

OVERVIEW OF DEATH CASES WITH ASPHYXIA EXAMINED IN THE FORENSIC MEDICINE AND MEDIKOLEGAL SECTION OF DR. MOEWARDI HOSPITAL 2017-2022

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Keywords

asphyxia; death; forensic; visum et repertum

Abstract

Asphyxia is the third most common case in forensics. Death from asphyxia can occur due to murder, accident, or suicide. This study aims to determine the description of death cases with asphyxia. This research is a descriptive research with observational study. The data collection technique used was total sampling with a sample of all cases of death with asphyxia examined at Dr. Moewardi Hospital in the period 2017-2022. From 2017 to 2022, there were 105 cases of death with asphyxia. The most cases were in 2020 (23%). The majority of victims were male (85%) and aged more than 50 years (39%). A total of 21 cases (20%) were strangulation asphyxia, 18 (17%) cases of suffocation asphyxia, 3 cases (3%) chemical asphyxia, 10 cases (10%) asphyxia due to disease, and 53 (50%) cases were other asphyxia. Signs of cyanosis were found in 91% of cases, petechiae in 56% of cases, edema in 2% of cases, and fine foam in 13% of cases. The most victims were found indoors with 48 cases (46%), followed by outdoors with 46 cases (44%), and in transportation with 1 case (1%). The three regions that sent the most victims were Surakarta city (63%), Sukoharjo district (10%), and Karanganyar district (10%). Most cases occurred in 2020. Males are most common in asphyxia cases. Other asphyxia is the most common type of asphyxia. In the majority of cases, signs of cyanosis were found. The place where the victims were found was relatively the same between indoors and outdoors

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INTRODUCTION

Asphyxia is a condition when the body experiences a lack of oxygen due to disruption of supply and transportation between the environment and organs (Dettmeyer et al., 2014). Lack of oxygen in the organs can cause death. Death from asphyxia itself can occur due to murder, accident, or suicide. Asphyxia is categorized into 3 types, namely suffocation, strangulation, and chemical asphyxia. Signs of death due to asphyxia include cyanosis, extensive and fast-onset body bruising, darker color of body bruises, foam from the mouth or nose, and blunt trauma marks around the nose or mouth if caused by smothering (Sihaloho & Parinduri, 2022).

In the US, suicide is the 10th leading cause of death with 42,773 cases in 2014. A total of 11,407 (26.7%) of them were related to asphyxia, namely hanging, strangulation, and smothering. The incidence of asphyxia due to suicide increased by 45.7% from 2005 to 2014 to 3.57 per 100,000 deaths. Some of the methods of suicide recorded in the study include 90.7% by hanging,

6.8% by smothering, 3.8% by gas, 0.6% by strangulation, and <0.1% by ingestion of foreign objects (Yau & Paschall, 2018). Based on a report on the epidemiology of asphyxia in the Forensic Department in Peshawar, Pakistan, 130 cases of death due to asphyxia were obtained from a total of 3,265 autopsy cases with a mortality rate of 3.98%. The causes of asphyxia in the study were murder (93.85%), suicide (3.85%), and accidental (2.3%), respectively (Khalil et al., 2014).

Research conducted in the Forensic Medicine and Medikolegal Section of Prof. Dr. D. Kandou Hospital in 2013-2017 obtained the results of 26 cases of death due to asphyxia. The subjects were dominated by male gender with 17 cases (65%) and the age group 17-25 years with 7 cases (27%). The prevalence of mechanical asphyxia was the highest at 25 cases (96.2%) with the most common cause being drowning (Rey et al., 2017). The number of deaths due to mechanical asphyxia in the Forensic Medicine Section of Prof. Dr. R D Kandou Hospital from 2010-2015 was 22 cases with the most cases occurring in 2011 as many as 32%. The biggest cause that is often found is self-hanging as much as 68.2% and the most common gender in cases of mechanical asphyxia death is male (54.5%) (Robi et al., 2016).

Based on the large number of cases and the lack of research on asphyxia, the researcher intends to conduct further research in the Forensic Medicine and Medikolegal Section of Dr. Moewardi Surakarta Hospital regarding the description of death cases with asphyxia. It is hoped that this study can provide an overview of asphyxia cases at Dr. Moewardi Hospital from 2017-2022.

METHODS

The research conducted was a descriptive observational study with a cross sectional approach. The research subjects included all cases of death with asphyxia examined at the Forensic Medicine and Medikolegal Installation of Dr. Moewardi Hospital in the 2017-2022 timeframe recorded in the visum et repertum and contained all research variables. Sampling was done using total sampling technique.

The variables in this study were measured through Visum et Reperum files and visum request files. The variables studied in this study were the number of cases per year, age, gender, type of asphyxia, signs of asphyxia, and crime scene. The data obtained were then analyzed descriptively and presented in the form of tables and graphs. This study has had an ethical feasibility permit issued by Dr. Moewardi Hospital with number 2.274/XII/HREC/2023.

RESULTS AND DISCUSSION

RESULTS

Data collection was carried out in December 2023 - January 2024 by identifying Visum et Reperum recorded in the Forensic Medicine and Medikolegal Section of Dr. Moewardi Hospital in 2017-2022.

Table 1. Number of death cases with asphyxia

Year	Number of Cases	%
2017	15	14
2018	13	12
2019	13	12
2020	24	23
2021	18	17
2022	22	21
Total	105	100

Based on Table 1, it is found that during the 2017-2022 period, the most cases occurred in 2020, namely 24 cases and decreased in 2021 to 18 cases.

Table 2. Overview of Death Cases with Asphyxia by Age

Age	Number of Cases	%
0-5 years	9	9

6-17 years	4	4
18-30 years	16	15
31-50 years	35	33
>50 years	141	39
Total	105	100

Based on Table 2, it was found that during the period 2017-2022, the highest incidence of asphyxia occurred at the age of more than 50 years, namely 41 cases (39%). The least number of cases was occupied by the age range of 6-17 years, namely as many as 4 cases (4%).

Table 3. Overview of Death Cases with Asphyxia by Gender

Gender	Number of Cases	%
Male	89	85
Female	16	15
Total	105	100

Based on Table 3, it was found that during the period 2017-2022, deaths with asphyxia occurred more in males with a percentage of 85%

Table 4. Overview of Death Cases with Asphyxia Based on Type of Asphyxia

Type of Asphyxia	Number of Cases	%
Strangulation	21	20
Sufocation	18	17
Chemical	3	3
Disease	10	10
Other	53	50
Total	105	100

Based on Table 4, it was found that during the period 2017-2022 the most common type of asphyxia found in this study was other asphyxia with a total of 53 cases (50%) and the least was chemical asphyxia which was 3 cases (3%).

Table 5. Overview of Death Cases with Asphyxia Based on Signs of Asphyxia

Signs of Asphyxia	Number of Cases	%
<i>Petechiae</i>	59	56
Cyanosis	96	91
Edema	2	2
Fine foam	14	13

Based on Table 5, it was found that during the period 2017-2022 91% of cases of death with asphyxia had cyanosis. The least sign that appeared was edema which was only found in 2 cases or about 2%.

Table 6. Overview of Death Cases with Asphyxia by Crime Scene Category

Crime Scene Category	Number of Cases	%
Indoor	48	46
Outdoor	46	44
In Transportation Tools	1	1
Unknown	10	10
Total	105	100

Based on Table 6, it was found that during the 2017-2022 period, the most common location was the indoor category with 48 cases (46%) and followed by outdoors with 46 cases (44%). Only 1 case (1%) was found with a crime scene in a means of transportation.

Table 7. Overview of Death Cases with Asphyxia by Crime Scene Region

Crime Scene Region	Number of Cases	%
Surakarta	66	63
Sragen	3	3

Karanganyar	11	10
Boyolali	7	7
Pacitan	2	2
Sukoharjo	11	10
Wonogiri	1	1
Unknown	4	4
Total	105	100

Based on Table 7, it was found that during the period 2017-2022, most cases were located in Surakarta City with a total of 66 cases (63%). This can happen considering that Dr. Moewardi Hospital was established in the city.

Although the forensic service of RSUD Dr. Moewardi operates in Surakarta, based on the results of the study, the crime scene was also found outside Central Java. There were 2 cases (2%) of deaths due to asphyxia examined at Dr. Moewardi Hospital with a crime scene in East Java. These cases were found in Pacitan District, East Java.

DISCUSSION

Based on the results of *Visum et Repertum* research in the Forensic Medicine and Medikolegal Section of Dr. Moewardi Hospital in 2017-2022, 105 cases of death with asphyxia were obtained. 2020 is the year when the most cases of death with asphyxia occurred, namely 24 cases (23%), up 85% from the previous year, namely 13 cases (12%). This can be influenced by the COVID-19 pandemic which causes mass layoffs and economic pressure, increasing the risk of suicide (Riani et al., 2021). The average case of death with asphyxia examined at Dr. Moewardi Hospital in 2017-2022 per year was 17.5 cases.

The age of victims of death cases with asphyxia examined at Dr. Moewardi Hospital in 2017-2022 varied with the most cases in the age category of more than 50 years with 41 cases (39%). While the fewest cases were in the age range of 6-17 years with a total of 4 cases (4%). Research in Pakistan showed similar results, namely 38.8% (85) cases of death with asphyxia aged over 49 years. Of these 85 cases, 49 cases (22.4%) of them were aged 49-58 years and 36 cases (16.4%) were over 59 years old (Memon et al., 2021).

Death victims with asphyxia examined at Dr. Moewardi Hospital in 2017-2022 were mostly male as many as 89 cases (85%). Meanwhile, cases of death with asphyxia that were female amounted to 16 cases (15%). This is in line with research in Maharashtra, India where 457 cases (69.9%) were male and 197 cases (30.1%) were female. However, the number of strangulation asphyxia cases was dominated by the female gender with a total of 8 out of 9 cases (88.9%) (Ghadge et al., 2016). Male gender was also the most common finding in the 2010-2016 study in Mexico compared to female gender (Miguel et al., 2019).

In this study, suffocation asphyxia was found in 18 cases (17%), strangulation asphyxia in 21 cases (20%), and asphyxia due to disease in 10 cases (10%). Other types of asphyxia were the most common with 53 cases (50%) and chemical asphyxia was the least with 3 cases (3%). According to research in Maharashtra, India in 2006-2015, the most common type of asphyxia was strangulation asphyxia with a total of 418 cases (63.9%), of which 409 were cases due to hanging. The second highest asphyxia frequency was suffocation asphyxia due to drowning (31.2%). According to the study, access to water, residential areas close to rivers, floods, lack of security, are factors that can increase the risk of drowning (Ghadge et al., 2016). In this study, there were 8 cases of asphyxia suspected to be due to drowning. This is in line with the geographical conditions of Surakarta City and its surroundings which are passed by the Bengawan Solo River which is the longest river on the island of Java.

Hanging is the most common cause because it is the most common way of suicide. However, in this study, there were 12 cases of hanging which was not the most common case that caused asphyxia. This may occur due to differences in regions/countries which is in line with research conducted at Dr. Soetomo Hospital Surabaya. Of the 108 cases of asphyxia found in the

study, 45 of them were cases of self-hanging while the other 63 cases were not cases of asphyxia due to self-hanging (Ermawati et al., 2018).

Ten out of 105 cases were asphyxia that occurred presumably because the victim was sick and 53 cases could not be identified as the cause or type of asphyxia. This can occur because the majority of asphyxia cases that occurred were not subjected to internal examination or autopsy, so the exact cause of death of the victim is unknown.

It was found that 91% of asphyxia cases studied had signs of cyanosis. While the sign of petechiae was found in 56% of cases, fine foam in 14% of cases, and the least edema in 2% of cases. The four signs can be found simultaneously in one case or not. However, the possibility of death due to asphyxia can appear if there is one of the four signs. According to the results of research at Dr. Mohammad Hosein Hospital Palembang, the most common sign of asphyxia is cyanosis with a percentage of 100% or found in all cases. Petechiae was also found in 3 Visum et Repertum files (27.3%) where the sign was mostly found on the sclera (Nasution et al., 2014).

The scene of the crime (TKP) or the place where the victim was found dead with asphyxia was mostly indoors with 48 cases (46%) and followed by outdoors with 46 cases (44%). Meanwhile, only 1 case (1%) was found in a means of transportation and 10 cases (10%) had no crime scene listed. The most cases of death with asphyxia examined at Dr. Moewardi Hospital in 2017-2022 came from Surakarta City, namely 66 cases (63%). While the least cases came from Wonogiri Regency with 1 case (1%).

CONCLUSIONS

Most cases occurred in 2020. Males are most common in asphyxia cases. Other asphyxia is the most common type of asphyxia. In the majority of cases, signs of cyanosis were found. The place where the victims were found was relatively the same between indoors and outdoors. Surakarta City is the largest contributor to death cases with asphyxia at Dr. Moewardi Hospital.

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