ORIGINAL ARTICLE

PREVALENCE OF EXHUMATION IN DISTRICT HYDERABAD: A LOCAL EXPERIENCE

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Background: Exhumation of bodies for forensic purposes serves as a pivotal tool in medico-legal investigations, yet there is scant data on the practice within the Pakistani context, particularly in the District of Hyderabad. Aim & Objective were to investigate the prevalence and outcomes of exhumations in Hyderabad, contributing to the knowledge base and understanding the cultural and legal factors influencing post-mortem examinations. **Methods**: A descriptive, observational, and retrospective analysis of 95 medicolegal exhumations carried out over two years, examining demographic data, the interval between death and exhumation, putrefactive changes, and the determination of the cause of death. **Results**: Of the 95 exhumations, 58 were male and 37 were female, with the majority of the deceased being under 40 years of age. Nearly half of the exhumations occurred within three months post-mortem, and advanced decomposition was a significant obstacle in determining the cause of death, which remained undetermined in 61.05% of cases. **Conclusion**: The study revealed a need for timely forensic interventions and highlighted the impact of decomposition on determining the cause of death. It underscores the necessity of advanced forensic methods to improve post-mortem examinations' outcomes. Advance technics are virtual autopsy but we are using old conventional autopsy

Keywords: Exhumation; Forensic Science; Post-Mortem Changes; Cause of Death; Decomposition; Medicolegal Investigations

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INTRODUCTION

Exhumation, the process of retrieving a body or it remains post-burial, is a complex and sensitive operation that must adhere to the legal frameworks established within a given jurisdiction. Typically involving both coffin and un-coffined remains, exhumation can occur for reasons consistent with societal norms or as a means of obfuscating unlawful acts.[1] The term itself originates from the Latin "exhumare," indicating a removal from the ground, with "ex" signifying "out of" and "humus" meaning "ground," thus to "exhume" is to bring to light.[2,3]

Permitted exhumations are conducted by qualified personnel in accordance with the legislative requirements of the governing territory. In Pakistan exhumation is a legal duty to be performed by authorised MLO / WMLO by the order or judicial magistrate on the complaint of next to kin to DG health who nominate special medical board to reach the contested grave yard.

- Elucidation of Mortality: This pertains to substantiating the cause of death and inspecting the circumstances under which the death occurred, particularly when suspicions of criminal activity surface.[3]
- Subsequent Autopsy Investigations: Situations where initial post-mortem findings are contested in legal contexts may give rise to the need for a second examination.[3]
- Identification Processes: The posthumous identification of individuals can be crucial in addressing civil or criminal disputes or in the aftermath of mass fatalities, where identification by international bodies is mandated.[3]
- Civil Legal Procedural Matters: Cases involving insurance claims or the legal implications of negligence following incidents such as vehicular mishaps or workplace accidents.[1,5]
- Scholarly Research Endeavours: Archaeological exhumations may be conducted for academic purposes, aiming to decipher disease evolution or dietary habits within specific historical populations.[1]
- Cemeterial Reallocations: The comprehensive relocation of graveyard sites to make way for land development projects, or to transition to perpetuity in burial arrangements.[1,3]

The practice of exhumation can vary significantly across cultures—for instance, in nations such as India where cremation predominates, the incidence of

exhumation is rarer and empirical data on the subject is scant.[6] Incineration of remains imposes considerable loss of tissue matter, which in turn substantially restricts the scope of any subsequent examinations.[7]
In Pakistan, the practice is to yield affirmative results from posthumous investigations. Additionally, performing an autopsy may often be perceived as a cultural transgression, insulting the memory and dignity of the deceased. Such sentiments may lead to the facilitation of exhumation in circumstances where foul play is suspected.[8,9] In instances involving suspicious death, the decedent's family members have the capacity to appeal to the judiciary, for instance, by petitioning the courts through a session judge,[8,10] by way of the local law enforcement, to authorize an exhumation. (section 176 CrPc) The process of exhumation is carried out by a designated team consisting of local police officers, a duty magistrate, and a medically trained examiner or appointed board tasked to oversee and execute the exhumation process.[10] Despite the occurrence of exhumations, there is a noticeable dearth in research pertaining specifically to this matter within the Pakistani context. Previous investigations have been geographically limited, focusing primarily on provinces such as Sindh and Khyber Pakhtunkhwa, with particularly scant attention being paid to the city of Hyderabad.

Therefore, the present study is intended to explore and clarify the prevalence of exhumations within the District of Hyderabad, Sindh. Through this research, it aims to contribute valuable insights to the extant body of knowledge, filling an identified gap in empirical data and understanding the cultural and legal interplays at work in the context of post-mortem examinations in this region.

MATERIAL AND METHODS

This research presents a descriptive, observational, and retrospective analysis of 95 medicolegal exhumations conducted in the District of Hyderabad. These exhumations were performed by Casualty Medical Officers (CMOs) appointed by the Medical Superintendent of the respective hospitals. The study encompasses a two-year period from January 2021 to December 2023, including cases from both urban and rural sectors of the district, and covers subjects of both genders. Data was meticulously gathered from comprehensive autopsy reports completed after each exhumation. This dataset encompasses various parameters such as age, gender, the interval between death and exhumation, the cause of death, the stage of putrefaction, and the allegations present at the time of exhumation. For the analysis, the Statistical Package for the Social Sciences (SPSS) version 25 was employed to interpret the data collected.

RESULTS

During the study period, a total of 85 exhumations were carried out. Of these 95 exhumations, 58 male and 37 female corpses were exhumed.

The age range at the time of death was 7–68 years, with a mean±SD age of 37.28±6.39 years, the age groups are presented in table-1. Majority of the deceased had died young, at an age of 40 or less. The table illustrates the demographic distribution of age and gender among the 95 subjects who underwent medico-legal exhumation in the District of Hyderabad over a period of two years. The data is categorized into seven distinct age brackets: under 10 years, 11 to 20 years, 21 to 30 years, 31 to 40 years, 41 to 50 years, 51 to 60 years, and over 60 years. For each age group, the frequency and percentage of both male and female exhumations are reported.

Out of the total exhumations, 58 were males (61.05%), and 37 were females (38.95%). The most prevalent age range for exhumations among males was 41 to 50 years, constituting 25.86% of the male subset. Conversely, the 21 to 30 years category was the most common for females, comprising 29.73% of the female subset. Notably, the 'over 60 years' age group was the least represented, accounting for 5.17% of the male subset and absent from the female subset.

Table-2 shows the time interval between exhumation and death of the exhumed. Out of the total 95 cases, the majority, representing 47.37%, were exhumed within a time frame of less than 3 months following death. The second most common interval, encompassing 32.63% of cases, was between 4- and 6-months post-mortem. The cases exhumed between 7 and 12 months accounted for 11.58%, while those conducted after more than 12 months constituted the smallest group at 8.42%. The aggregate of these cases sums up to the complete cohort, ensuring that the data set represents 100% of the cases studied.

Table-3 shows putrefactive changes in exhumed cases. Maggot infestation was noted in 23 cases, constituting 24.21% of the total. The combination of maggot infestation and skeletonization was observed in 11 cases, accounting for 11.58%, while maggot infestation with mummification was less common, present in 4 cases and comprising 4.21%. Skeletonization without maggot infestation was reported in 8 cases (8.42%), and colour changes were the least observed, occurring in only 2 cases (2.11%). Notably, almost half of the cases, 47 in total, did not have any putrefactive changes mentioned, representing 49.47% of the sample size.

Figure-1 shows the results of determination of cause of death in exhumed cases. In cases exhumed within less than 3 months, the cause of death was determined in 18 instances (18.95% of the total cases),

whereas it remained undetermined in 27 cases (28.42%). For the interval between 4 and 6 months, the cause of death was ascertained in 15 cases (15.79%), with 16 cases (16.84%) left unresolved. The 7 to 12 months category saw the cause of death determined in 3 cases (3.16%) and undetermined in 8 cases (8.42%). In instances where the exhumation occurred more than 12 months after death, the cause of death was established in only 1 case (1.05%), with 7 cases (7.37%) remaining indeterminate. Collectively, these findings account for all 95 cases, with determinations of cause of death made in 37 cases (38.95%) and undetermined in 58 cases (61.05%).

Table 1 Age distribution of exhumed cases

Age	Male	Percent	Female	Percent	Total	Percent
Less than 10 years	6	10.34	2	5.41	8	8.42
between 11 and 20 years	9	15.52	8	21.62	17	17.89
Between 21 and 30 years	12	20.69	11	29.73	23	24.21
Between 31 and 40 years	8	13.79	6	16.22	14	14.74
Between 41 and 50 years	15	25.86	7	18.92	22	23.16
Between 51 and 60 years	5	8.62	3	8.11	8	8.42
More than 60 years	3	5.17	0	0	3	3.16
Total	58	100	37	100	95	100

Table 2 Time interval between death and exhumation

Time Interval between death and exhumation	Cases	Percentage
Less than 3 Months	45	47.37
Between 4 and 6 Months	31	32.63
Between 7 and 12 months	11	11.58
More than 12 months	8	8.42
Total Cases	95	100

Table-3: Pattern of putrefactive changes in exhumed cases

Putrefactive changes in exhumed cases		
Changes	**Number**	**Percentage**
Maggot infestation	23	24.21
Maggot infestation + Skeletonization	11	11.58
Maggot infestation + Mummification	4	4.21
Skeletonization	8	8.42
Color changes	2	2.11
Not mentioned	47	49.47
Total	95	100

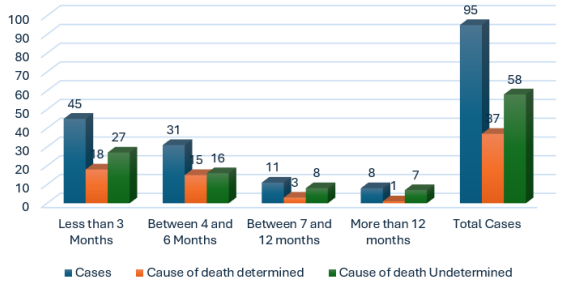

Figure-1: Determination of cause of death in exhumed cases

DISCUSSION

The exhumation of deceased individuals for forensic investigation is a critical component of medico-legal practice, serving as a pivotal tool in the post-mortem determination of cause of death and other legal inquiries. This retrospective descriptive study meticulously examined the exhumation records from the District of Hyderabad over a span of two years, revealing insightful patterns and outcomes. During the study period, a total of 95 exhumations were conducted, comprising 58 males and 37 females, thereby underscoring a gender distribution skewed towards males. The age of the deceased at the time of death ranged from 7 to 68 years, with a mean age of 37.28 years and a standard deviation of 6.39 years. The majority of the deceased were young, with ages of 40 or below, highlighting a concerning trend of premature mortality. The temporal aspect of the exhumations, as depicted in Table 2, indicates that nearly half of the exhumations occurred within three months post-mortem, with a significant reduction in frequency as the interval extended beyond six months. These findings suggest a tendency to perform exhumations relatively soon after death, potentially reflecting on the condition of the remains and the urgency of legal proceedings.

Exhumation, though often viewed as a violation of sacred rest, is occasionally necessitated by the deceased's relatives when the cause of death is shrouded in uncertainty.[11] In the current regional context, the reluctance to proceed with exhumations can be attributed to concerns over familial dishonour, with many families preferring not to disturb the remains of their loved ones. Within this study, it was noted that the cause of death remained indeterminate in a significant number of cases (61.05%), predominantly due to the advanced decomposition of the bodies. This extensive decomposition was largely a consequence of delays in carrying out the exhumation process.

Comparatively, our findings diverge from those reported in a national study by Qazi et al. in 2006, which documented a 34% incidence of

indeterminate cause of death.[12] On the other hand, Memon & colleagues reported a higher rate of 42.85% for unresolved cases.[13] Studies from Germany, conducted by Verhoff et al., Seibel et al., and Grellner et al., have demonstrated considerably lower rates of undetermined causes of death in exhumed bodies, ranging from 0.8% to 22%.[5,11,14] The elevated rate of inconclusive determinations in our region may be attributed to early putrefactive changes, exacerbated by the hot climate, waterlogged conditions, salinity, and inadequate drainage systems around burial sites. Additionally, in cases of neurogenic death, pathological changes are often undetectable.[14]

Despite inherent challenges, exhumations can yield valuable insights into the cause of death, although the likelihood of success diminishes with each passing day.[15] In our study, the majority of the bodies, accounting for 80% of the cases (n=76), were exhumed within six months post-mortem. It was observed that a quarter of these cases (n=23; 24.21%) were in an advanced state of decomposition or were completely skeletonized. These observations differ from those made by Hussain et al., who reported advanced putrefaction in 80.4% of bodies exhumed between 4 months to a year after death.[9] Conversely, Breitmeier *et al*. have identified significant morphological features in soft tissues and internal organs that are sufficient to ascertain the cause of death, even in exhumations conducted several years post-mortem.[16] The pronounced decomposition in bodies exhumed more than two years after death is a significant barrier to determining the cause of death, which is typically inferred from the condition of soft tissues.[10] However, the delay in decomposition observed in European countries such as Germany enhances the prospects of successful determination of cause of death in exhumations conducted long after burial.[15]

In the present study, the proportion of exhumed male bodies was higher (61.05%) compared to females (38.95%), with a ratio of approximately 1.57:1. This distribution diverges from other regional studies.[12,17,18] The lower incidence of violent deaths among females within this societal context has been attributed to their esteemed status, which often affords them protection from tribal and family conflicts, a practice rooted in religious, cultural, and traditional norms.[19]

Our research also revealed that the majority of the deceased originated from rural areas, accounting for approximately 74.25% of cases, while the urban population comprised about 25.75%. This distribution aligns with findings from Qazi *et al*., who reported a 77% rural involvement in similar cases.[12] Similar findings have been reported from Urban and rural sind by Kumar and Colleagues.[18] The higher representation of rural individuals in our study may be linked to a greater rate of illiteracy and a lack of awareness regarding legal processes, which can delay the exhumation proceedings. A notable number of cases in middle-aged individuals could be attributed to their engagement in violent activities and a higher susceptibility to certain diseases, such as acute myocardial infarction, which might not yield positive findings upon disinterment. Additionally, it was observed that blunt injuries to the head and chest were common causes of death. However, in 61.05% of the cases, the cause of death could not be determined, often due to advanced putrefaction and the absence of advanced exhumation techniques.

These findings initiate a profound discussion on the logistical, biological, and methodological factors influencing forensic investigations and the determination of cause of death in exhumed bodies. The implications of these findings are multifaceted, affecting forensic practices, the legal implications of timely exhumations, and the interpretation of post-mortem findings in the medico-legal context. The cases are collected both from rural as wel a from urban area. The study's findings delineate the demographic patterns and post-mortem changes of exhumed bodies, highlighting the predominance of younger individuals and a male majority in the sample population. The majority of exhumations occurred within three months of death, suggesting an emphasis on timely forensic investigations. However, the determination of the cause of death remained elusive in over half of the cases, largely attributed to advanced decomposition.

One limitation of this study is the potential for selection bias, as it only includes cases that underwent exhumation. Additionally, the retrospective nature of the study may limit the completeness of data. The lack of advanced forensic techniques in the region poses a significant barrier to determining the cause of death, especially in cases of delayed exhumation. Future studies should aim to incorporate technological advancements in forensic science to improve the accuracy of post-mortem examinations

Limitations:

When autopsied bodies are in advance stage of colliquative putrefaction then the only help is from hard tissues (bones).

AUTHORS' CONTRIBUTION

SI: Conceptualization of the study design. LR, FW: Literature search, data collection. SAQ, SM, HS: Data

collection, data analysis, data interpretation. Proofreading.

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