

Assessment of Sudden Natural Deaths in Medico-Legal Autopsies at Tertiary Care Teaching Hospital

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Abstract

Background and Aim: Sudden natural death that occurred apparently to a healthy individual sometimes creates suspicions of foul play, thus subjected to medicolegal (ML) examinations. The study aims to assess the sociodemographic profile of the sudden natural death cases brought for medicolegal autopsy and identify the commonest accountable cause of sudden natural death.

Material and Methods: The study was conducted in the Department of Forensic Medicine, at tertiary care teaching hospital, India for the duration of 1 year. During the study period total of 784 cases were brought for medicolegal autopsies to mortuary, out of which 50 cases were found to be sudden natural death constituting an overall burden of 6.37%. All the cases of autopsy having the opinion of natural death as a cause of death and cases brought dead in casualty without evidence of unnatural cause were included. The distribution of the cases concerning various sociodemographic variables was presented as frequencies and percentages.

Results: Male predominance was observed among the sudden death cases as out of 50 cases, 40 cases (80%) were male, and 10 cases were female with a sex ratio of 4:1. Most of the cases were reported from the adult age group and the commonly involved age group was 31 to 40 years. Among the causes of sudden death, the most involved organ system was the cardiovascular system (44%), followed by the gastrointestinal system (22%), respiratory system (18%), central nervous system (14%) and genitourinary system (2%).

Conclusion: Cardiac causes are the most common cause of sudden natural death among the adult population in the study site. Increased frequency of sudden deaths among urban, married and adult male populations might be due to sedentary lifestyles in urban areas and increased stress among married individuals due to workload and family responsibilities, indicating a physical and mental disequilibrium in modern times resulting in this type of unexpected deaths.

Key Words: Autopsy, Cardiovascular System, Natural Death, Sociodemographic Variables

Introduction

Death is an inevitable occurrence in the life of every person. Every human being wants to die

naturally and peacefully. But sometimes, sudden death that occurred apparently to a healthy individual may raise many questions and create suspicion among the near and dear ones of foul play.

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Such incidents are most shocking and unexpected. The term sudden death refers to the sudden and unexpected deaths; the external examination fails to elicit cause of death. The majority of these are natural deaths. But very often, natural deaths form the basis of medico-legal investigations, if they have occurred suddenly and unexpectedly in apparently healthy people and under suspicious conditions.

A death that is not known to have been caused by any trauma, poisoning or violent asphyxia and occurs suddenly or within 24 hours of the onset of terminal symptoms is defined as sudden death.¹ According to the World health organization (WHO), sudden death is an unexpected nonviolent death of a person usually seen within 24 hours of the onset of symptoms.² Whereas, death occurring due to some natural diseases or pathological conditions where the death is not intended or attempted is attributed as a natural death.³ There is frequent or unexpected deaths with natural deaths, but sudden death is not always natural and vice versa. An autopsy can differentiate sudden natural death from sudden unnatural death. Most reported causes of sudden natural deaths are related to the cardiovascular system followed by respiratory, neurological, digestive, infectious and genito-urinary conditions.^{4,5} Almost 40-50% of cardiovascular deaths are accounted for sudden cardiac deaths.⁶ As per the Centre for global health research, cardiovascular diseases are the leading cause of death in India.⁶ Annually, an estimated 7 lakh sudden cardiac deaths occur in India.⁷ Studies suggest that unevaluated ischemic heart disease is the most significant cause of sudden cardiac deaths in developed countries.^{5,7}

In such cases, it is usually not possible to certify the cause of death only on external examination of body. In all such cases, an autopsy is imperative to obviate the possibility of unnatural death. After the completion of autopsy, the outcome may quite often reveal some natural disease, the presence of which may pose issues like association of the disease with trauma, work, crime, emotion, excitement, etc. may suggest suspicion of foul play and its relative contribution towards death.

The study aims to assess the sociodemographic profile of the sudden natural death cases brought for medicolegal autopsy and identify the commonest accountable cause of sudden natural death.

Material and Methods

The study was conducted in the Department of Forensic Medicine, at tertiary care teaching hospital, India from February 2022 to January 2023. Study included all the cases of autopsy having the opinion of sudden natural death a cause of death over last year. The Institutional Ethical Committee gave their approval (GMERS/Narmada/1920) to the study protocol and written informed consent was taken from all **Autopsy patients relatives**.

All the cases of autopsy having the opinion of natural death as a cause of death and cases brought dead in casualty without evidence of unnatural cause were included. Unnatural death cases, unknown cases, natural death cases with recorded chronic illness, poisoning and decomposed cases were excluded. The death circumstances were analyzed from the inquest report and hospital cause of death certificate. All instances of sudden natural death were analyzed irrespective of age and sex.

The distribution of the cases concerning various sociodemographic variables was presented as frequencies and percentages.

Statistical analysis

The recorded data was compiled and entered in a spreadsheet computer program (Microsoft Excel 2007) and then exported to data editor page of SPSS version 15 (SPSS Inc., Chicago, Illinois, USA). For all tests, confidence level and level of significance were set at 95% and 5% respectively.

Results

During the study period total of 784 cases were brought for medicolegal autopsies to mortuary, out of which 50 cases were found to be sudden natural death constituting an overall burden of 6.37%. Male predominance was observed among the sudden death cases as out of 50 cases, 40 cases (80%) were male, and 10 cases were female with a sex ratio of 4:1.

The age and gender distribution of the cases showed that most of the cases were reported from the adult age group and the commonly involved age group was 31 to 40 years (30%) followed by 41 to 50 years (24%) in both male and female. One case of sudden natural death was reported from the lowest

age group of 0-10 years and the highest age group of 80-90 years. (Table 1)

Sudden death is more common among the cases brought from urban residential areas, with 34 cases (68%). The majority of the cases were average body mass index (BMI) with 31 (62.0%) cases.

Among all cases, 50% of cases were brought dead to the hospital (Table 2). Among the causes of sudden death, the most commonly involved organ system was the cardiovascular system (44%), followed by the gastrointestinal system (22%), respiratory system (18%), central nervous system (14%) and genitourinary system (2%).

Among the cardiac causes, chronic coronary insufficiency is the most common cause (34%). Cardiac tamponade was observed in 2 (1%) cases. Among the gastrointestinal causes, chronic liver disease (14%) was reported in most cases. While among the respiratory causes, pneumonia (10%) was mainly observed.

Table 1: Age and gender-wise distribution of cases

Age in years	Male	Female	Total
0-10	1	0	1
11-20	2	1	3
21-30	6	2	8
31-40	11	4	15
41-50	10	2	12
51-60	4	1	4
61-70	3	0	3
71-80	2	1	3
81-90	1	0	0
Total	40	10	50

Table 2: Distribution of cases according to the place of death

Place of death	Number	Percentage
Brought dead	25	50
Hospital	7	14
Roadside	2	4
Home	16	32

Discussion

Deaths of unnatural, suspicious and unexpected manner necessitate an autopsy as a portion of the

evidence-gathering process.⁸ In sudden death investigation, sequential autopsy examination investigates the underlying cause of death and answers the suspicion of foul play regarding those unexpected deaths.⁹

During the study period total of 784 cases were brought for medicolegal autopsies to mortuary, out of which 50 cases were found to be sudden natural death constituting an overall burden of 6.37%. Other studies from northeast India reported the incidence of sudden natural death of 8.6% to 9.2%.^{10,11} Meanwhile, the incidence of sudden natural death in other parts of India is reported as low as 0.74 to as high as 13.5%.¹²⁻¹⁴. Among all cases, males are seen to be affected mostly (80.2%) with an M: F ratio of 4:1. Male predominance in sudden natural deaths was observed in many other similar studies from India and around the globe.¹⁵⁻¹⁸ This finding is consistent with the study of Azmak A D¹⁹, Sarkoija T. et al²⁰, Thomas A.C. et al²¹. A recent study reported marriage dissatisfaction as a significant risk factor of sudden cardiac deaths among males.²² Urbanization as a factor of cardiovascular mortality was reported in a study from Brazil.²³ This might be due to an increasingly sedentary and stressful urban lifestyle.

The majority of the sudden natural deaths in the present study were related to the cardiovascular system. Various studies reported cardiac origin as the most common cause of sudden deaths in both genders, specifically among the adult male population.^{21,22,24,25} Chronic coronary artery disease was the most reported cardio-vascular ailment. The finding is in agreement with some other studies.^{21,22,26}

Several studies^{23,24,27,28} reported respiratory system ailments as the second prevalent cause of sudden death; however, in the present study, gastrointestinal system problems, particularly chronic liver diseases, were reported second most cause of death. Pneumonia was the most common respiratory cause. The cause of death in the only child below ten years old is pneumonia. Pneumonia is considered the prime cause of death among children below five years, accounting for almost 16% of child deaths.²⁹ Coronary artery disease was not only the principle cause among cardiovascular causes, but also important cause among all sudden deaths amounting

to 33.96%, with male preponderance, which is consistent with previous studies,^{4-6,20-22} Coronary artery disease was not only the principle cause among cardiovascular causes, but also important cause among all sudden deaths amounting to 33.96%, with male preponderance, which is consistent with previous studies.⁹⁻¹⁴ This is because underlying heart disease is nearly always found in victims of sudden cardiac death. Typically in adults it takes the form of atherosclerosis or scarring from a prior heart attack. Therefore, risk factors for sudden cardiac death include similar risk factors for atherosclerosis, such as smoking, high blood pressure (B.P.), indiscriminate use of alcohol, sedentary life style, and stress and strain in life and lack of regular medical checkup.

Various studies reported cardiac origin as the most common cause of sudden deaths in both genders, specifically among the adult male population.⁵⁻⁷ Several studies^{10,11,14,15} reported respiratory system ailments as the second prevalent cause of sudden death. Study demonstrates the importance of histopathology in autopsy diagnosis of sudden deaths.

Conclusion

The present study reveals that cardiac causes are the most common cause of sudden natural death among the adult population in the study site. Increased frequency of sudden deaths among urban, married and adult male populations might be due to sedentary lifestyles in urban areas and increased stress among married individuals due to workload and family responsibilities, indicating a physical and mental disequilibrium in modern times resulting in this type of unexpected deaths. A thorough postmortem and histopathological examination can solve most of the doubts arising from sudden death among the common population.

Ethical approval was taken from the institutional ethical committee and written

Informed Consent was taken from all the Autopsy patient relatives.

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