

Original Research Article

## Pattern of Natural Deaths and the Frequency of Occurrence of Diseases That Cause Them

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### ABSTRACT

**Background:** Natural deaths are a conundrum which needs to be solved by a careful post-mortem analysis, which will reveal the pattern of causation in such cases.

**Materials and Methods:** This was an observational, retrospective, descriptive study that included all cases of sudden unexpected natural deaths during the period of January 2008 to December 2009, for which a postmortem was performed in the mortuary premises of the department.

**Results:** There were 74 cases of natural deaths during the relevant period, with male predominance. Cardiovascular causes formed the major cause of death 44.59 % ( 33 cases), of which in males the major cardiovascular disease accounting for death was coronary artery disease (CAD) which was seen in 20 cases.

**Conclusion:** The pattern revealed from this study showed a male predominance. Cardiovascular diseases were the most frequent cause for natural death followed by respiratory diseases. CAD was present in a significant proportion of such cases.

**Keywords:** Natural deaths; Post-mortem; Coronary heart disease.

### INTRODUCTION

The WHO (world health organisation) defines sudden death as a death occurring less than 24 hours from onset of symptoms, which is otherwise not explained / death known not to be violent or instantaneous for which no cause can be discovered / death without sign of disease. [1]

Sudden natural death in all age groups can result from diseases or conditions arising in any organ system, although conditions affecting the heart, lungs, and brain are the

most likely to result in truly sudden death. [2]

Post mortem is essential in such deaths to ascertain the cause of death, especially in a young person and also to rule out foul play, as an external examination by itself may not provide the required information to arrive at a proper conclusion of cause of death. [3]

The disease patterns and the frequency of occurrence of diseases which culminate in sudden natural deaths are bound to vary across geographic, ethnic and socioeconomic situations. Hence this study

was envisaged to detect the patterns and frequencies of various diseases that lead to a natural death in cases coming under the purview of this medical facility.

## MATERIALS AND METHODS

This is an observational, retrospective, descriptive study that included all cases of sudden unexpected natural deaths during the period of January 2008 to December 2009, for which a postmortem was performed in the mortuary premises of the department of Forensic Medicine, Karnataka Institute of Medical Sciences, Hubli, Karnataka.

The postmortem records available with the department were scrutinised for selection of cases for this study. All cases of death deemed to be sudden and unexpected natural deaths were included in the study. For cases so identified, the hospital records, full postmortem reports, and other relevant ancillary material were retrieved and studied. History regarding the cases was obtained from the police records. Only cases which satisfied the definition of natural death and where complete clinical and/or autopsy findings were available were included in this study.

## RESULTS

There were 74 cases of natural deaths during the period January 2008 to December 2009. There was an overall male predominance, the number of male cases was 64(86.49%) in comparison to female cases of 10(13.51%). The male female ratio

was 6.4:1. The maximum number of cases was in the 41-50 years group 19cases (25.67%), closely followed by the 31-40 and 51-60 years group (15cases (20.27%) in each group). This overall distribution pattern is reflected in the males but in the females the predominant age group was 21-30 years group. Another observation noted was that there were no cases of natural deaths in women above 60 years and below 10 years during the relevant point in time. (Table 1)

Age group (Years)	Males	Females	Total
0 - 10	1	0	1(1.35%)
11 - 20	1	1	2(2.70%)
21 - 30	6	4	10(13.51%)
31 - 40	15	0	15(20.27%)
41 - 50	16	3	19(25.67%)
51 - 60	13	2	15(20.27%)
61 - 70	9	0	9(12.16%)
> 70	3	0	3(4.05%)
All ages	64(86.49%)	10(13.51%)	74(100%)

The leading cause for natural deaths was cardiovascular disorders accounting for 44.59 % (33 cases) of the cases. This is followed by the next larger group i.e. the respiratory system which was about 32.43 % (24 cases). Multisystem disorders accounted for about 9.46% (7 cases) of natural deaths. This overall system affliction in natural deaths is mirrored in the male cases, whereas in females there was an equal distribution between the cardiovascular, respiratory, gastrointestinal and multi organ system involvement (20% each), whereas genitourinary and miscellaneous causes accounted for 10% each. (Table 2)

Organ system	Male	Female	Total
Cardiovascular	31(48.44%)	2(20%)	33(44.59%)
Respiratory	22(34.37%)	2(20%)	24(32.43%)
Gastrointestinal	1(1.56%)	2(20%)	3(4.05%)
Central nervous	2(3.12%)	0(0%)	2(2.70%)
Genitourinary	2(3.12%)	1(10%)	3(4.05%)
Miscellaneous	1(1.56%)	1(10%)	2(2.70%)
Multiple organ	5(7.81%)	2(20%)	7(9.46%)
All organ systems	64(86.49%)	10(13.51%)	74(100%)

In males the major cardiovascular disease accounting for death was coronary

artery disease (CAD) which was seen in 20 cases, the next common cause being

hypertrophic heart disease being seen in 10 cases. The youngest person afflicted by CAD was 18 years old while the oldest was 79 years. Two cases with hypertrophic heart disease were also complicated by cirrhosis. The major disease process affecting the

respiratory system and being responsible for death was pneumonia seen in 22 cases. One male case had tuberculosis, while another had fungal infection (actinomyces). Six cases of pneumonia also demonstrated cirrhotic nodules in the liver. (Table 3)

**Table 3 – Specific cause of death in the cases examined**

Organ system	Disease process	Males	Females	Total
Cardiovascular	Myocarditis	0	1	1
	CAD	20	1	21
	Hypertrophic heart disease	10	0	10
	Cardiac tamponade	1	0	1
Respiratory	Pneumonia	20	2	22
	Tuberculosis	1	0	1
	Fungal infection	1	0	1
GIT	Haemorrhagic gastritis	0	1	1
	Cirrhosis	0	1	1
	Intestinal perforation	1	0	1
CNS	Intracerebral haemorrhage	2	0	2
Genitourinary	Ruptured ectopic pregnancy	0	1	1
	Pyelonephritis	2	0	2
Miscellaneous	Septicemia	1	1	2
Multiple system	-	5	2	7

## DISCUSSION

The maximum number of natural death cases in this study was in the 41-50 years group 19(25.67%), closely followed by the 31-40 and 51-60 years group (15(20.27%) in each group). In the study done by Zanjad NP et al the maximum number of cases belonged to age group 31-40 years (28.50%) and 41-50 years (24.10%).<sup>[4]</sup> Whereas in the study done by Chaudhari VA et al the maximum number of sudden natural deaths were seen in the individuals above 30 years of age with peak incidence in the age group of 51-60 years with 59 (25.65%) cases. The mean age of the victims in that study was 51.04 years.<sup>[5]</sup> Our findings as far as the age wise distribution of natural death cases is in concordance with the observations by Chaudhari SH et al.<sup>[6]</sup> Overall there is a male predominance in all such similar studies, but the male female ratio varies across studies namely 4.75:1,<sup>[5]</sup> 2.1:1<sup>[7]</sup> and 4.3:1.<sup>[6]</sup> In our study the male to female ratio was 6.4:1.

In our study the leading cause for natural deaths was cardiovascular disorders

accounting for 44.59 % ( 33 cases) of the cases. This is followed by the next larger group i.e. the respiratory system which was about 32.43 % ( 24 cases). Multisystem disorders accounted for about 9.46% ( 7 cases) of natural deaths. Similar findings have been echoed in studies by Zanjad NP et al,<sup>[4]</sup> Chaudhari VA et al,<sup>[5]</sup> Chaudhari SH et al,<sup>[6]</sup> Pelemo OE et al<sup>[7]</sup> and Fayaz AF et al.<sup>[8]</sup> Textbooks of forensic medicine while describing natural deaths also mention cardiovascular disease as the leading cause for natural deaths.<sup>[9,10]</sup>

The major cardiovascular disease accounting for death in our study was coronary artery disease (CAD), the next common cause being hypertrophic heart disease. Coronary artery disease was also the most common cardiovascular disease responsible for natural deaths in several studies,<sup>[4-6]</sup> but in a study done in Nigerian population hypertensive artery disease was the leading cardiovascular cause.<sup>[7]</sup> This shows that patterns of disease varies with the population studied. Cardiomyopathies have been found to be the second largest group responsible for sudden cardiac death

and hypertrophic cardiomyopathy has a prevalence of 2 in 1000 young adults. [11]

As far as the respiratory cause is concerned in our study the major disease process affecting the respiratory system and being responsible for death was pneumonia seen in 22 cases. One male case had tuberculosis, while another had fungal infection (actinomyces). This is also echoed in studies by Zanjad NP et al, [4] Chaudhari VA et al, [5] Chaudhari SH et al [6] and Pelemo OE et al. [7]

## CONCLUSION

The pattern of natural deaths revealed from this study showed a male predominance. Cardiovascular diseases were the most frequent cause for natural death followed by respiratory diseases. CAD was present in a significant proportion of such cases. Some of these cases exhibited cirrhosis and hence additional factors like alcohol consumption and attendant malnutrition are also important factors to be taken into account.

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