Scholars Journal of Applied Medical Sciences
Abbreviated Key Title: Sch J App Med Sci
ISSN 2347-954X (Print) | ISSN 2320-6691 (Online)
Journal homepage: https://saspublishers.com

OPEN ACCESS

Forensic Medicine

Forensic Autopsy Findings in Determination of the Risk Factors of Sudden Infant Death Syndrome

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DOI: 10.36347/sjams.2022.v10i04.002 | **Received:** 22.02.2022 | **Accepted:** 01.04.2022 | **Published:** 05.04.2022

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Abstract **Original Research Article**

Introduction: Sudden infant death syndrome (SIDS) occurs when a seemingly healthy newborn under the age of one year dies unexpectedly while sleeping. SIDS is often known as crib death because neonates usually die in their cribs. Even after a thorough forensic examination and death site investigation, the general diagnosis of SIDS is made when the cause of infant death cannot be determined. According to the 1969 definition, SIDS is still an excluding diagnosis. Despite the fact that this syndrome has various distinguishing characteristics, such as an age distribution that only affects children under the age of one year and an apparent incidence during sleep, there has been a reluctance to include these characteristics in the classification. The aim of the study was to better understand the risk factors of sudden infant death syndrome (SIDS). ***Methods:*** This cross-sectional analytical study was conducted at the Department of Forensic Medicine, Pabna Medical College Hospital, Pabna, from March 2020 to April 2021, and the participants of the study were 25 sudden and unidentified infant death cases at the study hospital whose guardians had given authorization for inclusion in the study. ***Result:*** The male: female ratio of the present study was 1.27:1. 60% of the participants had died while at home, and no information regarding the activity of infant at time of death was available for 56% of cases. Initial forensic analysis confirmed SIDS in 76% of the cases. Among the SIDS cases, majority had no observable risk factors, but family history of ailments and habits such as heart disorders, respiratory distress and smoking were determined as possible risk factors. Previous history of SIDS in family was also considered as a risk factor. ***Conclusion:*** The location of the infants at the time of death is very important in properly determining cause of death. Better observation of the infants can help in conducting a proper forensic analysis.

Keywords: Sudden, Syndrome, SIDS, Infant, Unknown.

INTRODUCTION

SIDS, or Sudden Newborn Death Syndrome, is a term coined in 1969 to describe cases in which the cause of death of an infant cannot be determined despite a thorough forensic investigation, including a death site inquiry [1]. SIDS is thought to be complex, despite the fact that no definitive causes have been identified yet. SIDS is thought to occur in newborns that have a biological predisposition and are exposed to external stimuli, such as side sleeping or soft bedding, at a vital developmental time. Bed-sharing, improper sleep surfaces (including sofas), tobacco smoke exposure, and preterm are all known risk factors for SIDS. SIDS is a type of infant death that occurs suddenly and unexpectedly (SUID). This occurs in children under 1 year of age, most often during sleep. Other types of SUID, generally those related to sleeping, can be largely attributed to choking, suffocation, trauma, respiratory infections, metabolic disorders, or infanticides [2]. Infant fatalities can be caused by a single cause or a series of events, with the majority of the occurrences being unexplained. There are certain procedures for the study of SIDS, however they are not available in our country at the now [3, 4]. The most difficult part of post-mortem forensic analysis is frequently the death scene investigation. When an infant is discovered dead, it is common for parents or relatives

to attempt to resuscitate the child. This is impossible to halt, and it disrupts the death scene, making reconstruction of the infant's exact position difficult at best. Although no particular cause of SIDS has been identified, prevalent risk factors include prone sleeping posture, co-sleeping with other family members, close cigarette smoking, heat, soft sleeping surface, and other related events [5]. As of yet, death site investigation has not become a common practice, neither has exploring clinical history of the infant. These factors lead to an inaccurate estimation of SIDS. Because the three characteristics used to identify SIDS are difficult to meet, and the contextual meanings of SIDS and sudden unexplained infant death (SUID) may overlap, it is usual to use SIDS and SUID interchangeably when cases occur. Furthermore, via joint research with forensic pediatric specialists, child health researchers and clinicians in Asian countries have begun to pay attention to the risk factors of SIDS or SUID [6, 7]. In Asia, little research has been done on the risk factors for SIDS.SIDS is caused by a variety of circumstances, including but not limited to health issues and ethnic or genetic traits. Pulmonary tuberculosis (PTB), being 6 months or younger (peak at 24 months), low birth weight, a low Apgar score at birth, exposure to smoking and alcohol, cardiac arrhythmia, and recent virus infections are all health-related SIDS risk factors. Each of these issues has its own mechanism, but they are all interconnected and made worse by newborns' underdeveloped immunity and poor physiological regulation [8]. The scope and significance of infants' vulnerability may be significant, especially in quickly urbanized nations with longstanding traditions and superstitions like Bangladesh and India, yet persuading parents and health professionals to accurately disclose information pertinent to SIDS may be difficult [7]. Due to such factors, forensic autopsy can provide greater information regarding the possible risk factors of SIDS.

OBJECTIVE

General Objective

- To observe and determine the possible risk factors for sudden infant death syndrome

METHODS

T This cross-sectional analytical study was conducted at the Department of Forensic Medicine, Pabna Medical College Hospital, Pabna. The study duration was 1 year, from March 2020 to April 2021, and the participants of the study were 25 sudden and unidentified infant death cases at the study hospital whose guardians had given authorization for inclusion in the study. The guardians of the infants were explained about the purpose of the study, and informed consent was obtained from them. The study was also approved by the ethical review committee of the study hospital. The data was collected using the survey instrument designed in the previous stage, as well as from the autopsy reports. Collected data were analyzed using the SPSS software.

Inclusion Criteria

- Sudden and unidentified infant death.
- Infant age <1 year.
- Patients whose parents had given consent to participate in the study.

Exclusion Criteria

- Mentally ill.
- Infants with determined cause of death.
- Unable to answer the criteria question.
- Exclude those affected with other chronic diseases etc.

RESULTS

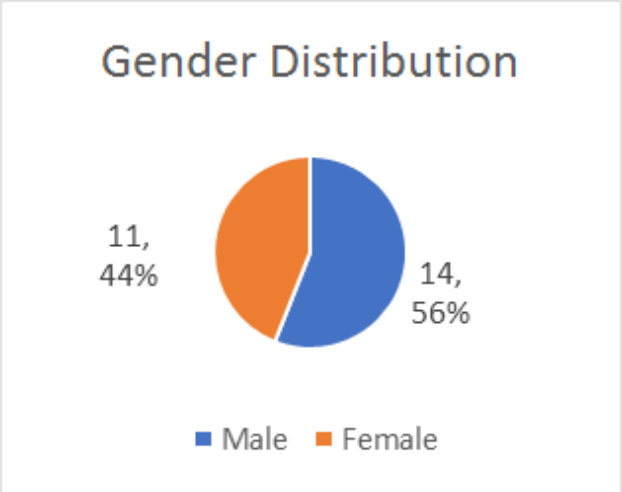

Fig-1: Gender distribution of the infants (n=25)

Among the deceased infants, majority (56%) was male, and 44% were female. The male: female prevalence was 1.27:1.

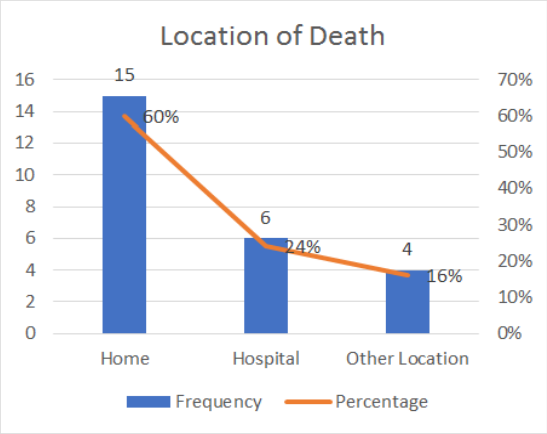

Fig-2: Distribution of the infants by location of death (n=25)

Majority of the participants (60%) had died while at home, while 24% of the infants died at the hospital. For the remaining 16% of the infants, they died at other locations.

Table-1: Activities of infant at the time of death (n=25)

Activity at Time of Death	Frequency	Percentage
Sleep	7	28.00%
Other activities at Home	4	16.00%
No Information	14	56.00%

No information was available for what the infants were doing for a majority (56%) of cases. 28% of the infants were sleeping at the time of death, and 16% were doing other activities at home at their time of death

Table-2: Manner of death of the infants (n=25)

Manner of Death	Frequency	Percentage
Natural	12	48%
Under Study	10	40%
Undetermined	3	12%

Observing the manner of death among the infants, it was observed that 48% had died a natural death, 40% were under study to determine their cause of death, and for the remaining 12% of cases, manner of death was Undetermined.

Table-3: Cause of probable death among the infants (n=25)

Cause of Probable Death	Frequency	Percentage
Trauma	2	8.00%
Malformation	1	4.00%
Congenital Heart Defect	1	4.00%
Prematurity	2	8.00%
SIDS	19	76.00%

Initial forensic analysis revealed that 76% of the infants had SIDS, 1 infant had congenital heart defect, 1 had malformation, and 2 had physical trauma as their probable cause of death.

Table-4: Possible risk factor of SIDS cases (n=19)

Probable Risk Factors	Frequency	Percentage
No available risk factors	13	68.42%
FH of respiratory disease	1	5.26%
FH of Smoking	2	10.53%
FH of Heart Defect	1	5.26%
Previous FH of SIDS	2	10.53%

Among the 19 identified cases of SIDS, possible risk factors were determined by taking both the family history and the forensic analysis of the infants in account. Despite this, for 68.42% of the infants (n=13), no available risk factors could be determined. 2 infants had a family history of smoking, and another 2 infants had a family history of SIDS cases. 1 infant had a family history of respiratory disease, and another had a family history of heart defect.

DISCUSSION

The SIDS diagnosis is a lengthy procedure. It's mostly an exclusionary diagnosis that relies heavily on the pathologist's knowledge. Various researches offer differing perspectives on what constitutes a sufficient cause of death. When none of the other probable symptoms match the autopsy data, death is determined as SIDS. The causes of infant mortality were reviewed at an international conference in Seattle in 1969, and a consensus was reached that was accepted by the US National Institutes of Health (NIH). After a thorough post mortem test that included a death scene inquiry, the inexplicable death of a newborn was standardized by medical records as sudden infant death syndrome (SIDS), and this remained without a likely cause of death [9-11]. The present study was conducted with the hopes of better understanding the risk factors in SIDS cases. In this study, among the 25 infant death cases, males had a higher prevalence. This was similar to the findings of other studies, where male infants had a higher risk of SIDS compared to the female infants [12]. The male gender is also assumed to be a possible risk factor for SIDS in many countries [13]. Among the infants, majority died while at home, while 24% of the infants died at the hospital. The remaining infants had died at other locations. Due to majority of the infants dying at the home, proper investigation of the scene was not possible. Similarly, no record was obtained regarding the activity of the infants at the time of death for 56% of cases. 28% of the infants were sleeping, and the remaining was doing some other forms of activities. For 48% of the cases, the manner of death was determined to be natural. For 40%, the manner of death was under study, and for the remaining 3 cases (12%), cause of death was undetermined. Forensic analysis of the infants revealed that 76% of the deaths were SIDS, 8% died due to prematurity, another 8% died as a result of physical trauma. Malformation and congenital heart defect were observed in 1 of the cases each. Among the 19 SIDS cases, further detailed investigation including available family history was done to determine possible risk factors of death. Despite the detailed analysis and investigation, no available risk factors were found for 68.42% (n=13) of the participants. 2 infants had a family history whether previous infants also died of SIDS. Family history if respiratory disease and heart defect were observed in 1 patient each. Another 2 infants had a family history of smoking. Passive smoking is considered another major risk factor for SIDS.

Limitations of the Study

The study was conducted in a single hospital with small sample size. So, the results may not represent the whole community.

CONCLUSION

The location of the infants at the time of death is very important in properly determining cause of death. Better observation of the infants can help in conducting a proper forensic analysis.

Funding: No funding sources

Conflict of interest: None declared

Ethical approval: The study was approved by the Institutional Ethics Committee

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