

## A STUDY ON VERBAL AUTOPSY OF CAUSE OF DEATHS AMONG INSURED MEMBERS IN RURAL AREAS OF WEST GODAVARI DISTRICT, INDIA

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### ABSTRACT

**Background:** For the last two decades disease mortality trends in developing countries was noticed, cardiovascular mortality was tremendously increasing even in rural areas also. Cardiovascular disease (CVD) is the reason for a large proportion of all deaths and disability worldwide. As per the report of Global Burden of Disease Study, in the year 1990, there were 5.2 million deaths from CVD in economically developed countries and 9.1 million deaths from the same cause in developing countries. **Objectives:** 1. To determine the environmental conditions and pre existing disease conditions of insured persons in relation to deaths in selected villages of West Godavari. 2. To study the various diseases patterns as cause of deaths analysis in interior rural areas in selected villages of West Godavari

district. **Materials & Methods:** A community based cross sectional study was conducted at some selected villages of west Godavari district during the period from July 2013 to August 2013. A sample size of about 289 study sample was taken from maximum death rate noticed

villages. Relevant death related information was collected from family members, relatives and sometimes information also collected from neighbours using simple random method.

**Results:** About 47.4% of the study population died in the age group of 45-50 years. Even 11 people died between the age group of 25-30 years also that reflects pre mature deaths in the society. In the study population, about 138 individuals were living in semi pucca houses, 77 people were living in katcha houses and lastly 74 people were having pucca houses. Those are living in katcha houses, about 19.4% were died from infections and parasitic diseases and where as 8.1% in pucca housing conditions. Out of 23 deaths in Polavaram mandal, about 21.7% people died from Tuberculosis and 17.4% were from cardiac problem, 13%.

**Conclusions:** Before death of the persons, many insured persons of low economic status were having one or more health problems like Diabetes mellitus and Heart disease etc. Insurance coverage measures taken up by the government of Andhra Pradesh to improve the quality of life and social security of rural people of west Godavari. Majority of Rural mandals, maximum people died from the cardiovascular disease as major cause of death was noticed through our verbal autopsy study.

**KEYWORDS:** Age, cause of death, housing conditions, pre existing disease, Verbal autopsy.

## INTRODUCTION

Cardiovascular mortality in Asian Indian population is likely to climb up 103% in men and 90% in women by 2015.<sup>[1]</sup> In fact, CHD has been predicted to rank first among the causes of death in Indian population by 2015.<sup>[2]</sup> The growth of cardiovascular diseases in India has been particularly pronounced in urban areas but many vascular deaths also occur in rural regions and this is still where the majority of the population lives. While there is some limited information about the causes and management of cardiovascular disease in urban regions, corresponding data for rural regions is scant.<sup>[3,4]</sup>

Cardiovascular diseases have assumed epidemic proportions in India as well. According to the World Health Report 2002, cardiovascular diseases (CVDs) will be the largest cause of death and disability in India by 2020. According to the World Health Report of 2002, deaths due to CHD in India rose from 1.17 million in 1991 to 1.59 million in 2000 and 2.03 million in 2010.<sup>[5]</sup> Cardiovascular diseases (CVDs) are the number one cause of death globally and are the leading cause of death in India also. Several surveys conducted across the country over the past few decades have shown a rising prevalence of major risk factors for CVD in

Asian Indian population. The problem of increasing risk factors for CVD in India is because of lack of surveillance system and lack of proper diagnosis in rural settings.

Mortality data by cause of death for the entire cross-section of the population in the country is essential for informed decision making in the Health Sector. The statistics on causes of death are available from the Medical Certification of Causes of Death (MCCD) under the Civil Registration System (CRS) suffering from the problem of both the coverage and quality.<sup>[7]</sup>

The underlying causes of death in the Report has been determined through an advanced form of Verbal autopsy called the “RHIME” or Representative, Resampled, Routine Household Interview of Mortality with Medical Evaluation method. This classification confirms to the World Health Organisation’s (WHO’s) classification of diseases to facilitate comparison with similar national and international estimates.<sup>[8]</sup>

Since then, a system of Verbal Autopsy under the domain of SRS has been in operation. In order to promote the effective improvement in the system, the Office of the Registrar General, India (ORGI) in collaboration with the Centre for Global Health Research (CGHR), University of Toronto has been trying to establish a reliable system to measure the causes of death in the country.<sup>[9,10]</sup> Keeping in view of the above facts and other factors, the present study was taken up to explore certain facts regarding cause of death and also to know the ground reality of the health problems and factors specially in interior Rural areas of West Godavari district.

## **OBJECTIVES**

1. To determine the environmental conditions and pre existing disease conditions of insured persons in relation to deaths in selected villages of West Godavari.
2. To study the various diseases patterns as cause of deaths analysis in interior rural areas in selected villages of West Godavari district.

## **MATERIALS AND METHODS**

A community based cross sectional study was conducted at some selected villages in 14 mandals of west Godavari district during the period from July 2013 to August 2013. West Godavari district health indicators are much better than other districts of Andhra Pradesh and also it is big in area wise and it connects to Telangana with Khammam district and some interior pockets of tribal population areas topographically and geographically. A sample size

of about 289 study sample was taken from maximum death rate noticed villages. In each Mandal, again visited some villages and ultimately 10% of deaths covered in their locality with the help of Bhima mitra and community co-ordinators and other paramedical staff. A study participants (already died individuals) were included between 25-50 yrs age group and relevant death related information was collected from family members, relatives and sometimes information also collected from neighbours also using simple random method. Details of death list was supplied by the Department of Rural Development Agency. Before proceeding the actual study, informed consent was taken from the informant. Data was entered in SPSS software 17.0 version and followed by analysis and interpretation was done and the final ICD-10 code was used for final diagnosis. Necessary statistical tests like simple proportions, chi square tests were applied.

## RESULTS

**Table. 1: Age wise distribution of deaths in study population.**

Age of the Persons	Number of Deaths	Percent
25-30	11	3.8
30-35	31	10.7
35-40	40	13.8
40-45	70	24.2
45-50	137	47.4
Total	289	100.0

About 47.4% of the study population died in the age group of 45-50 years. Even 11 people died between the age group of 25-30 years also that reflects pre mature deaths in the society.

**Table. 2: Cause of Death in relation to Housing Conditions of the Person.**

Housing Conditions	Infections & parasitic diseases (A00-B99)	Circulatory system diseases (I00-I99)	Respiratory system diseases (J00-J99)	Digestive system diseases (K00-K99)	Injuries, poisoning & other (S00-T98)	Neo plasms (C00-D48)	Genito urinary diseases (N00-N99)	Nervous system diseases (G00-G99)	Skin problems & Burns (L00-L99)	Total
Pucca	6 (8.1%)	29 (39.1%)	7 (9.4%)	12 (16.2%)	4 (5.4%)	6 (8.1%)	8 (10.8%)	2 (2.7%)	0 (0%)	74
Semi pucca	21 (8.6%)	54 (39.1%)	8 (5.7%)	21 (15.2%)	9 (6.2%)	5 (3.6%)	10 (7.2%)	9 (6.2%)	1 (0.7%)	138
Katcha	15 (19.4%)	30 (38.9%)	8 (10.3%)	10 (12.9%)	1 (1.2%)	6 (7.7%)	4 (5.1%)	2 (2.5%)	1 (1.2%)	77
Total	42 (14.5%)	113 (39.1%)	23 (7.9%)	43 (14.8%)	14 (4.8%)	17 (5.8%)	22 (7.6%)	13 (4.4%)	2 (0.6%)	289

Chi-square( $x^2$ ) – 15.405, 16 d.f., p-value - 0.495

In the study population, about 138 individuals were living in semi pucca houses, 77 people were living in katcha houses and lastly 74 people were having pucca houses. Those are living in katcha houses, about 19.4% were died from infections and parasitic diseases and where as 8.1% in pucca housing conditions.

**Table. 3: Cause of death according to previous history of disease before Death.**

previous history of disease	Infections & parasitic diseases (A00-B99)	Circulatory system diseases (I00-I99)	Respiratory system diseases (J00-J99)	Digestive system diseases (K00-K99)	Injuries, poisoning & other (S00-T98)	Neoplasms (C00-D48)	Genito urinary diseases (N00-N99)	Nervous system diseases (G00-G99)	Skin problems & Burns (L00-L99)	Total
Nil	32 (17.9%)	74 (41.3%)	2 (1.1%)	30 (16.8%)	14 (7.8%)	7 (3.9%)	10 (5.6%)	8 (4.5%)	2 (1.1%)	179
Diabetic mellitus	5 (13.9%)	12 (33.3%)	1 (2.8%)	5 (13.9%)	0 (0%)	0 (0%)	9 (25%)	4 (11.1%)	0 (0%)	36
heart disease	2 (9.1%)	16 (72.7%)	0 (0%)	3 (13.6%)	0 (0%)	0 (0%)	1 (4.5%)	0 (0%)	0 (0%)	22
Obesity	2 (28.6%)	4 (57.1%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)	1 (14.3%)	0 (0%)	0 (0%)	7
Bronchial asthma	0 (0%)	3 (23.1%)	5 (38.5%)	3 (23.1%)	0 (0%)	0 (0%)	1 (7.7%)	1 (7.7%)	0 (0%)	13
Epilepsy	1 (25%)	2 (50%)	0 (0%)	1 (25%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)	4
Cancer	0 (0%)	1 (9.1%)	0 (0%)	0 (0%)	0 (0%)	10 (90.9%)	0 (0%)	0 (0%)	0 (0%)	11
Tuberculosis	0 (0%)	0 (0%)	15 (100%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)	15
Other	0 (0%)	1 (50%)	0 (0%)	1 (50%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)	2
Total	42 (14.5%)	113 (39.1%)	23 (8.0%)	43 (14.9%)	14 (4.8%)	17 (5.9%)	22 (7.6%)	13 (4.5%)	2 (0.7%)	289

Chi Square( $X^2$ ) value 405.725, 72 d f, P- value 0.0001

Out of 289 deaths, about 179 (61.9%) were having no identified diseases before death and 38.9% were having different diseases before death. About 36 (12.5%) were having Diabetes mellitus before death, 22 (7.6%) were having known cardiac problem, 15 (5.2%) were having Tuberculosis and lastly 13 (4.5%) people were having bronchial asthma problem ( $p < 0.001$ ).

**Table. 4: Cause of death in relation to age of the person in Buttaya Gudem Mandal.**

age of death person	Accident	Acute MI	Alcoholic cirrhosis	Alcoholic liver Cirrhosis	Cardiac failure	Dengue fever	Fever of unknown Origin	Heart attack	Heat stroke	Liver failure	Stroke, CVA, Hemiplegia	TB	Total
30-35	0 (0%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)	1 (100%)	1
35-40	0 (0%)	0 (0%)	1 (100%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)	1
40-45	1 (14.3%)	1 (14.3%)	0 (0%)	1 (14.3%)	0 (0%)	3 (42.9%)	1 (14.3%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)	7
45-50	0 (0%)	0 (0%)	2 (20%)	0 (0%)	2 (20%)	1 (10%)	0 (0%)	2 (20%)	1 (10%)	1 (10%)	1 (10%)	0 (0%)	10
Total	1 (5.3%)	1 (5.3%)	3 (15.8%)	1 (5.3%)	2 (10.5%)	4 (21.1%)	1 (5.3%)	2 (10.5%)	1 (5.3%)	1 (5.3%)	1 (5.3%)	1 (5.3%)	19

Out of 19 deaths in Buttayagudem mandal, 10 deaths in the age group of 45-50 years. Of which, 20% deaths from alcohol related problems and 20% deaths from cardiac problems.

**Table. 5: Cause of death in relation to age of the person in Jangareddy Gudem Mandal.**

Age of the Death Person	Acute MI	Alcoholic Cirrhosis	Brain tumour	Ca.Cervix	Carcinoma Stomach	Chronic kidney disease	Dengue	Jaundice	Paralysis stroke CVA	Peritonitis	Rat poison	RTA	Throat cancer	Total
25-30	0 (0%)	0 (0%)	1 (33.3%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)	1(33.3%)	1(33.3%)	0 (0%)	3
30-35	2 (100%)	0 (0%)	0(0%)	0(0%)	0(0%)	0(0%)	0(0%)	0(0%)	0(0%)	0(0%)	0(0%)	0(0%)	0(0%)	2
35-40	1 (20%)	0(0%)	0(0%)	0(0%)	0(0%)	0(0%)	0(0%)	1 (20%)	0(0%)	1 (20%)	0(0%)	1 (20%)	1(20%)	5
40-45	1 (25%)	2 (50%)	0(0%)	0(0%)	1 (25%)	0(0%)	0(0%)	0(0%)	0(0%)	0(0%)	0(0%)	0(0%)	0(0%)	4
45-50	3 (27.3%)	1 (9.1%)	0(0%)	1 (9.1%)	0(0%)	1 (9.1%)	2 (18.2%)	0(0%)	1 (9.1%)	0(0%)	0(0%)	2(18.2%)	0(0%)	11
Total	7 (28%)	3 (12%)	1 (4%)	1 (4%)	1 (4%)	1 (4%)	2 (8%)	1 (4%)	1 (4%)	1 (4%)	1 (4%)	4 (16%)	1 (4%)	25

Out of 25 deaths in Jangareddygudem mandal, 7 (28%) were died from cardiac problem, 16% (4) from road traffic accidents and 3 (12%) from alcoholic cirrhosis. About 12% of the died between 25-30 years of age group. 40% of the people died less than 40 years of age group.

**Table. 6: Cause of death in relation to age of the person in Koyyala Gudem Mandal.**

Age of the person	Acute MI	Appendicitis	Chronic Kidney failure	Cirrhosis of Liver	Dengue	Fever	Paralysis	Pneumonia	RTA	Suspected case of TB	HIV	TB	Total
25-30	0 (0%)	0(0%)	0(0%)	0(0%)	0(0%)	0(0%)	0(0%)	0(0%)	1 (100%)	0(0%)	0(0%)	0(0%)	1
30-35	0(0%)	1 (12.5%)	0(0%)	5 (62.5%)	0(0%)	0(0%)	0(0%)	0(0%)	1(12.5%)	0(0%)	0(0%)	1(12.5%)	8
35-40	2(40%)	0(0%)	0(0%)	2(40%)	0(0%)	0(0%)	0(0%)	1(20%)	0(0%)	0(0%)	0(0%)	0(0%)	5
40-45	0(0%)	0(0%)	0(0%)	1(33.3%)	0(0%)	0(0%)	1(33.3%)	0(0%)	0(0%)	1(33.3%)	0(0%)	0(0%)	3
45-50	2 (20%)	0(0%)	1(10%)	3(30%)	1(10%)	1 (10%)	0 (0%)	0 (0%)	1 (10%)	0 (0%)	1 (10%)	0 (0%)	10
Total	4 (14.8%)	1 (3.7%)	1 (3.7%)	11 (40.7%)	1 (3.7%)	1 (3.7%)	1 (3.7%)	1 (3.7%)	3 (11.1%)	1 (3.7%)	1 (3.7%)	1 (3.7%)	27

Out of 27 deaths in Koyyalagudem mandal, 11 (40.7%) people died from cirrhosis of liver, 4 (15%) people died from cardiac problem. Majority of deaths occurred in the age group of 45-50 years. Next to that, 8 people died in the age group of 30-35 years age group.

**Table. 7: Cause of death in relation to age of the person in Polavaram Mandal.**

Age of the Death Person	Acute MI	Bronchial Asthma	Cancer (Oral)	Carcinoma Breast	Chronic Kidney disease	Cirrhosis of Liver	Dengue	HIV	Hydrocoele	paralysis	RTA	TB	Total
30-35	0 (0%)	1 (50%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)	1 (50%)	2
35-40	0 (0%)	0 (0%)	1 (50%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)	1 (50%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)	2
40-45	0 (0%)	0 (0%)	0 (0%)	1 (14.3%)	0 (0%)	3 (42.9%)	0 (0%)	1 (14.3%)	0 (0%)	1 (14.3%)	0 (0%)	1 (14.3%)	7
45-50	4 (33.3%)	0 (0%)	0 (0%)	0 (0%)	1 (8.3%)	0 (0%)	1 (8.3%)	0 (0%)	1 (8.3%)	1 (8.3%)	1 (8.3%)	3 (25%)	12
Total	4 (17.4%)	1(4.3%)	1(4.3%)	1(4.3%)	1(4.3%)	3 (13%)	1(4.3%)	2 (8.7%)	1(4.3%)	2 (8.7%)	1(4.3%)	5 (21.7%)	23

Out of 23 deaths in Polavaram mandal, about 21.7% people died from Tuberculosis, 17.4% were from cardiac problem, 13% were from cirrhosis of liver and lastly 8.7% were from HIV.

## DISCUSSION

The present study was conducted in the form of verbal autopsy through the involvement of trained health care professionals among 289 death persons information during the period from July 2013 to August 2013. About 47.4% of the study population died in the age group of 45-50 years. Even 11 people died between the age group of 25-30 years also that reflects pre mature deaths in the society. In the study population, about 138 individuals were living in semi pucca houses, 77 people were living in katcha houses and lastly 74 people were having pucca houses. Those who are living in katcha houses, about 19.4% were died from infections and parasitic diseases and where as 8.1% in pucca housing conditions.

Out of 289 deaths, about 179 (61.9%) were having no identified diseases before death and 38.1% were having different diseases before death. About 36 (12.5%) were having Diabetes mellitus before death, 22 (7.6%) were having known cardiac problem, 15 (5.2%) were having Tuberculosis and lastly 13 (4.5%) people were having bronchial asthma problem ( $p < 0.001$ ). In the present study, about 39.1% were died from the cardiovascular origin and it reflects the gravity of the problem in rural area. some studies conducted in Causes of death in rural adult population of North India (2002-2007), using verbal autopsy tool revealed that cardiovascular mortality was more in rural population conducted by Palanivel C, Yadav K, Gupta V, Rai SK, Misra P, Krishnan A. et al during the year 2002-2007.<sup>[11]</sup> More than half of deaths were attributed to NCDs. Similar results of predominance of non-communicable cause of deaths (more than 50% among males and 43-54% among females) have been observed in other states such as Assam, Maharashtra and Tamil Nadu.<sup>[12]</sup> According to Sample Registration System (SRS) estimates (2001-2003), NCDs were the leading causes of death in the country, constituting 42% of deaths.<sup>[13]</sup> A recent study based on 18-year mortality surveillance using Verbal autopsy from rural Haryana, reported 47.6% of deaths attributable to NCDs.<sup>[14]</sup> Their lower proportion of deaths due to NCDs may be because of prior reference period and also inclusion of deaths under 15 years of age. However, a study in urban slums of Kolkata, India reported 66% of deaths due to NCDs.<sup>[15]</sup> Cardiovascular diseases have assumed epidemic proportions in India as well. According to the World Health Report 2002, cardiovascular diseases (CVDs) will be the largest cause of death and disability in India by 2020. India is predicted to bear the greatest CAD burden, according to the estimates from the Global Burden of Disease Study.<sup>[6]</sup> since the vast majority of deaths in China occur in rural areas,<sup>[16]</sup> it is of obvious importance to assess the validity of rural mortality data using similar

procedures. However, the lack of reliable, detailed clinical information on deaths in rural areas precludes such an assessment.

Almost in the all mandals of our study revealed that highest death rate was noticed from acute myocardial infarction and heart related problems, next alcohol related problems. But in more interior areas like polavaram mandal highest death rate from Tuberculosis, koyyalagudem mandal more deaths reported from Alcoholic cirrhosis and on the whole maximum deaths from cardiovascular mortality.

## CONCLUSIONS

There was statistically significant association was found between different pre existing diseases of the person with causes of death manner in insured persons ( $P < 0.01$ ). It was observed that large number of deaths in the study population have been occurring in early ages as well as in middle ages, which is suggestive that proper medical attention, good housing, rural uplift in the form of education, socioeconomic opportunities support and health care facilities can certainly help to alleviate this situation. The spread of non-communicable diseases, particularly, the vascular, digestive diseases, respiratory disease and cancers, which were causing maximum deaths in specially in rural areas is another important finding of the Report. There is a need to strengthen the national programme for control of cardiovascular diseases, cancers and stroke and diabetes Mellitus. To substantiate our study findings, need more similar studies in the rural areas with large sample size is required.

## SOURCE OF FUNDING

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## CONFLICT OF INTEREST

None.

Institutional ethical Committee clearance taken.

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