gecko as one of the types of poisons used in Bukavu. With regard to the symptoms and signs of poisoning (Figure II), the descending order of belief in these signs and symptoms by respondents is as follows: a dry cough repeatedly was considered the most common sign of poisoning with (39.5%), change in skin colour to black (18.5%), feeling a lump in the throat and not going down (9%), Internal thoracic burns(8.5%), incurable headaches(6.5%), abdominal bloating and chronic fever each with 5.5%, acute abdominal pain and weight loss(4.5%) and finally people who cited more than one symptom(2.5%). Bussières and Bailey came to almost the same conclusion in 2000 when they conducted analyses on the inadequacy of antidotes in various hospital pharmacies in Canada. They concluded that dry coughs were being treated with several antibiotics that did not provide a solution. It was only after the poison test that it was discovered that antidotes had to be given for severe intoxication. Chifundera et al. also concluded in 1994 that dry cough was among the most remarkable signs of poisoning in the Bushi. They had further pointed out that some of the above mentioned signs such as weight loss and change in skin colour, internal chest burns etc. were cited among the most common signs found among the Bashi.

Table 1 summarizes the results of Figure 3 and Figure 4 which show that there is a significant relationship at the threshold.α = 1% between CASP and CE ($\chi 2$=271,289, p = 0.000), between CASP and SSE ($\chi 2$=311,555, p = 0.000) and between CASP and EAP ($\chi 2$= 44, p = 0.000). This would be explained by the fact that when a person is promoted, he or she becomes an object of covetousness and therefore needs to be careful about his or her safety. In this respect, they must ask themselves many questions about the symptoms and signs of poisoning that may be present in their body. These results are in line with those obtained by Philippe in 2002 who was researching armed conflicts in Africa. The author concluded that when a soldier reaches a higher rank, his peers of the same rank before him will seek to kill him at all costs.

V. CONCLUSION

This research aimed at verifying whether cases of poisoning actually exist in the city of Bukavu has led to confirmatory results, which nevertheless require further scientific work on laboratory analysis of test poisons and antidotes samples. These cases of poisoning have been justified in most cases by competition at a high rank within the same community. At the end of this study, we concluded that hatred or jealousy was the primary cause of the poisoning cases recorded in the city of Bukavu, the basic material used to make poison was gecko and the most common antidote effects encountered were vomiting and diarrhoea. In order to provide a lasting solution to the cases of poisoning in the city of Bukavu, we recommend a sincere collaboration between modern and traditional medicine.

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