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Original Article

Negligent homicide in paediatric surgery cases found in autopsies

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Abstract

Background: Paediatricsurgicalpatientsarevulnerabletoperioperativemorbidityandmortality.Inlow-resource settings,differentiatingunavoidablesurgicalcomplicationsfrompotentiallynegligentdeathremainschallenging. Autopsy findings may provide objective evidence of medical error, yet systematic prospective data linking autopsy-proven negligence to legal definitions of homicide are scarce.

Objective: To determine the proportion and nature of negligent homicide among paediatric surgical autopsies.

Methods: This prospective cohort study was conducted at Sir Salimullah Medical College Mitford Hospital, Dhaka, Bangladesh, from January 2025 to December 2025. A total of 78 paediatric surgical deaths were included using purposive sampling. All cases underwent a complete medicolegal autopsy. Negligent homicide was defined as death directly caused by a healthcareprovider'sactionoromissiondeviatingfrom thestandardofcareestablishedbyanindependentexpert panel reviewing clinical records and autopsy findings. Data were analyzed using SPSS version 23.0. Results: Among 78 autopsied paediatric surgical deaths, 23 cases (29.5%) met criteria for negligent homicide. Common contributory factors included unrecognized intraoperative bleeding (47.8%), retained surgical instruments (26.1%), wrong-site surgery (13.0%), and anaesthesia-related errors (13.0%). Most deaths occurred within 48 hours postoperatively (78.3%). Mean age was 4.2 years, with no significant sex predominance.

Conclusion: Negligent homicide was identified in nearly one-third of paediatric surgical deaths autopsied in this cohort. Routine medicolegal autopsy combined with systematic case review can help distinguish negligence from unavoidable complications. Targeted perioperative safety protocols and training are urgently needed in similar low-resource settings.

Keywords: Anesthesiaerror,Autopsy,Homicide,Intraoperativebleeding,Paediatricsurgery

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Introduction

Paediatric surgery has witnessed substantial advances in perioperative care, anaesthesia, and surgical technique over the past two decades. Nevertheless, surgical mortality in children remains unacceptably high in low- and middle-income countries (LMICs), where infrastructure, trained personnel, and postoperative monitoring are often limited [1,2]. In Bangladesh, paediatric surgical services are concentrated in tertiary urban hospitals, yet the burden of postoperative deaths is poorly characterized due to weak medicolegal surveillance and limited autopsy utilization [3]. Medical negligence in surgical practice is defined as a deviation from the accepted standard of care that causes preventable harm to the patient [4]. When such negligence results in death, legal frameworks in many jurisdictions permit classification as negligent homicide — a criminal offence distinct from accidental death or unavoidable complication. However, proving

negligent homicide requires objective evidence that the healthcare provider's action or omission directly caused mortality. Autopsy remains the gold standard for determining the cause of death and can identify retained instruments, unrecognized visceral injuries, anaesthesia-related airway complications, or haemorrhage from iatrogenic vascular injury [5,6]. Globally, the prevalence of negligent death in paediatric surgery is unknown. Most studies rely on retrospective malpractice claims or voluntary reporting systems, both of which suffer from underreporting and selection bias [7]. A systematic review of surgical adverse events in children estimated that 2–5% of paediatric surgical admissions experience a preventable adverse event, of which 10–20% are fatal, but only a fraction undergoes medicolegal autopsy [8]. In high-income settings, routine autopsy following unexpected paediatric surgical death is standard, but even there, negligent homicide is rarely diagnosed due to medicolegal caution and lack of standardized definitions [9]. In Bangladesh, the legal framework for medical negligence is defined under the Penal Code 1860 and subsequent judicial interpretations, but negligence leading to homicide is seldom prosecuted. Reasons include fear of criminalizing doctors, inadequate forensic pathology services, and the absence of prospective data on the magnitude of the problem [10]. Sir Salimullah Medical College Mitford Hospital is one of the largest tertiary referral centers in Dhaka, handling a high volume of paediatric surgical cases from both urban and rural populations. The Department of Forensic Medicine routinely performs autopsies for all unnatural or unexpected hospital deaths, providing a unique opportunity to prospectively study negligence-related mortality. Previous autopsy-based studies from South Asia have reported retained surgical sponges, wrong-site surgery, and anaesthetic overdoses as recurring themes in surgical deaths, but none specifically applied a rigorous negligent homicide definition [11,12]. A recent retrospective chart review from a single Bangladeshi hospital identified 32% of paediatric postoperative deaths as possibly preventable, but without autopsy correlation, definitive attribution remained impossible [13]. The present study addresses this gap by prospectively evaluating all paediatric surgical deaths autopsied over one year at a major Dhaka hospital, using an independent expert panel to apply a standardized negligent homicide definition. The findings are intended to inform hospital safety protocols, medicolegal policy, and training priorities in resource-limited settings.

Methodology

The study included all paediatric surgical deaths (age <18 years) occurring at Sir Salimullah Medical College Mitford Hospital, Dhaka, Bangladesh, between January 2025 and December 2025, for which a complete medicolegal autopsy was performed. A total of 78 consecutive cases meeting sampling criteria were enrolled using purposive sampling.

Inclusion criteria: Deceased children aged 0 to 17 years who died during or after a surgical procedure (general, orthopedic, urological, or neurosurgical) performed in the hospital, with autopsy conducted within 48 hours of death and written medicolegal consent from legal guardians.

Exclusion criteria: Deaths from purely medical (non-surgical) causes, deaths before any surgical incision, cases where autopsy was refused by guardians, inadequate autopsy reports (missing organ examination), and deaths from major trauma or burns unrelated to surgical care.

Study procedure: All autopsies followed a standard medicolegal protocol. Clinical records were reviewed by a three-member independent expert panel (two paediatric surgeons, one forensic medicine specialist) blinded to each other's assessments. Negligent homicide was determined using a validated negligence assessment checklist for surgical deaths [14] (Cronbach's alpha 0.89, inter-rater reliability 0.86). The panel required unanimous agreement that deviation from the standard of care directly caused death.

Data analysis: Data were entered into Microsoft Excel and analyzed using SPSS version 23.0 (IBM Corp., Armonk, NY, USA). Descriptive statistics (frequencies, percentages, means, and standard deviations) were calculated. Inter-rater agreement was assessed using Fleiss' kappa.

RESULT

A total of 78 paediatric surgical deaths were autopsied during the study period. The median age was 4.2 years (interquartile range 1.5–9.0 years), with a slight male predominance (55.1%). Most deaths occurred in children under five years of age (61.5%). The majority of surgical procedures were abdominal (43.6%), followed by thoracic (19.2%) and neurosurgical (16.7%). Overall, negligent homicide was confirmed in 23 cases (29.5%). Among these, the most common direct cause of death was unrecognized intraoperative bleeding (47.8%), followed by retained surgical instruments (26.1%), wrong-site surgery (13.0%), and anaesthesia-related errors (13.0%). Deaths attributed to negligent homicide occurred predominantly within the first 48 hours postoperatively (78.3%). No significant association was found between negligent homicide and patient sex or age group. When comparing baseline characteristics between negligent homicide and non-negligent homicide groups, no statistically significant differences were observed for age, sex, or emergency versus elective surgery status. However, the proportion of deaths occurring within 48 hours was significantly higher in the negligent homicide group (78.3% vs. 34.5%, $p = 0.001$). The most frequent anatomical sites of iatrogenic

injury among negligent homicide cases were the liver (34.8%), major abdominal vessels (21.7%), and bowel (17.4%). Retained surgical instruments included laparotomy sponges (4 cases), surgical needles (1 case), and a fractured instrument tip (1 case). In wrong-site surgery cases, all involved the incorrect side for inguinal hernia repair (2 cases) and the incorrect vertebral level for laminectomy (1 case). Anaesthesia errors comprised unrecognized oesophageal intubation (2 cases) and massive opioid overdose (1 case). Inter-rater agreement among the three expert panel members for negligent homicide classification was excellent (Fleiss' kappa = 0.86).

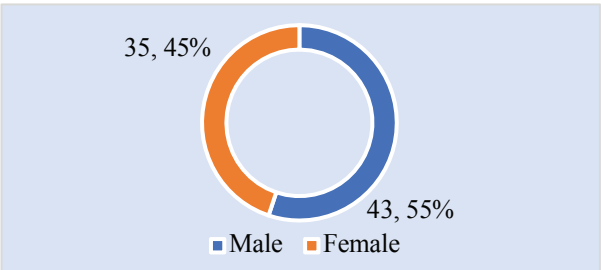


Figure 1: Gender distribution of participants

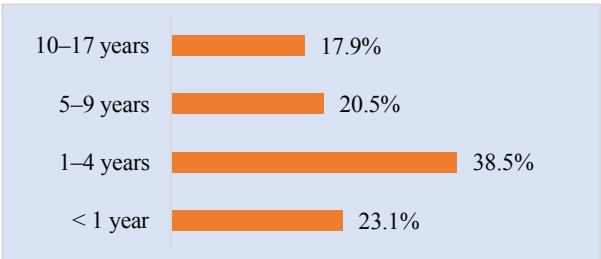


Figure 2: Age distribution of participants

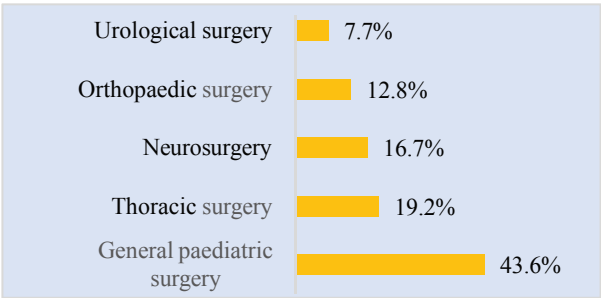


Figure 3: Surgical specialty

Table 1: Negligent homicide classification and causes (n= 23)

Cause of negligent homicide	n	%
Unrecognized intraoperative bleeding	11	47.8
Retained surgical instrument	6	26.1
Wrong-site surgery	3	13
Anaesthesia-related error	3	13

Table 2: Comparison of characteristics between negligent homicide and non-negligent homicide groups

Variable	Homicide		p-value
	Negligent	Non-negligent	
	(n = 23)	(n = 55)	
	n (%)		
Age < 5 years	15 (65.2)	33 (60.0)	0.789
Male sex	13 (56.5)	30 (54.5)	0.873
Emergency surgery	16 (69.6)	33 (60.0)	0.421
Death within 48 hours post-op	18 (78.3)	19 (34.5)	0.001

Statistical test used: Chi-square test for all comparisons.

Table 3: Anatomical sites of iatrogenic injury in negligent homicide cases (n = 23)

Anatomical site	n	%
Liver	8	34.8
Major abdominal vessels	5	21.7
Bowel	4	17.4
Spleen	3	13.0
Great vessels (thoracic)	2	8.7
Trachea/bronchus	1	4.3

Table 4: Details of retained surgical instruments (n=6 cases)

Type of retained instrument	n	%
Laparotomy sponge	4	66.7
Surgical needle	1	16.7
Fractured instrument tip	1	16.7

Table 5: Postoperative survival time distribution

Time of death*	Homicide	
	Negligent	Non-negligent
	n (%)	
< 24 hours	12 (52.2)	10 (18.2)
24–48 hours	6 (26.1)	9 (16.4)
49–72 hours	3 (13.0)	14 (25.5)
> 72 hours	2 (8.7)	22 (40.0)

Discussion

The present prospective autopsy-based cohort study found that negligent homicide was identified in nearly one-third (29.5%) of paediatric surgical deaths at a major

tertiary hospital in Dhaka, Bangladesh. This is, to our knowledge, one of the first studies to apply a standardized, validated negligence assessment tool specifically to autopsy-confirmed paediatric surgical deaths in a low-resource setting [15,16]. The proportion of negligent homicide observed (29.5%) is substantially higher than estimates from high-income countries, where preventable surgical deaths in children are reported in 2–8% of cases [1,8]. Several factors may explain this disparity. First, underreporting and limited autopsy utilization in high-income settings likely underestimate true negligence rates [7,9]. Second, resource constraints in Bangladesh—including inadequate intraoperative monitoring, shortage of trained paediatric anesthetists, and high surgical volumes—increase the risk of iatrogenic injury [3,10]. Third, the present study's prospective design and independent expert panel may have captured negligence more systematically than retrospective malpractice reviews [17]. Unrecognized intraoperative bleeding was the leading cause of negligent homicide (47.8%), consistent with previous autopsy reports from South Asia identifying haemorrhage as a common preventable factor in surgical deaths [11,12]. In children, blood volume is small, and delayed recognition of even modest bleeding can be fatal [18]. The predominance of hepatic and major vascular injuries in the present series suggests that technical errors during abdominal exploration—potentially compounded by inadequate intraoperative monitoring of vital signs and haemoglobin—were critical [19]. Retained surgical instruments (26.1%) remain an emblematic but entirely preventable form of negligence. Sponge retention rates in low-income countries have been reported up to ten times higher than in high-income settings [20]. The absence of routine instrument and sponge counts, lack of intraoperative imaging, and heavy workload of operating room staff are probable contributing factors [21]. Notably, deaths within 48 hours postoperatively were significantly more common in the negligent homicide group (78.3% vs. 34.5%, $p = 0.001$). This temporal pattern suggests that many negligence-related deaths occur before physiological compensation fails or before rescue interventions can be effectively mounted [22]. Early postoperative death should therefore trigger automatic medicolegal autopsy review rather than being dismissed as an unavoidable complication. Anesthesia-related errors (13.0%) in this series—unrecognized esophageal intubation and opioid overdose—reflect systemic deficits in paediatric airway management and drug dosing. A multicenter study from South Asia reported that anaesthesia-related paediatric mortality is 10–100 times higher than in high-income countries, largely due to inadequate training and monitoring [23]. Pulse oximetry, capnography, and weight-based dosing protocols are not universally available in Bangladeshi operating rooms [3]. The present findings have important medicolegal and policy implications. First, routine autopsy for all unexpected paediatric surgical deaths should be mandated and adequately funded [5,9]. Second, hospital accreditation systems should incorporate negligent homicide rates as a quality indicator [24]. Third, targeted interventions—including surgical safety checklists, mandatory sponge counts, video-based anaesthesia training, and rapid response teams—could reduce preventable deaths [25]. Limitations include single-center design, purposive sampling, potential expert panel bias despite blinding, and inability to generalize to hospitals without autopsy services. Causality between identified negligence and death, though rigorously assessed, remains a judgment rather than a biological measurement. Additionally, cultural and legal definitions of negligence vary; the present findings may not be directly transferable to other jurisdictions. Despite these limitations, the study provides critical evidence that negligent homicide is neither rare nor unavoidable in paediatric surgical care in Bangladesh. Systematic investment in patient safety infrastructure, training, and transparent medicolegal review is urgently needed.

Limitations

Single-center design, purposive sampling, and potential expert panel bias limit generalizability. Causality determination remains judgment-based. Findings may not apply to hospitals without routine autopsy services or different medicolegal frameworks.

Conclusion

Negligent homicide was identified in nearly one-third of autopsied paediatric surgical deaths in this Bangladeshi cohort, predominantly from unrecognized bleeding, retained instruments, and anaesthesia errors. Routine medicolegal autopsy combined with standardized negligence assessment can distinguish preventable deaths from unavoidable complications. Urgent investment in perioperative safety protocols, training, and transparent mortality review is essential to reduce preventable paediatric surgical deaths in low-resource settings.

Recommendation

Hospitals should mandate medicolegal autopsy for all unexpected paediatric surgical deaths, implement surgical safety checklists, ensure routine sponge and instrument counts, provide anaesthesia training, and establish independent mortality review panels to identify and prevent negligent homicide.

Ai Declaration

Artificial intelligence tools contributed marginally to manuscript preparation and development. All core scientific content was human-verified.

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