

International Journal of Medical Science and Advanced Clinical Research (IJMACR) Available Online at:www.ijmacr.com

Volume – 8, Issue – 3, May - 2025, Page No.: 20 – 31

Observational study of the effect of socio-demographic profile in unnatural death cases among pediatric age group at SMS Medical College & attached Hospital, Jaipur (2021-2022)

¹Dr. Dipender Singh, Senior Resident, Department of Forensic Medicine & Toxicology RUHS College of Medical Science, Jaipur

²Dr. R.K. Punia, Senior Professor, Department of Forensic Medicine & Toxicology, S.M.S Medical College & Hospital, Jaipur.

³Dr. Anil Yadav, Professor & Head of Department of Forensic Medicine & Toxicology RUHS College of Medical Science, Jaipur

⁴Dr. Surya Bhan Kushwaha, Postgraduate resident, Department of Forensic Medicine & Toxicology, S.M.S Medical College & Hospital, Jaipur.

Corresponding Author: Dr. Dipender Singh, Senior Resident, Department of Forensic Medicine & Toxicology RUHS College of Medical Science, Jaipur

How to citation this article: Dr. Dipender Singh, Dr. R. K. Punia, Dr. Anil Yadav, Dr. Surya Bhan Kushwaha, "Observational study of the effect of socio-demographic profile in unnatural death cases among pediatric age group at SMS Medical College & attached Hospital, Jaipur (2021-2022)", IJMACR- May - 2025, Volume – 8, Issue - 3, P. No. 20 – 31.

Open Access Article: © 2025 Dr. Dipender Singh, et al. This is an open access journal and article distributed under the terms of the creative common's attribution license (http://creativecommons.org/licenses/by/4.0). Which allows others to remix, tweak, and build upon the work non-commercially, as long as appropriate credit is given and the new creations are licensed under the identical terms.

Type of Publication: Original Research Article **Conflicts of Interest:** Nil

Abstract

Background: Globally, unnatural deaths among children represent an increasing public health concern. These fatalities, which often result from accidents, suicides, and homicides, are frequently preventable through targeted socio-economic and policy-based strategies (World Health Organization, 2014).

Aim: To observe the effect of socio-demographic profile in unnatural death among paediatric age group in Jaipur region. **Methods:** This research involved a prospective, crosssectional observational study conducted according to defined inclusion and exclusion criteria. A total of 65 pediatric medico-legal autopsy cases related to unnatural deaths were reviewed. The study took place at the Mortuary of the Department of Forensic Medicine & Toxicology, SMS Hospital, Jaipur, over a one-year period from June 15, 2021, to June 14, 2022.

Results & Observations: Of the 65 cases analyzed, 61.54% were male and 38.46% were female. Unintentional causes were noted in 49 instances, all of

.....

which were classified as accidental deaths. Most of the children were from Hindu families (86.15%), resided in rural settings (67.7%), and had an educational level up to high school (30.76%). Additionally, 39.23% came from families earning between $\gtrless20,715$ and $\gtrless41,429$ per month, belonged to the upper middle class, and lived in nuclear households (72.3%).

Conclusion: The findings highlight a clear association between socio-demographic variables and the occurrence of unnatural deaths in children. Implementing measures such as community awareness enhanced mental health resources, road safety improvements, and educational outreach could play a crucial role in lowering these preventable fatalities.

Keywords: Pediatric mortality; Unnatural death; Sociodemographic profile; Accidents; Suicide; Prevention **Introduction**

Children represent a country's foundational human resource, and their health is an important biomarker of its general development and public health improvement. As the population's most vulnerable group, paediatric health metrics indicate not just current healthcare efficacy but also future socioeconomic stability and productivity. A nation's ability to assure its children's survival, well-being, and optimal development is inextricably related to scientific advances, policy efficacy, and commitment to long-term growth. As a result, protecting children's health is more than just a moral imperative; it is a strategic investment in the country's long-term resilience and prosperity.¹ Unnatural deaths in the paediatric population pose a serious public health concern, especially in developing nations where data can be scant due to weak mortality registration systems. These deaths can be broadly grouped into two unintentional and intentional types: acts. An unintentional death frequently include accidents, such as road traffic incidents, drowning, and falls, whereas intentional deaths might emerge as homicides and suicide.² Unintentional injuries rank as the second most significant cause of death in children, with an estimated 8.2 deaths per 100,000 population. Among these injuries, transport-related incidents account for 5.1 deaths per 100,000 population, making them the third leading cause of death worldwide.³⁻⁴

Cause of death varies by developmental status of the nation.⁵ The lack of awareness surrounding this problem has hindered the implementation of proven preventive measures to the extent seen in high-income countries.⁶ From a medical perspective, natural death refers to deaths that occur solely as a result of disease or natural processes (e.g., old age or internal malfunctions of the body not directly caused by external forces). Natural deaths contrast with non-natural deaths, which include homicide, suicide, and accidents. In all of these cases, the causes are potentially preventable because an external and violent event occurs that leads to the person's death.⁷

According to the World Health Organization (WHO, 2014), a substantial proportion of these deaths could be averted through targeted socio-economic interventions, policy reforms, and public health initiatives. In particular, the socio-demographic background of affected individuals plays a pivotal role in determining the risk and nature of unnatural deaths.⁸ Factors such as economic status, education level, family structure, and rural-urban residency contribute significantly to the vulnerability of children in various settings. Childhood begins after birth and continues into adolescence; according to the Children's Bill of Rights, childhood is defined as the life up to 18 years after birth.⁹ Childhood

injuries are a major public health problem worldwide and are by far the leading cause of death in children. They pose a serious threat to child health and account for 7 to 10% mortality in the world.¹⁰ Trauma has been a major cause of death in childhood populations¹¹. To accomplish this goal, researchers, programme planners and policy-makers need information on the causes of death occurring in countries.¹²

This study is thus being initiated to observe the effect socio-demographic profile in unnatural deaths of paediatric age group from birth to 18 years. The classification of the Eunice Kennedy Shriver National Institute of Child Health and Human Development (NICHD) frequently used in the U.S. and Australia¹³ : Infancy- Birth to 12 months, Toddler- 13 months to 2 years, Early childhood- 3 to 5 years, Middle childhood- 6 to 11 years, Early adolescence -12–18 years, Late adolescence: 19 to 21 years.

Significance of studying socio-demographic factors in paediatric unnatural deaths

Studying socioeconomic variables in cases of unnatural mortality among children is critical for understanding and minimizing the hazards connected with such deaths. Age, gender, socioeconomic class, parent's education level, and geographical location are all important criteria in identifying high-risk populations and developing focused preventative interventions. Children from lowincome homes or rural areas are frequently exposed to unsafe circumstances and may lack access to timely and high-quality healthcare, making them more vulnerable to unintentional or purposeful injury. Analysing these patterns helps better policymaking and equitable resource allocation by emphasizing population-specific requirements. Furthermore, such research reveals systemic disparities in healthcare access and safety standards, which contribute to avoidable fatalities. Socio-demographic analysis can also help build culturally relevant awareness campaigns targeted at lowering dangerous behaviours and boosting child safety. Finally, continual monitoring of sociodemographic trends helps to evaluate the efficiency of child welfare programs and ensures that they can adapt to the changing demands of varied communities.^{14,15,16}

Aim of the study

To observe the effect of socio-demographic profile in unnatural death among paediatric age group in Jaipur region.

Materials and Methods

All medico-legal paediatric unnatural death cases autopsied at SMS Medical College and Attached Group of Hospitals, Jaipur, who gave written informed consent for participation in the study were included in the cross sectional descriptive observational study. We excluded the unnatural deaths in paediatric age group whose medico-legal autopsy was waived off by investigation officer and all cases of natural death in paediatric age group autopsied at mortuary. The sample size was calculated at 95% confidence level, assuming 60% intentional deaths among unnatural deaths in paediatric age group as found in the seed article "unnatural deaths in paediatric age group in a tertiary hospital in Bangalore: an autopsy study.¹⁷ At relative allowable error of 20%, 65 cases of unnatural deaths in the paediatric age group were required as sample size for the purpose of the present study. The sampling technique used was consecutive sampling.

Observations & Results

Table 1: Showing Gender Wise Distribution of Victims.

Gender	No. Of Cases	Percentage
Male	40	61.54 %
Female	25	38.46 %
Total	65	100.00



Fig.1: Gender distribution of Paediatric Victims

In this study total 65 paediatric victims studied. Male children account for 61.54 % (40 victims) while female account for 38.46 % (25 victims).

Table 2: Showing Age- Wise Distribution of the Victims.

Age Group (Years)	No. of Victims		Total No. of	Percentage
	Male	Female	Victims	
Infant (0-12 months)	01 (01.53 %)	01 (01.53 %)	02	03.07 %
Toddler (12 months-2yr)	06 (09.23 %)	01 (01.53 %)	07	10.76 %
Early Childhood (3y-5y)	05 (07.69 %)	05 (07.69 %)	10	15.38 %
Middle childhood (6y-11 y)	13 (20.00 %)	06 (09.23 %)	19	29.23 %
Early Adolescent (12y-18y)	15 (23.07 %)	12 (18.46 %)	27	41.53 %
Total	40 (61.54 %)	25 (38.46 %)	65	100%



Fig. 2: Age- Wise Distribution of Victims

The study found that the majority of cases (41.53%) were in the Early Adolescent (27 children: 15 males, 12 females), followed by the Late Childhood (29.23% in which 19 cases: 13 males, 06 females). The early childhood group accounted for 15.38% (10 cases: 05 males, 05 females), the toddler group accounted for 10.76% (07 cases: 06 males, 01 females) and the infant group had the fewest cases at 3.07% (2 cases: 1 male, 1 female).

Table 3: Showing Pattern of Death Wise Distribution of Victims.

Pattern of Death	Manner of Death	No. of Subjects	Percentage
Intentional	Homicidal	04	06.15 %
Death	Suicidal	12	18.45 %
Unintentional Death	Accidental	49	75.40 %
Total		65	100%



Fig. 3: Showing Pattern of Death Wise Distribution of Victims

In present study unintentional pattern of death was present in 49 subjects with accidental manner of death in all. Intentional pattern of death was present in 16 subjects with homicidal manner of death in 6.15 % and suicidal manner of death in 18.45 % which is predominantly in adolescent age group.

Table 4: Showing Religion Wise Distribution of Victims

Religion	No. Of victims	Percentage
Hindu	56	86.15%
Muslim	09	13.85 %
Total	65	100%



Fig.4: Showing Religion Wise Distribution of Victims

In present study maximum cases were of Hindu religion 86.15 % ; 56 cases while Muslim account for only 13.85 % ; 9 cases.

Table 5: Showing Domicile Wise Distribution of Victims.

Residence	No. Of Subjects	Percentage
Rural	44	67.7 %
Urban	21	32.3 %
Total	65	100%

Page 4



Fig. 5: Showing Domicile Wise Distribution of Victims

In present study maximum cases were of rural domicile 67.7 %; 44 cases, while urban domicile present in 32.3 %; 21 cases.

Education Status	No. Of Subjects	Percentage
Illiterate	16	24.6 %
School Age	01	01.5 %
Primary School	16	24.6 %
Middle School	12	18.46 %
High School	20	30.76 %
Total	65	100%

Page 2



Fig. 6: Showing Education Status Wise Distribution of Victims

Dr. Dipender Singh, et al. International Journal of Medical Sciences and Advanced Clinical Research (IJMACR)

In present study majority of subject have schooling up to High School 20 subject; 30.76 %, followed by Primary School & Illiterate 16 subject each (24.6 %), Middle School 12 subject; 18.46 %. The least number of subject had education up to School Age 01 subject; 1.5 %.

Table 7: Showing Family Income Wise Distribution of Victims

Class	Family Income	No. Of Subjects	Percentage
1	2092-6213	00	00 %
2	6214-10356	04	6.15 %
3	10357-15535	12	18.46 %
4	15536-20714	14	21.54 %
5	20715-41429	32	39.23 %
6	>41429	03	04.60 %
	Total	65	100%



Fig.7: Showing Family Income Wise Distribution of Victims

In present study majority of subject 32 (39.23 %) had a family income in the range of 20715 - 41429, followed by income ranging in between 15536 - 20714, 14 subject ; 21.54 %, 10357 - 15535, 12 subject ; 18.46 %, 6214 - 10356, 4 subject ; 6.15 % and > 41429, 3 subject ; 4.60 %. There were 0 victim with family income in range of 2092 - 6213. Table 8: Showing Socio – Economic Status Wise Distribution of Victims.

Socio-Economic Status	No. Of Subjects	Percentage
Lower	04	06.15 %
Upper lower	12	18.46 %
Lower middle	14	21.54 %
Upper middle	32	39.23 %
Upper	03	04.62 %
Total	80	100%

©2025, IJMACR



Fig.8: Showing Socio - Economic Status Wise Distribution of Victims

In present study majority of subject belongs to upper middle class 32 subject (39.23%), followed by lower middle class 14 subject (21.54%), upper lower class 12 subject (18.46%) and only 4 subject belongs to lower class, least number of subject belongs to upper class with only 3 subject (4.62%).

Table 9: Showing Type of Family Wise Distribution of Victims.

Type of Family	No. of Subjects	Percentage
Joint	18	27.7 %
Nuclear	47	72.3 %
Total	65	100%



Fig.9: Showing Type Of Family Wise Distribution Of Victims

In present study 47 subjects (72.3 %) had nuclear family & 18 subjects (27.7 %) had joint family.

Dr. Dipender Singh, et al. International Journal of Medical Sciences and Advanced Clinical Research (IJMACR)

Discussion

Age - Maximum children were of school age group 36.9 % ; 24 cases (19 male & 5 female). The other groups affected in descending orders were 27.7 % cases of teenage group 18 cases (7 male & 11 female), 20 % cases of toddler age group 13 cases (9 male & 4 female), 12.3 % cases of pre – school age group 8 cases (4 male & 4 female). The least affected cases were of infant age group 3.07 % cases (1 male & 1 female) similar result were reported in study of Athani P, et al., Bangalore, 2017 (15 – 18 years ; 46.88 %)¹⁰; Kumar A, et al., Varanasi, 2014 (12 - 19 years ; 65.47 %)¹⁸; Varma RK, et al., Bangalore, 2021 (12 - 18 years ; 82.22 %, **Pre – School & 5 – 12 years ; 6.5 % each**)¹⁷. This is due to the fact that school-aged children are more at risk for accidents, suicidal ideation due to depression and other mental health conditions, and the highest number of toddler deaths can be explained by the fact that toddlers are very delicate at this age and can die from even minor injuries.

Gender - Males (61.54 %) victims predominant over the females (38.46%) in the present study with a Male: Female ratio of about 1.6:1. Similar results have been reported by **Athani P, et al., Bangalore, 2017** (55.22%)¹⁰; **Kumar A, et al., Varanasi, 2014** (56.55 %)¹⁸; **Varma RK, et al., Bangalore, 2021** (56 %)¹⁷. This is attributable to the fact that Males are the active participants of the society and more commonly engaged in outdoor activities. This explains the male preponderance in all studies.

Religion - The victims in this study showed a Hindu preponderance (86.15 %) followed by Muslim (13.85 %). Similar results have been reported by Kumar A, et al., Varanasi, 2014 (Hindu; 89.83 %, Muslim; 3.88

%)¹⁸. This is attributable to the fact that we are living in Hindu dominant society.

Domicile - The victims in this study showed a rural preponderance 67.70% with only 32.30 % victims from urban population. Similar result have been reported by **Kumar A, et al., Varanasi, 2014 (Rural; 88.37 %)**¹⁸. This is easily explained by the fact that in villages and rural areas, parents typically leave their young children alone at home. As a result, there is a higher risk of RTA, unintentional hanging, and accidental consumption of household poisons. Additionally, because the villagers have a limited understanding of issues relating to mental health, they struggle to determine whether or not their children are depressed. Understanding this can aid in reducing the higher rate of suicide cases in rural areas.

Education - In present study majority of subject had an education status up to high school 20 subjects (30.76 %). There are very less studies who comments on education of children in paediatric deaths, hence not used as a variable for comparison to other studies.

Family income - In present study majority of subject 32 (39.23 %) had a family income in the range of 20715 K – 41429 K. There are very less studies who comments on family income of children in paediatric deaths, hence not used as a variable for comparison to other studies.

Socio–economic status - The victims in this study showed a upper middle class preponderance 39.23% with only 4.62% victims from upper class. The results are quite different in the study of **Varma RK, et al., Bangalore, 2021 (upper lower class; 38 cases & least ; lower class).**¹⁷ This explains why children in the upper middle class are more likely to experience paediatric deaths because the family members are struggling to meet the needs of the family, the child did not receive proper care and affection due to the intense pressure of

©2025, IJMACR

work, and many times children engaged in the digital world, which is a very serious problem today because digital content influences the children and can sometimes result in fatal casualties (online gaming is one of the most common cause).

Type of family- The victims in this study showed Nuclear Family preponderance 72.3 % with 27.70 % victims from Joint family. This can be easily explainable by the fact that in joint families there are more number of family members there to take care of the children thereby creating a healthy and friendly environment around the child and contributing in preventing the deaths in children.

Conclusion

The present study highlights that school-age children and males are the most affected in pediatric deaths, primarily due to increased exposure to accidents and mental health challenges. Rural and nuclear family settings show higher vulnerability, likely due to limited supervision and awareness. A notable number of cases also come from upper middle-class families, suggesting that digital exposure and reduced parental attention may be emerging risk factors. While Hindu children were more affected, this aligns with regional population demographics. Compared to previous studies, the pattern of age distribution differs, emphasizing the need for interventions. region-specific Overall, enhancing parental awareness, improving supervision-especially in rural and nuclear family settings and addressing mental health and digital safety are crucial steps to prevent avoidable pediatric deaths.

Limitations of The Study

The sample size in this study is relatively small and limited to cases brought to SMS Medical College and its attached group of hospitals, which restricts the generalizability of the findings to the broader population. Most of the victims were referred cases, meaning they may not accurately represent the general population of Jaipur or any specific geographic region. Additionally, the manner of death was determined based on information provided by the victim's relatives and the police inquest, while the mode of death relied primarily on the history given, which may introduce reporting bias or inaccuracies.

References

- Narkhede V, Sinha U, Bhardwaj SD, Pitale S. Morbidity profile in under five children in urban slum area of Nagpur. National Journal of Community Medicine. 2012;3(3):442-46.
- Reddy, R. P., & Kumar, N. P. (2015). Demographic study of unnatural deaths in paediatric age group in General Hospital, Khammam. International Journal of Research in Medical Sciences, 3(6), 1511–1514. https://doi.org/10.18203/2320-6012.ijrms20150117
- OHCHR. Convention on the Rights of the Child. [[Last acessed on 2022 Oct 28]]. Available from:https://www.ohchr.org/en/professionalinterest/ pages/crc.aspx .
- UNICEF. What is the Convention on the Rights of the Child? [[Last accessed on 2022 Oct 28]]. Available from:https://www.unicef.org/child-rightsconvention/what-is-the-convention
- Kliegman RM, Behrman RE, Jenson HB, Stanton BF. Nelson Textbook of Pediatrics. 19th ed. Philadelphia: Elsevier; 2011. p. 1-2.
- Global burden of diseases. Compare |Institute for Health Metrics and Evaluation (IHME) Viz Hub. [[Last accessed on 2022 Oct 28]]. Available from:http://vizhub.healthdata.org/gbd-compare.

Dr. Dipender Singh, et al. International Journal of Medical Sciences and Advanced Clinical Research (IJMACR)

- - Harris A. 'Natural' and 'Unnatural' medical deaths and coronial law: A UK and international review of the medical literature on natural and unnatural death and how it applies to medical death certification and reporting deaths to coroners: natural/unnatural death: a scientific review. Med Sci Law. 2017;57(3):105– 14.
 - World Health Organization. (2014). Global report on drowning: Preventing a leading killer. World Health Organization. Retrieved from https:// www. who.int /publications/i/item/global-report-on-drowningpreventing-a-leading-killer
 - Ghai OP. Essential pediatrics. 9th ed. New Delhi: CBS Publishers; 2019. p. 8-9.
 - Athani P, Hugar BS, Harish S, Girishchandra YP. Pattern of unnatural deaths among children: An autopsy study. Med Leg J. 2016 Nov;84(0):1-3. doi: 10.1177/0025817216679353.
 - Mokdad AH, Forouzanfar MH, Daoud F, et al. Global burden of diseases, injuries, and risk factors for young people's health during 1990–2013: a systematic analysis for the Global Burden of Disease Study 2013. Lancet. 2016;387(10036):2383-2401. doi:10.1016/S0140-6736(16)00648-6.
 - World Health Organization. Millennium Development Goals & Health, Development and Poverty. New York: World Health Organization; 2006
 - Clark R, Locke M, Bialocerkowski A. Paediatric terminology in the Australian health and healtheducation context: a systematic review. Dev Med Child Neurol. 2015;57(11):1011-1018. doi: 10.1111/dmcn.12803.

- 14. World Health Organization. (2023). Global status report on child injury prevention. https://www.who.int
- 15. UNICEF. (2022). The State of the World's Children2022: A fair chance for every child. https://www.unicef.org/reports
- Spencer, N., & Blackburn, C. (2020). Health inequalities in children and young people. Archives of Disease in Childhood, 105(1), 25–28. https://doi.org/10.1136/archdischild-2019-317374
- 17. Varma RK, Shruth P, Jagannath SR. Unnatural deaths in the paediatric age group in a tertiary hospital at Bangalore: An autopsy study. Indian J Forensic Med Toxicol. 2020;15(1):262-267.
- Kumar A, Pandey SK, Singh TB. Epidemiological study of unnatural death among children in Varanasi area (India). Int J Sci Res. 2014 Oct;3(10):1438-41.