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Secondary Data Analysis of Postmortem Records in PCMC Area to Understand the Burden of Myocardial Infarction

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Abstract

Background: There has been a global upsurge in the cases of non-communicable diseases, especially cardiovascular diseases. Analysis of the leading causes of death in the community is very crucial in understanding and planning the health care policies. The aim of this study was to evaluate the burden of myocardial infarction in Pimpri Chinchwad city with the help of the Postmortem examination record analysis.

Methods: In this cross sectional study, the data related to 674 deaths in the period of 2019 to mid-2021 was considered. The data was obtained from the postmortem examination records of the Postmortem Centre of Talegaon Dabhade General Hospital. The obtained data was classified and analyzed with the help of descriptive statistics in order to find the burden of the leading causes of death, especially of myocardial infarction.

Conclusion: Myocardial Infarction was found to be the leading cause of death in the Pimpri Chinchwad area ranging to 33.38%. It was also seen that the deaths due to myocardial infarction was seen more in people of the age groups 25 to 64 years. These can be prevented by changing lifestyle, diet and reducing risk factors like smoking, obesity and stress. The obtained result also indicates that there is a need for increased cardiac care facilities with more cardiac ambulance and cardiac care centres in Pimpri Chinchwad city. The other leading causes of death found in the secondary analysis of the Postmortem records were death due to head injury (n= 142, 21.06%) and haemorrhagic shock (n=70, 10.38%).

Keywords: Forensic medicine, Cause of death; Myocardial Infarction; Epidemiology; Post Mortem record; Preventive medicine.

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Introduction

Thanatology is the branch of medicine which deals with the study of death. The word thanatology is derived from the Greek word *Thanatos* which means death and *logus* means science. According to medicine, death is stoppage of circulation of blood with consequent cessation of vital functions. The Law dictionary of Black states that "death is the cessation of life, the ceasing to exist and cessation of animal and vital functions consequent thereupon such as respiration, pulsation, etc."[1]

The course of disease transition in India has been changeable over a substantial period of time. The disease trend has been travelling from infectious and communicable diseases, nutrition disorders to non-communicable and occupational diseases. The increase in the prevalence of non-communicable diseases has led to the rise of cardiovascular diseases in globally. Of all the non-communicable disease cases which are prevalent in India, about two-third of it belongs to the cardiovascular diseases. Both the rural and the urban parts of India equally suffer from the burden of cardiovascular diseases.[2] As per the Global Burden of Disease study, nearly 24.8% of all the deaths in India are a result of the cardiovascular diseases.[3]

The reports of World Health Organization also suggest that the patterns of death have changed in the world and the causes of death have moved from infectious to non-infectious. Heart failure, stroke, chronic obstructive pulmonary diseases and lower respiratory tract diseases are the four leading causes of death in the world.[4]

The number of cases of Coronary Artery Disease (CAD) has substantially increased from 1% to 9.6% in the urban population within 1960 to 1995. The numbers of these cases have doubled in the next ten years. A comparative study between the rural and the urban population suffering from cardiovascular diseases in India show that its incidence is more in the urban population than rural by 11%.[5] Even in the month of August 2021, in the times of COVID-19 Pandemic, it was observed that the number of deaths in Pune was more due to Non-communicable disease than from COVID-19. This is indicative of the three fold rise in the incidence of non-communicable diseases in the city.[6]

The burden of disease in the city of Pune during the time when the survey was carried out was 4.7% of the total population. The consumption of various unhealthy foodstuffs also contributes to the incidence of Myocardial infarction. Oily food consumption is seen in about 64.2% people suffering from cardiovascular diseases. The prevalence of tobacco chewing is seen abundantly in adults suffering from cardiovascular disease, which is further denoted in a table below.[7] [Table 1]

Table 1: Tobacco consumption in various age groups[7]

Sr. No.	Age group	Percentage of people consuming tobacco
1	20-29	14 %
2	30-39	26 %
3	40-49	30.9 %
4	50-59	29.1 %

According to a publication in The Lancet 2000, South Asians residing in Canada are more prone to heart diseases than their European and Chinese counterparts. Some physicians claim that the South Asian population has experiences frequent famines due to which their bodies find it difficult to make a metabolic U-turn. This results in high insulin tolerance and therefore higher risks for diabetes and obesity.[7]

A postmortem examination (autopsy) is a standard, current medical procedure performed in a surgical manner, through which a thorough check of tissues and organs of a human body after death, aiming at determining the cause of death, of mechanisms that lead to that outcome. With such increasing rise in the number of communicable and non communicable diseases in the society, conducting a Post mortem examination proves vital in establishing the cause of death of the deceased. A well conducted post mortem examination also helps in improving the medical sciences and the public health. It helps one understand the mortality rate as defined by the death certificate. Mortality data aids in understanding the health of the population. Causes of death ascertained by postmortem examination are a subset of the total number of deaths registered in an area. [8]

Materials and Methods

Study setting

This article is a secondary data analysis of postmortem registers data which was collected from the Post mortem centre of Talegaon General Hospital in Pune from the years 2019 to 2021. Talegaon dabhade

is a town in Maval taluka at Pune district. It is situated in the outskirts of Pimpri-Chinchwad city. This area is well known for its hilly terrain and presence of several large dams such as the Pawana dam. The population of Maval taluka is approximately about 3.8 lakhs and is popular for tourist attractions. The Postmortem centre of Talegaon General Hospital is one of the main centres for conduction of postmortem examinations in the Maval taluka.

Data source

The postmortem examination registers are maintained by the Postmortem Centre of Talegaon Dabhade for each year. Data is entered by the doctor who conducted the postmortem examination. The columns in the registers include date of conduction of the postmortem examination, name, age and sex of the deceased, address (local and permanent) of the deceased, and cause of death and name of the doctor who conducted the postmortem examination. For our study, the data was collected using a predesigned format from the postmortem registers/ record whilst maintaining the confidentiality.

Ethical clearance

Since it was a secondary data analysis, ethical approval was waived off by the Institutional Ethics Committee. However, prior permission was sought for conducting the study.

Statistical analysis

The data was entered in Microsoft Excel worksheet and was cross-validated by the primary investigator. The data was analyzed with the help of descriptive statistics. Analysis of the data was based on age, sex and cause of death. The diagnoses provided in the postmortem record were categorized.

Results

A total of 674 postmortem examinations were conducted in the Talegaon General Hospital Postmortem Centre, Pune in the study period. The number of postmortem examinations may have been affected due to the ongoing COVID-19 Pandemic.

The postmortem records revealed that the most deaths that occurred in PCMC, barring the deaths due to COVID-19 Pandemic, were due to myocardial infarction. Myocardial infarction (MI) was found to be the major cause of death according to the postmortem records in the study span. It accounted for about 33%, claiming about 225 lives. The other major causes of death found were death due to head injury (21.06%), haemorrhagic shock (10.38%), hanging (9.94%) and drowning (7.12%). The other causes of death according to the postmortem examination include congestive cardiac failure, death due to electric shock, food poisoning, hypovolemic shock and septic shock. Some decomposed bodies were also brought for postmortem examination in which elicitation of cause of death was difficult. The viscera in such cases were preserved and sent to the forensic laboratory for further evaluation. [Table 2- Original]

Table 2: Frequency distribution of causes of death according to ICD 10*

Cause of death	Frequency (N)	Percentage
Myocardial Infarction	225	33.38%
Head Injury	142	21.06%
Haemorrhagic shock	70	10.38%
Hanging	67	9.94%
Drowning	48	7.12%
Congestive Cardiac Failure	33	4.89%
Electric shock	13	1.92%
Food poisoning	10	1.48%
Hypovolemic shock	5	0.74%
Septic shock	4	0.5%
Decomposed bodies found	24	3.56%
Cases in which viscera was preserved and sent to forensic laboratory	33	4.89%

(International Classification of Diseases, 10th revision)*

Figure 1 denotes the age wise distribution of the people who died due to myocardial infarction. The grouping of age is done according to the 2001 Census Data of the Government of India.[9] Around 16.44% (n=37) of the deceased people belonged to the age group 65 to 79 years. 2.66%, that is, 6 people above the age of 80 years succumbed to myocardial infarction during the span of study. The age groups of 25 to 44 years and 65 to 79 years show a similar graph of 38.66% (n= 87) and 39.11% (n= 88) respectively. Death due to myocardial infarction was seen the least in the age groups of 15 to 19 years and 20 to 24 years with 1.33% (n= 3) and 1.77% (n= 4) respectively. [Figure 1- Original]

Figure 2 depicts the sex wise distribution of people who died due to myocardial infarction in the study span. A huge difference has been found in the frequency of deaths due to myocardial infarction in either of the sexes. It has been seen that 193 out of 225 (85.77%) people that died due to MI were males while the frequency in females was 32 (14.22%). This is indicative of an increased burden of myocardial infarction in males than in females in PCMC area. [Figure 2- Original]

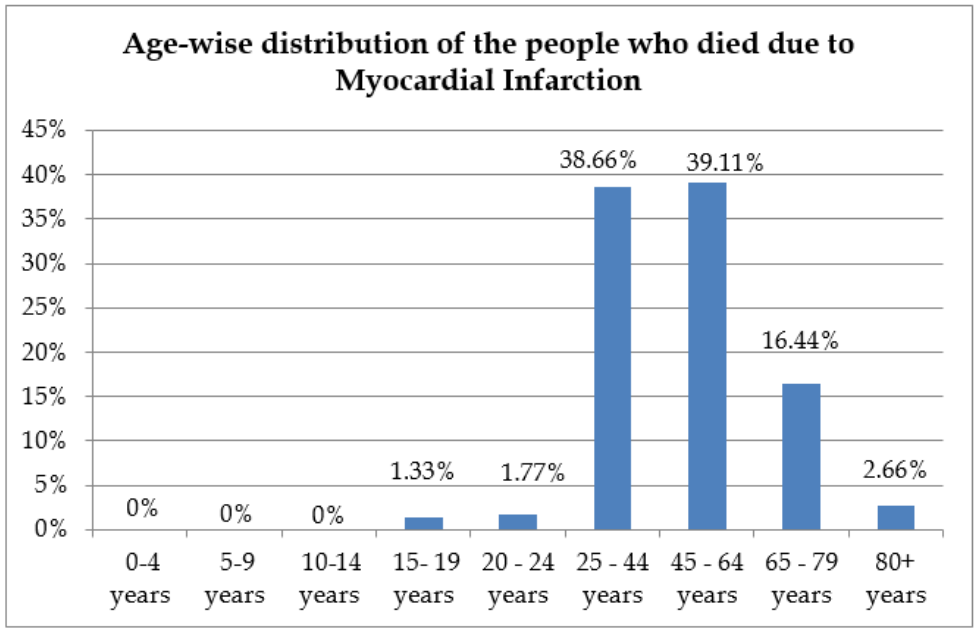

Figure 1: Age-wise distribution of the people who died due to Myocardial Infarction

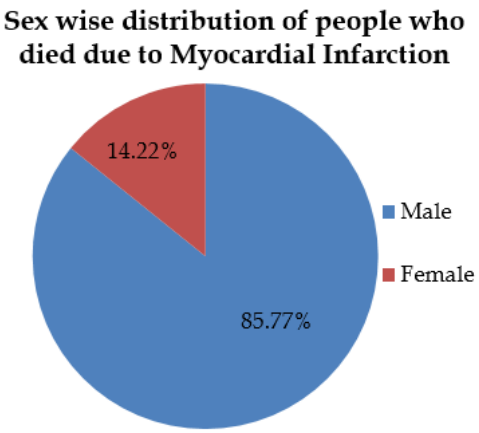

Figure 2: Sex wise distribution of people who died due to Myocardial Infarction

Conclusion

Out of the 674 postmortem examinations conducted in the Postmortem Centre of Talegaon General Hospital, Pune in the study span of 2019 to 2021, the three leading causes of death found were myocardial infarction, head injury and haemorrhagic shock. As the study span was an active COVID-19 Pandemic period, there was a relative decline in the number of postmortem examinations conducted in the said postmortem centre. Barring the deaths due to the Corona virus affections, the maximum death rate seen in PCMC area was due to Myocardial infarction.

The postmortem examination is important to inspect public health and to assess the adequacy of the available resources in a given area. The cause of death determined by a postmortem examination is an indicator of the total number of deaths in that particular region.[8] The present study shows a high incidence of death due to myocardial infarction in PCMC during the study span. Of the 674 postmortems

that were conducted, about 225 postmortems conducted were of myocardial infarction. This shows that the deaths due to MI in PCMC is significant and needs to be addressed.

According to the estimation of the World Health Organization, India will have about 60% of the world's cardiac patients. Due to overt globalization and changing lifestyles of people all over the world, a significant upsurge has been observed in the lifestyle disorders. Industrialization, modernization and urbanization have directly and indirectly affected the health of the people with respect to the dietary habits, the levels of physical activity and consumption of tobacco in the form of various products. The major biological risk factors for cardiovascular diseases are high blood pressure, overweight and obesity, high blood cholesterol and chronic diabetes mellitus type II. Unhealthy dietary habits such as increased consumption of saturated fats, salts and refined carbohydrates and reduced intake of fruits and vegetables also contribute to the affection of cardiovascular diseases.[7]

The increasing number of deaths due to myocardial infarction gives rise to various facets of the health care system that can be questioned. Not just is the health care system responsible but also is the changing lifestyle of people which contribute to the disease affections in people. The above study shows that the maximum deaths due to myocardial infarction were seen in the Maval region of PCMC which roughly accounted for about 39.5% (n= 89) of the total deaths due to myocardial infarction in PCMC. Also, the deaths due to myocardial infarction seen in Talegaon Dabhade region accounted for 18.22% (n=41). The high incidence in Maval region can be attributed to the poor health care facilities in the Maval region of PCMC. The availability of Cardiac ambulances and specialized Cardiac Care centres should be increased in the Maval region so as to bring down the death rate due to MI.

Ethical Clearance: Taken from the Institutional Ethical Committee

Source of Funding: Self Funded

Conflict of Interest: Nil

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