



Forensic Pathology

A case series of child suicides in Lusaka, Zambia

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ARTICLE INFO

Keywords:

Suicide
Children
Autopsy
Forensic pathology investigation
Special dissections

ABSTRACT

Suicide implies a singular motive of ending one's own life by self-harm. Child suicides may be misclassified as accidental or homicidal due to a lack of history of mental illness and alteration of the scene to disguise the circumstances. This case series describes the approach to investigating suicides in children. It also described the methods used to commit suicide in children. The cases were obtained from the Office of the State Forensic Pathologists' records. Cases whose manner of death was classified as suicide were selected. Coroner's order for postmortem forms and postmortem reports were used to obtain demographic data, history, the circumstances of death, and the methods used. Eleven children aged eight to fifteen years who committed suicide between June 2019 and September 2020 were autopsied. Of these, three were male, and eight were female. Nine hanged themselves while two ingested organophosphate compounds. To investigate child suicides adequately, the pathologist must consider the scene, history, and circumstances. The autopsy must include special dissections such as musculocutaneous dissection of the anterior, posterior torso and extremities, layered dissection of the neck and face, posterior neck dissection, and anogenital examination to reveal injuries that may have been concealed. In conclusion, correlating scene data, history, and circumstances with autopsy findings and ancillary tests are vital in opining the cause and manner of death. Every effort must be made to rule out homicide.

Introduction

Suicide implies a singular motive of ending one's own life by self-harm [1]. Child suicides may be classified as accidental or homicidal by the pathologist due to; a lack of alarming tendencies such as threats to end one's life, alteration of the scene to disguise the circumstances for religious, social, and insurance purposes [2–4].

In 2016, suicides in children accounted for 1.4% of all deaths globally and were the second leading manner of death among adolescents [5]. A literature review shows that most children by the age of nine (9) years understand the concept of death and suicide [2,6].

Kölves et al. showed that hanging, poisoning, and firearms, were the most preferred methods in children globally [7]. Hepp et al. showed that hanging, descent from height, railway-suicides, poisoning, and firearms were the most frequent in Europe [8]. In South Africa, hanging, shooting, gassing, and burning are common among teenagers [9]. There are no studies in Zambia on the subject of child suicides in the medicolegal population despite all cases of suicides undergoing medicolegal death investigation.

To investigate child suicides adequately, the pathologist must consider the scene, history, and circumstances. The autopsy must include special dissections such as musculocutaneous dissection of the anterior, posterior torso and extremities, layered dissection of the neck and face, posterior neck dissection, and anogenital examination to reveal injuries that may have been concealed [10–12]. Because suicides in children are a diagnosis of exclusion, every effort by the pathologist must be employed to rule out any other manner of death.

This case series aims to describe the approach to the medicolegal death investigation of suicides in children. It also describes the methods used to commit suicide in children.

Materials and methods

The cases were obtained from the Office of the State Forensic Pathologists' records. Cases that were determined to be child suicides after medicolegal death investigations were selected. Coroner's order for postmortem forms and postmortem reports were used to obtain demographic data, the circumstances of death, the method of suicides,

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and the place of death. The Office of the State Forensic Pathologist granted permission to write a case series.

Results

Case 1

An 8-year-old-girl was found hanging on a tree behind her parents' house. While playing with her friends, she was noted to have been trying to tie a wire around her neck several times. The friends reported to her mother, who reprimanded her for her odd behavior. A few hours later, she was found hanging on a tree in the backyard. There was no history of mental illness. Postmortem examination showed a girl with dependent lividity on the lower extremities and distal aspects of the upper extremities. There were no petechial hemorrhages. The neck showed a ligature mark located above the level of the laryngeal prominence, which rose laterally to the point of suspension on the back of the left ear. A standard internal examination was unremarkable. The cause of death was hanging, and the manner of death was suicide.

Case 2

An 11-year-old-boy was found hanging in the bathroom of his grandmother's house with the door locked from inside. He used a rope to hang himself to the wooden poles that hold the roof. There was no history of mental illness. Before his death, his dog had chased an old man who threatened to bewitch him. A review of the scene photographs showed a boy completely suspended with a rope around his neck. The external examination showed no petechial hemorrhages. Dependent lividity was present on the lower extremities and distal aspects of the upper extremities. The tongue was protuberant from the mouth with postmortem drying of the tip. The neck showed an indented furrow. There was a ligature mark located above the level of the laryngeal prominence, which rose laterally to the point of suspension on the left chin. A standard internal examination was unremarkable. The cause of death was hanging, and the manner of death was suicide.

Case 3

An 11-year-old-girl was found hanging using a cloth "chitenge material" in the living room at a family friend's house with the door locked from the inside. She had been sent by her mother to help out with babysitting. There was no history of mental illness. A review of the scene photos showed a girl completely hanging with a chitenge around her neck tied to the window. Postmortem examination showed a girl with dependent lividity on the lower extremities and distal aspects of the upper extremities. There were no petechial hemorrhages. The tongue was protuberant from the mouth with postmortem drying of the tip. The neck showed faint indentation markings. The neck showed a ligature mark located above the level of the laryngeal prominence, which rose laterally to the point of suspension on the back of the right ear. A standard internal examination was unremarkable. There was no evidence of sexual assault. The cause of death was hanging, and the manner of death was suicide.

Case 4

A 12-year-old-girl was found hanging on the tree in the bush. A review of the scene photos shows a girl hanging with a cloth (chitenge material) around her neck tied to a tree. The external examination showed dependent lividity on the lower extremities and distal aspects of the upper extremities. The tongue was protuberant from the mouth with postmortem drying of the tip. The neck showed an indented furrow. There was a ligature mark located above the level of the laryngeal prominence which rose laterally to the point of suspension on the right submandibular region. A standard internal was unremarkable.

Special dissections including musculocutaneous dissection of the anterior torso; layered dissection of the neck and face in an avascular field; posterior neck dissection; musculocutaneous dissection of the posterior torso; and musculocutaneous dissection of the extremities were unremarkable. The cause of death was hanging, and the manner of death was suicide.

Case 5

A 13-year-old girl died after ingesting a pesticide (doom). She is said to have been left at home with the elder brother while the mother went to the village to visit. The brother found her unconscious in the house upon returning from work. He rushed to the local clinic, where she was pronounced dead upon arrival. There was no history of mental illness. External examination showed a girl without injuries. A standard internal examination was unremarkable. The stomach contained partially digested food particles with a paraffin-like smell. There was no evidence of sexual assault on examination of the genitalia. Toxicology testing of blood revealed diclofopos, an organophosphate compound. The cause of death was organophosphate toxicity, and the manner was suicide.

Case 6

A 13-year-old-girl died after ingesting an insecticide (Amitraz), which she confessed to the mother. She was taken to the local clinic, where she died three hours after admission. There was no history of mental illness. External examination showed a girl without injuries. A standard internal examination was unremarkable. The stomach contained partially digested food particles with a paraffin-like odor. Toxicology testing of blood revealed cypermethrin, an organophosphate compound. The cause of death was organophosphate toxicity, and the manner of death was suicide.

Case 7

A 13-year-old-boy was found hanging on his bedroom window using a shoelace. There is no history of mental illness. A review of the scene photos shows a boy partially hanging with a shoelace around his neck in a kneeling position. External examination showed petechial hemorrhages on the face and conjunctivae. Hypostatic staining was present on the lower extremities and distal aspects of the upper extremities. The tongue was protruding from the mouth. The neck showed an indented furrow. There was a ligature mark located above the level of the laryngeal prominence and rose laterally to the point of suspension at the right angle of the submandibular region. A standard internal examination was unremarkable. Special dissections including musculocutaneous dissection of the anterior torso, layered dissection of the neck and face in an avascular field, posterior neck dissection, musculocutaneous dissection of the posterior torso, and musculocutaneous dissection of the extremities were unremarkable. The cause of death was hanging, and the manner of death was suicide.

Case 8

A 14-year-old girl was found hanging in the living room of her parents' house. A review of the scene photos showed a girl completely hanging with a rope around her neck tied to the poles that support the roof. External examination showed hypostatic staining was present on the lower extremities and distal aspects of the upper extremities. There were no petechial hemorrhages on the face and conjunctivae. The tongue was protruding from the mouth. There was a ligature mark located above the level of the laryngeal prominence and rose laterally to the point of suspension at the right angle of the submandibular region. A standard internal examination was unremarkable. The cause of death was hanging, and the manner of death was suicide.

Case 9

A 14-year-old-girl was found hanging in an unfinished building. There was no history of mental illness. A review of the scene photos shows a girl completely hanging with a piece of cloth (chitenge material) tied around her neck. External examination showed no petechial hemorrhages. Hypostatic staining was present on the lower extremities and distal aspects of the upper extremities. The neck showed an indented furrow. The ligature mark was located above the level of the laryngeal prominence and rose laterally to a suspension point below the right chin. A standard internal examination was unremarkable. Special dissections including musculocutaneous dissection of the anterior torso, layered dissection of the neck and face in an avascular field, posterior neck dissection, musculocutaneous dissection of the posterior torso, and musculocutaneous dissection of the extremities were unremarkable. The cause of death was hanging, and the manner of death was suicide.

Case 10

A 15-year-old-boy was found hanging in the bathroom of his parents' house with the door locked from the inside using a rope. There was no history of mental illness. External examination showed no petechial hemorrhages. Hypostatic staining was present on the lower extremities and distal aspects of the upper extremities. The neck showed an indented furrow. The ligature mark was located above the level of the laryngeal prominence. The ligature mark rose laterally to a point suspension on the back of the right ear. A standard internal examination was unremarkable. The cause of death was hanging, and the manner of death was suicide.

Case 11

A 15-year-old-girl was found hanging on a tree near a water body. There was no history of mental illness. A review of the scene photos showed a girl completely hanging with a wire around her neck tied to a tree. External examination showed no petechial hemorrhages. Hypostatic staining was present on the lower extremities and distal aspects of the upper extremities. The tongue was protruding from the mouth. The neck showed an indented furrow. The ligature mark was located above the laryngeal prominence and rose laterally to the point of suspension on the right angle of the submandibular region. A standard internal examination was unremarkable. Special dissections were performed, including musculocutaneous dissection of the anterior torso, layered dissection of the neck and face in an avascular field, posterior neck dissection, musculocutaneous dissection of the posterior torso, and musculocutaneous dissection of the extremities were unremarkable. The cause of death was hanging, and the manner of death was suicide.

Discussion

Literature around the forensic pathology of child suicides is scarce [4]. We present a case series of three (3) boys and eight (8) girls aged between the ages of eight (8) to fifteen (15) years, who committed suicide between June 2019 and September 2020 in Lusaka. Studies in the United States of America have shown an increase in the number of girls committing suicide. These studies suggested that girls are more susceptible to anxiety and depression compared to boys who display conduct and aggressive disorders [12,13]. We note that none of the cases in our series reported a history of mental illness. However, one boy was reported to have been threatened with being bewitched, which may have triggered the suicide. A study conducted in Zambia by Muula et al. stated that suicide ideations were associated with alcohol and cannabis use [14], this is at variance with our findings as the decedents who presented for medicolegal investigations in our case series had no

suicidal ideations and had no history of alcohol or any other drug use. Review of unpublished clinical data shows a significant number of suicidal ideations among adolescents in Lusaka, however, none of the cases in this series was from this pool of patients.

Hanging (nine cases) was the preferred method in this series. Literature globally shows that hanging is the desired method of committing suicides in children [7,8,15]. We postulate that hanging was preferred due to easy accessibility to materials used. Organophosphate poisoning was the other method utilized. We note that the low use of organophosphate poisoning may be due to a lack of money to procure the poison.

Forensic pathology investigation provides an insight into the dynamics of child suicides including contributory factors such as, physical, sexual or psychological trauma and the scene of death [6,7]. This factors need to be determined in the circumstantial evidence given to avoid flawed causes and manners of death. Cases 2, 3, 4, 7, 8, 9, and 11 had scene photographs that we reviewed before the autopsy. Reviewing scene photos enabled us to pay particular attention to the victim's position and the general condition of the surrounding environment. This enabled us to form a hypothesis of the cause and manner of death while considering all possible explanations for the death, including self-harm, a homicide mimicking a suicide, or an accidental death [1]. Two of the cases without review of scene photographs were organophosphate poisoning, and two were hanging.

We acknowledge that it is a weakness in our death investigation system, as all cases in suspected suicides in children must have scene photographs [10]. In this case series, we sought history from guardians, relatives, and friends. The history revealed events that may have led to the suicides, as in Case 2. We also inquired about the relationships between the deceased and the guardian, siblings, and other housemates. A history of sexual, physical, or emotional abuse and a child's health status was elicited [1]. This enabled us to have an understanding of the dynamics of the child's environment in these suicide cases. Special dissections were performed on cases that were found in unsecured environments (Cases 4 and 9). This was in an effort to rule out sexual assault or any other physical injuries in these cases as failure to do so can lead to a flawed analysis of the circumstantial evidence, autopsy findings and result in a poorly formulated opinion on the cause of death and manner of death [1,11].

Cases 4, 7, 9, and 11 had special dissection performed to rule out physical and sexual trauma evidence. The radiological examination would be contributory in cases where there is suspicion of child abuse; however, we are limited by a lack of postmortem imaging.

Our acquisition of a database is based on witness statements, the social and medical history of the victim, the environment in which the suicide occurred, and the autopsy is used to validate the hypothesis of suicide, homicide or accident or discard it. We believe that forensic pathology investigation of deaths in children in suicides must apply the principles of medicine by correlating scene data, history, and circumstances with autopsy findings and ancillary tests [16].

Conclusion

The forensic pathology investigation in child suicide must correlate scene data, history, and circumstances with autopsy findings and ancillary tests. Every effort must be made to rule out homicide. The methods used in child suicides are hanging and organophosphate poisoning.

Key learning points

1. The forensic pathology investigation of child suicides.
2. Methods used to commit suicide among children in Lusaka, Zambia.
3. The value of special dissections in child suicides.

CRediT authorship contribution statement

Cordilia Himwaze: Conceptualization, Methodology, Validation, Formal analysis, Investigation, Resources, Data curation, Writing - original draft, Writing - review & editing, Visualization, Project administration. **Luchenga Mucheleng'anga:** Conceptualization, Methodology, Validation, Formal analysis, Investigation, Resources, Data curation, Writing - original draft, Writing - review & editing, Visualization, Project administration.

Conflict of interest

The authors have no conflict of interest to report.

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