

Causes of sudden natural non-traumatic death: A medico-legal autopsy study

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Abstract

Background: Sudden natural deaths undoubtedly constitute a significant portion of deaths which undergo autopsy for investigation of death. In all such cases, an autopsy is necessary to obviate the possibility of unnatural deaths, escaping investigation. Therefore, medico-legal autopsy based study of SNNDs was decided to determine causes of population involved. **Material and Methods:** The present study was conducted in the Department of Forensic Medicine and Toxicology, S. V. N. Government Medical College, Yavatmal during 1st October, 2010 to 31st August, 2012. During the study period, a total of 1711 medico-legal autopsies were performed by the department, of which 125 (7.3%) cases were of SNND. The detailed post mortem examination was conducted to establish cause of death. **Results:** Maximum i.e. 41 (32.8%) cases were of cardiovascular causes followed by 32 (25.6%) due to respiratory causes. 17 (13.6%) cases were of central nervous causes, 20 (16%) were of gastrointestinal causes, 05 (04%) due to genitourinary causes and 10 (08%) were of miscellaneous causes. Out of cardiovascular causes, coronary artery disease contributed for 80.4% of cases. **Conclusion:** Statistics on causes of death in SNND may be employed in explaining trends and differentials in overall mortality, indicating priorities for health action and the allocation of resources. They are also helpful in designing intervention programmes, and in assessment and monitoring of public health problems and programmes. **Key Words:** Sudden, natural, non-traumatic, death, autopsy, causes.

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INTRODUCTION

Sudden natural non-traumatic deaths (SNNDs) are rarely studied so completely as other deaths, because many of sudden natural deaths occur outside the hospital or shortly after patient's arrival at hospital¹. Sudden natural death is a medico-legal death, for which it is necessary to find the cause of death. However, many cases do not have reliable medical documents regarding underlying diseases that can help to explain the cause of death². The World Health

Organization (WHO) defines the sudden death as a death, which occurs within 24 hours from the onset of terminal illness³. The most widely accepted definition of sudden death is a death which is not known to have been caused by any trauma, poisoning or violent asphyxia, and where death occurs all on a sudden or within 24 hours of the onset of terminal symptoms⁴. In such cases after autopsy, the cause of death may be revealed. In sudden natural deaths, it is usually not possible to certify the cause of death from external examination of body. In all such cases, an autopsy is necessary to obviate the possibility of unnatural deaths, escaping investigation⁵. Often after autopsy, suspicious unnatural death may turn out to be natural death⁶. In sudden natural death the cause of death is not obvious from external and sometimes internal examination of the dead body. So, the study was conducted to look into the causes in order to arrive at the diagnosis.

MATERIAL AND METHODS

The present study was conducted in the Department of Forensic Medicine and Toxicology, S. V. N. Government Medical College, Yavatmal during 1st October, 2010 to 31st August, 2012. Prior permission cum no objection certificate to carry out study was obtained from Institutional Ethical Committee. During the study period, a total of 1711 medico-legal autopsies were performed by the department, of which 125 (7.3%) cases were of SNNDs. The detailed post mortem examination was

conducted to establish cause of death. Selection of cases was done as per the definition of sudden and natural death. The 125 cases included in present study were admitted cases at our institution or other hospitals, brought dead cases or died within 24 hours of onset of terminal symptoms of natural diseases brought for post-mortem examination. The cases, where the cause of death was unnatural such as trauma, violent asphyxia or poisoning were excluded from this study.

RESULTS

During the study period, a total of 1711 medico-legal autopsies were performed by the department, of which 125 (7.3%) cases were of SNND. The manner of death was not understood by investigating officer in 109 (87.2%) cases and even before autopsy, it was found to be natural in 16 (12.8%) cases.

Table 1: Demographic characteristics of study population

Demographic data	No. of cases (%)
Age groups (years)	
0-10	12 (9.6%)
11-20	13 (10.4%)
21-30	21 (16.8%)
31-40	25 (20%)
41-50	26 (20.8%)
51-60	17 (13.6%)
61-70	07 (5.6%)
71-80	04 (3.2%)
Sex	
Male	92 (73.6%)
Female	33 (26.4%)
Marital status	
Married	92 (73.6%)
Unmarried	31 (24.8%)
Widow	02 (1.6%)

Out of total 125 cases studied, maximum number of cases i.e. 72 (57.6%) were seen in the age group of 21 to 50 years with peak incidence i.e. 26 (20.8%) in the age group 41 to 50. The least affected age group was 71-80 years with 4 (3.2%) deaths. A total of 92 (73.6%) cases were males and 33 (26.4%) were females with a ratio of 2.8:1. The average age of SNND was 37.5 ± 18.5 years for both sexes. The average age of SNND for male was 41.3 ± 16.4 years and for female 26.8 ± 20 years. SNND were commonly observed in married i.e. 92 (73.6%) followed by 31 (24.8%) in unmarried and 02 (1.6%) in widow (Table 1).

Table 2: Distribution of SNND cases as per system involved (n=125)

System	Number of cases	Percentage
Cardiovascular System	41	32.8
Respiratory System	32	25.6
Central nervous system	17	13.6
Gastrointestinal system	20	16
Genitourinary system	05	04
Miscellaneous	10	08

Out of total 125 cases of SNND, maximum i.e. 41 (32.8%) cases were of cardiovascular causes followed by 32 (25.6%) due to respiratory causes. 17 (13.6%) cases were of central nervous causes, 20 (16%) were of gastrointestinal causes, 05 (04%) due to genitourinary causes and 10 (08%) were of miscellaneous causes (Table 2).

Table 3: Cause wise distribution of SNND cases (n=125)

System	Cause of death	Number of cases	%
CVS	Aortic stenosis	02	1.6
	Coronary artery disease	33	26.4
	Cardiac tamponade	01	0.8
	Hypertrophic cardiomyopathy	01	0.8
	Myocardial infarction in a case of CAD	02	1.6
	Mitral stenosis with cardiomegaly	01	0.8
	Myocarditis	01	0.8
RS	Bilateral Consolidation with pleural effusion	01	0.8
	Bronchopneumonia	16	12.8
	Complication in pulmonary tuberculosis	06	4.8
	Pneumonia	08	6.8
	Pulmonary oedema	01	0.8
CNS	Intra-cerebral haemorrhage	09	7.2
	Intra-cerebral haemorrhage in CML (Leukaemia)	01	0.8
	Intra-ventricular haemorrhage	02	1.6
	Meningitis	04	3.2
	Encephalitis	01	0.8
GIT	Acute gastroenteritis	05	4
	Acute haemorrhagic pancreatitis	02	1.6
	Complication in cirrhosis	01	0.8
	Complication in acute fulminant hepatitis	01	0.8
	Perforation peritonitis	03	2.4
	S and H* following rupture of oesophageal varices	06	4.8
	S and H following rupture of portal vein	01	0.8
GUT	Small bowel ischemia	01	0.8
	Acute renal failure	02	1.6
	S and H following abruption of placenta	01	0.8
MISC	S and H following post partum haemorrhage	02	1.6
	Cerebral malaria	01	0.8
	Sickle cell crisis	09	7.2
	Total	125	100

*S and H= Shock and Haemorrhage

It was observed that out of total cases, highest 33 (26.4%) cases were of coronary artery disease, 25 (20%) were of pneumonia (bronchopneumonia + lobar pneumonia), 12 (9.6%) were of intra-cranial (intra-cerebral + intraventricular) haemorrhage, 06 (4.8%) were of shock and haemorrhage following rupture of oesophageal varices, 02 (1.6%) were of acute renal failure, 02 (1.6%) were of shock and haemorrhage following post partum haemorrhage and 09 (7.2%) were of sickle cell crisis (Table 3).

DISCUSSION

Unnatural deaths must always be investigated by the police, but very often natural deaths form the basis of medico-legal investigations, if they have occurred suddenly in apparently healthy persons and under suspicious circumstances. In such cases, a medical practitioner should not certify the cause of death without holding a post mortem examination, even if there is strong evidence of disease. Often after necropsy, unnatural deaths may turn out to be natural and vice versa⁷. In present study, manner was not understood by

investigating officer in 109 (87.2%) cases. Prima facie it is very difficult to comment about manner of death in sudden deaths for investigating officer and sometimes also to Forensic Expert. In present study (Table 1), it was observed that maximum number of SNND cases i.e. 72 (57.6%) were seen in the age group of 21 to 50 years with peak incidence i.e. 26 (20.8%) in the age group 41 to 50 years. This finding is consistent with studies of Chaturvedi *et al*⁸, Kumar *et al*⁹, Rao *et al*¹⁰, Sarkioja *et al*¹¹ and Udnoon *et al*¹² and not consistent with studies of Azmak AD *et al*¹² and Escoffery *et al*¹³. This may be due to more and more recent westernization of Indian society, sedentary life style, physical and mental stress, lower socio-economic status, geographic and demographic variations, addictions and infections. In present study (Table 1), maximum i.e. 92 (73.6%) cases were males with male to female ratio of 2.8:1. Variations in disease frequency between sexes have been ascribed to basic biological differences between the sexes, and hormonal, cultural and behavioural differences between the sexes (e.g., smoking, alcoholism) due to different roles in social setting¹⁴. In present study (Table 1), maximum cases were

having married status. This coincides with study of Kumar *et al*⁹. No relation was found between marital status and SNND. As marriage is not the risk factor for SNND. It is only accidental finding because maximum cases were married in the study population. In present study (Table 2), highest i.e. 41 (32.8%) cases died due cardiovascular causes followed by 32 (25.6%) due to respiratory causes. This observation is consistent with matter quoted by Reddy³, Nandy⁴ and Udnoon *et al*². Out of SNND causes, cardiovascular causes were highest i.e. 41(32.8%). This observation is consistent with the matter quoted by majority of studies i.e. Kuller *et al*¹ (40.5%), Luke *et al*¹⁵ (38%), Meina Singh *et al*¹⁶ (32.7%). Most vulnerability of the cardiovascular system for SNND is attributed due to the risk factors, emotions, dietary habits, sedentary life style, addictions, physical and mental stress effect individually or collectively. Lowest i.e. 5 (4%) cases were due to genitourinary causes. This observation is consistent with the matter quoted by Nandy⁴ (4%), Reddy³ (3-5%), Dixit¹⁷ (3-5%) and study of Udnoon *et al*² (3.5%). In present study (Table 3), highest i.e. 33 (26.4%) cases were of coronary artery disease, 25 (20%) were of pneumonia, 12 (9.6%) were of Intracranial haemorrhages, 6 (4.8%) were of shock and haemorrhage following rupture of oesophageal varices, 2 (1.6%) were of acute renal failure, 2 (1.6%) due to shock and haemorrhage following post partum haemorrhage and 9 (7.2%) were of Sick cell crisis. Heart is most vulnerable to ischemic changes and coronary artery disease is also called ischemic heart disease (IHD) or coronary heart disease (CHD). IHD is the leading cause of death worldwide for both men and women (7 million total per year)¹⁸. Out of total cases highest i.e. 41 (32.8%) cases were of cardiovascular causes and out of total causes highest i.e. 33 (26.4%) cases were of coronary artery disease. This observation is consistent with the matter quoted by Nandy⁴, Reddy³, Knight¹⁹, Polson²⁰, Taylor²¹, Di Maio²², Wentworth *et al*²³, Penttila Anti²⁴, Sarkioja *et al*¹¹, Thomas *et al*²⁵, Fornes *et al*²⁶, Anderson *et al*²⁷, Azmak AD¹², Undoon *et al*² and Luke *et al*¹⁵.

CONCLUSION

Statistics on causes of death are important and widely used for a number of purposes. They may be employed in explaining trends and differentials in overall mortality, indicating priorities for health action and the allocation of resources. They are also helpful in designing intervention programmes, and in assessment and monitoring of public health problems and programmes, moreover, they give important clues for epidemiological research.

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