Descriptive study of autopsies in the Atlantic and Magdalena departments*

Estudio descriptivo de las autopsias en los departamentos Atlántico y Magdalena

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Abstract
The present study is aimed to determine some epidemiological aspects related to homicides committed by hired killers with firearms. We conducted a data collection survey of historical records from the Institute of Legal Medicine and Forensic Sciences. The sample (n = 310) is composed of homicide victims in 2007 in the departments of Atlántico and Magdalena. We found that 93.5 % of the victims were male. Most of the victims (38.7 %) were found in the age range between 21 and 30 years old. A high percentage (32.9 %) of the victims were unmarried. The most common racial trait was the "mestizo" (94.2 %). A percentage of 48.4 % of the victims had a height between 161 and 170 cms. The days with higher incidence of killings were Mondays (19 %) and Fridays (18.4 %). The places where most of the murders happened were "in public" places with a percentage of 33.2 %. The most common number of bullet impacts was "2" with a 21.3 %. The most common body region impacted was on the head. Finally the paper presents the findings of the study.

Resumen
El presente estudio se propuso determinar algunos aspectos epidemiológicos relacionados con los homicidos cometidos por sicarios con arma de fuego. Se realiza una colección de registros históricos del Instituto de Medicina Legal y Ciencias Forenses. La muestra (n=310) está compuesta por víctimas de homicidio del año 2007 en los departamentos Atlántico y Magdalena. Se encontró que el 93,5 % de las víctimas eran de sexo masculino. La mayoría de las víctimas (38,7 %) se encontraban en el rango de edad de 21 a 30 años. Un alto porcentaje (32,9 %) de las víctimas vivían en unión libre. El rasgo facial más común era el "mestizo" (94,2 %). El 48,4 % de las víctimas media entre 161 y 170 centímetros de estatura. Los días con mayor incidencia eran los lunes (19 %) y los viernes (18,4 %). Los lugares descritos como "públicos" fue donde ocurrieron la mayoría de los homicidios con un porcentaje del 33,2 %. "2" fue el número de impactos de bala más común con un 21,3 %. La región corporal que fue impactada con mayor frecuencia se trató del área de la cabeza. Finalmente, el artículo presenta los resultados del estudio.

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Introduction

The aim of this study is to make a simple description, based on a 310 necropsy studies taking into account homicides that occurred in the Department of Atlántico and Magdalena, Colombia which is a country that has been affected by the situation created by an internal war, as well as, by murders committed by hired killers. This article presents a summary with descriptive values that will help to get a better view of how these murders occur in these regions.

In Colombia, murders are classified as: simple, aggravated, felony, for mercy, induction or assisted suicide, manslaughter, abusive, artificial insemination or fertilized ovulum transferred without consent. In this case, within all of these categories, the hired murderer commits an aggravated homicide because the homicide committed "by price, profitable promise or due to abject or futile fact" (Act 40 of 1993, 1993) is found aggravated under these circumstances.

Different scientists have stated the existence of diverse factors that may affect the incidence of this crime in a given situation. Among these factors, there are culture (Ousey & Lee, 2010), social and cultural structure (DeFronzo et al., 2007) resource deprivation (Pridemore & Trent, 2010; McCall & Nieuwbeerta, 2007), the number of inhabitants (McCall, Land & Parker, 2010), the type of zone (Weisheit & Wells, 2005), the level of economic inequality (Chamlin & Cochran, 2006), divorce rates (Beaulieu & Messner, 2010), among others.

Homicides in the world

The WHO (2002), in 2002 estimated that there had been about 520 000 deaths caused by murders, equivalent to a rate of 8.8 homicides per 100 000 people in the world. Homicide is the second leading cause of violent deaths with a total share of 31.3 % after suicide with 49.1 %. It is important to emphasize that low-income countries are the ones with more deaths caused by violence with a percentage of 91.1 %. From the total number of killings by homicide, 77 % were men, having a rate three times bigger than women. Also, men between 15 and 29 years old had the highest homicide rates (19.4 per 100 000 population) followed by men aged between 30 and 44 (18.7 per 100 000 inhabitants). Moreover, the highest rates of youth homicide occur in Africa and Latin America, and also, the lowest in Western Europe, parts of Asia and the Pacific.

Criminal behavior in Colombia

According to Espino-Duque (2010), in Colombia in 2009, a total of 454 030 criminal behaviors were recorded. Comparing these figures with those of the previous year, where 460 135 behaviors were registered, there was a downward variation by 1 %. Also, according to this author, there was a decrease of criminal behavior in 8 of the 18 Penal Code titles compared to the last two years; these decreases were "against life and personal integrity" by 17 %; "against persons and objects protected under the international humanitarian law" by 9 %; "against economic assets" by 3 %; "against copyright" by 4 %, "against the economic and social order" by 2 % "against natural resources and the environment" by 5 %, "against effective and righteous administration of justice" and 13 % "against the existence and security of the State" going from two murders in 2008 to one in 2009. Meanwhile, the other titles of the Penal Code show increase in various types of crimes.

It is important to highlight that only crimes

"against life and personal integrity" had a 22.27 % of the total counting 101 135 cases in 2009. Within this title, the criminal conducts that occurred most often were common personal injury, personal injury inflicted during a trafficaccident and homicide, totaling 97 099 cases, accumulating a percentage of 96 % in the total number of crimes that threaten "against life and personal integrity."

On the other hand, we find relevant to add that this sort of criminal behaviors represent life meaning for these people, keeping in mind that we need to address the subjectivity of the killers.

Homicide in Colombia

According to the records of murder in Colombia, for the last 12 years there has been a decline in the number of this crime. In 1997 there were 24 306 cases of murder, the highest rate of homicides occurred in 2002 with a total of 27 829 (Acero Alvarez, 2010).

According to official data of violence in Colombia, in 2010 there were a total of 17 459 homicides, a rate of 38.36 homicides per every 100 000 habitants. The age group with the highest rate of homicide victims is between 25 and 29 years old, with a rate of 90.64 per 100 000 populations. Meanwhile, homicide victims were male in a total of 16 015 cases. Another important fact is the marital status of the victims, in which there was a high prevalence of homicides in the single population, representing 50.16 % (Acero Alvarez, 2010).

In Colombia, the most common method used by criminals is the firearm constituting 77.6 % of the total number of homicides registered in 2010, being this method the one used in 13 549 opportunities. It follows the stabbing of 2 444 cases and a 14 %. In 2010, in the

departments of Atlántico and Magdalena there were a total of 958 homicides.

In this study, a descriptive analysis of the reports in the Atlantic and Magdalena departments located in the Colombian Caribbean region is presented.

Method

Data was obtained from historical records of the Institute of Legal Medicine and Forensic Sciences. The sample (N = 310) is comprised of homicide victims in 2007, in the Atlantic and Magdalena Departments. The sample was selected according to two criteria: 1) the murder was committed with a firearm, and 2) the murder was committed by hired killers. The information is taken from the Statistical Information System and Operational Delinquency (SIEDCO) of the National Police of Colombia, from where information from each victim was obtained and from their corresponding forensic autopsy reports from the National Institute of Legal Medicine.

The data were processed in SPSS (version 18) and analyzed according to epidemiological factors such as sex, age, marital status, weekday death scene, number of input impacts firearm, among others. At the same time, turn crosses were made for research relevant variables.

Results

Table 1. Sex

	Sex	Frequency	Percentage
	Male	290	93,5
	Female	16	5,2
	NS/NR	2	,6
	Total	308	99,4
Lost	System	2	,6
	Total	310	100,0

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From the total number of victims killed by hired murders with a firearm, it was found that male participation is the most significant, representing 93.5 % (290) of the total, while only 5.2 % (16) corresponds to the female gender.

Table 2. Age

	Age	Frequency	Percentage
	Less than 10 years	1	,3
	Between 11 and 20	19	6,1
	Between 21 and 30	120	38,7
	Between 31 and 40	97	31,3
	Between 41 and 50	57	18,4
	Between 51 and 60	10	3,2
	More than 60 years	2	,6
	NS/NR	2	,6
	Total	308	99,4
Lost	System	2	,6
	Total	310	100,0

The sample selected for the study presented as a result the age range of the homicide victims at the time of their death. It is noted that the 38.7 % of the victims were between 21 and 30 years of age while 31 % were within the range between 31-40 years old, followed by the victims ranging between 41 and 50 years old representing 18.5 % of the victims. Moreover, the ages with lower incidence were those younger than 10 years old, people between 51 and 60 years old and the victims between 11 and 20 years old.

The most frequent marital status of the victims was cohabiting with a percentage of 32.9 %. The second most frequent was "single" with a percentage of 27.4 %. Only 16.8 % of the victims were married. On the other hand, the marital status data was not obtained for 20.6 % percentage of the victims.

Table 3. Marital status

	Marital status	Frequency	Percentage
	Single	85	27,4
	Married	52	16,8
	Cohabited	102	32,9
	Other	5	1,6
	NS/NR	64	20,6
	Total	308	99,4
Lost	System	2	,6
	Total	310	100,0

Table 4. Weekday death

	Weekday death	Frequency	Percentage
	Monday	59	19,0
	Tuesday	34	11,0
	Wednesday	38	12,3
	Thursday	39	12,6
	Friday	57	18,4
	Saturday	47	15,2
	Sunday	34	11,0
	Total	308	99,4
Lost	System	2	,6
	Total	310	100,0

The day of the week with the highest frequency of deaths was Monday with a percentage of 19.2 %. The day with the second highest incidence of death was Friday with 18.4 %. The days with less frequent deaths were Tuesday (11 %) and Sunday (11 %).

The most frequent site of the murder was "in public" with a percentage of 33.2 %. Following, "Close / Facing a business establishment" with 8.1 %. The places with the lowest frequencies were "in a restaurant" with a 1.3 % and "on a farm / Vereda" also with 1.3 %.

Table 5. Features of the scene

Features of the scene		Frequency	Percentage
Near the residence		8	2,6
Near the company		8	2,6
Near the shoo/market		11	3,5
Inside the residence		13	4,2
Inside a restaurant		4	1,3
In a motorcycle		8	2,6
In a car		7	2,3
In a hospital		16	5,2
Near a commercial place		25	8,1
In the farm		4	1,3
In front of a bar		7	2,3
In front of the residence		20	6,5
Inside a billiard		12	3,9
Outside the city		16	5,2
In a mechanic workshop		5	1,6
In public		103	33,2
NS/NR		28	9,0
Total		295	95,2
Lost	System	15	4,8
	Total	310	100,0

Table 6. Location - scene - municipality

Municipality		Frequency	Percentage
Barranquilla		96	31,0
Soledad		30	9,7
Puerto Colombia		1	,3
Malambo		7	2,3
Baranoa		1	,3
Galapa		1	,3
Candelaria		1	,3
Santa Marta		160	51,6
Ciénaga		4	1,3
NS/NR		7	2,3
Total		308	99,4
Lost	System	2	,6
	Total	310	100,0

The scene where a higher frequency of victims occurred was Santa Marta with a percentage of 51.6 %. Barranquilla followed with 31 % of victims.

Table 7. Location - scene - Department

Department		Frequency	Percentage
Atlántico		137	44,2
Magdalena		168	54,2
NS/NR		3	1,0
Total		308	99,4
Lost	System	2	,6
	Total	310	100,0

Of the two departments studied, it was found that Magdalena had a higher incidence rate of homicide victims with a percentage of 54.2 %, equivalent to a total of 168 victims. Meanwhile, the Atlantic showed a percentage of 44.2 % with a number of 137 victims.

Table 8. Number of firearm impacts - Input

Number of impacts firearm - input		Frequency	Percentage
0		13	4,2
1		57	18,4
2		66	21,3
3		54	17,4
4		38	12,3
5		32	10,3
6		20	6,5
7		16	5,2
8		4	1,3
9		4	1,3
10		2	,6
12		1	,3
14		1	,3
Total		308	99,4
Lost	System	2	,6
	Total	310	100,0

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The most frequent number of input impacts was "2" with 21.3 %, followed by "1" with a percentage of 18.4% and "3" with 17.3 %. Within the less frequent number of impacts are "12" and "14" both with a percentage of 0.3 %.

Table 9. Number of gun impacts – output

Number of impacts firearm - output		Frequency	Percentage
	0	279	90,0
	1	12	3,9
	2	9	2,9
	3	3	1,0
	4	1	,3
	5	1	,3
	6	3	1,0
	Total	308	99,4
Lost	System	2	,6
	Total	310	100,0

Most gunshot fire did not leave the body of the victim as 90 % showed "0" output impacts. The second most frequently impacts on output was "1" with 3.9 %, corresponding to 12 victims.

Table 10. Inlet port according to body regions

Characteristics of the scene- Description of murder place	scene - Department			Total
	Atlántico	Magdalena	NS/NR	
Near the residence	8	0	0	8
Near the company	3	5	0	8
Near the shoo/market	10	1	0	11
Inside the residence	4	9	0	13
Inside a restaurant	1	3	0	4
In a motorcycle	7	1	0	8
In a car	4	3	0	7
In a hospital	0	16	0	16
Near a commercial place	16	9	0	25
In the farm	2	2	0	4
In front of a bar	3	4	0	7
In front of the residence	15	5	0	20
Inside a billiard	4	8	0	12
Outside the city	1	15	0	16
In a mechanic workshop	3	2	0	5
In public	42	61	0	103
NS/NR	1	24	3	28
Total	124	168	3	295

The highest frequency of impacts received according to regions of the body was the head with a total of 469 impacts, equivalent to 46 %. The body received 341 impacts equivalent to 34 % and the extremities received a total of 204 impacts representing 20 % of the total. Specifying by area of all the head impacts, the areas that had the highest input frequency impacts were the left occipital area with a percentage of 17.5 %, followed by the right occipital area with 16.6 %. The most frequent body areas were the suprascapular impact left with a percentage of 8.8 % equivalent to 27 impacts and neck on the right side (infrascapular) also with 8.1 % with a total of 25 impacts. Meanwhile, the area of the limbs with higher input frequency of impacts was the left anterior arm don a percentage of 5.5 % equivalents to a total of 17 input impacts.

Table 11. Features and Location of the scene

Body region	Weekday death							Total
	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday	Sunday	
Input - Head - Occipital right	1	3	1	6	2	2	1	16
Input - Head - Occipital left	4	2	3	4	3	4	0	20

According to the data obtained, in both the Atlantic and the Magdalena departments, the "public area" is the most common place of homicide. On the other hand, in the Magdalena a trend was observer, different from the Atlantic, where killings were carried out "in a hospital", of which Magdalena had 16 and the Atlantic did not have any. Another major difference is in the tendency to commit murder by hired killers "near their residence" since in the Atlantic 8 of these were committed, while in Magdalena 0 homicides occurred in places with this feature. Also in the Magdalena many more murders were committed by hired killers "outside city limits" than in the Atlantic, with a difference of 15-1.

The right occipital area had the highest input frequency of impacts on Thursday. While the left occipital showed their greatest number of input impacts on Mondays, Thursdays and Saturdays.

most frequent was "single" with a percentage of 27.4 %. Only 16.8 % of the victims were married. On the other hand, the marital status data was not obtained for 20.6 % percentage of the victims.

Table 13. Marital Status

	Marital status	Frequency	Percentage
	Single	85	27,4
	Married	52	16,8
	Cohabited	102	32,9
	Other	5	1,6
	NS/NR	64	20,6
	Total	308	99,4
Lost	System	2	,6
	Total	310	100,0

Table 12. Inlet according to body regions and days of the week

Body region		Weekday death							Total
		Monday	Tuesday	Wednesday	Thursday	Friday	Saturday	Sunday	
Body	Input - Head- Suprascapular left	1	1	2	1	2	1	0	8
	Input - Body- Scapularleft	3	1	0	2	1	0	1	8

The body areas with the most input impacts were the left suprascapular area with a total of 8 hits and also the right scapular area with a total of 8 hits. On the left suprascapular area, the most often impacts were received on Wednesday and Friday with 2 hits each. Meanwhile, the left scapular area received the highest number of impacts on Monday with a total of 3.

The most frequent marital status of the victims was cohabiting with a percentage of 32.9 %. The second

Discussion

An autopsy is a fundamental instrument in homicide cases with an unknown perpetrator, because it can provide information about the possible psychological print related to the motivation and intentionality of the murderer, from the type of injury, the number of projectiles impacted and the area of the bodyinjured, providing important clues to better understand this type of homicide.

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From a medical approach, Hamilton and colleagues (2008), (Padubidri, Menezes, Pant, & Shetty, 2013), Lucena, et al., (2009); Hebert, Maleki, Vasovic, Arnold, Steinberg & Prystowsky (2014); Park, Huh, Piao, Kim, & Hwang, (2013); Colville-Ebeling, Freeman, Banner, & Lynnerup, (2014); Sinard (2013) and Tette, Yawson, & Tettey (2014); Elder, (2007); Yayci, Pakis, Karapirli, Celik, Uysal, & Polat, (2011); Subedi, Yadav, Jha, Paudel, & Regmi, (2013) used autopsies to verify diagnosis of dementia with Lewy bodies, Parkinson's and Alzheimer's disease, aneurysms and several other diseases or to address educational practices in order to improve autopsy adult and paediatrical education.

Newton, Coffin, Clark, & Lowichik, (2004) and Hull, Nazarian, Wheeler, Black-Schaffer, & Mark, (2007), Wong, Chan, Beh, Yau, Yip, & Hawton, (2010); Flach and colleagues, (2014); Mohammed & Kharoshah, (2014); Inokuchi, and colleagues, (2014); Yeow, Mahmud, & Raj, (2014); Matsumoto, Sengoku, Saito, Kakuta, Murayama, & Imafuku, (2014); Ifteni, Correl, Burtea, Kane, & Manu, (2014); Le Blanc-Louvry, Thureau, Lagroy de Croutte, Ledoux, Dacher, & Proust, (2014) and Kodaka, and colleagues, (2014) note that autopsies still remain important to medicine to strengthen the pathologist-internist collaboration and to make clearer diagnosis or unexpected pathologic findings. In exactly this same direction, Burton & Underwood, (2007) state that autopsy has been often underused in modern clinical practice but it is an important procedure with potential to advance medical knowledge and part of its relevance comes from its epidemiological, educational, forensic and clinical value.

There has been other topics related to autopsies like the knowledge, attitudes, perceptions and the way relatives react to that forensic procedure, like those made by Ogata, Nishi, & Maeda, (2009) and Oluwasola, Fawole, Otegbayo, Ogun, Adebamowo, & Bamigboye, (2009) that assesed this type of constructs finding that it is difficult to obtain consent from relatives of deceased patients in a Nigerian Tertuary Institution and that only 38 % of relatives had satisfactory knowledge about the procedure.

From a psychological perspective, there are psychological autopsies that help to understand the possible reasons behind a suicide or suspicious deaths, like the studies conducted by van Spijker, Graafsma; Dullaart & Kerkhof (2009); Wong, Chan, Beh, Yau, Yip, & Hawton, (2010) and Yücel Beyaztas, Bütün, Özer, & Celik, (2013), Kizza, Hjelmeland, Kinyanda, & Knizek, (2012), Paraschakis, Michopoulos, Douzenis, Christodoulou, Koutsaftis, & Lykouras, (2012), Ahmed, de Jager, Haigh, & Garrard, (2013) and Henry & Greenfield, (2009), that analyze personality factors involved on the deaths and suicides retrospitivily in order to make predictions around their deaths based on their personality profile.

This article is only intended to provide data to the scientific investigation of the killings, so its interest is purely academic, it doesn't attempt to specifically investigate in itself any information relating to any particular criminal.

In the present study we found a high incidence of male homicide victims in killings (94.2 %). This, shows a concordance with global figures of homicides where men comprise the vast majority (77 %). However, it is clear that global figures do not specify the modalities of homicides, so its incidence in males, despite having a majority in both studies, in the present study significantly exceeds global figures. Given this lack of information provided by global data shows, there is a need to investigate the variable "homicide killings" to be more specific

as to the methods of murder. Other studies also show a high incidence of homicide victims in males (Abrams, Leon, Tardiff, Marzuk & Sutherland, 2007).

The area of the body with the most number of impacts was the head, so one can deduce a special preference for injuring the victim specifically in the Occipital area where you will find 1 or 2 shells.

Another important result found is the high incidence of homicide victims that is in the age range between 21 and 30 years old (38.7 %) and in the age range of 31 and 40 years old (31.3 %). Other studies have found similar rates in these ranges. Amongstthese studies is the one carried out by Goren, Subasi, Tirasci & Kemaloglu (2003), where the majority of homicide victims belonged to the age group between 16-25 years of age (38.7 %) as well as the study of Kumar, Li, Zanial, Lee & Salleh (2005) with 63 % of victims between 20-39 years old. Considering the WHO data, the results found in this study have a strong correlation with the global incidence where the two ranges with the highest incidence of homicide victims are, first, between 15 and 29 years old and in Second, between 30 and 44 years old of age.

In Colombia, social exclusion is a phenomenon that affects poor people in a deep manner. It limits opportunities for young people and it is harder for them to get educated and find jobs. If they do actually get a job, salaries in Colombia are very low and employees with low salaries cannot even pay for the basic goods they need, so many of these youths find illegal gangs as a way out and this makes it more plausible for them to kill or get killed.

In terms of the most common marital status of the homicide victims, a result was found that may be highly relevant. The lowest incidence of homicide victims of killings is occupied by those whose marital status was married. This result is of great importance since there are lines of research regarding homicide that have linked it with divorce rates (Beaulieu & Messner, 2010), so it would be possible to further clarify and add to the literature that has found a relationship between these variables, murder and marital status.

At last, we propose that it is necessary to create educational programs that involve families so that there can be a change in the way families conceive violence, thus educate them to adopt non-violent behaviors that could promote, explicitly, non-violent practices as a healthy alternative, understanding that through experience people can learn to understand the culture of peace (Polo, Pineda y Romero, 2008).

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