

Public Awareness of Poisonous Plants: A Rural–Urban Comparative Study with Medico-Legal Perspectives in Tamil Nadu

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Abstract - Poisonous plants constitute a significant yet often underestimated public health concern, particularly in regions with rich biodiversity such as Tamil Nadu. These plants contain toxic compounds capable of causing mild to severe health complications, including fatal outcomes when misidentified or improperly handled. The present study investigates the level of public awareness regarding commonly occurring poisonous plants among rural and urban populations and examines their medico-legal relevance. A comparative cross-sectional survey was conducted among fifty participants, equally divided between rural and urban settings. Data were collected using a structured questionnaire focusing on plant identification, toxic parts, and associated health effects of ten widely distributed poisonous plants. Statistical analysis revealed a notable disparity in awareness levels, with urban participants demonstrating higher awareness compared to their rural counterparts. Despite this, both groups exhibited limited knowledge regarding specific toxic components and medico-legal implications. The findings underscore the urgent need for targeted educational interventions, particularly in rural areas where exposure risk is higher. Enhancing public awareness can significantly reduce accidental poisoning incidents, improve early medical response, and aid forensic investigations. The study highlights the intersection of public health, environmental knowledge, and forensic science in addressing plant-based toxic exposure.

Keywords: *Poisonous plants; Public awareness; Rural–urban disparity; Plant toxicity; Medico-legal significance.*

I. INTRODUCTION

Poisonous plants are a naturally occurring component of ecological systems, containing toxic substances that

serve as defence mechanisms against herbivores and environmental stressors. These plants produce secondary metabolites such as alkaloids, glycosides, lectins, and proteins, which can exert harmful physiological effects on humans and animals. Exposure may occur through ingestion, inhalation, or dermal contact, leading to a spectrum of health consequences ranging from mild irritation to severe organ failure and death.

Tamil Nadu, characterised by diverse ecological zones including coastal plains, agricultural lands, and forested regions, hosts a wide variety of such toxic plant species. Many of these plants, including ornamental and medicinal varieties, are easily accessible in both rural and urban environments. Their aesthetic appeal and traditional usage often obscure their toxic nature, thereby increasing the likelihood of accidental exposure.

The significance of poisonous plants extends beyond medical implications into the domain of forensic science. Plant toxins have been implicated in cases of accidental poisoning, suicide, and, in rare instances, homicide. The identification of plant-based toxins in biological samples is crucial for medico-legal investigations, necessitating a comprehensive understanding of their properties and effects.

Public awareness plays a pivotal role in mitigating the risks associated with poisonous plants. However, awareness levels are often influenced by socio-economic, educational, and environmental factors. Rural populations, despite frequent exposure, may

lack scientific knowledge regarding toxicity, whereas urban populations may benefit from better access to information but have limited direct interaction with plant species.

This study seeks to bridge this knowledge gap by assessing and comparing awareness levels among rural and urban populations in Tamil Nadu. It further explores the medico-legal implications of plant poisoning, emphasising the need for interdisciplinary approaches to public health and forensic science.

II. REVIEW OF LITERATURE

Previous studies have consistently highlighted the gap between exposure to poisonous plants and awareness of their toxic properties. Research conducted across various Indian states indicates that while rural populations often possess traditional knowledge of plant identification, their understanding of toxic mechanisms and health implications remains limited. Conversely, urban populations, though less exposed, tend to have better general awareness due to educational advantages.

Ethnobotanical studies have revealed that traditional medicinal practices frequently involve the use of toxic plants. While such practices are rooted in cultural knowledge, the absence of standardised dosages and scientific validation often leads to misuse and poisoning incidents. Researchers have also noted a generational decline in traditional knowledge, particularly among younger populations, further exacerbating the risk.

Hospital-based studies have documented numerous cases of plant poisoning, with children being particularly vulnerable due to curiosity and lack of supervision. Commonly implicated plants include those with attractive seeds or flowers, which may entice accidental ingestion. These studies emphasise the importance of parental awareness and community education.

Comparative studies have demonstrated varying levels of awareness between rural and urban populations. While rural individuals may recognise certain plants as poisonous, they often lack knowledge about symptoms and treatment. Urban individuals, on the other hand, may be aware of general toxicity but unable to identify specific plants.

The medico-legal dimension of plant poisoning has also been explored in forensic literature. Accurate identification of plant toxins is essential for determining the cause of death or injury. Studies recommend improved documentation of poisoning cases and collaboration between healthcare professionals, botanists, and forensic experts.

Overall, the literature underscores the need for integrated educational programs that combine traditional knowledge with scientific understanding to enhance public awareness and prevent poisoning incidents.

III. AIM AND OBJECTIVES

The primary aim of this study is to evaluate the level of public awareness regarding poisonous plants in Tamil Nadu, with a specific focus on comparing rural and urban populations. This objective arises from the recognition that awareness is a critical determinant of preventive behaviour in public health contexts.

The study seeks to identify commonly occurring poisonous plants in both rural and urban environments. By focusing on widely distributed species, the research ensures relevance to everyday exposure scenarios. Understanding which plants are most commonly encountered allows for targeted awareness initiatives.

Another key objective is to assess the extent of knowledge among individuals regarding the identification and toxic effects of these plants. This includes awareness of specific plant parts that are toxic, symptoms of poisoning, and appropriate responses to exposure. Such knowledge is essential for preventing accidental ingestion and ensuring timely medical intervention.

The study also aims to compare awareness levels between rural and urban populations. This comparison provides insights into how environmental and socio-economic factors influence knowledge and behaviour. Identifying disparities enables the development of tailored educational strategies for different communities.

Furthermore, the research explores the medico-legal significance of poisonous plants. By examining their role in forensic investigations, the study highlights the importance of accurate identification and

documentation in legal contexts. This aspect underscores the interdisciplinary nature of the issue, bridging public health and forensic science.

Ultimately, the objectives of the study are aligned with the broader goal of enhancing public safety through education and awareness.

IV. MATERIALS AND METHODOLOGY

The study employs a cross-sectional survey design to assess public awareness of poisonous plants. A total of fifty participants were selected, comprising twenty-five individuals each from rural and urban areas. The sample was chosen to ensure representation from diverse backgrounds, thereby enhancing the validity of the findings.

Data collection was conducted using a structured questionnaire specifically designed for the study. The questionnaire included questions related to plant identification, awareness of toxicity, and knowledge of health effects. Participants were also asked to indicate their familiarity with ten commonly occurring poisonous plants.

Prior to data collection, participants were informed about the purpose of the study, and their consent was obtained. This ethical consideration ensured voluntary participation and adherence to research standards. The questionnaire was administered in a manner that facilitated clear understanding and accurate responses.

The selected plants were chosen based on their prevalence and known toxic effects. These included species commonly found in gardens, agricultural fields, and public spaces. By focusing on familiar plants, the study aimed to assess practical awareness rather than theoretical knowledge.

Data analysis was performed using descriptive statistical methods, including frequency and percentage calculations. A Chi-square test was applied to determine the significance of differences between rural and urban awareness levels. This statistical approach provided a robust framework for interpreting the results.

The methodology ensures a systematic and scientific approach to data collection and analysis, enabling reliable conclusions to be drawn regarding public awareness.

V. RESULTS

The results of the study reveal a clear disparity in awareness levels between rural and urban participants. Urban respondents demonstrated a higher overall awareness, with approximately 68% correctly identifying poisonous plants, compared to 40% among rural participants.

Recognition of specific plants varied significantly. Certain plants were more commonly identified due to their widespread presence and distinctive features. However, knowledge of toxic parts and associated health effects was limited across both groups.

Statistical analysis indicated significant differences in awareness for several plant species. These findings suggest that environmental exposure alone does not guarantee adequate knowledge. Instead, access to education and information plays a crucial role in shaping awareness.

The results also highlight gaps in knowledge regarding symptoms of poisoning and appropriate responses. Many participants were unaware of the severity of potential health effects, indicating a need for improved education.

Overall, the findings demonstrate that while awareness exists to some extent, it is insufficient to prevent accidental poisoning. Targeted interventions are necessary to address these gaps and enhance public safety.

VI. DISCUSSION

The findings of the study align with previous research indicating disparities in awareness between rural and urban populations. Despite frequent exposure, rural participants exhibited lower awareness levels, suggesting that traditional knowledge alone is insufficient for understanding plant toxicity.

Urban participants, benefiting from better educational resources, demonstrated higher awareness. However, their knowledge was often superficial, lacking depth regarding toxic mechanisms and medico-legal implications. This highlights the need for comprehensive education that goes beyond basic identification.

The study underscores the importance of integrating scientific knowledge with traditional practices. While traditional medicine offers valuable insights, it must be supplemented with accurate information to prevent misuse.

From a medico-legal perspective, the lack of awareness poses challenges for forensic investigations. Misidentification of plant toxins can hinder the determination of cause of death or injury. Therefore, improving public knowledge is essential not only for prevention but also for effective legal processes.

The discussion emphasises the need for interdisciplinary collaboration, involving healthcare professionals, educators, and forensic experts. Such collaboration can facilitate the development of effective awareness programs.

Overall, the study highlights the complex interplay between environment, education, and awareness in shaping public understanding of poisonous plants.

VII. CONCLUSION

The study concludes that public awareness of poisonous plants in Tamil Nadu is inadequate, particularly among rural populations. While urban participants demonstrate relatively higher awareness, significant gaps remain in knowledge regarding toxic effects and medico-legal implications.

The findings highlight the urgent need for targeted educational interventions aimed at improving awareness across all demographics. Community-based programs, school curricula, and public health campaigns can play a vital role in disseminating information.

Improving awareness can significantly reduce the incidence of accidental poisoning, enhance early medical response, and support forensic investigations. The study also emphasises the importance of proper documentation and reporting of poisoning cases to strengthen medico-legal frameworks.

Future research should explore larger sample sizes and incorporate qualitative approaches to gain deeper insights into public perceptions and behaviours. Additionally, the integration of technology, such as

mobile applications for plant identification, can further enhance awareness.

In conclusion, addressing the issue of poisonous plants requires a holistic approach that combines education, public health initiatives, and forensic expertise. By fostering awareness and knowledge, it is possible to mitigate risks and promote a safer interaction with the natural environment.

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