

# Trend of Medicolegal Manner of Deaths in Ghana: A Forensic Autopsy-Based Study.

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Received: May 2017

Accepted: May 2017

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## ABSTRACT

**Background:** Medicolegal deaths refer to sudden deaths or deaths with uncertain/unknown cause. Forensic or medicolegal autopsies are performed to establish the exact cause of death, circumstances of death, identity of deceased and also the manner of death. The present study profiles the trend of manner of medicolegal death cases using forensic autopsy findings and police reports from the law court. **Methods:** Data on manner of death were obtained by retrospective review of forensic autopsy findings, police/coroner's reports, toxicology and histology reports. Descriptive analysis was done with SPSS ( $\alpha=0.05$ ). **Results:** A total of 303 medicolegal autopsies were performed; 114 (37.6%) natural deaths, 185 (61.1%) unnatural deaths and 4 (1.3%) unascertained cases. Out of the 185 unnatural deaths, there were 119 accidental deaths, 59 homicidal deaths and 7 was suicidal. Cardiovascular diseases, road traffic accident (RTA), blunt injury assault and chemical poisoning were the dominant factors to natural, accidental, homicidal and suicidal deaths respectively. **Conclusion:** RTA was the major manner of death identified in the study. This study showed that most of the medicolegal death cases in Ghana are due to unnatural causes and mainly accidental.

**Keywords:** Ghana, Manner of Death, Medicolegal Autopsy, Natural, Unnatural.

## INTRODUCTION

Medicolegal deaths refer to sudden deaths or deaths with uncertain/unknown cause. Forensic or medicolegal autopsies are conducted under the ordinance of legal authority or a coroner. It is performed to establish the exact cause of death, circumstances of death, identity of deceased and also the manner of death. Due to the legal purposes, forensic autopsies are performed by an expert forensic autopsy surgeon or pathologist who can accurately give evidence on the cause of death at the law court or inquest.<sup>[1]</sup>

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Manner of death can be natural or unnatural. Natural deaths are due to ageing or diseases/pathologies. Unnatural deaths, on the other hand, can be due to violence, injury or poisoning. This can be homicidal, suicidal or by accidents. Some unnatural death are undetermined by autopsy, toxicology and histology. Homicides refers to death at the hands of person with an intention of causing the harm. Suicide is intended self-inflicting injury or poisoning resulting

in death. Deaths by accident are conversely nonpurposive.<sup>[2]</sup> Unnatural cause of deaths can be attributed to factors such as assault (gunshot, lynching, strangulation etc), thermal burns, drowning, road traffic accident, fall from height, chemical poisoning/intoxication, hanging and electrocution.<sup>[2-4]</sup>

The present study profiles the trend of manner of death of medicolegal cases using forensic autopsy findings and police reports from the law court.

## MATERIALS AND METHODS

Forensic autopsies performed by certified forensic pathologists at the Department of Pathology, Komfo Anokye Teaching Hospital, were retrospectively reviewed within the period of January to December, 2015. Data was retrieved from the inquest form from the medicolegal autopsy archives for present study which include name of deceased, sex and cause and manner of death.

Data was collated into excel spreadsheet and grouped into natural and unnatural deaths. Grouping was done by comparing autopsy findings to police/coroner's reports, as well as toxicology and histology reports. Natural and unnatural death were further classified based on contributory or external factors. Descriptive analysis was done with Statistical Product for Social Sciences (SPSS) version 20 at a confidence level of 95% ( $\alpha=0.05$ ).

**RESULTS**

A total of 303 medicolegal autopsies were conducted by qualified forensic pathologists at study site within the 1 year study period. This represents 18.1% of the total autopsies conducted at the Department of Pathology in 2015. One hundred and two (33.7%) females died in 2015 whilst that of the males was 201 (66.3%) [Table 1]. Distribution of manner of death showed 114 (37.6%) natural deaths, 185 (61.1%) unnatural deaths and 4 (1.3%) unascertained cases. Out of the 185 unnatural deaths, there were 119 accidental deaths, 59 homicidal deaths and 7 was suicidal [Table 1]. Natural deaths were dominant among the 64 males (56.1%) as compared to 50 (43.9%) natural death for the female counterpart. Most natural causes were related to cardiovascular diseases resulting in 43 (37.7%) deaths. This is followed by 32 respiratory (28.1%), 19 hepatobiliary (16.7%), 8 genitourinary (7.0%) and 7 (6.1) gastrointestinal diseases. Neurological pathologies resulted in 3 death cases whilst endocrinal and musculoskeletal pathologies resulted in 1 death case each. There was male dominance

over the females in all systemic anomalies except for cardiovascular, genitourinary and musculoskeletal diseases as depicted in [Table 2]. From table 3, demographics of homicides revealed a higher male prevalence (62.7%) than the females (22%). Most homicides were as a result of blunt injuries sustained from assault (23 cases, 37.3%). Nineteen (32.2%) were due to gunshot and 5 (8.5%) deaths were due to stabbing. Strangulation accounted for 4 (6.8%) death cases whilst chemical poisoning, decapitation and lynching led to 2 (3.4%) homicidal cases each. One (0.9%) person each was killed via smothering, sharp-edged assault and thermal burns.

Road traffic accidents (51.3%), drowning (18.5%), drug overdose/poisoning (4.2%) and electrocution (2.5%) were some factors leading to accidental deaths. The rest include fall from height, trapped in a pit or collapsed and thermal burns from fire outbreak which accounted for 5.9% accidental deaths each whilst aspiration, crushed injuries and miscarriage accrued 0.8% death each. Approximately 1.7% each was due to accidental mechanical explosion and trauma as seen in [Table 4].

**Table 1: Frequency Distribution of Sex and Manner of Death.**

	Frequency	Percentage (%)
<b>Sex</b>		
Female	102	33.7
Male	201	66.3
Total	303	
<b>Manner Of Death</b>		
Accidental	119	39.3
Natural	114	37.6
Homicide	59	19.5
Suicide	7	2.3
Unascertained	4	1.3
Total	303	

**Table 2: Trend of Natural Deaths among Males and Females.**

Natural (Diseases)	Sex (%)		Total	p-value
	Female	Male		
Cardiovascular	24 (21.1)	19 (16.7)	43 (37.7)	0.169
Respiratory	12 (10.5)	20 (17.5)	32 (28.1)	
Hepatobiliary	4 (3.5)	15 (13.2)	19 (16.7)	
Urogenital	5 (4.4)	3 (2.6)	8 (7.0)	
Gastrointestinal	3 (2.6)	4 (3.5)	7 (6.1)	
Neurological	1 (0.9)	2 (1.8)	3 (2.6)	
Endocrine		1 (0.9)	1 (0.9)	
Musculoskeletal	1 (0.9)		1 (0.9)	
Total	50 (43.9)	64 (56.1)	114 (100.0)	

Suicide was committed by only males. The act was predominantly carried out via chemical poisoning accounting for 57.1% of suicidal deaths (4 cases). Hanging (28.6%) and gunshot (14.3%) were the other methods of committing suicide in present study [Table 5].

Most medicolegal cases in present study was due to road traffic accident (61 death cases). This was

followed by cardiovascular (43 cases) and respiratory (32 cases) diseases. There were 24 deaths cases due to blunt trauma assault, 22 deaths by drowning, 20 by gunshot, 19 by hepatobiliary diseases, 11 due to chemical poisoning and 8 by genitourinary diseases. Four death cases had undetermined/unascertained cause of death due to extensive decomposition. The least external cause of

death was due to aspiration, sharp-edge assault injury, endocrine and musculoskeletal diseases,

crushed injuries, miscarriage and smothering as seen in [Table 6].

**Table 3: Sex Distribution of External Factors of Homicides.**

Homicide	Sex (%)		Total	P-Value
	Female	Male		
Blunt Injuries Assault	8 (13.6)	14 (23.7)	23 (37.3)	0.181
Gunshot	6 (10.2)	13 (22.0)	19 (32.2)	
Stabbing	1 (1.7)	4 (6.8)	5 (8.5)	
Strangulation	1 (1.7)	3 (5.1)	4 (6.8)	
Chemical Poisoning	2 (3.4)		2 (3.4)	
Lynched		2 (3.4)	2 (3.4)	
Decapitation	2 (3.4)		2 (3.4)	
Smothering	1 (1.7)		1 (1.7)	
Sharp-Edged Assault	1 (1.7)		1 (1.7)	
Thermal Burns		1 (1.7)	1 (1.7)	
Total	22 (37.3)	37 (62.7)	59 (100.0)	

**Table 4: Distribution of Males and Females Involved in Accidental deaths.**

Accident	Sex (%)		Total	p-value
	Female	Male		
RTA	17 (14.3)	44 (37.0)	61 (51.3)	0.548
Drowning	5 (4.2)	17 (14.3)	22 (18.5)	
Fall From Height	1 (0.8)	6 (5.0)	7 (5.9)	
Thermal Burns	3 (2.5)	4 (3.4)	7 (5.9)	
Trapped (Collapsed Building)	2 (1.7)	5 (4.2)	7 (5.9)	
Drug Overdose/Poisoning		5 (4.2)	5 (4.2)	
Electrocution		3 (2.5)	3 (2.5)	
Blunt Injury Trauma		2 (1.7)	2 (1.7)	
Mechanical Explosion		2 (1.7)	2 (1.7)	
Aspiration Of Food		1 (0.8)	1 (0.8)	
Crushed Injuries		1 (0.8)	1 (0.8)	
Miscarriage	1 (0.8)		1 (0.8)	
Total	29 (24.4)	90 (75.6)	119 (100.0)	

**Table 5: Suicidal Death Pattern among Males.**

Suicide	Sex (%)		Total
	Male	Female	
Chemical Poisoning	4 (57.1)		4 (57.1)
Hanging	2 (28.6)		2 (28.6)
Gunshot	1 (14.3)		1 (14.3)
Total	7 (100.0)		7 (100.0)

**DISCUSSION**

Forensic autopsies accounted for 18.1% of the total autopsy examination at study site in 2015. Mortality rate among the males were approximately twice that of the female corresponding to 66.3 and 33.7% respectively. This trend is in harmony with most studies conducted across the globe. Studies by Anjanamma et al,<sup>[3]</sup> Basunde et al,<sup>[5]</sup> and He et al

recorded similar male mortality rate as present study.<sup>[6]</sup> A higher male mortality rates were documented by studies conducted in Saudi Arabia (90%), Egypt (84.6%) and Nigeria (81.4%).<sup>[2,7-8]</sup> Dayanand et al in India also recorded a dominant but lower male prevalence (58.65%) than that of present study.<sup>[9]</sup> The male dominance can be ascribed to the exposure to environment due to outdoor work activities, putting them at higher risk than females.

**Table 6: Demographics of Manner of Death with the various Cause of Death.**

Cause Of	Manner Of Death	Total	P-
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Death	Accidental	Homicide	Natural	Suicide	Unascertained	Value
RTA	61					61
Cardiovascular			43			43
Respiratory			32			32
Blunt Injuries Trauma	2	22				24
Drowning	22					22
Gunshot		19		1		20
Hepatobiliary			19			19
Poisoning/Drug Overdose	5	2		4		11
Genitourinary			8			8
Fire Outbreak/Thermal Burns	7	1				8
Fall From Height	7					7
Gastrointestinal			7			7
Trapped Collapsed Building)	7					7
Stabbing		5				5
Decomposed					4	4
Strangulation		4				4
Electrocution	3					3
Neurological			3			3
Decapitation		2				2
Mechanical Explosion	2					2
Hanging				2		2
Lynched		2				2
Aspiration of Food	1					1
Crushed Injuries	1					1
Sharp-Edged Assault		1				1
Endocrine			1			1
Miscarriage	1					1
Musculoskeletal			1			1
Smothering		1				1
Total	119	59	114	7	4	303

0.00

Most death cases were attributed to unnatural cause accounting for about 61.1% of all medicolegal cases. Approximately 37.6% natural deaths was recorded whilst 1.3% had undetermined/unascertained cause of death. Husaini et al recorded 73.59% unnatural death (modal manner of death),<sup>[10]</sup> 25.31% natural deaths and 1.1% undetermined manner of death which concords with current study. A study in China documented 13.8% undetermined manner of death and 1.8% natural deaths.<sup>[6]</sup> The low undetermined death in this study shows a high efficiency on the part of the forensic pathologists and the police service in ensuring that autopsies are conducted at the right time to avoid extensive decomposition and

loss of vital evidence in pronouncing the manner of death. About one-third of deaths were of natural cause and this implies that Ghanaians must regularly check their health status to avoid sudden natural deaths.

Cardiovascular, respiratory, hepatobiliary and genitourinary pathologies (in descending order of prevalence) were the major causes of natural death. Cardiovascular diseases were mainly ischaemic heart diseases, myocardial infarction and cardiomegaly due to hypertension. Liver cirrhosis, hepatosplenomegaly and endstage fatty liver dominated hepatobiliary diseases whilst pneumonia and tuberculosis were the recorded for respiratory

diseases. Leukemia, pancreatitis and gangrenous bowels were identified for musculoskeletal, endocrine and gastrointestinal pathologies respectively. The trend of natural death of current study corresponds with that of Mandong et al in Nigeria.<sup>[8]</sup> This may be due to similarities in lifestyle or culture in Ghana and Nigeria. Both studies recorded dominant male prevalence for natural death but male to female ratio in Nigeria (6:1) outweighs that of present study (1.28:1). Patel et al contrastingly recorded respiratory diseases as the overriding natural cause of death in India.<sup>[11]</sup>

Unnatural death profile shows suicide, homicide and accidental death in ascending order of prevalence. This shows that Ghanaians are at a higher risk of getting involved in accidental death than committing suicide or being killed by another person. Similar trend is documented by studies in Nigeria and China.<sup>[6,8]</sup> Accident as the major manner of unnatural death is also showed by Anjanamma et al,<sup>[3]</sup> Husaini et al and Issa et al.<sup>[7,10]</sup> Contrarily, a higher suicidal death rate (than homicide) were recorded in their studies which is opposite to current study. Antipodal trend of manner of unnatural deaths were recorded in Germany and Egypt with modal suicidal and homicidal deaths respectively.<sup>[2,12]</sup>

Ghanaian men are at a higher risk of being involved in accidental death than females, though there was no significant correlation between sex and accidental death. Similar sentiment was identified among Germans, Chinese and Nigerians.<sup>[6,8,12]</sup> Road traffic accident contributed to more than half of accidental death in present study. This may be imputed to bad road, delinquent driving and inordinate number of vehicles on our roads. RTA as the major cause of accidental death in present study accords with majority of the studies across the globe.<sup>[35,12]</sup> Accidental drowning was common at the various mining sites in Ghana. Majority of the drowned were identified in mining pits followed by wells and rivers. More people were found to lose their lives via fall from height, fire outbreak (burns) or trapped under collapsed building than being poisoned, electrocuted or accidentally hit by blunt objects. Mechanical explosion, aspiration of food, crushed under a machine and miscarriages were minor causes of accidental in this study. Chinese and Indians were documented to accidentally die from drowning and thermal burns than being intoxicated/poisoned and this concurs with present findings. However, the assertion that Asians are more likely to die of poisoning than a fall from height contradicts findings in Ghana.<sup>[5,6]</sup> Mandong et al<sup>[8]</sup> also recorded more thermal burns cases than drowning, a polar finding to present study.

Homicide was the second cause of unnatural death in this study. Statistical insignificant relationship was established between sex and homicides showing a male dominance of approximately 62.7%. Majority of victims were killed via blunt object assault. This

was followed by gunshot, stabbing and strangulation. Chemical poisoning, decapitation, smothering and butchering were identified among only females. This peculiar findings can be ascribed to the escalating rate of killing women for rituals. Studies in Nigeria and Egypt confirm blunt trauma as the cardinal method of homicide in Africa.<sup>[2,8]</sup> People who are usually seen with sharp tools and guns in public are usually suspected to be criminals and hence the use of blunt objects such as wood, concrete blocks and fists are mostly used. The use of sharp objects was predominant in Asia whilst firearms were dominant in Europe.<sup>[6,12]</sup>

Suicide was the least option among all the unnatural deaths with absolute prevalence among men. Current study presented chemical poisoning as the ultimate suicide method. Organophosphate was the only chemical identified after toxicology. Hanging was the second suicidal method whilst gunshot was the least. This shows that most Ghanaians are likely to commit suicide by hanging than shooting themselves. A major contributory is the availability of tools for hanging such as rope, sponge and cloth as compared to guns or firearms. The preferred method of committing suicide in China was by hanging whilst that of India was mostly via thermal burns.<sup>[6,13]</sup>

The forensic autopsy and the police reports showed road traffic accident as the ultimate manner of death of all medicolegal autopsies in present study. This was followed cardiovascular and respiratory diseases. Blunt injury trauma and drowning were other external factors leading to death of Ghanaians in present study. This trend harmonize with a study in Nigeria by Mandong et al,<sup>[8]</sup> China by He et al and India by Anjanamma et al.<sup>[3,6]</sup> Studies in other African countries depicted blunt injury trauma as the major manner of death.<sup>[2]</sup> Findings by Dayanand et al and Issa et al also contrast present study,<sup>[7,9]</sup> documenting chemical poisoning as the peak manner of death.

## CONCLUSION

This study has shown that most of the medicolegal death cases in Ghana are due to unnatural causes, mainly accidental. Road traffic accident was the prime manner of death and this calls for an intervention of Road Safety Commission and the Motor Transport and Traffic Unit (MTTU) in the country to ensure discipline on our highway. Cardiovascular as the major cause of natural deaths shows the persistent of these diseases despite major health programs initiated to curb these anomalies. This study also shows high rate of homicide via blunt trauma. The police service must provide adequate security in our communities and not necessarily look out for weapons such as firearms or machete/knives which are generally perceived to be weapon of choice for murder. Suicide was common among Ghanaian men which mainly carried out via

chemical poisoning. Finally, Ghana is at high risk of losing most citizens (especially men) via sudden death and therefore all effort must be put in place protect lives of citizens.

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**How to cite this article:** Ossei PPS, Agyeman-Duah E. Trend of Medicolegal Manner of Deaths in Ghana: A Forensic Autopsy-Based Study. *Ann. Int. Med. Den. Res.* 2017; 3(4):PT56-PT61.

**Source of Support:** Nil, **Conflict of Interest:** None declared