AUDIT ARTICLE

# An examination of autopsies in a 400 bedded government hospital in Jhelum. An insight into the sudden cause of death and costs associated with autopsy in young government personnel

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## Abstract

**Objective:** To explore the different causes of sudden death among serving government employees.

**Method:** The audit study was conducted at the Pathology Department of a tertiary care hospital Combined Military Hospital (CMH) Jhelum, Pakistan, and comprised data of all autopsies between January 2017 and June 2021. Sampling was done by non probability purposive sampling technique which requires no statistical method calculation. Data was recorded related to weight of specimens, lists of tissue specimens for histopathological, chemical, and forensic examination, and the tests performed on samples of blood, urine, and other body fluids. Ethical review approval was taken from ethical review committee of the hospital dated October 2017. Data was analysed using Microsoft excel.

**Results:** All the 34 autopsies of male subjects were performed to explore the cause of sudden death. Coronary atherosclerosis was the most common cause of death 14(41.2%), followed by drowning 4(11.7%). Drug abuse, blood alcohol, narcotics, carbon monoxide and toxic elements were found in 5(14.7%) cases.

**Conclusion:** Myocardial infarction was found to be the most common cause of death among serving government employees.

**Keywords:** Autopsy, Coronary atherosclerosis. (JPMA 75: 74; 2025)

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## Introduction

World Health Organisation (WHO) defines sudden death as "death within 24 hours from the onset of the symptoms". It can also be defined as deaths that are sudden, unexpected, clinically unexplained, or otherwise obscure even though there need to be no unnatural element in their causation.[1]

Autopsy is a comprehensive technological, systematic, analytical study of a deceased human being, requiring exterior examination of the body, cutting up and studying the substance of the cranial, chest and visceral structures of abdomen with a precise aim.[2] Keeping in view the multiplicity of objectives, the whole process is classified into two important groups.[3] The first group comprises clinical, educational, hospital post-mortem (PM) examination through which medical professionals go in quest of finding the magnitude of disease for which the expired person was getting treatment. The second group comprises medico-legal or forensic autopsy that looks into unexpected, sceptical, unknown, unusual, contentious or criminal deaths. It encompasses deaths due to violence, mechanical intervention to respiratory passages, physical and environmental factors and intoxication with poisons. Also, naturally occurring deaths happening suddenly under suspicious conditions fall in this category. In case of the deaths related to serving government servants, all autopsies are performed by professional pathologists irrespective of the nature and mode of death. In Pakistan, however, hospital PM examinations are usually not conducted mostly because of objections raised by the deceased's close relatives who often consider it against their religious beliefs and social norms. It is only in government hospital setups that it is obligatory to do PM examinations in all cases of sudden deaths regardless of the cause of death; whether overt or natural.[4]

The current audit study was planned to explore the different causes of sudden death among serving government employees.

## Materials and Methods

The audit study was conducted at the Pathology Department of a tertiary care hospital in Jhelum, Pakistan, and comprised data of all autopsies between January 2017 and June 2021. The autopsies of all serving government employees who had either been brought dead to hospital or died during hospitalisation were included irrespective of their age, designation and gender. Data of retired government employees and families of both serving and

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retired government personnel was excluded.

During the PM examination, verification of documents, including particulars of the deceased, written orders to carry out autopsy by the relevant consultant, consent of a near relative or consent of the head of the institute concerned and approval by the head of hospital where the autopsy had to be carried out, was done. An external examination was done to look for any foul play. The body cavities were opened giving a Y-shaped incision extending from the sternum and clavicle downwards till below the umbilicus. The cavities of thorax and abdomen were cut open as per routine with no bias related to the anatomic cause of death. The organs and their representative sections were obtained from the thorax, abdomen and cranium. Blood specimens, body fluids and urine samples, if present, were also collected. In case of firearm injuries, samples around the entry and exit wounds were taken. Likewise, any anatomic injury or abnormality from which the sample could be taken was also obtained. Data was recorded related to the weight of specimens, tissue specimens for histopathological, chemical and forensic examinations, and tests performed on blood, urine and other body fluids. The body cavities were closed and stitched. After giving the body the ritual bathing, it was handed over to the authorities or families concerned.

PM histopathological tests were sent to tertiary care government laboratory in Rawalpindi, while tissues for forensic toxicology were sent to the Punjab Forensic Science Agency (PFSA), Lahore. https://pfsa.punjab.gov.pk/system/files.

## Results

All the 34 autopsies were performed on male subjects with mean age 34 ± 10.9 years. (Figure 1). There was 1(2.9%) inpatient, and the rest were brought in for PM examination. None of the autopsies revealed any sign of foul play on external examination. None of the autopsies revealed a homicidal cause of death. PM provisional diagnosis matched PM histopathological diagnosis in 97% cases. There were 14 cases of Myocardial infarction (MI), 3 cases of underlying medical diseases other than MI,2 cases of electrocution, 4 cases of drowning, 4 deaths of firearm injuries, 2 sudden deaths in sleep,1 case of road traffic accident (RTA), 2 Accidental deaths other then RTA and 2 cases of Fosfine poisoning. Forensic toxicology report was positive in 9(26.5%) samples. Coronary atherosclerosis was the most common cause of death 14(41.2%), followed by drowning 4(11.7%) (Table). Mean ages of individual causes

**Table:** Summary of the findings

| No | Cause of death | No of deaths | Mean±SD Age | %age | Provisional Cause of death | Histopathology results | Punjab forensic lab results | Blood and Urine toxicology results AFIP |
|---|---|---|---|---|---|---|---|---|
| 1. | Sudden unexplained death's cause | 14 | 38.2± 6.48 | 41.2% | Myocardial Infarction | Severe Coronary artery disease/ Atherosclerosis ;leading to MI/ Superimposed Thrombus formation | Negative toxicology results | 2 also found positive for urine toxicology cannibinoids, benzodiazepine, along with major coronary artery disease |
| 2. | Sudden unexplained deaths without any obvious cause other than IHD | 3 | 31.6± 9.01 | 8.8% | Sudden adult death syndrome | Pulmonary embolism, dissecting aneurysm and spontaneous pneumothorax | Negative toxicology results | Not detected |
| 3. | Electrocution | 2 | 32± 2.82 | 5.9% | Sudden death due to cardiac arrest | Skin changes consistent with electrocution | Negative toxicology results | Not detected |
| 4. | Drowning | 4 | 25.7± 2.98 | 12% | Asphyxia and cardiopulmonary arrest | Visceral congestion consistent with death due to asphyxia secondary to drowning. Congestion of lungs and anthracosis | Negative toxicology results | Not detected |
| 5. | Firearm injury | 4 | 34.2±10.96 | 11.8% | Massive haemorrhage and shock | Skin(Dermis) homogenisation and focal deposits of carbon dust present in deeper dermis and subcutaneous tissues | Negative toxicology results | Not detected |
| 6. | Sudden death in sleep | 2 | 32± 8.48 | 5.9% | Hypoxic injury/ Carbon monoxide (CO) poisoning | Specimens partially autolyzed with focal pulmonary Haemorrhage and focal coronary artery disease | CO gas detected in Splenic blood | CO detected in whole blood 68% and 77% respectively |
| 7. | Road traffic accident (RTA) | 1 | 24± 8.48 | 2.9% | Severe Head Injury with multiple skull fractures | Intracerebral haemorrhage due to RTA | Negative toxicology results | Not detected |
| 8. | Accidents other than RTA | 2 | 32.5± 6.36 | 5.9% | Rib fractures/Lung injury/Head injury | Head injury due to brain laceration/Multiple rib fractures causing lung damage and respiratory failure | Negative toxicology results | Not detected |
| 9. | Poisoning | 2 | 35± 15.5 | 5.9% | Rat pill ingestion to commit suicide | Death consistent with Severe coronary artery disease, Right coronary artery 100% occluded | Fosfine detected in stomach contents | Urine Bezodiazipines positive |

AFIP: Armed Forces Institute of Pathology, IHD: Ischaemic heart disease, SD: Standard deviation

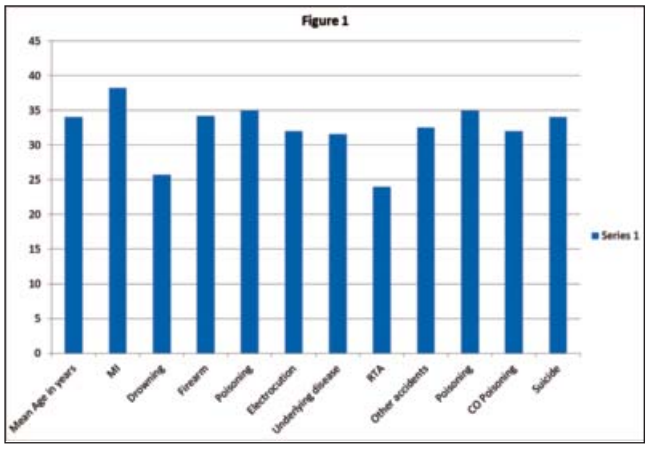


**Figure:** Mean ages in Years in individual causes
MI: Myocardial infarction, CO: Carbon mono-oxide.

are shown in (Figure 1).

Drug abuse, blood alcohol, narcotics, carbon monoxide (CO), and toxic elements were found in 5(14.7%) cases. There was 1(2.9%) death due to spontaneous pneumothorax, and the deceased was found to be positive for antidepressant drug fluoxetine which was detected in the liver. There was 1(2.9%) patient who died due to severe coronary atherosclerosis who was found positive for orphenadrine in the liver. There were 5(14.7%) cases of suicide and they were brought in dead as gunshot wounds and rat pill poisoning.

Material and resources spent on one autopsy were approximately Pakistani rupees (PKR) 66,800. This included histopathology charges, expense on material, like surgical blades, gauzes, cotton rolls, formalin and jars for specimen, as well as transportation charges of the specimen to Lahore and Rawalpindi.

## Discussion

In the study, the mean age was recorded to be 34±10.96 years among 34 cases. This is comparable to the earlier finding reporting the most affected age group being 20-40 years (52.7%)[5]. Out of 17 accidental deaths in the current study due to firearm injury, electrocution, drowning, road traffic accident (RTA), poisoning, traumatic fatal accidents, none was due to homicide. In comparison, homicidal deaths accounted for 82.67% cases in a study carried out in Khyber Pakhtunkhwa (KP).[6]

Serving government employees usually avoid quarrels and animosities because of service reasons**.** In the current study, firearm injury and poisoning were suicidal 5(14.7%), and this was comparable to an earlier study reporting 1.9%.[5] This correlates to common problems of anxiety and depression in the general population which generally go unaddressed. Among the accidental deaths, only 1(2.9%) died in an RTA, and he was the driver. The frequency of RTA was reported to be 3.8% in one study[5]. In other accidental deaths, there were 4 drowning cases, and they were all fresh water drowning cases. In one study comprising 3,136 medico-legal autopsies, 125(3.98%) were drowning deaths.[7] According to the WHO, drowning was the reason for death in 372,000 cases in 2012. This makes it the world's third leading unintentional, or accidental, injury-related death. Around 449,000 people worldwide lost their lives to drowning in 2000, according to data from the Global Burden of Disease. Drowning also resulted in 1.3 million years of lost life and incapacity.[8] Since there are no pathognomonic signs to diagnose drowning, therefore all the current cases were labelled as accidental based on circumstantial evidence. The large gap in the number of cases in the current study compared to other studies is due to the difference in sample size. Death due to CO poisoning was found in 2(5.8%) case in the current study. CO was inhaled while sleeping by exposure to fumes from gasoline due to lack of knowledge about CO toxicity. CO poisoning deaths was reported to be 2.7% in a study done in Istanbul.[9] In the current study, death due to other accidental causes included electrocution and blunt trauma on head while operating a crane. There were 4(11.7%) such cases. All were accidental in nature based on circumstantial evidence. In an audit of autopsies in 2016 of 785 autopsies, 6(0.7%) deaths were due to electrocution, and 103(13%) were due to blunt trauma.[5]

Sudden unexplained natural deaths due to coronary atherosclerosis had the highest incidence 14(41.7%) in the current study, while 3(8.8%) cases were confirmed on autopsy histopathological findings as sudden unexplained death due to pulmonary embolism, dissecting aneurysm and spontaneous pneumothorax. In an earlier PM audit of 250 cases, deaths due to coronary atherosclerosis were 83(73.45%).[10] This was in line with the current study to the extent that coronary atherosclerosis was the leading cause of death.

In the current study, PKR66,800 were spent on a single autopsy. In government institutions, all expenses are borne by the healthcare facility itself. In a 1997 survey by the American Board of Pathology Forensic Examination Board, the average fee charged was $518 (PKR119,140).[11] In the current setup, no PM examination fee is charged.

In 5 suicidal deaths in the current study, 3 were due to gunshot wound and 2 occurred due to ingestion of rat pill poison. All the 5 deceased had a history of psychiatric illness and domestic family issues. In one study in Karachi, death due to suicides was found in 7(11.4%) PM cases.[12]

The mean age recorded in suicidal deaths in the current study was 34±10.96 years. The age range in the Karachi study with 7 suicidal deaths was 20-39 years.[12]

In the current audit, pre-mortem and PM findings were the same except in 1 case in which initial histopathology report revealed death consistent with severe coronary atherosclerosis, but later on during chemical examination, rat pill poison was detected in the stomach. In an annual audit of autopsies in Hong Kong, no major or minor differences were found in pre-mortem and PM findings.[13]

## Conclusion

Myocardial infarction was found to be the most common cause of sudden unexplained death, and the resources spent on autopsies were huge. Lifestyle modifications can help in the prevention of coronary atherosclerosis in young age. Accessibility to a nutritionist to plan a healthy diet and regular exercise, and timely psychological sessions to cope with stress levels can help. Drowning can be prevented by learning swimming. Accidents, like electrocution and CO poisoning, can be reduced by creating awareness. Underlying cardiac diseases require screening at the time of induction with echocardiography.

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UN: Screening, formation of topic, literature search and writing.
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IAS, AB: Screening and reviewing.