

Decision to Incision for Surgical Emergencies: The Practice and Challenges in a Low-Income Setting

Olubusola T Alagbe-Briggs¹ and Rex Friday Ogoronte A Ijah^{2*}

¹*Department of Anesthesia, University of Port Harcourt Teaching Hospital and Senior Lecturer, University of Port Harcourt Port Harcourt, Nigeria*

²*Department of Surgery, University of Port Harcourt Teaching Hospital, Port Harcourt, Nigeria*

***Corresponding Author:** Rex Friday Ogoronte A Ijah, Department of Surgery, University of Port Harcourt Teaching Hospital, Port Harcourt, Nigeria.

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Abstract

Prompt attention to surgical emergencies has always been the standard of care intended to improve outcome and forestall negative consequences. Patients feel dissatisfied when delay is encountered in the care of their loved ones. The objectives of this study were to investigate the awareness, practice and challenges associated with response to emergency surgical conditions at the University of Port Harcourt Teaching Hospital during the study period (April 2020 to January 2021). A mixed-method prospective/cross-sectional descriptive study was carried out between the months of April 2020 and January 2021 in a multispecialty tertiary healthcare facility using a proforma (for prospective data collection) and semi-structured questionnaires. A total of 105 respondents were recruited in the questionnaire survey, and 86 surgical procedures were recorded in the study proforma. All the respondents (100%) asserted positively to awareness of medico-legal issues in surgical practice and 96 (91.4%) were also aware of violence against health workers following perceived injustice to patients. There was significant prolongation of surgical intervention time was occasioned by occurrence of patient-related and hospital-related factors. The findings from the questionnaire-based survey was to a large extent corroborated by the data obtained from direct observation of practical experiences at the point of duty using study proforma. Emergency response practice was hindered by the challenges encountered at the point of duty, despite the high awareness of the caregivers. Insurance coverage for surgical patients and reduction in hospital-related sources of delay will improve emergency surgical services.

Keywords: *Decision to Incision; Emergency Surgeries; Delays; Challenges; Port Harcourt*

Introduction

The attention and urgency attached to the care of patients at the emergency department helps to define what this department is all about, as such patients are operated immediately or within a few hours [1]. Prompt attention to surgical emergencies has always been the standard of care intended to improve outcome and forestall negative consequences [2-6]. Such emergency conditions are encountered in almost all surgical specialties, though some specialties are more involved and the prevalence of specific conditions may vary within specialties [7-9]. The timing of acute care surgery (TACS) has been an issue of concern to the World Society of Emergency Surgery Study

Group Initiative, with a call for standardizing surgical emergency intervention timing and for administrative authorities to establish dedicated operating theatre for acute care surgeries [10]. However, implementation of this desired objective with establishment of dedicated acute care surgery discipline has been reported to vary in different centers [11]. Although no one standard definition exist for emergency surgery with absence of consensus, cases that present at emergency department have been grouped into immediate life-threatening; life-threatening; organ/limb threatening; non-critical, emergent; non-critical, non-emergent, urgent; and semi-urgent [12].

In the United States, factors that degrades quality of care at the emergency department have been associated with closure of the emergency department [13-16]. These factors include: overcrowding, prolonged patient waiting times, patients leaving unattended to and increased morbidity/mortality. Financial burden of hospital treatment, lack of a good referral system and inadequate training of existing staff have been identified as barriers to effective surgical service delivery in low and middle income countries [17,18]. Lack of proper hospital infrastructure and human resources, delayed fitness for surgery, funds issue, were some of the issues reported as factors responsible for delay in the care of orthopedic emergencies in an Indian study [19]. In an eight-year study, 24% of patients admitted for emergency surgery were delayed due to organizational causes, and only 21% of these delayed cases had their surgeries within 24 hours [1].

There have been reported cases of violence to health workers for perceived injustices experienced in other countries [20-23]. This phenomenon is gradually being witnessed in our country [24-28]. Patients avoiding hospital due to poor satisfaction with services has also been reported in other climes [29-31]. Such patient-expressed dissatisfaction with services in health institutions has also been reported in our setting in Nigeria [32-36]. These issues may have led to growing awakening on medical negligence against health workers and institutions, and consequent medico-legal consciousness in our society [37-41]. This study therefore obtained information from doctors at their points of duty, so that the issues and challenges in our setting could be known, and the way forward suggested to improve service delivery and forestall ugly occurrences. The aim of this study was to investigate the awareness, practice and challenges associated with response to emergency surgical conditions at the University of Port Harcourt Teaching Hospital. The following research questions served as guide for this study: What is the scope of awareness of surgical/anesthetic teams on response to emergency surgical conditions at the University of Port Harcourt Teaching Hospital?; To what extent do the surgical and anesthesia teams practice ideal response to surgical emergencies?; and What are the challenges encountered by surgical and anesthetic teams of doctors in the care of emergency surgical conditions at the University of Port Harcourt Teaching Hospital?

Materials and Methods

A mixed-method cross-sectional descriptive study was carried out between the months of April 2020 and January 2021 at the University of Port Harcourt Teaching Hospital, a tertiary healthcare facility in Port Harcourt, the capital of Rivers State, South-South of the Federal Republic of Nigeria. The hospital is a multi-specialty center that renders the following surgical services: general surgical, neuro-surgical, otorhinolaryngologic, dental/oral-maxillo-facial, plastic surgical, cardiothoracic, orthopedic, obstetric and gynecologic, urologic, pediatric, and laparoscopic surgical procedures. The study instruments were a proforma (for prospective data collection) and semi-structured questionnaires for a survey.

The study setting/sites were the specialist out-patient clinics (for the questionnaire-based data), and the accident and emergency/operating theatre (for proforma-based data by the independent observer). After pre-testing the questionnaires in a similar work environment (private hospital), the convenience sampling method was used to administer 120 questionnaires to doctors involved in emergency surgical care. The specially designed study proforma was used to document information on emergency surgical procedures carried out from October 2020 to January 2021, using the systematic sampling method (using every other emergency surgery). Data was retrieved for analysis using the IBM Statistical Package for the Social Sciences (SPSS) version 20.0.

Results

A total of 105 respondents were recruited in the questionnaire survey, and 86 surgical procedures were recorded in the study proforma out of 172 emergency surgeries carried out within the study period. Data in table 1-5 were summarised from the opinion of respondents in study questionnaires, while those in table 6 and 7 were derived from direct observation of practical experiences at the point of duty using study proforma. The socio-demographic characteristics of the respondents is summarized in table 1. Ninety-one (86.6%) respondents had spent between 1 - 20 years in service cutting across different departments. Thirty-two (30.5%) respondents were from surgery department, 26 (24.8%) from Anaesthesiology and 16 (15.1%) from Obstetrics and Gynaecology. As shown in table 2, all the respondents (100%) asserted positively to awareness of medico-legal issues in surgical practice and 96 (91.4%) were also aware of violence against health workers following perceived delays to patients' surgical care. One hundred and three (98.1%) respondents had encountered delay while caring for emergency surgeries.

Variables	Frequency	Percentage
Sex		
Male	65	61.9
Female	40	38.1
Age		
Less than 25 years	1	1.0
25 - 40 Years	66	62.8
41 - 60 years	38	36.2
Marital Status		
Single	27	25.7
Married	76	72.4
Separated	2	1.9
Years in service		
Less than 1 Year	9	8.6
1 - 10 years	50	47.6
11 - 20 years	41	39.0
21 - 30 years	5	4.8
Health staff category		
Surgeon (All Specialists)	17	16.2
Senior Registrar	25	23.8
Registrar	58	55.2
House officer	5	4.8
Doctors department		
Accident and Emergency	2	1.9
Surgery	32	30.5
Obstetrics and Gynecology	16	15.1
ENT	9	8.6
Ophthalmology	13	12.4
Dental/Maxillofacial	7	6.7
Anesthesiology	26	24.8

Table 1: Socio-demographic characteristics of respondents.

Delay in surgical emergencies was described as very often by 86 (81.9%) respondents (See table 2). The average time from decision to incision for Obstetrics and Gynaecology emergencies was asserted to be 1 - 6hours by 83 (79.0%) respondents, while the same duration was indicated by 66 (62.9%) respondents for other surgical emergencies in the health facility.

Variables	Frequency	Percentage
Awareness of Medico-legal issues in Surgical practice		
Yes	105	100.0
Awareness of violence against health workers following perceived injustice to patients		
Yes	96	91.4
No	9	8.6
Awareness of need for urgency in emergency surgical conditions in hospital		
Yes	105	100.0
Encounter delays while preparing for emergency surgery		
Yes	103	98.1
Not sure	2	1.9
Experience delays in the operating room during surgical emergency		
Yes	103	98.1
No	1	1.0
Not sure	1	1.0
Frequency of experience delays while preparing for surgical emergency		
Very often	86	81.9
Sometimes	19	18.1
Average decision to incision time for Obstetrics and Gynecologic surgeries		
< 1 hour	13	12.4
1 - 6 hours	83	79.0
7 - 23 hour	8	7.6
1 - 2 days	1	1.0
Average decision to incision time for other surgical emergencies		
< 1 hour	3	2.9
1 - 6 hours	66	62.9
7 - 23 hour	35	33.3
1 - 2 days	1	1.0

Table 2: Awareness of emergency response to surgical emergencies.

Table 3 shows the challenges encountered in the care of patients with emergency surgical conditions ranging from human, material and environmental factors. Forty-four (41.9%) respondents considered all the listed challenges as responsible for delay. The different types of human and material challenges encountered are presented in table 4. The factors considered as most critical impediment to proper response to surgical emergencies were such patient factors as “no investigations”/“no payment” as asserted by all (100.0%) respondents. The factors considered as most critical impediments to care of surgical emergencies are documented in table 5.

Variables	Frequency	Percentage
Challenges encounter in the care of patients with emergency surgical conditions		
Human	11	10.5
Material	35	33.3
Environmental	2	1.9
All of the above	44	41.9
Human and material	13	12.4
Other challenges encountered while caring for patients with emergency surgical conditions		
Surgeon impatient for patients’ optimization	2	1.9
Inadequate nursing staff	3	2.9
Poor Staff attitude	3	2.9
Poor Infrastructure	16	15.2
Poor patients’ attitude	13	12.4
None	68	64.8
Opinion on causes of delay in the operating room		
Electric Power failure	16	15.2
Equipment failure	18	17.1
Poor staffing and attitude	3	2.9
All of the above	50	47.6
None of the above	12	11.4
Poor management	4	3.8
Patient factor (Finance)	2	1.9

Table 3: Challenges encountered during emergency response to surgical emergencies.

Variables	Options	Yes		No	
		Freq	%	Freq	%
Human challenges	Surgical team factor	72	68.6	33	31.4
	Anaesthetic team factor	52	49.5	53	50.5
	Hospital theatre space factor	65	61.9	40	38.1
	Hospital laboratory factor	84	80.0	21	20.0
	Patient factor (No investigations/payment)	105	100	0	0.0
	All of the above	26	24.8	79	75.2
	Other human challenges	Absence of Potter	93	88.6	12
Inadequate theatre nursing staff		90	85.7	15	14.3
Queuing up to the emergencies		84	80.0	21	20.0
All of the above		39	37.1	66	62.9
Material challenges	Lack of instrument to use	72	68.6	33	31.4
	Lack of sutures to use	88	83.8	17	16.2
	Lack of surgical gloves to use	81	77.1	24	22.9
	Lack of anaesthetic drugs to use	93	88.6	12	11.4
	Lack of sterile patient drapes	88	83.8	17	16.2
	Lack of sterile gauze and abdominal packs	87	82.9	18	17.1
	Lack of Oxygen	24	22.9	81	77.1
	Lack of sterile surgeon’s gown	93	88.6	12	11.4
	Absence of Trolley to wheel patient to and from theatre	83	79.0	22	21.0
	All of the above	21	20.0	84	80.0
Administrative	Power Outage	28	26.7	77	73.3

Table 4: Types of human and material challenges encountered.

Variables	Options	Yes		No	
		Freq	%	Freq	%
Most critical impediment to proper response to surgical emergencies	Surgical team factor	27	25.7	78	74.3
	Anaesthetic team factor	24	22.9	81	77.1
	Hospital theatre space factor	42	40.0	63	60.0
	Hospital laboratory factor	39	37.1	66	62.9
	Patient factor (No investigations/payment)	62	59.0	43	41.0
	Material factor	47	44.8	58	55.2
	Environmental factor	28	26.7	77	73.3
	All of the above	18	17.1	87	82.9

Table 5: Factors considered as most critical impediments to proper response to surgical emergencies.

Table 6 shows the different emergency procedures, observed times of patient readiness, and practical surgical intervention time. Of 86 emergency surgeries were practically observed, the average time of patient’s readiness varied from 15 minutes to as long as 6 hours 21 minutes. The average surgical intervention time varied from 30 minutes to 7 hours 33 minutes for different surgeries, with a wider range of 15 minutes to more than 24 hours. Obstetrics and gynaecology surgeries had the shortest intervention time, while general surgery had the longest intervention time. Table 7 shows the observed practical reasons for delay in emergency surgical intervention. Patient-related and hospital-related reasons were evaluated. The frequency of occurrence of financial constraints among patients as a reason for delay was experienced in more than half of the cases. There were sundry issues among hospital-related factors, and lack of consumables and other materials needed for surgery were foremost.

S/N	Procedures			Total Number of Procedures	Time of Patients Readiness (Hours/Minutes)		Surgical Intervention Time (Hours/Minutes)		Surgical Intervention Time (Hours/Minutes)	
	Specialty	S/n	Procedure types		Total time	Average time	Minimum time	Maximum time	Total time	Average time
1	General Surgery	1	Appendicectomy for Acute Appendicitis	5	15h50min	3h10min	40min	11h16min	22h12min	4h26min
		2	Herniorrhaphy for Obst. or Strangulated Hernia.)	3	13h45min	4h35min	1h30min	6h11min	15h31min	5h10min
		3	Expl Lap for Acute Abd.	11	73h36min	6h21min	50min	24h16min	83h6min	7h33min
		4	Expl Lap for Abd Trauma	2	11h16min	5h38min	2h59min	9h14min	13h54min	6h57min
2	Ortho	1	Trauma (Gunshot): Limb Surgery	1	1h50min	1h50min	-	-	24h	24h
		2	Trauma (RTA-Fracture)	3	6h35min	2h11min		11h	19h50min	6h36min
		3	Amputation for Diabetic / Septic Limb	3	7h35min	2h31min	1h50min	1h	10h20min	3h26min

5	Neuro-surgery	1	Surgery for Head Injury (Gunshot)	2	2h30min	1h15min	1h45min	2h13min	3h45min	1h53min
		2	Borehole for subdural Hematoma	1	40min	-	-	-	2h13min	-
6	Cardio T and Vas Surgery	1	Vascular Repair	2	1h55min	57.5min	3h5min	6h10min	9h15min	4h33min
7	Obs and Gyne Surgery	1	Surgery for Ectopic Gestation	7	11h10m	1h36min	15min	4h45min	13h17m	1h54min
		2	Emergency Cesarean Section	42	93h17min	2h13min	30min	10hrs	228h17min	4h26min
		3	Explo Lap and Hysterectomy for Ruptured Uterus	3	9h20min	3h6min	3h46min	6h55min	17h41min	5h54min
		4	Explo Lap for Abd Pregnancy	1	15min	15min	-	-	30min	30min
8	ENT Surg.	1	Foreign Body Removal from Airway	3	10h10min	3h13min	2h55min	7h30min	11h00min	3h40min
9	Ophthal Surgery	1	Corneal/Scleral Laceration	2	40min	20min	30min	50min	1h20min	45min

Table 6: Showing emergency procedures and observed practical field intervention time.

S/no	Category	S/no	Reasons for delay	Frequency	Percentage (%)
1	Patients related				
		1	Financial constraints - delay in payment for investigations, drugs, blood, etc.	46	53.5
		2	Delay in signing consent for surgery	6	5.8
		3	None availability of patient relatives	1	1.2
2	Hospital related				
	Human challenges		No Technician	1	1.2
			No Potter to transport patient	8	9.3
			Surgical Team Delay	2	2.4
			Anesthetic Team Delay (SR not available)	2	2.4
	Material challenges	1	No consumables: pack, face mask, Oxygen, etc.	14	16.3
		2	No IV Fluids in Theatre Pharmacy	1	1.2
		3	Theatre Pharmacy issue-release of materials for surgery	10	11.6
	Space Challenges		Lack of theatre space to take emergency surgery	3	3.5
	Laboratory Issue		Delay in laboratory tests	2	2.4
			Delay in lab support with blood	3	3.4
	Administrative challenges	1	Power outage	4	4.7
		2	No Functional Monitor/Suction Machine/Oxygen in Emergency Theatre	5	5.8
3		NHIS Issues	1	1.2	

Table 7: Showing observed practical reasons for delay in emergency surgical intervention (N = 86).

Discussion

The demographics in the study demonstrated that majority of the doctors involved in surgical services had worked for 1 - 20 years in the health facility. This duration of service is enough to enable them to be well informed about the importance of emergency surgical interventions in their disciplines. Almost all respondents asserted positively to awareness of medico-legal issues in surgical practice and are also aware of delays in the emergency and operating room, violence against health workers following perceived injustice to patients, and need for urgency in surgical emergencies. The decision to incision time for both obstetric and gynaecologic emergencies and other surgical emergencies was described as 1 to 6 hours by majority of respondents. However, majority of respondents had also asserted to existence of significant delay in the care of surgical emergencies, implying that the true decision to incision time is likely to be more towards 6 hours than one hour, or rather longer.

The shortest decision to incision time was seen with obstetric patients. In the discipline of obstetrics and gynecology, the decision to delivery time is known to be 30 minutes, as recommended by the Royal College of Obstetrics and Gynecology and the Society of Midwives [42-45], in order to improve outcome. In intra-abdominal bleeding from trauma, a delay of more than 90 minutes has been reported to affect survival adversely [46]. The median time (decision to incision) of one day was reported in Ethiopia for emergency neurosurgical conditions [47]. A median decision to incision time of 7.2 hours has been reported in patients with acute appendicitis, and the risk of perforation is known to increase with time: occurring within 72 hours in adult and within 8 - 24 hours in children [48,49]. In addition, when surgical cases are delayed, patients are known to suffer increased risk of morbidity or mortality, physical/emotional distress, and financial losses [50]. However, burnout has also been reported in the workplace environment, among care givers [51-55].

In our clime, the time of patient's readiness adds to the surgical intervention time and describes the time taken to ensure that payments are made for mandatory laboratory investigations, blood for transfusion, etc. in preparation for the surgery. This is the case in our setting where most of our patients do not have insurance coverage, although theatre and anaesthetic fees are not mandatory before surgery is conducted. It is an undesirable time that adds to prolongation of necessary surgical intervention. In this study, this time is variable, being as short as 15 minutes, and sometimes as much as 72 hours. The average time of readiness varied from one surgery to another, and it seems not to be described in most studies. The average surgical intervention time for acute appendicitis (of 4 hour 26 minutes) in this study is shorter than the 7.2 hours described in another study [48,49]. In laparotomy for a ruptured appendix, the average surgical intervention time of 7 hours 33 minutes is comparable. However, this latter study reported median time [48,49], while our study described mean intervention time. Although the shortest time of decision to incision was seen in obstetric surgery, the finding in our study of mean surgical intervention time of 4 hours 26 minutes for emergency Caesarean section, is longer in duration than the reported and recommended 30 minutes [42-45] and differs from the Kano study of 137minutes [56]. The explanation for this delay are patient related and hospital related factors highlighted in this study and other studies [56,57].

Patients feel dissatisfied when delay is encountered in the care of their loved ones who have emergencies surgical conditions, worst still when complications arise following that delay. Also, challenges are encountered in the care of emergency surgical conditions that seem to be persisting. Such challenges experienced in our setting are multidimensional: patient financial issues, organizational constraints, etc. These issues are quite worrisome, to the extent of affecting the zeal of the emergency care surgeon/anaesthetist with resultant stress, apathy, fatigue, burnout etc. Persisting organizational constraints could lead to patient dissatisfaction and avoidance of patronage of health facilities that are so labelled. Similar challenges have resulted to medico-legal issues in some other settings. In a study in Nigeria, a waiting time of 4 - 180 hours (with a mean of 44 hours) was reported for patients admitted for emergency abdominal surgical conditions, with the most common source of delay being financial difficulty [6]. Emergency caesarean section duration of 30 minutes and a mean decision to delivery time of 137minutes was reported with good outcome in Kano Nigeria [56]. No surgical specialty is spared of the delay from deci-

sion to incision, and theatre in efficiencies has been reported to be a significant cause in our environment [57], resulting from peculiarities of a developing economy. Communication with the patient is therefore strongly advised to enlist their understanding [57].

The organizational challenges encountered that occasions delay in surgical emergencies were numerous, being human, material and environmental factors. Among all these factors, available data from our questionnaire survey and direct observation of practical experiences at the point of duty using study proforma revealed that patients' financial constraints are the most commonly encountered source of delay (factor) in the care of surgical emergencies. This is closely followed by organizational challenges. This brings to the fore the issue of the national health insurance scheme which should help to cushion the effect of out-of-pocket expenses. However, almost a quarter of the respondents considered all the factors as being responsible for the delay. Though the issues are numerous, the ones considered as most critical impediments were: surgical team/anaesthesia factor; operating theatre space factor; laboratory factor; material factor and patient factor.

In the African setting, reasons for delay in the care of surgical emergencies has been classified into first, second and third delays as reported in a Ghanaian study [58,59]. While first and second delays were occasioned by patient self-treatment and traditional or religious healers, the third delay is in-hospital, multifactorial, and significantly associated with mortality [59]. These factors were not considered in our study. Another study in Rwanda [60], reported that factors contributing to delay were financial, laboratory, non-availability of operating theatre and absence of operating surgeon. The results of our study seem to share some similarity with this Rwandan study. In a Kenyan study [61], it was observed that the 30 minutes decision to incision recommended guideline was not achieved with attendant negative consequences. In South Africa, 46% of births were attended to by skilled personnel compared to 96% in Europe, suggesting that there are comparatively less number of skilled personnel for this purpose in this African country [62]. Low level surgical care services in district hospitals have been identified in sub-Saharan Africa with a call for improvement [18].

Limitation of the Study

The Limitation of this study is that the observation was carried out by the anesthetic team, and due to bias, they are not likely to always report the delay occasioned by anesthetic team factor. This implies that the true frequency of occurrence of anesthetic team factor may be more than reported in this study. Secondly, the actual decision to incision time may be longer than is reported in this study, since the anesthetic team is only brought into the picture after being informed. The interval between the actual decision for surgery time and the time of notification to the anesthetic team was therefore not considered.

Conclusion

The practice of emergency response was being hindered by the challenges encountered at the point of duty, despite the high awareness of the caregivers. There was significant prolongation of surgical intervention time (from decision to incision) for surgical emergencies, occasioned by occurrence of patient-related and hospital-related factors. The findings from the questionnaire-based survey was to a large extent corroborated by the data obtained from direct observation of practical experiences at the point of duty using study proforma. The most frequent reason for delay in surgical emergencies was financial challenges on the part of the patients. These challenges can be ameliorated if there is insurance coverage for surgical patients. Ensuring functional emergency response teams and reduction in the frequency of occurrence of the hospital-related sources of delay by the administrators of local hospital authorities, will also go a long way to improve emergency surgical services.

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