Autopsy Report Dataset description

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1 Domain Background

One of the most popular population-based studies conducted by examining death records is epidemiology of forensic deaths. These certificates, which include external and interior exams of the deceased person's body as well as other details about the person, are forensic autopsy reports created by pathologists. These reports seek to identify the main reason of death. (CoD). In both criminal and civil investigations, forensic autopsy reports are a useful source of data, and comparing several reports can give accurate early warnings of disease activity.Autopsies and post-mortem examinations greatly improve the quality of health care and contribute to health education [1].

1.1 The forensic autopsy

During an autopsy, a pathologist examines the body of the deceased from the inside out, learns about the organs, and examines the physical evidence found in the deceased's body to identify the various forms of death (natural, violent, or toxic). death). Pathologists also collect information about the deceased's personal characteristics, injuries, histopathological reports, and medical history [2].

The autopsy serves several important functions, including:

1. **Establishing the medical cause of death:** An autopsy provides detailed information about the health of the deceased, helps determine the cause of death, and helps improve medical practice. .

2. **Determining the form of death:** The autopsy helps classify the cause of death as either homicide, suicide, accidental, or natural death. This is important for the criminal justice system to take appropriate legal action.

3. **Determining the date of death:** The autopsy provides an estimated time of death. This is important in criminal investigations and trials.

4. **Identification of the deceased:** In some cases, the deceased is unknown. An autopsy can provide important identifying information such as: Dental Records, Medical History and Physical Characteristics.

5. **Determining the method used in cases of violence:** In the case of violent deaths, autopsies help identify the perpetrator's tools and contribute to criminal investigations and prosecution of the perpetrators.

Overall, the medico-legal autopsy serves as a vital tool in uncovering the truth behind a person's death and improving the functioning of both the medical and criminal justice systems.

1.2 The causes of death

he death can be classified into various categories: death due to illness, death as a result of an accident, suicide, and murder. These are grouped into three broad categories of cause of death [3]: *natural death,violent death and toxic death.*

1.2.1 Natural death

Natural death refers to death caused by physiological conditions such as old age, disease, or other natural causes. However, apparently healthy people may die suddenly, and autopsy is often the only way to determine the true cause of death. In a forensic context, natural death is primarily due to sudden death due to heart problems, but other causes are possible, including: Deaths can occur from nervous system-related causes, gastrointestinal causes, respiratory disease, and metabolic disorders such as cancer and diabetes.

1.2.2 Violent death

Violent death is defined as intentional external intervention (physical or toxic, by a person, machine, or product) in circumstances that can be criminal (homicide), accidental (a brutal external cause), or self-inflicted (suicide). The diagnosis in this case is not always straightforward . In the context of violent death, the causes usually refer to an injury or wound.

1.2.3 Toxic death

If death from poisoning is suspected, the coroner should request a toxicological analysis and collect a toxicological sample to obtain a comprehensive toxicological profile of the deceased. In medicine, poisons are defined as substances that

temporarily or permanently disrupt vital functions of the human body leading to death. Toxicology considers several anatomical and clinical features such as:

- Hepatic syndrome: sub-icterus and hepatic insufficiency.
- Toxic hepato-nephritis syndrome: digestive disorders, jaundice, oliguria or anuria.
- Ocular syndrome: helps in diagnosing three toxins: botulism, alcohol, atropine.
- Acute encephalopathy: characterized by delirious, convulsive, or comatose forms.
- Respiratory form: characterized by symptoms such as coughing, dyspnea, and pulmonary edema.

2 Description of the dataset

The study was performed on 200 autopsy reports gathered from the University Hospital of Tlemcen in Algeria, within the forensic medicine department. The reports were classified into three Manner of Death (MoD) categories: natural death, violent death (penetrating, suicide, homicide), and toxic death. The personal information of the deceased, such as name, first name, and address, was removed from the reports, retaining only demographic information, details about external and internal examinations of the body (including the nervous, cardiovascular, respiratory, and digestive systems), and the conclusions about the cause of death.

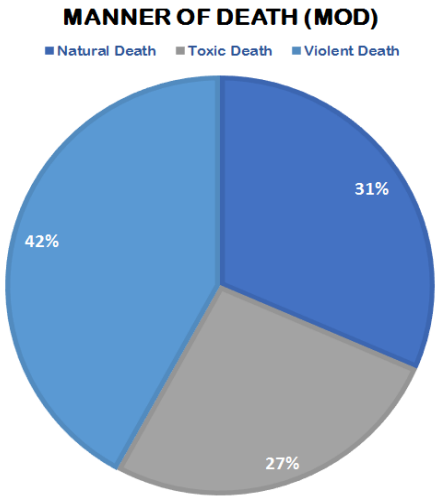

Figure 1: Distribution of manner of death.

The collected dataset is in French and consist of 63 reports for natural death, 53 for toxic death, and 84 for violent death, as shown in Figure 1. Each type of manner of death encompasses reports with multiple unique causes of death (CoD), resulting in a collected dataset with 12 different causes of death across the three categories. The distribution of these causes of death can be seen in Table 1.

Manner of Death (MoD)	**Cause of Death (CoD)**
Natural Death	Myocardial infarction
	Decompensated cardiomyopathy
	Cerebral palsy
	Pulmonary neoplasia
	Infectious myelopathy
	Rupture of a cerebral aneurysm
Violent Death	Head trauma
	A vital hanging
	Electrical burns
	Thermal burns
Toxic Death	Acute lung edema
	Asphyxia syndrome

Table 1: CoDs categorization

The Figure 2 represents the 5 most frequent causes of death in the dataset.

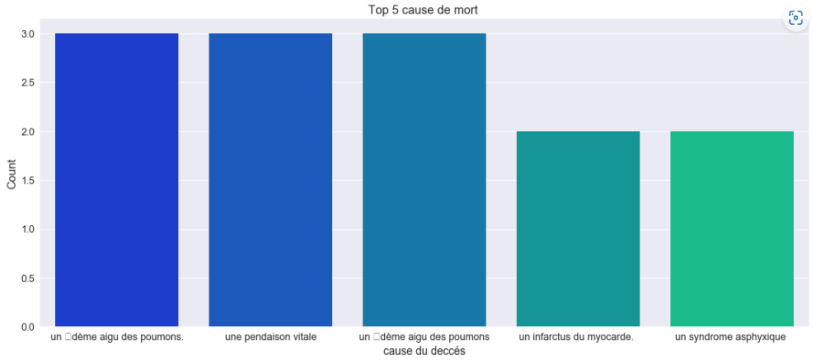

Figure 2: Top 5 causes of death.

3 Solution Statement

In recent years and with the development of technology and artificial intelligence, bioinformatics researchers are very interested in studying the real needs of doctors by collecting real medical data (medical images, medical reports, numerical data ...) in order to discover prior knowledge that lies in this large amount of data (big data) as well as the correlations between these data.

In addition to epidemiological and demographic studies, there are also studies of risk factors for diseases and the study of the causes of death of a particular population, especially in the case of suspicious deaths, which are very large in reality, and the classification of these causes.
Recently, text-mining techniques have provided the capability to automatically predict the Manner of death (MoD) from free-text medical autopsy reports.
This dataset can be used to detect the maner of death by using text mining and machine learning tools. we can also use this data to detect the cause of death (CoD) from these reports by taking the case of Multi-label classication approche into consideration. In future we intend to expand our database with more examples of learning, by collecting more autopsy reports.

References

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