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ORIGINAL ARTICLE

Mortality Profile of Autopsied Geriatric Population: A Retrospective Study from Eastern India

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Abstract:

The elderly or geriatric age group is more vulnerable not only to natural diseases but also to accidents, suicides, and homicides in developing countries. To study the epidemiology, age, sex, cause and manner of elderly who were brought for medicolegal autopsy, this retrospective review analysed post-mortem reports of the elderly age group (60 years and above), who were referred for medicolegal autopsy at SCB Medical College & Hospital, Cuttack, Odisha between January 1, 2018, to December 31, 2019. The elderly individuals accounted for 12.6% of autopsies during the study period and most of them belonged to the 60-64 year age group and showed male predominance (72.2%). Overall, craniocerebral injuries (32.7%) were found to be the leading cause of death in the autopsied geriatric population, followed by poisoning (21%, n=160). Among natural causes, non-communicable diseases such as cerebrovascular accidents (3.4%) and cardiovascular diseases(2.6%) were the chief cause of death than communicable diseases such as tuberculosis (0.3%). Regarding manner, accidents were more frequently reported than suicides, natural deaths, and homicides. Of note, suicides were twice as common in elderly females (n=127) than in elderly males (n=63). The results of the study highlight that accidents represented significant deaths among the autopsied elderly age group than suicides, homicides, and natural diseases in India. Medicolegal autopsies play a paramount role not only in the determination of the cause and manner of such deaths but also in providing mortality statistics for effective policymaking.

Keywords: Geriatric deaths; Accidents; Gerontology; Medicolegal autopsy; Poisoning; Suicide.

Introduction:

The elderly age group (≥ 60 years) is on the rise across the world. It has been estimated that the proportion of the elderly age group is increasing at a fast phase and is expected to contribute 16 % of the world population in 2050 against 10 % in 2022.[1] India, which become the world's most populous country in 2023, also faces the challenge of an unprecedented increase in the geriatric age group.[2] Various factors such as socio-economic status, lifestyle, availability of quality healthcare, increasing life expectancy, genetics, nutrition, and environment, etc. attributed to this ever-increasing population of the elderly.[3] The rising geriatric population pose a major public health challenge, especially in developing countries and their already constrained healthcare system because of their vulnerability to deaths from natural and unnatural causes. The knowledge of the mortality profile, which varies across countries and regions of a country, is imperative for any government and health care providers. Because the mortality data contributes to vital statistics, thus, in turn, exhibits the effectiveness of implemented programs and future policy making.[4] However, studies on elderly mortality are primarily devoted to natural deaths and their certification by physicians. There is a dearth of literature available on elderly mortality from medicolegal autopsies, which is crucial in determining the cause and manner of death in unnatural and suspicious deaths in the elderly, especially in India. Hence, the present study was carried out to investigate the mortality profile of the elderly or geriatric population (60 years and above) subjected to medicolegal autopsies at a tertiary health care centre in eastern India.

Materials and methods:

This descriptive retrospective study was conducted to assess the geriatric age group mortality among cases brought for medicolegal autopsy at the mortuary of the Department of Forensic Medicine & Toxicology, SCB Medical College & Hospital, Cuttack, Odisha after obtaining due clearance from the institutional ethics committee. The post-mortem reports along with their annexures such as the inquest report and viscera report were referred to during the study period ranging from January 1, 2018, to December 31, 2019. For the present study, the elderly or geriatric age group or senior citizens are considered to be individuals aged 60 years and above.[5] Post-mortem reports of unknown, decomposed bodies, and deceased aged less than 60 years were excluded from the study. The cause of death and manner of death were determined based on the police

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Table 1. Basic details of the studied population.

Year	2018	2019	Total
1. Number of autopsies performed			
Total autopsies	2682	3319	6001
Elderly Age Group	324	437	761 (12.6 %)
2. Sex of the geriatric population			
Males	239	311	550 (72.2 %)
Females	85	126	211 (27.8 %)
3. Age of the geriatric population			
60-64	118	160	278 (36.5 %)
65-69	62	107	169 (22.2 %)
70-74	63	89	152 (20 %)
75-79	45	39	84 (11.0 %)
80 & above	36	42	78 (10.3 %)
Total			761

Table 2. Cause of death in the geriatric population.

Cause of Death						
Variable	Cranio cerebral injuries	Poison-ing & its compli-cations	Burns & its compli-cations	Haemo-rrhage & Shock	Others (Vertebrospinal Injuries, CVA, envenomation, electrocution, etc)	Total
Sex wise Cause of Death						
Male	204	111	25	59	151	550 (72.2 %)
Female	45	49	58	14	45	211 (27.8 %)
Total	249 (32.7%)	160 (21%)	83 (10.9%)	73 (9.6%)	196 (25.8%)	761
Age wise Cause of Death						
60-64	84	59	26	29	80	278 (36.5%)
65-69	48	35	21	16	49	169 (22.3%)
70-74	58	28	17	17	32	152 (20%)
75-79	35	18	9	6	16	84 (11%)
80 & above	24	20	10	5	19	78 (10.2%)
Total	249 (32.7%)	160 (21%)	83 (10.9%)	73 (9.6%)	196 (25.8%)	761

or magistrate inquest report, the autopsy requisition, the post-mortem report, chemical, histopathological and other ancillary tests, and the crime scene investigation report (when available). The deceased aged 60 years and above, subjected to medicolegal autopsies were classified into the following categories: 60-64 years, 65-69 years, 70-74 years, 75-79 years, and > 80 years. The data were filled in structured proforma and entered into the MS Excel spreadsheet for further descriptive analysis.

Results:

A total of 6001 post-mortem reports (PMR) were reviewed for this study, of which 761 (12.6 %) were found to be eligible as per inclusion criteria and included in the analysis. Of the 761 geriatric autopsies reviewed, it was found that more than two-thirds of the autopsies (72.2%, n=550) were performed on males and less than one-third (27.8 %, n=211) were done on females. The majority of them belonged to 60-64 years (36.5 %, n=278) followed by 65-69 years(22.2%, n=169) and 70-74 years (20 %, n=152) (Table 1).

Table 3. Manner of death in the geriatric population.

Manner of Death					
Variable	Accidental	Suicidal	Natural	Homicidal	Total
Sex wise Manner of Death					
Male	350	63	58	15	486 (63.9%)
Female	138	127	10	0	275 (36.1 %)
Total	488 (64.1%)	190 (25%)	68 (9%)	15 (1.9%)	761
Age wise Manner of Death					
60-64	165	74	29	10	278 (36.5%)
65-69	105	44	19	1	169 (22.3%)
70-74	108	30	11	3	152 (20%)
75-79	58	21	5	0	84 (11%)
80 & above	52	21	4	1	78 (10.2%)
Total	488 (64.1 %)	190 (25%)	68 (9%)	15(1.9%)	761

Overall, craniocerebral injuries (32.7%, n=249) were found to be the leading cause of death in the autopsied geriatric population, followed by poisoning & its complications (21%, n=160). While craniocerebral injuries following traffic accidents contributed to the predominant deaths in males (n=204), burn and its complications were the major killer in females (n=58) (Table 2). Some of the other causes of death that were frequently encountered are vertebrospinal injuries (4.8 %, n=37), envenomation (4.4 %, n=34), and Asphyxia (3.4 %, n=26). Of note, natural causes were reported less frequently in our study as follows: cerebrovascular accident (3.4 %, n=26), cardiovascular diseases (2.6 %, n=20), senility/natural disease process (2.2 %, n=17), malignancy (0.3 %, n=3), and tuberculosis (0.3 %, n=3).

The results also revealed that nearly two-thirds of the geriatric deaths (64.1%) were due to accidents and one-fourth of them were due to self-harm i.e. suicide (25%). While accidents contributed to the majority of deaths among both males and females, suicides were found to be more frequently reported by females. Particularly, suicides were twice as common in females (n=127) than in males (n=63). Natural deaths like cardiovascular diseases and cerebrovascular accidents more commonly led to death in males than females in the autopsied geriatric population (Table 3).

Discussion:

This descriptive retrospective study was carried out to analyse the cause and manner of geriatric deaths brought for autopsies at a tertiary care teaching hospital in the Eastern Indian state of Odisha. The significant findings of the study are that craniocerebral injuries from accidents were the most common cause of death in both males and females. Poisoning and burns were the second most common cause of death among males and females, respectively. Suicides were twice the more commonly seen manner of death in females than males, whereas natural diseases resulted in majority deaths among males than females.

One of the main objectives of the medicolegal autopsy is the determination of the cause of death. The cause of death certified by autopsy surgeons in medicolegal deaths plays a crucial role in death registration with the local authorities and in the mortality statistics of a country. This, in turn, helps implement the policies and legal frameworks to combat the factors responsible for such deaths in the future. Our study results suggest that the geriatric

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age group in this part of eastern India are more prone to die due to craniocerebral injuries from traffic accidents followed by poisoning complications and burns. This is consistent with a study from Karnataka[6] and Uttar Pradesh[7] that reported blunt injuries to the head as the most common cause of death. This may be likely resulting from senility and natural diseases induced functional disturbances, cognitive impairment, movement and reflex abnormalities, and vision difficulties which make the elderly vulnerable to frequent falls and accident-related deaths.[8] However, our results are inconsistent with a study from Egypt[9] which reported Homicides as the most common manner of death and a study from Nigeria[10] which revealed natural diseases were the most common manner of death among the elderly age group. These discrepancies may be due to different socioeconomic status, culture, literacy, availability of health care, and existing policies to safeguard the elderly in the studied population.

Among natural deaths, NCDs such as cerebrovascular accidents (3.4%) and cardiovascular diseases (2.6%) were found to be the more frequent killers than communicable diseases like tuberculosis (0.3%) in the elderly. This is likely due to the decreasing trend of tuberculosis cases[11] and the increasing trend of NCDs in the country for the past several years because of changing lifestyles, food habits, and stress in the elderly.[12] Regular health check-ups and screening programs for non-communicable diseases and malignancies should be made mandatory for the geriatric age group to avoid such preventable deaths.

Although senility and natural deaths from diseases dominate the causes of death of the geriatric population in general, they should not be compared with cases of medicolegal autopsies. Such sudden natural deaths are less frequently encountered in forensic practice as they become a medicolegal case only when brought dead to emergencies or when there is no family physician or last treating physician to certify the cause of death.

On the other hand, socioeconomic, physical, psychological, and emotional neglect in the elderly results in loneliness and suicide. In our study, poisoning was the most common means to commit suicide, especially among females. Conversely, the data from the National Crime Records Bureau "Accidental Deaths & Suicides in India 2019" report that suicides were more common among males than females with nearly a male: female ratio of 3:1 (8302:2709) among the elderly age group.[13] The report also estimated that hanging was the more common manner of death than poisoning, which also corresponds with a study from Tunisia.[8] However, in our study, poisoning and its complications were found to be the most commonly used method to commit suicide, possibly due to the easy availability of agricultural poisons and the selection of the study population i.e. geriatric age group.

Besides diseases and accidents, the elderly are also more prone to homicides because of the perceived burden by their family members with resultant vulnerability to physical abuse. Further, crimes against the elderly are reported rising in India.[14] However, the present study results reveal that only 1.9% (n=15) of the elderly deaths were due to homicides, and all victims were males. This surprisingly low prevalence of homicides among the elderly in this region also corresponds to the official figures for the state of Odisha in India.[14–16]

Limitations: Since the data was obtained from a single autopsy centre in Eastern India, the results could not be generalizable to the whole of India or any other country. However, the results can be utilised to compare studies from other regions. The demographic data such as occupation, social economic status, income, etc. and case-specific details for example, the exact type of vehicles in accidents, and the exact poisonous compound from the confirmatory analysis were either not available or could not be obtained from the records. Such additional information would have helped to draw more inferences.

Conclusion:

The results of the study reiterate that the geriatric population is more prone to accident-related deaths, particularly from craniocerebral injuries. The policies should be in place to make the roads safe and elder-friendly. Prompt screening for communicable and non-communicable diseases should be made available to the elderly especially those who are living in rural and semi-urban regions. It is also highlighted here that physical, psychological, and emotional support by family members is crucial to mitigate suicides among the elderly and to promote graceful ageing. The importance of medicolegal autopsies in determining the cause and manner of deaths in the elderly should not be underestimated. The autopsy surgeon should be able to delineate between natural and unnatural deaths in the elderly to meet the ends of justice. A nationwide study on the mortality profile of the elderly age group subjected to medicolegal autopsies is the need of the hour.

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