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Age and gender distribution of violent fatalities: An autopsy study

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Abstract

This study investigated the age and gender distribution of fatalities resulting from violence to inform public health policy on the necessity for their prevention and management. This is a descriptive prospective study of the regional distribution of injuries in violent deaths in Nairobi; of all the bodies brought to the city mortuary Nairobi between June 1 2009, and May 31 2010. Data was entered on a proforma data sheet. Data were analysed using SPSS 11.5.0 (SPSS Inc., Chicago, and III.) It is presented using frequency tables, graphs and pie charts. This study found out that the age range of the study individuals was 10-79. The highest deaths were in the age group 30-39 at 39 per cent, followed by the age group 20-29 at 38 per cent, while the least deaths were in the age group 70-79 at 0.1 per cent. Violent deaths due to homicides were highest in the 20-29 age group at 46.7 per cent, followed by the 30-39 age group at 36.5 per cent, with the age being between 10-59 years. Accidents comprised of road traffic and other accidents. The Peak age group of deaths was 30-39 at 44.6 per cent, followed by the 20-29 age group at 28.1 per cent with the age range of 10-59. In suicide, the age range was 10-39, with the highest age group being 30-39 at 37.5 per cent. Followed by the age group of 20-29 at 37 per cent.

Key words: Autopsy, deaths, gender, public health policy, violence.

INTRODUCTION

Violence causing fatal trauma to the body, the commonest cause of unnatural death, is a preventable leading global public health problem. Violent deaths are categorised as those due to homicide, accidents or suicide. In the United States, violent deaths from suicides, homicides, and accidents are the leading causes of death of people aged 1-39 (Mohan et al., 2006). Violent fatalities show gender and age variations.

Violence was declared by the World Health Assembly as a leading global public health problem (WHO, 1999). This declaration acknowledged the importance of enforcing a global strategy to address the problem of violence as a health issue that is preventable. First and foremost, is to build the foundation necessary to control and prevent violence is measuring and analysing the nature of the problem in individual countries (WHO, 2000). Africa studies indicate that violence rates are higher in Africa as compared to other continents; and that there is also considerable variation in homicide rates between different urban centers (Plain, 2006).

The global rate of total female homicide in 2017 was estimated to be 2.3 per 100,000 female population, the global female intimate partner/family-related homicide rate was 1.3, while the intimate female partner homicide rate was estimated at 0.8 per 100,000 female population (UNODC, 2019).

LITERATURE REVIEW

Various studies demonstrate that violent deaths predominantly involve males. The highest prevalence is 93.3 per cent in Dar es Salaam, Tanzania (Outwater et al., 2008), followed by 82.6 per cent in Northern Norway, 60 per cent in Manipal, Southern India.,(Mohanty et al., 2006), 77 per cent (Kellermann & Mercy, 1992) One study however, reveals female predominance of 73 per cent in Trakya, Turkey (Azmak, 2006). A study by Sanford et al., (2006) indicated as follows suicide and homicide rates were lower for females as compared to males. For suicidal cases, females were diagnosed with depression as compared to their male counterparts 55 per cent 36 per cent), a yhucurrent mental health problem (66 per cent v 42 per cent) or a history of suicide attempts (25 per cent v 13 per cent). Firearms were largely used to commit suicide in 65(%) of males and 42 per cent of females. Poison-taking was more common in female than male suicides (37 per cent v 12 per cent). Both male and female homicide victims indicated to have died from a handgun or a sharp instrument. Fifty-seven per cent of female homicides involved intimate partner violence, compared with 15 per cent of male homicides. Among female homicides involving intimate partner violence, 78 per cent occurred in women's homes. White females were most affected as compared to the African -American females, but African -American females formed a higher rate of homicide than white females in an autopsy study involving one hundred and twenty-two accident fatalities, one hundred and three (86%) cases were males (Mandong et al., 2006).

A study on unnatural deaths in Manipal, southern India, by Mohanty et al. (2006) indicated that male preponderance was quite evident at 71.4 per cent except for death due to burns, where the females were more at 74.4 per cent. A Medicolegal Autopsy study conducted by Ivar and Leif (1998) indicated that out of all the violent fatalities, 82.6 per cent were males, while a study on fatalities resulting from road traffic accidents conducted by Kamdar and Arden (1974) showed that 79 per cent of the victims were males. A study on homicide and suicide conducted by Akhiwu et al. (2000) showed that the rates were higher in males 81 per cent and 76.7 per cent in homicide and suicide, respectively. A Suicide study by Azmak (2006) indicated that in suicides, males constituted 78.1 per cent of the cases. Karn et al., 2011 in a homicide study found that males were most of the time victims at 80 per cent. Another medicolegal autopsy study on homicide by Hilal et al. (2005) indicates that males were the majority at 83.06 per cent. Intentional injury victims in the analysed autopsy reports by Plains (2006) showed that it comprised predominantly males at 89 per cent. An Analysis of Medicolegal autopsies by Afandi (2012) showed that victims of unnatural deaths were largely males at 75.9 per cent.

The majority of studies reveal the age group 21-40 years to be the most dominant, 73 per cent (Mandong et al., 2006), 31 per cent (Sevitt, 1973), 52 per cent (Mc Coy et al., 1989), a medicolegal autopsy study by Meel (2007) indicated that 52 per cent of the victims in motor vehicle accidents ranged from ages of 21 and 40 years. A study on deaths due to road traffic accidents conducted by Hanifa et al. (2006) indicated that overall most cases were seen in the age group 20-29 years at 27 per cent, a

study on fatalities resulting from road traffic accidents conducted by Kamdar and Arden (1974) indicated that 62 per cent of the victims ranged from age 12 to 60 years, of these 28 per cent were between 12 and 30 years and 34 per cent between 30 and 60 years. The largest number of victims of suicidal deaths were of the age group 21-30 years, Mohanty 2006. A study on homicide and suicide conducted by Akhiwu et al. (2000) showed that the majority of the victims of homicide and suicide rates between 20 and 40 years. A Suicide study by Azmak (2006) indicated that suicides comprised 16.1 per cent of all forensic autopsies and that 27 per cent of the cases were aged between the ages of 21 and 30 years, with a mean age of 39.7 years. Karn et al. (2011), in a homicide study, found that the victims were largely from the age group of 21 to 40 years, 52 per cent. Another medicolegal autopsy study on homicide by Hilal et al. (2005) indicates that 72.74 per cent of the victims were aged between 21 and 50 years. In an autopsy study analysis conducted by Plainis et al. (2006), the mean age in the intentional deaths group was 34±9.6 years. An Analysis of Medicolegal autopsies by Afandi (2012) showed that victims of unnatural deaths were a majority in the age group of 21 to 30 years at 32.5 per cent.

METHODOLOGY

Materials were all the bodies that fulfilled the criteria of violent fatal outcome between June 1, 2009, and May 31 2010. Bodies were categorised by gender and divided into ten age groups of 10 years each. A complete forensic autopsy examination was done on each, and details of causes, site and extent of injury were recorded on a data collection form. The Kenyatta National Hospital/University of Nairobi Ethics and Research Committee sought the study's approval. Authority to conduct the study was sought from the Medical Officer of Health, Nairobi City Council, and permission was obtained from the Superintendent and pathologist in charge of the city Mortuary. Conducting autopsies was done professionally, adhering to ethics that include consent from the relatives and confidentiality of the information gathered. Only vitreous humour was taken from the bodies. Coding of the information was done to delink the samples from the source. The Data sheets were handled confidentially. Data was entered on a proforma data sheet. The day, date, day of the week, month and times of death were noted. The cases were divided into male and female, and each gender was divided into eight age groups. Data were analysed using SPSS 11.5.0 (SPSS et al., and III.) It is presented using frequency tables, graphs and pie charts.

RESULTS AND DISCUSSION

Autopsies were conducted on 2566 bodies over a period of one year, out of which 124 cases were excluded due to natural deaths (82) and those whose cause of death could not be ascertained at post-mortem, 42 (Table 1).

Table 1: Distribution of Deaths by Category in Nairobi, Kenya

Cause of deaths	Number	Percentage (%)
Violence	2442	95.2
Natural	82	3.2
Unascertained	42	1.6
Total	2566	100

There were 2,442 cases of violent deaths, and the causes of death were distributed amongst all the known causes of violent deaths, namely homicide, suicide and accidents. The most common cause of death was homicide at 47.3 per cent, followed by accidents at 43.6 per cent, while the least common cause was suicide at 9.1 per cent. (Table 2).

Table 2: Distribution of Violent Deaths by Cause in Nairobi, Kenya

Cause of deaths	Number	Percentage (%)
Homicide	1154	47.3
Accident	1064	43.6
Suicide	224	9.1
Total	2442	100

Violent Deaths: Age Distribution

The 2,442 cases of violent deaths had an age range of 10 – 79 years. The highest number of deaths was in the age group 30-39 at 39 per cent, followed by the age group 20-29 at 38 per cent while the least deaths were in the age group 70-79 at 0.1 per cent (Table 3).

Table 3: Distribution of Violent Deaths by Age in Nairobi, Kenya

Age in years	Numbers	Percentage %
10-19	37	1.5
20-29	928	38
30-39	952	39
40-49	415	17
50-59	98	4
60-69	10	0.4
70-79	2	0.1
Total	2442	100

Homicide

Violent deaths due to homicides were high in the 20-29 age group at 46.7 per cent, followed by the 30-39 age group at 36.5 per cent. The age range was between 10-59 years. Gunshots were the highest in the 20-29 age group at 51, 7 per cent, followed by the 30-39 age group at 33.4 per cent. Blunt injuries came second with a peak age of 20-29 at 42.5 per cent, again followed by the age group 30-39 at 37.0 per cent. The peak age for stabbing injuries was 30-39 at 57.6 per cent, while the least cause of death in this category was strangulation, with a peak age group of 30-39 at 50 per cent (Table 4).

Table 4: Homicide by Category and Distribution by Age in Nairobi, Kenya

Age Groups	10 - 19		20 - 29		30 - 39		40 - 49		50 - 59		Totals	
	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
Gunshots	5	1.	273	51.7	177	33.4	72	13.5	2	0.4	529	100
Blunt injuries	13	2.86	193	42.5	168	37.0	75	16.5	5	1.1	454	100
Stabbing	0	0	65	38.4	96	57.6	6	3.8	0	0	167	100
Struggled	0	0	1	25	2	50	1	25	0	0	4	100

Pearson's X^2=28.86, P=0.0041 (statistically significant)

Accidents

Accidents comprised of road traffic and other accidents. The peak age group of deaths was 30-39 at 44.6 per cent, followed by the 20-29 age group at 28.1per cent. The age range was from 10-59. In road traffic accidents (RTA), the pattern of distribution by class and age, amongst pedestrians, the highest number of deaths was recorded for the age group 30-39 at 43.4 per cent, followed by the age group 20-29 at 26.8 per cent. For cyclists, the highest) number of deaths was recorded in the age group 30-39 at 44.8 per cent, followed by the age group 20-29 at 27.7per cent. For the drivers, the highest number of deaths was recorded for the age group 40-49 at 33.3 per cent, followed by the age group 20-29 at 28.8 per cent, and finally, amongst the passengers, the highest number of deaths was recorded for the age group 30-39 at 40.1 per cent, followed by the age group 40-49 at 25.7 per cent (Table 5).

Table 5: RTA by Class of Persons and Age in Nairobi, Kenya

Age Groups	10 - 19		20 - 29		30 - 39		40 - 49		50 - 59		60 - 69		Totals	
	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
Pedestrian	6	1.3	117	26.8	211	43.4	82	18.8	20	4.5	0	0	436	100
Cyclists	5	2.13	65	27.7	105	44.8	44	18.8	15	6.4	0	0	234	100

Drivers	0	0	13	28.8	12	26.6	15	33.3	5	11.1	0	0	45	100
Passengers	0	0	54	25.2	86	40.1	55	25.7	19	8.8	0	0	214	100

X^2=23.85, P=0.0213 (statistically significant)

In other accidents**,** the distribution of deaths by cause and age showed subtle variations. The highest age range was 20-49 for all, except for the cases of falling from heights that were 10-49. The highest number of fatalities from falls from the train was recorded in the 30-39 age group at 71.4 per cent. Drowning recorded the highest fatalities in the 20-29 age group at 45.2 per cent. Burns had the highest fatalities in the 30-39 age group at 55 per cent, electrocution had the highest fatalities in the 30-39 age group at 35 per cent, while falling from a height recorded the highest fatalities in the 20-29 age group at 45 per cent (Table 6).

Table 6: Distribution of Other Accidents by Age (years) in Nairobi, Kenya

Cause of death	10 - 19		20 - 29		30 - 39		40 - 49		Totals	
	No.	%	No.	%	No.	%	No.	%	No.	%
Falls from train	0	0	1	14.3	5	71.4	1	14.3	7	100
Drowning	0	0	16	45.2	12	33.3	7	21.4	35	100
Burns	6	10	17	31	31	55	2	4	56	100
Electrocution	2	10	4	25	6	35	5	30	17	100
Fall from heights	1	5	9	45	7	35	3	15	20	100

X^2=21.14, P=0.0213 (statistically significant)

Suicide

In suicide, the age range was 10-39, with the highest age group being 30-39 at 37.5 per cent next followed by the age group of 20-29 at 37 per cent. Suicide by age varied among the causes. Fatalities by hanging had a peak in the age group of 30-39 at 36.7 per cent, followed by the age group of 20-29 at 33.3 per cent. Poisoning had a peak in the age group of 20-29 at 56.5 per cent, followed by the age group of 30-39 at 36.5 per cent (Table 7).

Table 7: Distribution of Categories of Suicide by Age in Nairobi, Kenya

Age Groups	10 - 19		20 - 29		30 - 39		40 - 49		Totals	
	No.	%	No.	%	No.	%	No.	%	No.	%
Poisoning	0	0	23	56.5	15	36.5	3	7.31	41	100
Hanging	7	4.1	59	33.3	65	36.7	46	25.9	177	100
Stabbing	0	0	21	0	1	100	0	0	1	100
Jumps from heights	0	0	1	20	3	60	1	20	5	100

Violent Deaths: Gender Distribution with the Age Range of 10 – 7

The distribution of the 2,442 cases of violent deaths showed variation by gender. Males comprised the largest group at 2256, 92.4 per cent. The highest number of deaths in males was recorded in homicide at 96 per cent and accidents at 88 per cent. Amongst females, the common cause of violent deaths was accidents at 66 per cent, followed by homicides at 23.7 per cent. The last of the female fatalities were from suicides at 10.3 per cent (Table 8).

Table 8: Distribution of Causes of Death by Gender in Nairobi, Kenya

	Male **No %**	**Female** **No %**	**Totals**
Homicide	1108,96	46,4	1154
Accidents	936,88	128,12	1064
Suicides	204,91	20,9	224

X^2=38.72, P<0.0001 (statistically significant)

Homicide

In homicides**,** males contributed the largest number of deaths, with the highest figure being recorded in gunshots, 52.7 per cent, followed by blunt injuries, 34 per cent. Amongst females, the largest number was recorded in blunt injuries, 57.5 per cent (Table 9).

Table 9: Categories of Homicide by Gender in Nairobi, Kenya

Gunshots	(471),89%	(58),11%
Blunt injuries	(304) ,67%	(150),33%
Stabbing	(117),70%	(50),30%
Strangled	(1) 25%	(3)75%

Accidents

In accidents, males were the majority 944, 88.7 per cent. The highest number of deaths, 43 per cent, was recorded among pedestrians, followed by cyclists at 22.9 per cent and passengers at 19.6 per cent. The least number was from those who were electrocuted, at 0.6 per cent. Amongst females, the highest fatalities were recorded from pedestrians at 26 per cent, followed by passengers at 23.4 per cent (Table 10).

Table 10: Distribution of Accidents by Gender in Nairobi, Kenya

	Male %	**Female %**
Pedestrian	(404).92.7%	(32)7.3%
Cyclists	(215),91.8%	(19),8.1%
Drivers	(42),93.3%	(3) 6.7%
Passengers	(185)86.4%	(29)13.6%
Falls from trains	(7),100%	(0),0%
Drowning	(29),83.3%	(6),16.7%
Burns	(39),70.1%	(17),29.9%
Electrocution	(6),35%	(11),65%
Fall from a height	(13),65%	(7),35%

Suicide by Gender

In suicide, males comprised the largest number, 77.7 per cent, with the highest being recorded in hanging, 75.3 per cent. Amongst females, hanging recorded the highest number of fatalities at 92 per cent (Table 11).

Table 11: Distribution of Suicide by Gender in Nairobi, Kenya

Poisoning	(39),95%	(2)5%
Hanging	(131),74%	(46),16%
Stabbing	(1)100%	(0) 0%
Jumping from a height	(3) 60%	(2)40%

This study of violent fatalities that had the age range of 10-79 found the highest deaths were in the age group 30-39 at 39 per cent, followed by the age group 20-29 at 38 per cent, while the least deaths were in the age group 70-79 at 0.1 per cent. This is in concurrence with the study conducted by Mohan et al., (2006) which indicated that violent deaths from suicides, homicides, and accidents are the leading cause of death of people aged 1-39.

Violent deaths due to homicides were highest in the 20-29 age group at 46.7 per cent, followed by the 30-39 age group at 36.5 per cent, .with the age being between 10-

59 years. Accidents comprised of road traffic and other accidents. The peak age group of deaths was 30-39 at 44.6 per cent, followed by the 20-29 age group at 28.1 per cent with the age range of 10-59. In suicide, the age range was 10-39, with the highest age group being 30-39 at 37.5% per cent. Next was followed by the age group of 20-29 at 37 per cent.

The majority of studies reveal the age group 21-40 years to be the most dominant, 73 per cent (Mandong et al., 2006), 31 per cent (Sevitt, 1973), 52 per cent (Mc Coy et al., 1989), a medicolegal autopsy study by Meel (2007) indicated that 52 per cent of the victims in motor vehicle accidents ranged from ages 21 to 40 years. A study on deaths due to road traffic accidents conducted by Hanifa et al. (2006) indicated that overall most cases were seen in the age group 20-29 years at 27 per cent, a study on fatalities resulting from road traffic accidents conducted by Kamdar and Arden (1974) indicated that 62 per cent ranged from age 12 and 60 years, of these 28 per cent were between 12 and 30 years and 34 per cent between 30 and 60 years. The largest number of victims of suicidal deaths ranged from age 21-30 years, Mohanty et al., (2006). A study on homicide and suicide conducted by Akhiwu et al. (2000) showed that the majority of the victims of homicide and suicide were of the age group 20 to 40 years. A Suicide study by Azmak (2006) indicated that suicides comprised 16.1 per cent of all forensic autopsies and that 27 per cent of the cases were aged between the ages of 21 and 30 years, with a mean age of 39.7 years. Karn et al. (2011), in a homicide study, found that the victims largely belonged to the age group 21 to 40 years 52 per cent. Another medicolegal autopsy study on homicide by Hilal et al. (2005) indicates that 72.74 per cent of the victims were aged between 21 and 50 years. In an autopsy study analysis conducted by Plains et al. (2006) the mean age in the intentional deaths group was 34±9.6 years. An Analysis of Medicolegal autopsies by (Afandi) 2012 showed that victims of unnatural deaths were a majority in the age group of 21 to 30 years at 32.5 per cent.

The distribution of violent fatalities showed variation by gender. Males comprised the largest group at 92.4 per cent. The highest number of deaths in males was recorded in homicide at 96 per cent and accidents at 88 per cent. Amongst females, the common cause of violent deaths was accidents at 66 per cent, followed by homicides at 23.7 per cent. The least fatalities were from suicides at 10.3 per cent.

The global rate of total female homicide in 2017 was estimated to be 2.3 per 100,000 female population, the global female intimate partner/family-related homicide rate was 1.3, while the intimate female partner homicide rate was estimated at 0.8 per 100,000 female population (UNODC, 2019).

Various studies demonstrate that violent deaths predominantly involve males. The highest prevalence is 93.3 per cent in Dar es Salaam, Tanzania (Outwater et al., 2008), followed by 82.6 per cent in Northern Norway, 60 per cent in Manipal, Southern India.,(Mohanty et al., 2006), 77 per cent (Kellermann et al., 1992) One study however, reveals female predominance of 73 per cent in Trakya, Turkey (Azmak, 2006). A study by Sanford et al. (2006) indicated as follows suicide and homicide rates were lower in females as compared to males. For suicidal cases, more females were diagnosed with depression (55 per cent v 36 per cent) as compared to males, a current mental health problem (66 per cent v 42 per cent) or a history of suicide attempts (25 per cent v 13 per cent). Firearms were the main method of suicide in 65 per cent of males and 42 per cent of females. Poison-taking was more common in female than male suicides (37 per cent v 12 per cent). Male and female homicide victims died mostly from a handgun or a sharp instrument. Fifty-seven per cent of female homicides involved intimate partner violence, compared with 15 per cent of male homicides. Among female homicides involving intimate partner violence, 78 per cent occurred in women's homes. White females committed more suicides than African - American females, but African -American females had a higher rate of homicide than white females in an autopsy study involving one hundred and twenty-two accident fatalities, one hundred and three (86%) cases were males (Mandong et al., 2006).

A study on unnatural deaths in Manipal, southern India, by Mohanty et al. (2006) indicated that male preponderance was quite evident at 71.4 per cent except for death due to burns, where the females were more at 74.4 per cent. A Medicolegal Autopsy study conducted by Ivar and Leif (1998) indicated that out of all the violent fatalities, 82.6 per cent were males, while a study on fatalities resulting from road traffic accidents

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CONCLUSION AND RECOMMENDATION

Conclusion: According to this study, violent fatalities largely involve the male gender and the age group most affected is from 20 to 40 years.

Recommendation: These findings ought to be taken into account in the development of violence prevention efforts.

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