



A RETROSPECTIVE STUDY OF SUDDEN NATURAL DEATH CASES BROUGHT FOR AUTOPSY AT JORHAT MEDICAL COLLEGE AND HOSPITAL, JORHAT, ASSAM

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ABSTRACT **Background-** From the very ancient time, sudden death always amused as well as agonised the man. In the epic Mahabharata, sudden and unexpected death was mentioned in the demise of King Pandu as he forgot the curse from sage while captivated by the beauty of Madri. Very often, the person was apparently normal till he died suddenly and pre-existing disease conditions might not have been diagnosed earlier. Medico-legal autopsy should be done to determine the exact cause of death and to rule out any foul play. Relevant data about the incidence and causes of sudden natural death will aid in the planning of health programs at community level. **Material and Methods:** Retrospective analysis of sudden natural death cases which were brought for medico-legal autopsy at Jorhat Medical College & Hospital during the one year period from January 1, 2021 to December 31, 2021 was studied. **Results:** The incidence of sudden natural death is 15.95% with male to female ratio 10.2 : 1. Most common age group involved in the study was 51-60 years followed by 31-40 years. Cardiovascular system (CVS) is the most commonly affected system (43.56%) followed by gastro-intestinal system (31.68%). Coronary artery disease is the main cause of cardiovascular deaths and also tops among all causes of sudden natural deaths. **Conclusion:** The incidence of sudden natural death is 16.01%. Males having age 51-60 years are most commonly affected. Cardiovascular diseases contribute to most of the sudden natural deaths of which Coronary artery disease is the leading cause. Increased awareness with regular health checkups is needed among the population at risk so as to improve quality of life.

KEYWORDS : Sudden natural death, Autopsy, Cause of death, Coronary artery disease

Introduction

As per the International classification of diseases version 11 (ICD-11), definition of sudden death is death, non-violent and not otherwise explained, occurring less than 24 hours from the onset of symptoms [1]. It is mentioned in the Knight's Forensic Pathology textbook that the deceased may not have any symptoms and utterly unaware of his chronic disease so that many clinicians and pathologists will accept death within one hour from the onset of illness as sudden death [18]. Natural death occurs due to some pathological condition or some natural disease, devitalisation or debility, old age, so that death is not intended neither attempted nor occur accidentally [2]. Very often, the deceased person was normal apparently till he died suddenly and the disease condition which was pre-existing might not have been diagnosed earlier [3]. Occasionally the person may die on the way to the hospital or sometimes dies in hospital prior to the attending doctors could come to a diagnosis [3]. Doubt of suspicion or foul play may arise due to sudden deaths in apparently healthy persons [4]. The attending doctors could not certify the cause of death with confidence because of the rapid appearance of symptoms leading to sudden death.[4]. Sometimes, natural death may present itself as a case of unnatural death and unfortunately it can occur vice versa too [3]. Hence medico-legal autopsy is necessary in such cases to obviate any possibilities of unnatural death, rule out any foul play, satisfy the aggrieved friends and relatives, for insurance purpose and it also gives a systemic view of various causes of deaths in such cases which ultimately aid to improve mortality statistics [4,5,6]. So an attempt is made to know the statistics of sudden natural deaths occurring in and around Jorhat district of Assam.

Aims and objectives

- To evaluate and analyse the socio-demographic aspect of sudden natural death cases.
- To know about the various causes and risk factors of sudden natural deaths.

Materials and methods

This retrospective study was conducted on all the autopsies performed in the Department of Forensic Medicine in Jorhat Medical College and Hospital situated in Jorhat, Assam, during the period from 1st January 2021 to 31st December 2021. Deaths deemed to have a sudden and / or unexpected death due to natural caused were identified. Detailed postmortem examination was performed in all those cases. A total of 633 autopsies were conducted of which sudden natural deaths contributed to 101 cases during the study period. Information

regarding age, sex, residence, date of death and other necessary information about the case had been collected from the accompanying police documents, medical records, histopathological reports and the relatives of the deceased. The data was compiled, put into tables and finally inferences were made.

Inclusion criteria

- Deaths which were undiagnosed occurring in less than 24 hours of admission to hospital and attending physicians were not able to establish the cause of death.
- Brought dead cases and cause of death remained undiagnosed.
- Cases with gross pathological finding confirmed by histopathology examination.
- Deaths due to terminal symptoms of natural diseases occurring within 24 hours.

Exclusion criteria

Deaths due to unnatural causes, natural deaths after 24 hours of hospitalization, decomposed cases.

Chart- 1

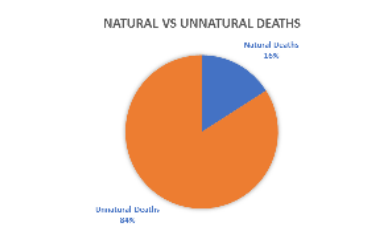
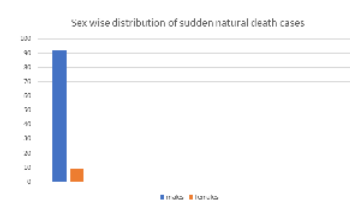


Chart-2



Results and Observations

There were a total of 633 autopsies during the study period and among those 101 cases (15.95%) were of sudden natural death (Chart- 1). Out

of 101 cases of sudden natural death, males dominated over females in the ratio of 10.2:1 (Chart- 2). The most common age group involved was observed to be between 51-60 years (26.73%) followed by 31-40 years (25.74%). (Table-1)

Table 1: Age & Sex wise distribution.

Age (in years)	Male		Female		Total no.	Percentage (%)
	No.	%	No.	%		
0-10	0	0	0	0	0	0
11-20	2	1.98	1	0.99	3	2.97
21-30	10	9.9	3	2.97	13	12.87
31-40	25	24.75	1	0.99	26	25.74
41-50	21	20.79	1	0.99	22	21.78
51-60	25	24.75	2	1.98	27	26.73
61-70	6	5.95	0	0	6	5.94
>71	3	2.97	1	0.99	4	3.96
Total	92	91.09	9	8.91	101	100

Out of the 101 cases of sudden natural deaths, maximum cases, i.e. 44 (43.56%) were of cardiovascular causes followed by gastrointestinal causes 32 (31.68%). 15 (14.85%) cases were due to respiratory causes; 9 (8.91%) were of central nervous system causes and 1 (0.99%) cases were due to genitourinary causes. (Table 2)

Table 2: Body System wise distribution of sudden natural death cases in males and females

Body System	Male	Female	Total	Percentage
CVS	39	5	44	43.56
GIT	30	2	32	31.68
RS	13	2	15	14.85
CNS	9	0	9	8.91
Genitourinary	1	0	1	0.99

It was observed that out total 101 sudden natural deaths, 44 cases were due to cardiovascular causes of which 40 cases are due to coronary artery disease while 4 cases are due to cardiac myopathies. Second common cause of sudden natural death was gastrointestinal cases with 32 number of cases, out of which 27 cases were of cirrhosis, 2 cases each were due to esophageal varices and gastric ulcer while 1 case was due to intestinal perforation with peritonitis. Pulmonary tuberculosis with 12 number of cases and pneumonia with 3 number of cases were the main causes of sudden natural death in respiratory system. Among the CNS causes, 5 cases were due to intracerebral haemorrhage with subarachnoid haemorrhage was the most common cause of SND followed by subarachnoid haemorrhage with 4 number of cases. Among genitourinary causes of SND, chronic kidney disease (1) was the main cause. (Table 3)

Table 3: Cause wise distribution of sudden natural death cases

System	Cause of death	Number of cases	Percentage
CVS	Coronary artery disease	40	39.6
	Cardiomyopathy	4	3.96
GIT	Cirrhosis	27	26.73
	Esophageal varices	2	1.98
	Perforation of gastric ulcer	2	1.98
	Intestinal perforation	1	0.99
RS	Tuberculosis	12	11.88
	Pneumonia	3	2.97
CNS	Intracranial & subarachnoid hemorrhage	5	4.95
	Subarachnoid hemorrhage	4	3.96
Genitourinary	Chronic kidney disease	1	0.99

Discussion

In the present study, the incidence of sudden natural death was 15.95% amongst all the medico-legal autopsies conducted during the study period. Similar incidence was found in the study conducted by Haridas S V (16.01%) [6] and Ambade V.N. (15.48%) [7]. The present study is inconsistent in incidence of sudden natural deaths with the studies conducted by Pandian J.R. (8.61%) [8], Azmak A.D. (28.98%) [9] and Meina Singh A. (2.66%) [10], this inconsistency may be due to difference in life style, culture and geographical area. It is observed in

the present study that there is a predominance of male gender with 92 cases (91.09%) comparing female gender with 9 cases (8.91%) and the Male : Female ratio was 10.2 : 1. Similar findings concerning gender were noted by Meina Singh A. (94.5%) [10], Pandian J.R. (86.66%) [8]. This finding is different from the findings of Shashikant K (77.42%) [4], Haridas SV (80.59%) [6]. We observed that the most affected age group is between 51-60 years i.e. 27 cases (26.73%) followed by 31-40 years i.e. 26 cases (25.74%) in the present study. Pandian J.R. [8] noted 31.67% cases belonged to 41- 50 years age group and 28.33% cases belonged to 31-40 years age group. Similar results where 41-50 years age group contributed to highest cases was found in the studies conducted by Ambade V N. (20%) [7], Chaudhari S.H. (30.81%) [11] and Meina Sing A. (34.5%) [10]. Dayananda R. [12] noted 64.70% cases were from 25-50 years age group. Doolan A.[13] observed that maximum case in the age group 31-35 years. Among the 101 cases of sudden natural deaths, the diseases of cardiovascular system were found in 44 cases (43.56%). Similar results were observed by Chaudhari S.H. (44.6%) [11], Kuller L. (49.5%) [14], Siboni A. (46.2%) [15], Zanjad N.P. (49.55%) [16]. The present study is inconsistent with studies of Azmak A.D. (55%) [9], Pandian J.R. (55.83%) [8], Dayananda R. (62.74%) [12]. Our results transliterate that most common cause of sudden natural deaths are due to cardiac diseases. Out of the 44 cases of sudden natural deaths due to the cardiovascular system, the single most cause is Coronary Artery Disease with 40 number of cases (90.9). Similar results were observed by Dayananda R. (92.96%) [12], Chaudhari S.H. (76.05%) [11], Zanjad N.P. (86.47%) [16]. Cardiomyopathy was found to be the cause of sudden natural deaths in 4 cases in our study. Pandian J.R. [8] observed four cases, Zanjad N.P [16] observed three cases and Chaudhari S.H [11] noted one case of Cardiomyopathy. In the present study of sudden natural deaths, 27 cases of cirrhosis of liver was found to be the most common gastrointestinal cause. We noted that that there were 2 cases of esophageal varices and 2 cases of perforation of gastric ulcer while 1 case was due to intestinal perforation with peritonitis. Among the 101 cases of sudden natural deaths, in 15 cases (14.85%) the cause of death was pertained to the respiratory system. Similar findings were noted by Pandian J.R. (16.67%) [8], Dayananda R. (22.55%) [12] and Zanjad N.P. (27.23%) [16]. The main causes were tuberculosis and pneumonia. Similar observations were made by Chaudhari S.H [11], Bobrowitz ID [17], Pandian J.R [8], and Zanjad N.P. [16]. In the present study of sudden natural deaths, a total of 9 cases associated with central nervous system were observed. Intracerebral and subarachnoid haemorrhage was observed in 5 cases while subarachnoid hemorrhage alone was observed in 4 cases. Pandian J.R. (4 cases) [8], Dayananda R. (2 cases) [12], Zanjad N.P. (4 cases) [16], and Chaudhari S.H. (2 cases) [11] also observed similar central nervous system associated causes of sudden natural death.

SUMMARY AND CONCLUSION

Relevant data on causes of sudden natural death is used for explaining trends in overall mortality, indicating priorities for allocation of resources, designing intervention programmes, assessment and monitoring of public health problems and programmes as well as aid in epidemiological research. The incidence of sudden natural death is 15.95%. Sudden natural deaths has male gender predominance with age group 51-60 years followed by 31-40 years. Single most important system involved in sudden natural death is cardiovascular system (43.56%). Coronary artery disease is the main cause of cardiovascular deaths and also tops among all causes of sudden natural deaths. Population at risk should be given proper awareness. Regular health checkups and increased health awareness may help to diagnose the disease or risk factors like hypertension, impaired fasting glucose, dyslipidaemia, ecg changes earlier so that quality and quantity of life can be improved and it can lead to decrease the number of sudden natural deaths.

Conflict of Interest Nil

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