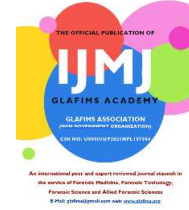


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A study on Postmortem cases of natural and unnatural death at NSCGMC Khandwa M.P.

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Abstract

This study investigates patterns observed in the postmortem examinations of both natural and unnatural deaths at NSC GMC Khandwa. The analysis includes an examination of age groups, the female-to-male ratio, causes of death, and their respective percentages concerning natural and unnatural deaths. Conducted as a retrospective study, this research is based on records of medico-legal autopsies performed in the mortuary at the Department of Forensic Medicine and Toxicology, Medical College and Hospital, Khandwa. The study covers a three-year period from April 1st, 2020, to March 31st, 2023. Out of the total deaths, 93% were classified as unnatural deaths, while 7% were attributed to natural causes. The male-to-female ratio was found to be 4.31:1. Poisoning emerged as the leading cause of unnatural deaths,

followed by road traffic accidents. In the case of natural deaths, heart disease was identified as the most common cause.

Introduction: This study aims to examine patterns in postmortem findings for both natural and unnatural deaths. Natural causes typically result from disease or old age, whereas unnatural causes stem from external factors such as accidents, violence, poisoning, or suicide [1]. In recent years, there has been a notable increase in suicide cases, with poisoning being a more prevalent cause compared to other suicide methods. The ready availability of various pesticides in today's times contributes to this trend.

The contemporary landscape witnesses an elevated incidence of suicides as a method of death, with poisoning featuring prominently. This surge is attributed to the

ready availability of different types of poisons. In the context of unnatural deaths, the term is applied when a demise occurs prematurely against the natural order, resulting from injury, position, or other violent means [2].

Death is further categorized as sudden or expected. Sudden death is defined when a person, not known to have been suffering from any dangerous disease, injury, or poisoning, is found dead or dies within 24 hours after the onset of a terminal illness [4]."

Objective

1. Investigate the causes of both natural and unnatural deaths at NSCGMC Khandwa.
2. Determine the male-to-female death ratio.
3. Analyse the distribution of cases based on age.

Material and method

Study Setup: This study was conducted at the Department of Forensic Medicine and Toxicology, NSC Govt Medical College, Khandwa (Madhya Pradesh).

Study Duration: April 1, 2020, to March 31, 2023 (3 years).

Study Design: Descriptive observational study.

Material: All data from autopsied cases at the mortuary of NSCGMC Hospital, Khandwa during the study period were included in the study, provided they met the inclusion and exclusion criteria.

Inclusion Criteria:

- All cases of natural and unnatural deaths brought to the mortuary for post-mortem, along with police inquest.

Exclusion Criteria:

- Deaths not recorded in police records.
- Cases of unnatural and natural deaths where written information was not provided by family members.
- Cases of unnatural and natural deaths received and handed over without post-mortem examination.

Result and observation

During the study period, there were a total of 1364 medico-legal autopsies conducted at the mortuary. Of these, 1263 (93%) were categorized as unnatural deaths, and 101 (7%) were classified as natural deaths. The distribution by gender revealed 257 (18.84%) females and 1107 (81.15%) males, indicating a male-to-female ratio of 4.3:1. The highest number of natural and unnatural deaths occurred in the 4th decade of life, followed by the 3rd, 5th, 2nd, and

6th decades, with the age group of 21-40 years being the most involved (see Fig 1). A pie chart (Fig 2) illustrates the composition of the total autopsies, emphasizing that 93% were unnatural deaths. Fig 1-Age and sex wise distribution death [Please refer to Figure 1 on last page]

Fig 2- Pie graph % of natural and un natural death [Please refer to Figure 2 on last page]

Among the causes of death, poisoning accounted for the highest number, with 378 cases, followed by 295 cases due to road traffic accidents (RTA) (see Table 1).

Within the category of natural deaths, the highest percentage was attributed to cardiac causes (36.66%), followed by respiratory deaths (23.76%), alimentary issues (22%), and then central nervous system (CNS) related deaths (18%) (refer to Table 2).

Additionally, during the study, it was observed that post-March 2021, the surge in Covid virus infections led to a decline in the rate of post-mortem examinations. Consequently, the number of post-mortem examinations in the years 2021 and 2022 decreased (see Fig 3).

The pie graph (Fig 4) illustrates that the majority of individuals included in this study were employed in the private sector, predominantly as laborers, followed by students and housewives. Occupational status was not applicable in 16 cases due to their low school age. The distribution of cases revealed that a significant proportion of both natural and unnatural deaths were from urban areas, as the study specifically focused on Khandwa and its surrounding regions. Furthermore, over 46% of the study population belonged to the literate sections of society.

This study was conducted to analyse the pattern of unnatural deaths in Khandwa region. The forensic autopsies of Khandwa included post-mortem cases in ascending order of natural deaths in Khandwa from April 2020 to March 2023, analysing the circumstances surrounding the death from police reports and clinical report data. This study was done keeping in mind all types of diseases that cause deaths, and who were brought to the mortuary for postmortem. The year-wise incidence gradually increased from total deaths. During the study, it was also found that after

March 2021, due to the increase in Covid virus infection and the implementation of new guidelines, the rate of post-mortem examination had also declined, hence the number of post-mortem examinations in the year 2021 and 2022 were less. In 2023, with a decrease in Covid virus infections, there was a resurgence in post-mortem examinations. The areas involving police inquest situations witnessed a subsequent increase, as depicted in Figure 5.

Discussion: In this study, poisoning emerged as the most prevalent finding, consistent with earlier research. Deaths attributed to poisoning continue to constitute a significant global health burden [3]. The primary poisons consumed include pesticides, insecticides, and rat poison (organophosphate and aluminium phosphide), owing to their easy accessibility. "India is often referred to as an agricultural country, where various types of pesticides are extensively utilized in farming, as demonstrated in previous studies. Given the country's agriculture-centric nature and the pursuit of maximum yield from the fields, farmers employ a diverse

range of pesticides and insecticides. This practice, however, leads to an increased risk of direct or indirect exposure to these chemicals [5]."

Out of the 378 cases of poisoning, constituting 27% of the total, only 2 cases were attributed to accidental poisoning. In the current study, approximately 48% of the cases involved unnatural deaths with a suicidal nature, the majority of which (29.92%) were due to poisoning. "The age group predominantly affected is 21 to 30 years, in alignment with findings from previous studies [5]. Interestingly, this study reveals a higher incidence of suicide by poisoning compared to other studies. Hanging, at 77%, emerges as the most prevalent method across all age groups, constituting 49% of male suicides and 28% of female suicides. Poisoning follows at 20%, with both methods collectively accounting for 97% of the cases [6]."

In approximately 9% of cases, alcohol was detected alongside poison. The male-to-female ratio is 4.3:1, deviating from findings in other studies [7]. Examining various modes of death, suicides account for 47.66%, accidents for

28.58%, homicides for 1.97%, and undetermined causes for 17.57%, which contrasts with other reports [7]. Variations may occur in unknown cases as the cause of death is determined during forensic investigations. Cases sent from Khandwa mortuary to the forensic lab often have pending reports, resulting in a higher number of unknown cases. Road traffic accidents make up 23.35%, totaling 295 cases, with 107 involving females. The male-to-female ratio in these accidents is 2.8, and 63.72% involve men.

This study observed a higher incidence of suicides, with hanging being the third most common method, considered a prevalent and painless form of death [8]. The total deaths by hanging in unnatural deaths were 162 (12.82%), significantly higher than reported in other states [7]. Other causes of death include drowning (4.5%), train accidents (2.6%), burns (0.74%), falls, and electric shocks. Approximately 1.5% of deaths were due to murders. Among natural deaths, the majority involved sudden cardiac death (37%), followed by respiratory system issues (24%), alimentary

system issues (22%), and central nervous system issues (18%).

Out of the 1364 cases, 257 (18.15%) were females, and 1107 (85.15%) were males. Males outnumbered females in every age group, with the 21-40 age group being more involved. The study showed that the age group of 20-50 years was most affected, comprising about 70% of the study population. These are active years of human life, involving various physical activities [2].

Conclusion: Over the past three years, NSC GMC Khandwa conducted autopsies on a total of 1364 cases, encompassing both natural and unnatural deaths. Unnatural deaths accounted for the majority at 93%, surpassing natural deaths which constituted 7%. Among unnatural deaths, suicides were the most prevalent, with poisoning identified in 27% of cases. In the category of natural deaths, heart disease emerged as the leading cause, representing 37% of the total."

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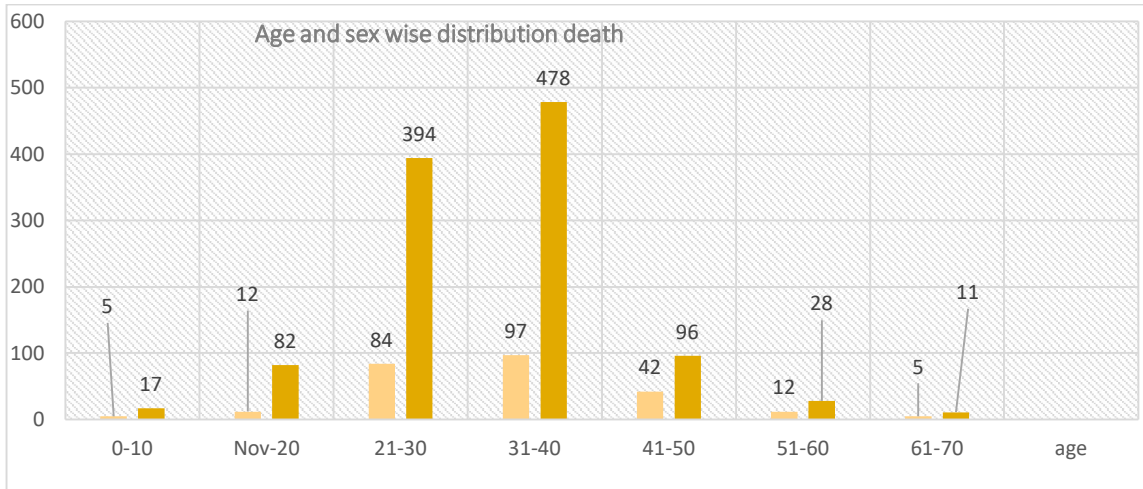


Figure 1-Showing Age and sex wise distribution death

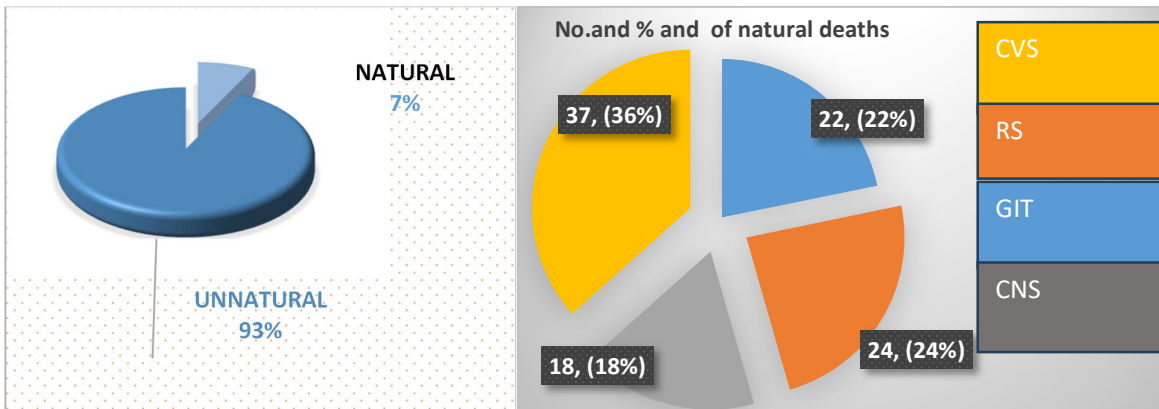
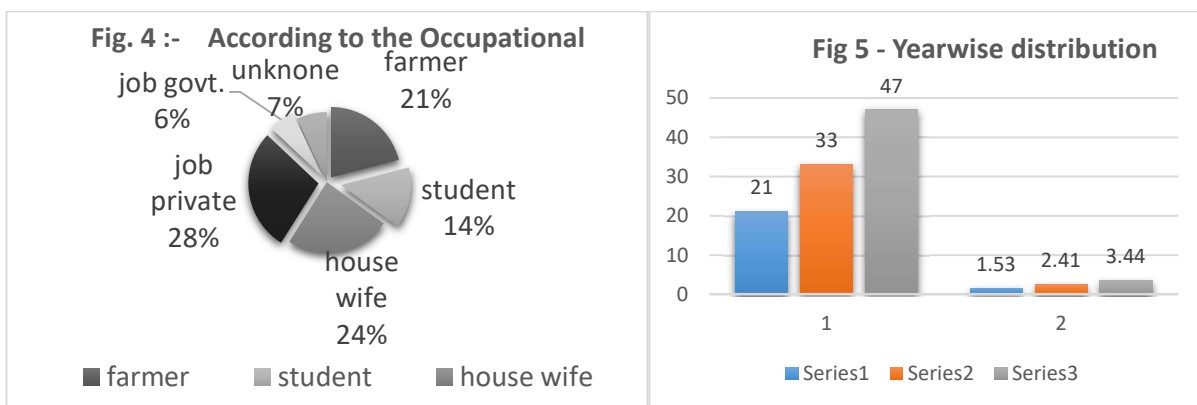


Figure 2 and 3: Showing pie graph % of natural and un natural death and Percentage of Causes of Natural Deaths.



| Unnatural Cause of death | suicidal | homicidal | accidental | unknown | Total |
|---|------------------------|----------------------|------------------------|------------------------|-------------|
| Death due to Poisoning | 378 | 0 | 2 | 1 | 381 |
| Death due to road traffic accident | 0 | 0 | 295 | 0 | 295 |
| Death due to hanging | 162 | 1 | 0 | 1 | 164 |
| Death due to drowning | 62 | 0 | 9 | 0 | 71 |
| Death due to railway injuries | 36 | 0 | 2 | 4 | 42 |
| Death due to burn/thermal injuries | 10 | 5 | 13 | 4 | 32 |
| Death due to trauma blunt/sharp, or assaults injuries | 5 | 19 | 0 | 2 | 26 |
| Death due to lightening and electricity | 0 | 0 | 20 | 0 | 20 |
| Death due to snake bite | 0 | 0 | 19 | 0 | 19 |
| Death due to fall from height | 2 | 0 | 1 | 0 | 3 |
| Death due to any other circumstances of death | 0 | 0 | 0 | 210 | 210 |
| Total | 602 (47.66%) | 25 (1.97%) | 361 (28.58%) | 222 (17.57%) | 1263 |

| Natural deaths | number |
|--|------------|
| GIT (liver disease) | 22 |
| Respiratory (T.B, pneumonia, pneumonitis) | 24 |
| CNS(intraventricular ,subdural hemorrhage) | 18 |
| Death due to cardiac failure/arrest | 37 |
| Total | 101 |