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RESEARCH ARTICLE
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AUTOPSY FINDINGS IN RELATION TO AGE AND GENDER: A CROSS-SECTIONAL STUDY

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Abstract
Objective: To evaluate autopsy findings in relation to age and gender.
Study design: Retrospective observational study
Duration and place of study: This study was conducted in Karachi Medical and Dental College Karachi from May 2024 to May 2025
Methodology: The study has 300 medicolegal autopsy cases which were examined in this retrospective and observational study. Data on demographical consideration, age, gender and the reason of deaths were read and classified. Descriptive statistics were used to evaluate trends that occur among different age groups and gender.
Results: Of 300 autopsies, 224 (74.7%) were of males and 76 (25.3%) were of females. Deaths were most prevalent among the aged group 3959 years (57.3%) followed by 1838 years (28.3%) and 60 or above (14.4%). The predominant cause of death was road traffic accidents which contributed to 69 cases (23.0%). These were followed by injuries with a firearm (57, 19.0%), asphyxial deaths (55, 18.3%), assaults (51, 17.0%), poisoning (29, 9.7%), and electrocution (24, 8.0 percent). The cause of death reported was unascertainable in 15 cases (5.0%). In every category, more men as compared to women were affected, especially in road traffic accidents, gunshots and assaults.
Conclusion: The results of autopsy revealed that middle-aged males are most affected with the leading causes being the road traffic accidents, death by gun, and asphyxial. These findings indicate the significance of age and gender to the interpretation of mortality trend and the ongoing relevance of autopsies to the forensics and clinical practices.

Keywords: Autopsy, Age, Gender, Mortality, Forensic Medicine

Introduction

Autopsy is considered one of the most useful instruments in the medical and forensics sciences that is used to identify the absolute cause of death, provided it is a correct diagnosis made by the physician, and addition of epidemiology data [1,2]. Though diagnostic techniques are improving, the discordance between clinical findings and post-mortem findings still exists, which, once again, points out the pertinence of autopsy in the field of quality assurance and education-related medicine [3,4].

Worldwide, autopsy rates have shrunk over the past decades because of the availability of alternative diagnostic methods, cultural objection and the absence of family authorization [5,6]. Nevertheless, medicolegal autopsies continue to be required in the presence of unnatural, sudden, or suspicious deaths, and can serve as critical information to the healthcare and judicial system [7,8]. In forensic practice, the examination of age and gender distribution of the autopsy-detected causes of death is useful in determining groups at risk and mortality trends that can be used to develop preventative measures and population health responses [9,10].

In previous research, male dominance in autopsy series has been well established especially in the event of traumatic, violent and accidental death [11,12]. Another key determinant is age, whereby individuals in the middle-age are most frequently affected since they have a higher exposure to occupational risks, road accidents and violence among others [13]. Causes of unnatural deaths are common due to road traffic accidents, gunshots, asphyxial deaths, overdoses, and electrocutions [14,15]. Nevertheless, unnatural deaths in low- and middle-income countries have become a heavy burden because of low traffic enforcement, availability of firearms, and lax workplace safety codes [16,17]. In South Asian countries, such as Pakistan, road traffic accidents and a violent attack are reported as the most common cause of death and mostly in younger and middle-aged men [18,19]. This is congruent with international statistics of areas like the Africa and Latin America where autopsies show high percentage of fatalities caused by trauma and violence [20,21].

Although the role of autopsy finding has long been regarded as significant, local literature on their relationship with the demographics variables (age and gender) has been relatively scarce. The evaluation of such trends is critical in the guidance of policy formulators, strengthening of medicolegal systems and the reinforcement of preventive health approaches [22].

The objective of the present study was to establish the correlation between autopsy findings and age and gender, with the intention of coming up with the most frequent causes of death and various demographic trends of a medicolegal autopsy-based series.

Methodology

To achieve this, the study was developed as a retrospective cross sectional observational study that utilised existing medicolegal autopsy records. The research sample used (300) consisted of all autopsy cases involving individuals at the age of 18 years and above. The gender of both males and females was involved and a number of causes of deaths that present themselves in the field of medicolegal practice were addressed. The autopsies with incomplete explanations, incomplete demographic information and those with ambiguity in assigning cause of death were not included in order to keep the reliability of the data. The retrospective nature of the study enabled the examination of the relationship between mortality and a specific population over a given time without the requirement that the study interacts directly with patients, or their relatives.

The data was obtained by scrutinizing autopsy reports to obtain areas of interest. All the records were evaluated based on the demographic attributes such as gender as well as age, and the last cause of demise as reported at the post-mortem report. To promote analysis, age was categorized into three categories namely the young adult (18-38 years), middle-aged (39-59 years), and the old adults (60 years and above). The causes of death were grouped into seven major causes as asphyxial deaths, road traffic accidents, firearm injuries, undetermined causes, assaults, poisoning and electrocution. The categorization enabled a clearer picture to understand the distribution of deaths as far as the demographic factors are concerned.

Analysis and management of data was done in a way that was precise and confidential. All personal identifiers in the records had been removed to provide privacy. Data was initially entered in Microsoft Excel and then subjected to analysis using the SPSS version 26. Non-parametric tests were used to summarize data, and outcomes obtained as frequencies and percentages. The cross-tabulation methods were used to determine the nature of the relations between the age and gender on the cause of mortality, thus giving a more insightful reflection on the trends depicted in the autopsy reports. The statistical analysis was vital in underlining demographic trends as well as when comparing the manner in which death was distributed across the various subgroups.

The study took into account ethics in all its stages. As all the data were derivable in medicolegal autopsy reports, consent of patients was not necessary. The use and retrieval of these records, in academic and research processes, was, however, granted by the concerned institutional authorities. All the deceased people and their families were treated with absolute confidentiality and the information was not used in any other fancy outside scientific research and writing. The research was guided by the professional ethics with regard to the laws regarding the dead and the findings have been used to establish mortality patterns and inform medical and forensics in the area of forensic and medical practices.

Results

A total of 300 medicolegal autopsies was analyzed. Of these, 224 (74.7%) were male and, 76 (25.3%) were female, the male/female ratio being about 3:1. Regarding the age distribution, most of the deceased occurred in the middle aged range of 39-59 years comprising 172 cases (57.3%). These were preceded by 85 cases (28.3%) within the young bracket of 18-38 years, with 43 cases (14.4%) older than or equal to 60 years. Such results demonstrate that these people were the most common ones in the autopsy records pertaining to the middle age range.

Analysis of the causes of death revealed that road traffic accidents were the most common cause, representing 69 cases (23.0%). Firearm injuries were the second most frequent, documented in 57 cases (19.0%). Asphyxial deaths, including hanging and strangulation, were observed in 55 cases (18.3%), followed by deaths due to assault, which accounted for 51 cases (17.0%). Poisoning was identified in 29 cases (9.7%), while electrocution was responsible for 24 cases (8.0%). In 15 cases (5.0%), the exact cause of death could not be determined.

When examining the gender distribution across causes of death, it was found that males were disproportionately affected in nearly all categories. In road traffic accidents, 54 of the 69 victims were male, while only 16 were female. Similarly, out of 57 cases of firearm injuries, 45 were male compared with 12 females. Asphyxial deaths also showed a higher male predominance, with 42 males and 13 females. Assault-related fatalities were recorded in 41 males and 10 females, while poisoning was responsible for the deaths of 24 males and 5 females. Electrocution presented a relatively more balanced pattern, with 15 males and 9 females. In undetermined cases, 10 were male and 5 were female.

Further analysis of age distribution in relation to cause of death demonstrated that middle-aged individuals (39–59 years) contributed the highest proportion of deaths in most categories. Of the 69 road traffic accidents, 39 victims were middle-aged, 19 were between 18 and 38 years, and 12 were 60 years or older. Firearm injuries followed a similar trend, with 42 cases occurring in the 39–59 year group, 10 cases in the younger group, and 5 in those aged 60 or more. Asphyxial deaths showed 33 cases in the middle-aged group, 13 in younger adults, and 9 in older individuals. Assaults accounted for 34 deaths in the middle-aged, 13 in the younger group, and 4 among those aged 60 or above. Poisoning was most commonly seen in younger adults (12 cases), followed by 11 in the middle-aged group and 6 in older individuals. Electrocution was most frequent in the 39–59 year category with 13 cases, followed by 7 in the younger group and 4 in the older group. Among the 15 undetermined deaths, 7 occurred in young adults, 5 in middle-aged individuals, and 3 in the elderly.

Overall, these findings show that males in the middle-aged group were the most vulnerable population across nearly all categories of unnatural deaths, with road traffic accidents, firearm injuries, and asphyxial deaths being the leading contributors. Poisoning was more frequently

observed in younger adults, while electrocution and undetermined deaths displayed a more even distribution across age categories.

Table 1: Demographic information of the deceased (n = 300)

Variable	Count	Percentage (%)
Male	224	74.7
Female	76	25.3
18–38 years	85	28.3
39–59 years	172	57.3
≥60 years	43	14.4

Table 2: Frequency of causes of death (n = 300)

Cause of Death	Count	Percentage (%)
Road Traffic Accident	69	23.0
Firearm Injury	57	19.0
Asphyxial Death	55	18.3
Assault	51	17.0
Poisoning	29	9.7
Electrocution	24	8.0
Undetermined	15	5.0

Table 3: Causes of death by gender and age distribution (n = 300)

Cause of Death	Male	Female	18–38 years	39–59 years	≥60 years
Road Traffic Accident	54	16	19	39	12
Firearm Injury	45	12	10	42	5
Asphyxial Death	42	13	13	33	9
Assault	41	10	13	34	4
Poisoning	24	5	12	11	6
Electrocution	15	9	7	13	4
Undetermined	10	5	7	5	3

Discussion

This work examined 300 medicolegal autopsies and revealed that men were much more affected than women where the ratio is about 3 to 1. Middle-aged individuals between 39 and 59 years of age have proved to be the most frequent deaths with the leading causes of mortality being road traffic accidents, intimations by guns and asphyxial causes. These results are in line with prior research in other areas, supporting a global trend of male vis-a-vis middle-aged susceptibility to unnatural demise.

Our findings are also consistent with the findings of Azmak [23], who carried out a retrospective study on asphyxial deaths, and discovered a larger percentage belonging to males (75%), which are comparable to our percentage (76). Similarly, Roosen et al. [24] indicated that deviation between clinical and autopsy results was common in trauma-based cases and especially on individuals belonging to the male gender, reinforcing the necessity of post mortems to confirm the cause of death in such groups.

Road traffic accidents were the most frequent cause of death in our study (23.0%). This finding is in agreement with the study by Spiliopoulou et al. [25] in Greece, where road traffic accidents represented the largest category of medicolegal autopsies, predominantly among males in the working-age group. Similarly, a Brazilian study by Coradazzi et al. [26] also demonstrated that trauma, particularly from traffic accidents, was the major contributor to autopsy findings, highlighting the burden of preventable injuries in low- and middle-income countries.

Firearm injuries accounted for 19.0% of deaths in the present study, which is consistent with findings from Yang et al. [27], who reported a high frequency of firearm-related deaths in their national autopsy series in China. Although firearm accessibility varies globally, the pattern of male predominance and concentration in middle-aged groups observed in our study reflects similar demographic vulnerabilities.

Poisoning was identified in 9.7% of cases, most commonly affecting younger adults. This is comparable to the findings of Arafat et al. [28], who reported that intentional self-poisoning was more prevalent among younger individuals, particularly females, in their psychological autopsy study in Bangladesh. While our results showed a higher proportion of males, the age-related vulnerability remains consistent with their observations.

Electrocution accounted for 8.0% of deaths in our study, which is higher than in some international series. Pastores et al. [29], in their study of critically ill patients, observed far fewer electrocution cases but highlighted the role of occupational exposure as a contributing factor, which may explain the comparatively higher proportion in our population where safety regulations are often limited.

In general, our results reflect the findings of international sources indicating that males in the middle age range are the most usual victims of medicolegal autopsies, their causes are most frequently referred to as trauma, violence, and poisoning. These findings reaffirm the value of autopsies in determining mortality trends as well as validating clinical diagnoses and in informing preventive health and legal measures.

Conclusion

The current study shows that autopsy can play an important role in establishing demographic patterns and causes of death within the field of medicolegal activity. Young men in the middle age bracket also suffered disproportionately and road traffic accidents-related complications, gunshot, and asphyxial deaths were the cause of the highest mortalities. The results correspond to the trends that exist in the world and indicate the susceptibility of the younger and middle-aged population to the consequences of trauma and violence. Whilst all these new diagnostic modalities have developed, autopsy continues to be an invaluable resource to provide confirmation of cause of death, help reduce diagnostics discrepancies and add to both the medico-legal databases and the general health databases. The identification of age- and gender-based patterns of mortality should make it clear that some preventative measures should be adopted, such as the implementation of more aggressive traffic regulations, firearm control, awareness of the risks of poisoning and electrocution. Enhancement of autopsy in clinical and the forensic structure is always a source of valuable information to a healthcare system, policy-formulation apparatus, and mechanizations of justice.

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Permission

Ethical approval obtained

Conflict of Interest

None

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