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An Assessment of Perioperative Mortality Rate in Aliabad Teaching Hospital, Kabul, Afghanistan

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Abstract: ***Introduction: Non-communicable diseases, including trauma and cancer as a result of inadequacy of surgery increasingly contribute to surgical burden, the absence of surgery and safe anesthesia in low and middle income countries is increased. Trauma, a main cause of death in low and middle income countries, depends on surgical interference to avoid disability and mortality. There are two million potentially avoidable deaths among the 5 million annual deaths due to injury, and many more among the growing burden of non-communicable diseases. This study seeks to determine perioperative mortality rate in the surgical wards of Aliabad Teaching Hospital, Kabul, Afghanistan. Method: The cross-sectional study was conducted in Aliabad Teaching Hospital from March 2018 to March 2019. Data elements potentially available from logbooks include: registration number, age, gender, date of operation, postoperative diagnosis, type of operation, systematic diseases of the patients and urgency of operation. Data were initially entered into an excel data sheet, and then exported to SPSS Statistics version 22 for further analysis. Results: From a total of 2856 patient records, 2093 were males and 763 females. The mean age of the subjects was 39.16 ± 16.995 years. Majority of the patients (43.2%) admitted to the general surgery ward of the Aliabad Teaching Hospital. The perioperative mortality rate was found to be 4.3 % among the study participants. Trauma was the first leading cause of perioperative mortalities. General anesthesia, age categories of 17-29 years, male, emergency procedures were associated with perioperative mortality. Conclusion: Trauma was first leading causes of perioperative mortalities. The higher perioperative mortality rates identified among 17- 29 years old age category.***

Key words: Non-communicable diseases, Perioperative mortality, Trauma, Avoidable deaths.

1. Introduction

The sequence of diseases and health seniorities change steadily on a term of time, safe surgery and anesthesia access are emerging as important subscriber to global health. Exhibitions are shown by several recent principals, which are elevating the outline of the role of surgery and safe anesthesia in global health. Principals and organizations with a new focal point on the role of surgery and anesthesia in global health involving the United Nations Sustainable Development Goals, the World Health Organization's global disability action plan 2014-2021, and the World Health Assembly resolution for surgery and safe anesthesia as part of Universal Health Coverage passed in May 2015, the disease control priorities for developing countries published in March 2015 and the Lancet Commission on Global Surgery published in April 2015. As a result, several new surgical metrics authorizing countries and to measure surgical care transmission and monitor progress, including perioperative mortality rate (POMR), have been included in WHO's 100 Health Indicators and have been assumed by the World Bank (1).

Disease Control Priorities 3 (DCP3) and the Lancet Commission on Global Surgery have put in order of importance indispensable surgery for low income countries (LICs) and low and middle income countries (LIMCs) (2).The indispensable Surgery amount of DCP3 supports 44 cost-effective surgical interventions and vital anesthesia capacity for every 1st Referral Hospital in low and middle income countries. Performance of these suggestions together with the persistent providing of emergency surgery and anesthesia is supposed to effect 28% of the global burden of disease counting 25% of trauma and 35% of obstetric burdens(3).

Additionally, as non-communicable diseases, including trauma and cancer as a result of inadequacy of surgery increasingly contribute to surgical burden, the absence of surgery and safe anesthesia in LMICs is increased. Trauma, a main cause of death in LMICs, depends on surgical interference to avoid disability and mortality. The morbidity and mortality from road traffic injuries accounts for 1.24 million deaths every year, and for every 1 person who dies in a traffic accident 20 are injured (4). LMICs report an annual injury death rate of 89 per 100,000, while high-income countries report only 51 per 100,000 (5). There are two million potentially avoidable deaths among the 5 million annual deaths due to injury and many more among the growing burden of non-communicable diseases such as cardiovascular disease, diabetes and cancer (2, 6)If the anesthesia associated mortality rate is about 1:500 in developing countries and half of the deaths were avoidable, we estimate each year there are 35000 avoidable anesthetic deaths among 35 million operations in LMICs (3).

This study seeks to determine POMR in Aliabad Teaching Hospital (ATH) in a retrospective way for 12 months, i.e. March 2018 - March 2019.

2. Methods

The cross-sectional retrospective study was conducted in ATH, Kabul University of Medical Sciences, from March 2018 to March 2019.Patients' perioperative data were collected from the medical achieve of ATH. Before collecting data and logbooks from ATH, theatres and

medical archive permission was taken from Kabul University of Medical Sciences relevant committee.

In addition, before conducting the study, ethical approval was obtained from Scientific Research Center of Kabul University of Medical Sciences review committee.

All patients above 17 years old who had a procedure at ATH during one year (March 2018 - March 2019) were included in the study. Patients who went to the operating theatre for operation but the operation was not conducted due to any reason, and patients who were operated at another institution and then transferred to ATH were excluded from the study.

POMR is defined as death following surgery and anesthesia on the day of surgery, including death in the operating theatre and before discharge from hospital or within 7 days from surgery. This definition of perioperative mortality has been proposed by the Safe Surgery Saves Lives initiatives of WHO's Patient Safety Program (7).

The study team collected the required data first by going through logbooks and then using patient charts collected from medical records. Anesthesia and surgical operating theatre logbooks were also examined to collect data. Data elements potentially available from logbooks were registration number, age, gender, date of operation, post-operative diagnosis, type of operation, systematic diseases of the patients, and urgency of operation. To follow up on disposition of these patients, the logbooks from the post-anesthesia care unit and all relevant wards were also examined.

All data with complete information were checked regularly to rectify any discrepancy, logical errors, and missing values. Initial data was entered into excel data sheet and then exported to SPSS Statistics version 22 for further analysis.

3. Results

From a total of 2856 patients, 2093 were males and 763 females. The mean age of the subjects was 39.16 ± 16.995 years. Figure 1 shows that the distribution of age variable is normal and the curve is symmetric about the mean.

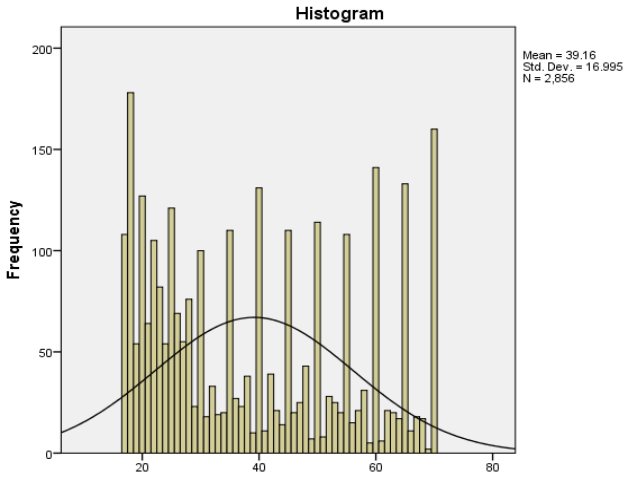

Figure 1: Age of the patients

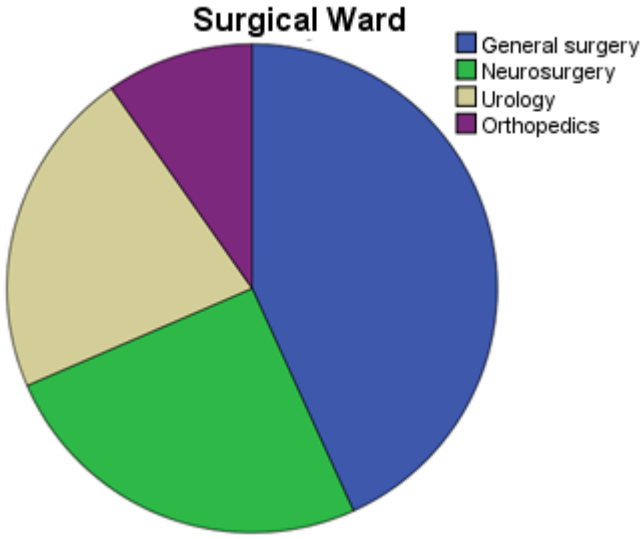

Figure 2: Patients surgical ward

The pie chart indicates that, majority of the patients (43.2%) admitted to general surgery ward of the ATH. Most of the patients lived in Kabul.

From the overall 2856 participants, 1689 (59.1 %) patients were given general anesthesia. Urgency of procedures was considered as a variable; both elective and emergency procedures were included in the study. In addition, 43.5% of the patients had systemic diseases. The perioperative mortality rate was found to be 4.3 % among the study participants.

Table 1: General characteristics of the subjects (n=2856)

Characteristics	Classification	n (%)
Gender	Female	763 (26.7)
	Male	2093 (73.3)
Age group	<30	1127 (39.5)
	=>30	17.29 (60.5)
Urgency of procedures	Emergency	826 (28.9)
	Elective	2030 (71.1.)
Systemic disease patients	Absent	1615 (56.5)
	Present	1241 (43.5)
Anesthesia type	General anesthesia	1689 (59.1)
	Spinal anesthesia	1106 (38.7)
	Local anesthesia	61 (2.1)

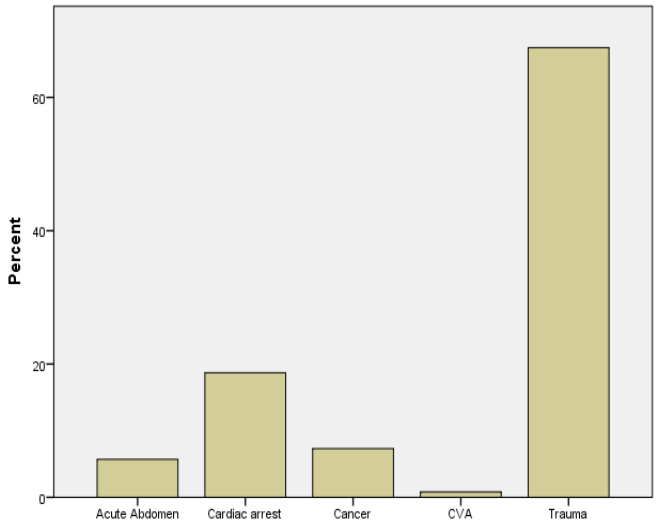

Figure 3: Cause of death

Figure 3 shows the causes of perioperative deaths occurred during study period in to surgical wards of ATH. As shown, most deaths (67.5%) were caused by trauma, followed by cardiac arrest (18.7%), cancers (7.3%), acute abdomens (5.7 %) and cardiovascular accidents (0.8%).

Table 2 shows the characteristics of subjects which had significant association with perioperative mortality. Male participants had more risk of perioperative mortality compared to female participants, with odds ratio of 1.6 and its corresponding 95% confidence interval (1.0 - 2.6). Patients with age category of 17-29 years old had increased risk of perioperative mortality, as compare to those more than 29 years of age years old, with odds ratio of 1.5 and its correspondent 95% confidence interval (1.1- 2.2). Emergency procedures had increased risk of perioperative mortality, as compare to those lower than elective procedures, with odds ratio of 10.3 and its correspondent 95% confidence interval (6.6 -15.9).Systemic disease of the patients had not showed statistical significance (p-value = 0.778). Furthermore, Patients whom received general anesthesia had increased risk of perioperative mortality, as compare to those lower than loco regional anesthesia, with odds ratio of 3.0 and its correspondent 95% confidence interval (1.9-4.7).

Table 2: Results of Chi-square analysis for factors associated with perioperative mortality

Factors		Deaths		OR (95 % CI)	p-value
		Yes n (%)	No n (%)		
Gender	Male	100 (4.8)	1993 (95.2)	1.6 (1.0-2.6)	0.040
	Female	23 (3.0)	740 (97.0)		
Age groups	<30	61 (5.6)	1066 (94.6)	1.5 (1.1-2.2)	0.019
	=>30	62 (3.6)	1667 (96.4)		
Urgency of procedures	Emergency	97(11.7)	729(88.3)	10.3 (6.6-15.9)	0.000
	Elective	26 (1.3)	2004 (98.7)		
Systemic disease	Absent	71 (4.2)	1544 (95.8)	1.1 (0.7-1.5)	0.788
	Present	52 (4.4)	1189 (95.6)		
Anesthesia type	General anesthesia	99(5.9)	1590 (94.1)	3.0 (1.9-4.7)	0.000
	Loco regional anesthesia	24(2.1)	1143 (97.9)		

4. Discussion

Perioperative mortality is not only a degree of access since the number of procedures performed must be identified to calculate it. Lack of access to safe surgery and anesthesia will consequence in delayed processes, which correlate with both a higher mortality rate and fewer procedures. A system that fails with respect to both safety and access will have a higher mortality rate and fewer procedures per head of population (8).

The perioperative mortality rate was found 4.3 % among the study population, i.e. 2856, which is lower than study conducted by Maman AFO B *et al.*,(9) and higher than what were reported by Tomta K *et al.,* (10) and Tyson AF *et al., (11),* where they reported 3.8 % and 2.5 % respectively.

Trauma, including various forms of trauma such as fall down, head trauma, road traffic accident, spine trauma, poly trauma and combined forms, was the first cause of perioperative mortalities in this study. This finding is similar to what Cherian, M. *et al.,* and Taira *et al.*,(4, 5) have reported in their studies, may depend strongly on the assumption that mortality trends in poor countries will have a relationship to economic and social development similar to those that have occurred in the higher-income countries. The morbidity and mortality from road traffic injuries accounts for 1.24 million deaths annually, and for every 1 person who dies in a traffic accident 20 are injured (4).

The study findings regarding mortalities caused by cardiac arrest (0.8%) are higher than what has been reported by Sprung J *et al.,* (12). cardiac arrests have been reported to be mostly attributable to anesthesia. The higher mortalities caused by cardiac arrest may possibly, the insufficiency of anesthesiologists. shortage of anesthesiologists is demonstrated in Afghanistan (9 anesthesiologists per 32 million population), Uganda (13 anesthesiologists per 27 million population), and Rwanda (9 anesthesiologists per 10 million population) (4, 13).Moreover, due to the presence of limited financial and logistic resources, anesthesiologists are bound to give the same anesthetic agents irrespective of type of surgical procedures which may sometimes increase in anesthetic-related morbidity and mortality and also affect surgical outcome as well (14).

Unfortunately, anesthesia still causes to most important and avoidable morbidity and mortality (15). Countries in Africa and other LMIC's have been surveyed to access surgical and anesthesia care, and weaknesses in surgery and anesthesia infrastructure have been identified (16, 17).

The higher perioperative mortality rates identified among 17- 29 years old category. This shows an accurate similarity with WHO injuries and violence evidence. This probably explains the fact that 17- 29 years old category are more susceptible to injuries and violence than greater age category (18)

The higher risk of perioperative mortality rates among males compared to females is in contour with the studies conducted by Richard L *et al.,* (19) and Braz LG, *et al.*. This can be described by the statement that, male participants are more prone to trauma, violence, and vascular disease than female participants (15).

Urgency of procedures were identified to have significant association with perioperative mortality using Chi-square analyses. Emergency procedures were associated with higher perioperative mortality in our study. Braz LG, *et al.,* and Newland MC, *et al.,* had also reported that emergency procedures have been associated with higher risks of perioperative mortality (15, 20).

More than a quarter of the interventions in this study were urgent cases. This is in contrast to Notrica M, *et al.,* and Linden *et al.,* studies outcome concerning to urgency of procedures, where they reported that more than half of all surgeries were urgent interventions (13, 21).

Chi-square analysis revealed that general anesthesia had higher risks of perioperative mortality as compared to those undergoing loco regional anesthesia. Arbous *et al.*, Lienhart A, *et al.*, and Braz LG, *et al.*, had reported similarly (15, 19, 22). Our findings have not shown any significant difference between patients with systemic diseases. However, Braz *et al.*, stated that, systematic diseases are risk factors for perioperative mortality (15).

5. Conclusions and Recommendations

The perioperative mortality rate was found 4.3 %. Trauma was the first leading causes of mortalities. Majority of the mortalities have occurred in patients undergoing general anesthesia age category of 17-29 years, male subjects, and emergency procedures.

Inadequacy of emergency services, safe anesthesia infrastructure, surgical services and number of anesthesiologists might have affected the perioperative mortality rate in Aliabad teaching hospital, therefore:

1) Promote the implementation of best practices, such as WHO guidelines for safe surgery and other procedure-specific or context specific evidence to decrease the complications. Develop a local culture of safety with regular quality of care discussions.
2) Develop quality improvement networks across settings to work collectively to identify and implement strategies to improve safety and decrease perioperative mortality rate (POMR).
3) Invest in the technology and human resources required for the prospective collection and analysis of POMR data.

Authors' Contributions

Mohammad Sharif Oria: Data collection, Writing 1st draft of the paper.
Hashmatullah Rahimi: Idea of the paper, Data collection.
Farid Forogh: Data entry, Data analysis.
Sheba Azim: Data collection, literature review
Besmillah Kamal: Data collection, Data entry
Omran Omar Amarkhil: Data entry, Drafting the table and figures
Abdullah Asady: Results description, Data analysis

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