

# Coronary Artery Stenosis in Victims of Sudden Death on Medicolegal Autopsy and its Incidence Rate

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## ABSTRACT

Coronary artery stenosis and the resulting ischemia of the heart is one of the leading causes of death worldwide. Along with worldwide research on the subject, research is being carried out on the subject in the Nishtar Hospital, Multan. Men are most affected. More morbidity occurs in the last decades of life. However, in some cases, the younger age group is also involved. This is also seen on the top page with higher education and urban settlements. Smoking and alcohol are the main risk factors. This often affects entrepreneurs and service owners. Cardiologists and treating physicians, as well as the general public, need lifestyle changes to consider early treatment and avoid unwanted complications.

**Aim:** This study was conducted to investigate atherosclerotic events in the coronary arteries of sudden death victims.

**Methods:** Research material consisting of 82 randomly selected cases from a total of 980 autopsies carried out due to sudden death in the period from May 2020 to January 2021 at the Forensic Medicine Department of Sheikh Zayed Hospital, Rahim Yar Khan and Islamic International Medical Collage, Rawalpindi. Information on the date, time and place of death, etc. obtained from the investigating police officer or from accompanying family members. 2. Clear cardiovascular diseases and events and current records were obtained from relatives or family members and accompanying police officers. 3. Sociodemographic data was obtained from relatives of the victim. The autopsy and histopathological findings were recorded. The cause of death was determined and the collected data were subjected to statistical analysis.

**Results:** The incidence of coronary stenosis was found in 47 out of 82 cases. In this study, the highest number of cases was recorded in the age groups 17 and 14, and 61-70 and 51-60 years, respectively. Men outnumbered 39 cases and females 8 cases. The youngest participant was a 24-year-old man and the oldest was a 78-year-old woman.

**Conclusion:** The study showed an unexpectedly high incidence of coronary stenosis in this region. Although the incidence is higher in men than in women, it is alarming for both sexes. Cardiologists and treating physicians, as well as the general public, need to change their lifestyle, consider early treatment, avoid unwanted complications, and raise awareness about the disease.

**Key words:** Coronary artery stenosis, Men, Smoking and Alcohol, Businessmen.

## INTRODUCTION

Coronary artery obstruction causing heart ischemia is a very common cause of sudden death<sup>1-2</sup>. The main pathological process is atherosclerosis or atherosclerosis of the coronary arteries. The incidence of ischemic heart disease most often begins in middle age, but the effects of the disease process, including sudden death, are not uncommon in the younger age groups<sup>3-4</sup>. Coronary artery disease is responsible for approximately 70% of sudden deaths, and 50% of them have no known clinical symptoms. Coronary atherosclerosis is also sometimes referred to as the "captain of the people of death"<sup>5-6</sup>. Cardiologists say at least 80% of normal lumen must be lost before myocardial necrosis can occur. However, most forensic pathologists blame coronary atherosclerosis for death in which much less lumen function is lost. The global burden of disease survey found 5.2 million deaths from cardiovascular disease in developed countries and 9.1 million deaths in developing countries in 1990. By 2021, there will be an almost 75% increase in global cardiac burden of vascular disease affecting developing countries<sup>7-8</sup>. The incidence of coronary atherosclerosis and

cardiovascular events varies widely with age, gender and location. Rapid urbanization, dietary changes, smoking and alcohol abuse, high levels of stress at work, as well as diabetes and high blood pressure are pushing society towards this cardiovascular risk<sup>9</sup>. Despite significant advances in medical and interventional cardiology and emergency care, the incidence of coronary artery disease appears to be high<sup>10</sup>.

The right coronary artery departs from the right aortic sinus, passes the pulmonary trunk and follows the right AV groove without separating any major branches near the origin. A small marginal vein emerges on the right edge of the heart, the main branch runs to the back of the heart where it becomes the posterior descending artery. The left coronary artery departs from the left aortic sinus and radiates through the anterior descending branch from the interventricular septum to the apex and circumferential branch that runs along the left AV groove to reach the posterior part of the heart<sup>11</sup>. The vein arrangement in the back of the heart changes between the left circumflex artery and the right coronary artery. Common sites of stenosis with or without thrombosis are the first part of the

anterior descending branch of the left coronary artery within 2 cm from the origin, then the proximal part of the right coronary artery, the first part of the circumsccribing coronary artery, the left coronary artery and the short main trunk of the left coronary artery<sup>12</sup>. This study was conducted to investigate atherosclerotic events in the coronary arteries of sudden death victims.

**METHODS**

Research material consisting of 82 randomly selected cases from a total of 980 autopsies carried out due to sudden death in the period from May 2020 to January 2021 at the Forensic Medicine Department of Sheikh Zayed Hospital, Rahim Yar Khan and Islamic International Medical Collage, Rawalpindi.

**Selection Criteria**

Inclusion criteria: 82 randomly selected sudden deaths.  
 Exclusion Criteria: Broken or decomposed bodies are excluded.

1. Information on the date, time and place of death, etc. obtained from the investigating police officer or from accompanying family members. 2. Clear cardiovascular diseases and events and current records were obtained from relatives or family members and accompanying police officers. 3. Sociodemographic data was obtained from relatives of the victim.

**Autopsy Examination**

A. External body examination and related findings are recorded.

B. Internal control

1. The skull, thorax and abdominal cavity were opened according to the routine post-mortem examination.  
 2. The heart is examined for discoloration, enlargement, or adhesions, including the pericardial space, for blood or other fluids. Heart weight obtained.

**Histopathology**

A 10% formalin solution was used to protect the heart. The coronary arteries were sectioned transversely at intervals of 2 to 3 mm along their course. Sections for further processing were taken as follows: Rt (A) - 2 cm proximal to the ostium of the right coronary artery Rt (B) - 2 cm behind the exit to the right lateral border of the heart. Rt (C) - Posterior descending artery Lt (A) - Left main trunk Lt (B) - Left anterior descending artery Lt (C) - Left circumferential artery 1. The heart is open in the direction of blood flow, thickness of the walls of the ventricle, damage valves, etc. However, the intensity of lumen patency was not observed in the study. 2. The cause of death was determined and the collected data were subjected to statistical analysis.

**RESULTS**

The incidence of coronary stenosis was found in 47 out of 82 cases. In this study, the highest number of cases was recorded in the age groups 17 and 14, and 61-70 and 51-60 years, respectively. Men outnumbered 39 cases and females 8 cases. The youngest participant was a 24-year-old man and the oldest was a 78-year-old woman. The most involved group was 61-70 men and 51-60 women. The table below shows the results.

Age group	Male	Female	Total	Percentage of cases involved
0-10	0	0	0	0
11-20	0	0	0	0
21-30	2	0	2	4.23
31-40	5	1	6	12.77
41-50	6	1	7	14.90
51-60	7	2	9	19.14
61-70	12	1	13	27.66
71 and above	7	3	10	21.23
Total	39	8	47	82

As shown in the figure below, most of the cases have occurred in urban areas.

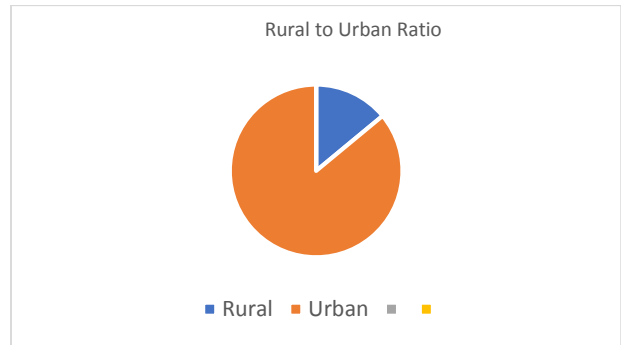


Fig. 1: Urban and rural distribution of cases

Most of the cases of coronary artery stenosis were in the educated class who enrolled above graduation level. There have been very few illiterate or unrecorded cases.

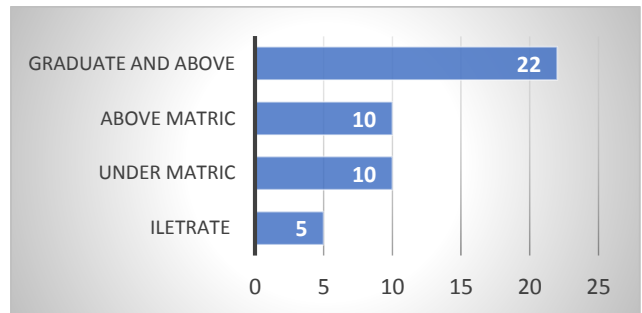


Fig. 2: Educational qualification distribution of cases

Most of the cases were related to tobacco use or smoking and alcohol, or both.

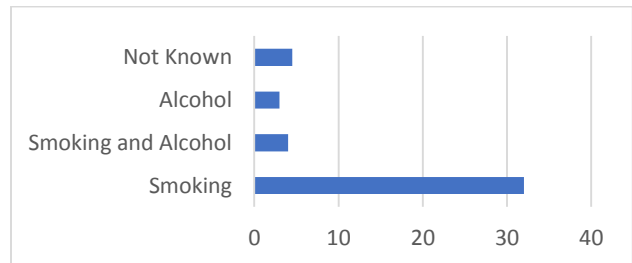


Fig. 3: Personal habits distribution of cases

The study shows that the business men are most affected by coronary artery stenosis (21 cases), followed by those in service with 9 cases. An interesting fact is the participation of 3 young students.

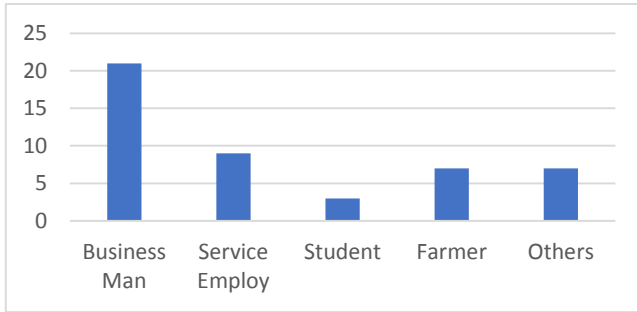


Fig. 4: Occupational distribution of cases

### DISCUSSION

In this study, 57.3% of the 82 cases showed coronary stenosis. This is almost comparable with the observations of employees such as Wig KL et al. (64%), Subramaniam R et al. (62%) and Singh V et al. (68%)<sup>13-14</sup>. However, Garg M et al. (46.4%) reported a lower incidence in their study. The study is similar to the results of the studies by Garga M et al. and Dhruva GA et al., who reported a higher incidence in the sixth and seventh decades of life. The higher incidence in males compared to females is consistent with all previous studies on the incidence of coronary stenosis. This can be attributed to men who are more exposed to stress and more prone to the effects of smoking and alcohol<sup>15-16</sup>. The higher incidence in the urban population is consistent with the findings of Konishi M et al., who found a growing trend of myocardial infarction in the urban population. This is mainly due to a sedentary lifestyle and changed eating habits, as well as changes in the lifestyle of city dwellers<sup>17-18</sup>. The tendency to become more skilled with the disease more frequent is in line with the findings of Sarvotham SG and Berry JN. However, Gupta R et al found that illiteracy and lower education were associated with greater exposure to risk factors leading to increased morbidity<sup>19-20</sup>. This difference may be due to the fact that low educated people generally do not report sudden deaths to justify a forensic autopsy in the workplace. Regarding the occupation, it can be seen that hired or servant workers are the most affected<sup>21-22</sup>. This is in contrast to the findings of Gupta R et al. who found a higher incidence in the low-employment population? The fact that the studied area is a city may result from the greater exposure of the population to risk factors<sup>23</sup>. Personal habits are more common in a population with active tobacco and alcohol consumption, which is consistent with most studies.

### CONCLUSION

The study showed an unexpectedly high incidence of coronary stenosis in this region. Although the incidence is higher in men than in women, it is alarming for both sexes. Age has a predominant influence. This study highlights the importance of screening for cardiovascular risk factors from the beginning of the third decade of life. Smoking and alcoholism can accelerate the development of coronary stenosis. All observations in this study indicated that the

incidence of coronary stenosis is alarming. Cardiologists and treating physicians, as well as the general public, need to change their lifestyle, consider early treatment, avoid unwanted complications, and raise awareness about the disease.

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