



*College of Medicine and Health Sciences
School of Health Science*

**IMPLEMENTATION OF PRE ANESTHESIA ASSESSMENT FOR
EMERGENCY PATIENTS AT MUHIMA DISTRICT HOSPITAL**

A dissertation submitted in partial fulfillment of the requirements for Master of Hospital and
Healthcare Administration (MHA)

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DECLARATION

I declare that:

- This capstone dissertation represents my own work;
- The contribution of any supervisors and others to the research and to the capstone dissertation was consistent with normal supervisory practice;
- External contributions to the research are acknowledged.

Candidate.....Date.....

DEDICATION

This capstone is dedicated to:

Almighty God, who enabled me to achieve this success,

My beloved husband HATEGEKIMANA Israel and my children INEZA Paulin, UHIRIWE

Anne Leslie and NIYO Anais.

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ABSTRACT

Pre anesthesia is an important component in anesthesia professional practice worldwide in general and Rwanda in particular. Therefore anesthesia administration to patients without prior anesthesia assessment can lead to life threatening side effects to patients.

At Muhima District Hospital (MDH) pre anesthesia assessment for emergency patients has always been given little or no attention despite clinical implication to patients.

It is in this regard that this study was conducted with objective to implement the pre anesthesia assessment for emergency patients in MDH.

We used pre and post interventional study design to investigate pre anesthesia assessment practice in anesthesia department at MDH.

Having analyzed the baseline data, the results revealed that the pre anesthesia assessment for emergency patients was nonexistent in other words it was not done at all.

The intervention was to develop and implement a policy on pre anesthesia assessment for emergency patients and train anesthetists.

The post intervention results showed that there has been a significant improvement of 67.5% from 0% of pre anesthesia assessment for emergency patients by anesthetists. On comparing pre and post intervention results, the results revealed a significant association between pre and post intervention results with a P- value of 0.000.

Developing and implementing a policy on pre anesthesia assessment for emergency patients is of significant positive clinical outcome. This approach therefore can accelerate the attainment of quality health care service delivery for emergency patients at MDH.

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LIST OF ACRONYMS AND ABBREVIATIONS

ASA	: American Society of Anesthesiologists
BARNA	: British Anesthetic and Recovery Nurses Association
BMI	: Body Mass Index
BP	: Blood Pressure
HMIS	: Health Management Information System
HRMS	: Human Resource Management System
MDH	: Muhima District Hospital
OR	: Operating Room
QI	: Quality Improvement
SASA	: South Africa Society of Anesthesiologists
SPS	: Strategic Problem Solving
WHO	: World Health Organisation

DEFINITION OF KEY TERMS

Pre anesthesia assessment

The literature does not provide a standard definition of pre anesthesia assessment but the advisory practice defines it as an evaluation done before delivering anesthesia for surgical and non surgical procedures (1,2).

Emergency patients

Emergency patients in the operating room are patients with life threatening condition necessitating immediate decision of operation (3).

Policy

Policies are written rules about how an institution is intend to work for achieving its goals (4).

Anesthesia

Anesthesia is a reversible blocking of pain feeling in whole body or in a part of it using pharmacology or other methods (5)

CHAPTER ONE: INTRODUCTION

1.1 BACKGROUND

Pre anesthesia assessment is an important component in anesthesia professional practice and should be done to all patients before anesthesia administration (6). Documentation of pre anesthesia assessment is a professional obligation and it is frequently incomplete or neglected component of practice (7). Despite the fact that pre anesthesia assessment is important at Muhima District Hospital emergency patients are not assessed prior to anesthesia administration according to the data collected in emergency patients' files operated in May 2016.

Muhima District Hospital is located in Nyarugenge District of Kigali City. The hospital was established in 2001 with the World Bank financial support through the Population Health Project of the Ministry of Health. Initially the facility was a health center and was upgraded to a District Hospital in April 2004. MDH has a catchment area of 326.478 inhabitants and serves ten health centers and Kigali Central Prison. The hospital has 170 beds with 78% of bed occupancy rate (8).

The services provided by the hospital include gynecology and obstetrics; neonatology; physiotherapy; dentistry; out patients; clinical psychology; HIV clinic with counseling, testing and treatment. The hospital has 230 staff both clinical and none clinical staff (9).

Table 1 : Top ten causes of Mortality of the Hospital, 2016

No	Causes	Percentage
1	Prematurity	52.1%
2	Asphyxia	25.8%
3	Congenital malformation	8.6%
4	Pneumonia	5.3%
5	Severe malaria confirmed	3.7%
6	Meningitis	1.6%
7	Maternal deaths	1.0%
8	Neonatal causes	0.5%
9	Hepatitis	0.5%
10	Neonatal infection	0.5%
11	Others	0%

Table 2: Top ten causes of Morbidity of the Hospital, 2016

No	Disease	Percentage
1	Acute respiratory infection	27.6%
2	Gastritis and duodenitis	11.4%
3	Simple malaria confirmed	9.6%
4	Urinary tract infection	9.3%
5	Prematurity	8.4%
6	Neonatal infections	7.5%
7	Abortions	6.8%
8	Asphyxia	6.4%
9	Skin infection	6.3%
10	Pneumonia	6.3%
11	Others	0%

Anesthesia department background

Anesthesia department has a total of 10 anesthesiologists: four with bachelor's degree and six with advanced diploma. According to MDH data (10), in 2015 the hospital performed 2448 operations of which 92% were cesarean section and 85% of operations were emergency. The anesthesia team has a schedule of three anesthesiologists working on day duty from Monday to Friday and two working on night duty, the weekend and during public holidays.

Table 3: Operating room (OR) background information

OR information	Data
Number of rooms	2
Number of operating tables	2
Patients operated in 2015	2448
Emergency patients in 2015	2080
Number of nurses	12
Number of anesthesiologists	10
General doctors	4
Residents in gynecology	4
Gynecologists	3

1.2 PROBLEM DEFINITION

There was lack of pre anesthesia assessment for emergency patients at Muhima District Hospital in a retrospective analysis of pre anesthesia assessment forms of emergency patients operated in May 2016. The results were alarming compared to the national and international standards of practice that emphasizes pre anesthesia assessment for all patients before anesthesia administration (1,11). After analyzing the pre anesthesia assessment for emergency patients, among others problems facing MDH, the hospital management and researcher met to discuss what needs to be done so as to find a long term solution to the pressing issues including pre anesthesia assessment for emergency patients. It is in this regards that pre-anesthesia assessment for emergency patients was chosen as an area of interest for the Quality Improvement project for the hospital.

1.3 OBJECTIVE

To implement pre anesthesia assessment for emergency patients at Muhima District Hospital from 0% to 30% from December 2016 to March 2017.

1.4 HYPOTHESIS

H⁰: Training of anesthetists on the policy will not improve the pre anesthesia assessment for emergency patients.

H^a: Training of anesthetists on the policy will improve the pre anesthesia assessment for emergency patients.

1.5 JUSTIFICATION OF THE PROJECT

Pre anesthesia assessment and anesthesia plan are essential components of anesthesia professional practice for all patients undergoing anesthesia and every patient need to be evaluated before anesthesia administration (6).

The intervention outcome is to reduce anesthesia related risks and complications among emergency patients at Muhima District Hospital. Recommendations and conclusion from this QI project will inform best practice and further Quality Improvement initiatives at MDH.

1.6 ORGANIZATION OF THE THESIS

This capstone is divided into six main chapters: Chapter one introduces the study setting and background of the hospital. Chapter two explores relevant literature in relation to the study with emphasis to pre anesthesia assessment for emergency patients. Chapter three addresses the study methodology particularly the root cause analysis, intervention selection and intervention evaluation. Chapter four presents and interprets the study results while; chapter five covers discussion of results and chapter six draws conclusion and recommendation for the study.

CHAPTER TWO: LITERATURE REVIEW

In anesthesia professional practice, the pre anesthesia assessment is an essential component (12). The pre anesthesia assessment is an evaluation done to patients before anesthesia administration (2,13).

WHO recommended that all patients should be assessed before anesthesia by an anesthesia care provider to obtain a full patient history, clinical examination of all systems and airways, laboratory test analysis, plan of anesthesia and obtaining a consent form at the end by the patients or next of kin (14).

The pre anesthesia assessment for elective procedure practice has been developed over years as opposed to emergency patients procedures thus poor clinical outcome for emergency patients (15).

Research suggests that for emergency patients the pre anesthesia assessment should be done even if time may be limited (15).

The anesthesia care provider has to take a full history for a patient including the last meal, laboratory test and physical examination so that he/she can be able to draw a plan to resuscitate the patients before in order to administer anesthesia accordingly (15).

The anesthetists as care provider should discuss with the patient before operation regarding treatment option as well as anesthesia risks (16). The assessment of anesthetic risks is an essential component of preoperative evaluation (17).

2.1 Importance of pre anesthesia assessment

The pre anesthesia assessment is important as it helps anesthesia providers to estimate perioperative risks, reduce anxiety and fear and to optimize patients conditions before anesthesia (13,18,19).

Nevertheless, the recognition of anesthesia risks may help anesthesia care providers to plan appropriate anesthetic care, including the preparation of resuscitation equipment and medications in order to deal on time with anesthesia related risks which include but not limited to cardiac arrest and many others to mention but a few (20).

2.2 Consequences related to anesthesia administration without pre anesthesia assessment

It becomes imperative to note that when pre anesthesia assessment is neglected, the patient is subject to poor preparation due to inadequate pre anesthesia assessment of emergency patients (21).

Among consequences of lack of patients evaluation prior to anesthesia is cancellation of operation room procedures which can lead to inefficient use of hospital resources and loss of hospital income as emphasized by Ju-Hsin Chang, Ke-Wei Chen et al (22).

In Rwanda, Ministry of Health 2013 report maternal mortality rate highlighted that 3% of maternal mortality rate were due to anesthesia related complications although the report does not specify if the above mortality rate was due to lack of pre anesthesia assessment for either elective or emergency procedures a situation also reported on by WHO that failure to assess patients before anesthesia is the easiest cause of avoidable accidents in anesthesia practice (14,23).

2.3 Pre anesthesia assessment in hospital settings

The pre anesthesia assessment should be done by an anesthesia professional before delivering anesthesia and a plan of anesthesia must be drawn (1).

Similar information regarding anesthesia (from pre anesthesia assessment to post anesthesia care) is supposed to be made and conserved in the patient's medical record (1).

Because the anesthesia record like other medical record is a legal document and should tell the story of what anesthesia professional did from the pre operative period to the postoperative period so that other professionals understand what has been done and it serves as evidence while paying insurance companies, when investigations are needed by professional councils or civil courts (24).

More still adequate completion of preoperative anesthetic records is mandatory according to South Africa Society of Anesthesiologists (SASA) guidelines (16).

A similar view is shared in Toronto where they analyzed the accuracy and completeness of anesthetic record and found that the completion rate was inferior to 37% but here they were analyzing all anesthesia records not only pre anesthetic records (25).

In Australia, a pre anesthesia assessment study database analyzed to identify the incidents related to pre operative patients assessment showed that 10% of patients were not assessed by anesthetist pre operatively. This percentage is greater as the records analyzed were incidents only (6).

Similarly Raff conducted an audit on anesthesia records in South Africa and showed that in 78% of analyzed records the pre anesthesia assessment was not done (26).

CHAPTER THREE: METHODOLOGY

3.1 STUDY DESIGN

A pre and post interventional study design was utilized in this QI project to evaluate the effect of this current study's intervention on the pre anesthesia assessment for emergency patients. The baseline data were collected retrospectively to analyze the pre anesthesia assessment for emergency patients at MDH while post intervention data were collected prospectively to evaluate the intervention.

3.2 BASELINE DATA COLLECTION PROCEDURES

To measure the magnitude of lack of pre anesthesia assessment for emergency patients at Muhima District Hospital, data were collected from operated emergency patients' files using a tally sheet. The number of emergency patients 'files with complete pre anesthesia assessment form and the number of emergency patients 'files with incomplete pre anesthesia form were studied.

This assessment form is found in patient's file and it contains 26 items which include: department, ward, bed, date, weight, height, American Society of Anesthesiologists (ASA), Mallampatti, anesthesia technique, type of intervention, elective, emergency, surgeon name, anesthetist name, patient complains, laboratory exams requested, blood pressure (BP), pulse, respiration rate, color of membranes, allergy, physical exam, consent signed, decision, name and signature of the anesthetist (appendix 10). If all items were not complete the conclusion was that the pre anesthesia assessment was not done as it has been said that if information is missing in a medical record it did not occur (26). The fully completed pre anesthesia assessment form with all components assessed was counted and individual item on the form

completion was counted too. Baseline results showed that the pre anesthesia assessment for emergency patients was not done at all at MDH as presented in the figure 1 below. Individual item completion was 0% for all pre anesthesia assessment form components.

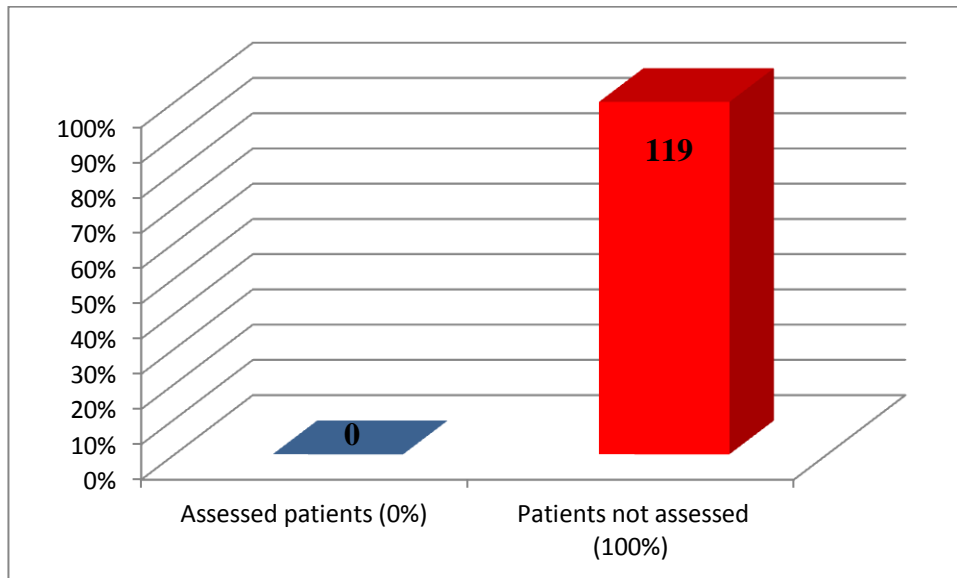


Figure 1: Summary of baseline results for pre anesthesia assessment for emergency patients at Muhima District Hospital

3.3 ROOT CAUSE ANALYSIS

After auditing pre anesthesia forms for emergency patients operated, a team including anesthetists, clinical director, director of nurses, QI focal person was instituted to conduct the root cause analysis to see the real root cause.

Initially, literature review was done to identify the possible causes to why emergency patients are not evaluated prior to anesthesia administration. The possible cause identified from the literature include but not limited to pressure of time and pressure from surgeon (6).

Secondly, brainstorming meetings with anesthesia were convened to discuss at length on all the possible cause for the lack of pre anesthesia assessment for emergency patients at Muhima District Hospital. The brainstorming meeting findings revealed five causes which included: shortage of anesthetists, lack of effective communication between OR and others concerned staff, negligence of anesthetists, lack of policy in place on pre-anesthesia assessment for emergency patients at MHD and Lack of standard pre-anesthesia assessment form.

The probable root causes identified were categorized in a fishbone diagram (figure 2).

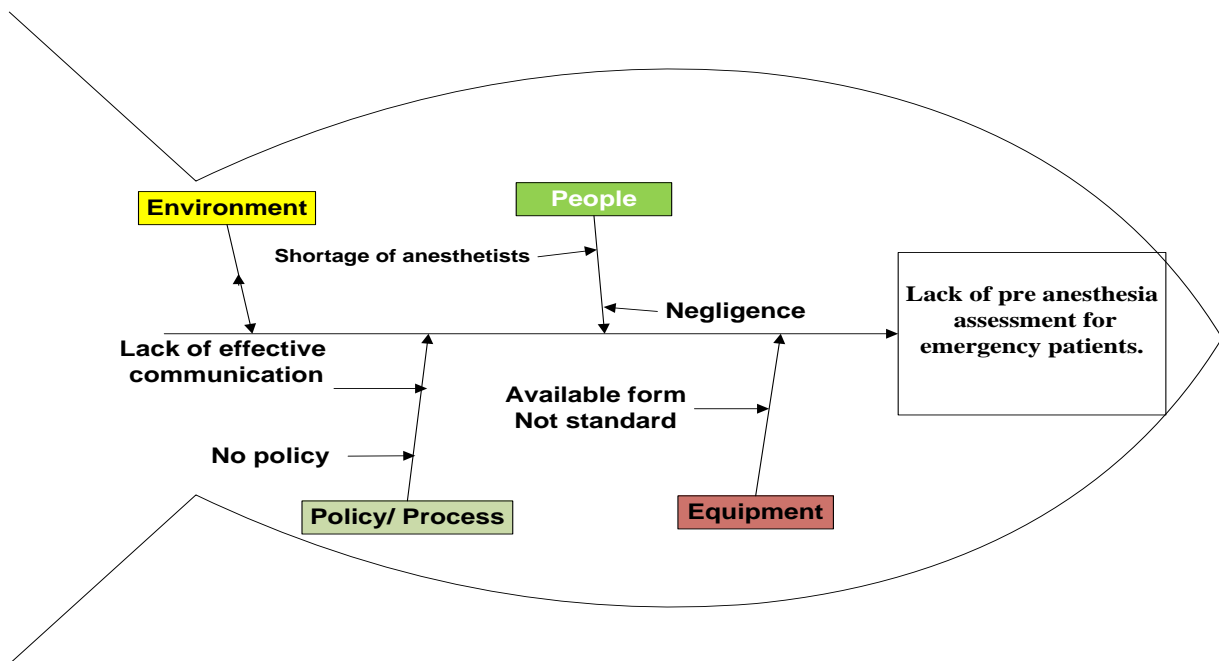


Figure 2: Fishbone diagram categorizing the potential root causes

The possible root causes from all resources are:

1. Shortage of anesthetists
2. Negligence of anesthetists
3. Lack of effective communication between OR team and others involved services.
4. Lack of policy in place on pre-anesthesia assessment for emergency patients

5. Lack of standard pre-anesthesia assessment form to be used by anesthesia staff.

3.3.1 Verification of root causes

Data were identified for each founded root cause in order to identify the real root cause.

3.3.1.1 Shortage of the staff

The number of patients operated in 2015 was counted and results showed total of 2448 patients operated. The total number was divided by the number of days and it was revealed that approximately 7 patients were operated every day. The schedule of anesthetists was analyzed to see the number of anesthetists worked per day and 5 anesthetists worked per day giving staff patient ratio of 1: 1.4.

The analysis intended to identify the number of patients one anesthetist attended to at one time. Because there is limited data on this variable, the possible comparison was made against international literature not necessarily Rwanda perspective the British Anesthetic and Recovery Nurses association (BARNA) provides a ratio of anesthetist of 1:1 (27).

Therefore, this comparison is less similar thus cannot be the possible root cause in this case.

Table 4: Anesthetists' negligence

The negligence of anesthetists was assessed by interviewing the MDH human resource on the qualification of anesthetists working in the hospital, observing using a tally sheet to see when anesthetists had no workload, were informed about emergency patients and didn't assess the patients. This observation considered also the availability of all needed materials to assess emergency patients.

	Frequency	Percent
Anesthetists' negligence	12	24.0
Anesthetists busy	38	76.0
Total	50	100.0

This table shows that in 24% of time anesthetists were negligent. After ten day observation from 20th-29th July 2016, among 50 patients who came after effective communication, 12 patients (24%) were not assessed and anesthetists were not busy. This has been considered as negligence because all anesthetists at MDH are graduated and licensed, patients' files have a pre anesthesia assessment form and all materials used to assess patients are always available in the hospital. Finding therefore revealed that negligence of anesthetists would be a cause for anesthetists' failure to conduct the pre anesthesia assessment for emergency patients.

Table 5: Effective communication between OR and other involved services

Effective communication between OR and other involved services was assessed by observation using a tally sheet.

	Frequency	Percent
Patients coming without OR communication	18	26.5
Patients coming after OR communication	50	73.5
Total	68	100.0

The obtained results after ten days observation from the 20th-29th July 2016 showed that at Muhima District Hospital 73.5% of patients came after intra services communication while in 26.5 % came without communication. Therefore lack of effective communication between

OR and others involved services would not be the real cause to lack pre anesthesia assessment for emergency patients.

3.3.1.4 Availability of the policy on pre anesthesia assessment for emergency patients

The observation findings revealed that the policy on pre anesthesia assessment for emergency patients was unavailable in the anesthesia service. Therefore the absence of the policy on pre anesthesia assessment for emergency patients is a cause for lack of pre anesthesia assessment for emergency patients as in hospital policies and procedures are mandatory to facilitate adherence on recognized professional practice and promote compliance with regulation (28). Without well written policy and procedure, the hospital will deliver substandard care and harm patients (28,29).

3.3.1.5 Lack of standard pre-anesthesia assessment form

The pre anesthesia assessment form used at Muhima District Hospital is in part of usual patient file and when compared with the form used at Ruhengeri Provincial Hospital, Masaka District Hospital and the standard form used by other researchers to assess the pre operative evaluation done by anesthetists and it was realized that there was no significant difference between the forms from other hospitals and MDH (appendices 11, 12 and 13).

Table 6: Root Cause Analysis Results

Root cause	Data	Standard	Difference	Decision
Shortage of anesthesiologists	Anesthesiologist/patient ratio 1.4: 1	BARNA staff/patient ratio 1:1	0.4	Rejected
Effective communication between OR and others involved services	73.5%			Rejected
Negligence of anesthesiologists	24%	0%	24%	Accepted
Lack of standard pre-anesthesia assessment form	Muhima form	Masaka , Ruhengeri and standard forms	No difference	Rejected
Availability of the policy	No policy			Accepted

As the table above depicts, two root causes were identified. The lack of a policy for pre anesthesia assessment for emergency patients has been chosen over negligence because it is expected to have a great impact on pre anesthesia assessment for emergency patients and addresses negligence. In anesthesia service, unavailability of a policy has been identified as the real root cause to lack of pre anesthesia assessment for emergency patients at Muhima District Hospital.

3.4. INTERVENTION

Based on the root cause that is unavailability of the policy on pre anesthesia assessment for emergency patients three interventions were proposed and analyzed:

- Develop and implement a policy on pre anaesthesia assessment for emergency patients
- Developed policy adoption to MDH.
- Use guidelines from another hospital at MDH
- The above proposed interventions were analyzed; a comparative matrix table was used (appendix 4) to select the best solution over others. The best solution to be implemented was to develop and implement a policy on pre anaesthesia assessment for emergency patients.

The selected intervention included:

- **Development and implementation of a policy on pre anaesthesia assessment for emergency patients**

The policy on pre anesthesia assessment for emergency patients was developed by the anesthesia team members and QI focal person, thereafter, submitted the developed policy to the hospital clinical Director for approval. The clinical director later forwarded the policy to the hospital Director for the final approval. Following policy approval, the next step was organizing training for the anesthetists on policy implementation. The following section addresses staff training on policy implementation.

The anesthetists training was organized and carried out in anesthesia department in 2 consecutive days.

When anesthetists had been trained on the pre anesthesia assessment for emergency patients policy, the copy of the developed policy was given to the anesthesia department while another copy was filed and kept with other hospital policies by in charge of accreditation.

The policy implementation started with effect from 1st February 2017 while monitoring of policy implementation done using a register where the number of emergency patients' files

was reviewed check if patients were assessed before anesthesia and results were communicated to the concerned staff on regular basis.

To facilitate policy application, an individual person in charge of conducting daily emergency patients assessment prior to anesthesia administration was identified during the day (appendix 8) while for night shift also individual staff was identified and assigned to assess patients to be operated as emergency on daily basis.

3.5. MEASURES

Both outcome indicator (% of pre anesthesia assessment for emergency patients) and process indicators (availability of the developed policy on pre anesthesia assessment for emergency patients in anesthesia department and number of trained anesthetists on the policy) was measured (appendix 6). To evaluate the impact of intervention (outcome indicator), the post intervention percentage of pre anesthesia assessment form completion was measured to check if emergency patients were assessed before anesthesia administration and obtained results were compared to the baseline data on pre anesthesia assessment for emergency patients. The availability of the developed policy on pre anesthesia assessment for emergency patients was evaluated by observation in the anesthesia service and the number of trained anesthetists was measured by counting the number of anesthetists on the attendance list of the training.

3.6. DATA ANALYSIS

Data analysis employed Microsoft excel and Statistical Package for Social Sciences (SPSS). The pre and post intervention data were analyzed and a chi square test was done to check for any statistical significance.

3.7. ETHICAL CONSIDERATION

Before collecting data at Muhima Hospital, we presented the proposal to the hospital ethical committee for approval, we wrote a letter to ask the authorization and afterwards the permission to conduct QI project was provided (appendix 9).

CHAPTER FOUR: RESULTS

4.1 Pre and post intervention data comparison

The baseline data were collected from emergency patients' files operated in May 2016. A total of 119 files were analyzed and patient was assessed prior to anesthesia administration at 0%. After implementation of a policy on pre anesthesia assessment for emergency patients, the pre anesthesia assessment of 0% rose to 67.5% with a P- value 0.000. The above results (0% to 67.5%), reflects the fully completed pre anesthesia assessment form with all components assessed. The individual item on the form completion was 0% at the baseline and in post intervention period it was between 90 and 100% (Appendix 14)

Indicators	Pre intervention		Post intervention		P-value
	N	%	N	%	
Sample	119		163		
% of pre anesthesia assessment for emergency patients	0	0	110	67.5	<0.000**

4.2 Number of trained anesthetists

The number of anesthetists trained on the policy on pre anesthesia assessment for emergency patients was 0/10 as the policy was not there in pre intervention period and it became 8/10 in post intervention.

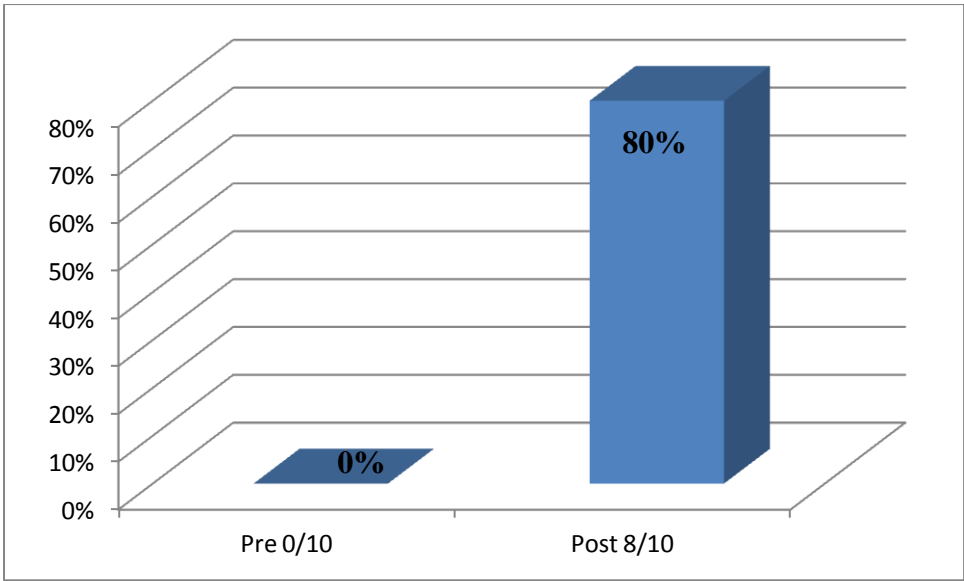


Figure 3: Number of anesthetists trained

4.3 Availability of a policy on pre anesthesia assessment for emergency patients at MDH

The policy was not available in baseline and it is available in post intervention. The policy was developed and was approved by the hospital Director before its application.

CHAPTER FIVE: DISCUSSION

The objective of this QI project was to implement the pre anesthesia assessment for emergency patients. The baseline results revealed that the policy on pre anesthesia for emergency patients was unavailable at Muhima District Hospital.

To ensure the pre anesthesia assessment for emergency patients, a policy on pre anesthesia assessment for emergency patients was developed. The policy implementation outcome was evaluated by identifying change in outcome since the implementation.

To ensure policy application, anesthesia staff was trained on the policy of course with emphasis on pre-anesthesia assessment of emergency patients as failure to train staff on a new policy can lead to lack of patient safety and enhance hospital allegation (28).

5.1 Pre anesthesia assessment in hospital settings

Results from this QI project revealed that the pre anesthesia assessment for emergency patients rose from 0% in pre intervention period to 67.5% in post intervention period with a statistical significance (p value of 0.000).

Even if this QI project improved the pre anesthesia assessment for emergency patients in MDH, it is however important that all patients whether elective or emergency be assessed prior to anesthesia administration for the cost-effective clinical outcomes (1). According to Rwanda Ministry of Health, anesthesia and sedation policy is classified in critical standards therefore, if pre-anesthesia assessment is attended to with due attention it may lead to death or serious harm to patients. (11).

Height and weight are important pre-anesthesia assessment component for emergency patients for accurate doses calculation. In addition, patients body mass index (BMI) measurement is important for predicting difficult airway (12). In this QI project weight was recorded in 90%.

To assess patients for anesthesia and surgery risks quantification, ASA proposed a classification and every patient should be classified before anesthesia (12). Results from this study revealed that 95 % of patients (appendix 14) were classified for risks assessment therefore, 5% Of patients were operated without anesthesia and surgery risks assessment.

The results from this QI project showed that during pre anesthesia assessment Mallampati classification for predicting airway management was completed at 95% at MDH although the airway assessment has been shown to lead to serious airway management problem if not well done and it was the first cause of pre operative contributing factors of incident with 29% in Australian (6,7).

The allergy was documented at 92% at MDH and it has been shown that in anesthesia practice allergy is from muscles relaxants drugs followed by latex and antibiotics thus a full history should be taken prior to anesthesia administration (16).

According to Mokgwathi and Baloyi (12), vital signs should be included in a minimum pre operative evaluation but in this QI project only BP was completed (100%) and it is different from their results where the BP was recorded at 92% in pre anesthesia assessment for elective cases.

This QI project showed that by developing the policy on pre anesthesia assessment together with training staff on it and monitoring can improve the percentage of pre anesthesia assessment of emergency patients.

In this QI project, eight steps of strategic problem solving (SPS) which include: problem definition, objective setting after measuring the magnitude, conduct the root cause, generation of alternative solutions, comparative analysis of solutions, implementation of the best solution, monitoring and evaluation respectively were followed in order to analyze the

situation thoroughly well for the better intervention outcome.

5.2 Key to successful intervention

The realization of this QI project objective is due to team work approach use to engage with other fellow staff in root cause analysis an important essential component as Strategic Problem Solving cannot be an individual exercise but a team work from the initial phases of the study throughout to the end.

The policy development and implementation in anesthesia department raised awareness among anesthesia staff and helped them to improve the emergency patients assessment prior to anesthesia administration. The use of notices in the staffrooms and other critical points within the anesthesia department particularly in all maternity departments reminding all staff that if emergency case is decided in their department they have to call anesthetists so that patients come in OR after being assessed.

The choice of a single problem that can be solved with a single intervention is the strength of Master of Hospital and health care administration approach in strategic problem solving. Thus the reason why such impressive results have achieved within this Quality Improvement project. Conducting the root cause to know the real root cause facilitated us to choose relevant intervention and obtain reasonable results.

The role of hospital management in supervising this QI project was an effective strategy that has kept the entire team follow up the intervention, monitor for the best intervention outcome.

The hospital management tasking staff to work as a team in this QI project facilitated a well thought about intervention and it is not surprising that the project objective has been realized.

Tasking individual staff a responsibility to assess emergency patients prior to anesthesia assessment facilitated the intervention realization.

5.3 Challenges encountered and how overcome

The challenge encountered was work overload on the side of researchers but also colleagues involved in the study. It became a serious concern to get staff concerned on board to develop the policy when they are all scheduled in the operating room roster. This therefore delayed policy development. To overcome this, it was decided by the involved team that a few individuals take up the task and when done, they come and present to others so as to get every member's insight.

Due to work overload among staff, training all anesthesia staff became a challenge and to overcome this we conducted a training of two consecutive days where we trained eight anesthetists and the two remained in the services to ensure that patients' care is not compromised.

Most staff thought involving in this QI project would be an additional work that they had no time for. The researchers however tried to explain to them how the project is embedded in their routine work and not necessarily additional work.

Resistance to change was another challenge encountered; most staff did not understand the expected outcome of this study intervention hence resistant to get them involved in the team. To overcome such, regular discussion meetings helped the staff to buy in and later joined the team, of course with cost-effective monitoring. A register was put in place and everyday verification if emergency patients were assessed and if not the shift was informed and reminded to do the assessment for emergency patients.

5.4 Lessons learned throughout project implementation

The quality improvement project on pre anesthesia assessment for emergency patients at Muhima District Hospital helped us to learn better how working in team and putting together ideas is important in improving the team spirit and creating good working environment.

By assigning one anesthetist for pre anesthesia assessment we learnt that it is important to have job description to make staff accountable for the assigned task.

During the implementation, we have learned that implementing a decision made by the team is easier. A close monitoring during implementation has been a good lesson to avoid resistance to change. From the study, we learnt also how good leadership is helpful in improving quality.

The implementation helped us to know better how if we use proper leadership and governance principles to manage internal workforce we can change things in our working place.

5.5 Limitations for the project

Limited research studies on the pre anesthesia assessment for emergency patients was a great concern. The sample size used in this QI project was small thus no generalization of study results to other hospitals. Limited time was also a limitation during implementation of this Quality Improvement project.

CHAPTER SIX: CONCLUSIONS AND RECOMMENDATIONS

6.1. Conclusions

The pre anesthesia assessment for emergency patients was not done at MDH. To implement the pre anesthesia assessment for emergency patients, eight steps of SPS were used : problem definition, objective setting after measuring the magnitude, conduct the root cause, generation of alternative solutions, perform a comparative analysis of solutions, implementation of the best solution, monitoring and evaluation.

The implemented solution was to develop and implement a policy on pre anesthesia assessment for emergency patients and train anesthesia staff on the policy. The implementation was successful with a positive clinical outcome. An effective use of SPS strategies can facilitate achievement of quality of service delivery in hospitals. The quality improvement project was cost effective and this shows that with available means hospitals can do more.

6.2. Recommendations

It is recommended that anesthesia staff continue assessing emergency patients and maintain improvement. MDH Senior Management needs to continue monitoring the intervention and use SPS to conduct other QI project within the hospital. The MOH needs to consider the application of this policy in other Rwandan hospitals for quality of care improvement.

There is a need for further research on the impact of lack of evaluation of emergency patients at Muhima District Hospital. A study on pre-anesthesia assessment for emergency patients needs to be conducted on a large sample.

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APPENDICES

Appendix 1. Tool used to measure the magnitude

SZ	Ward	Bed	Date	Weight	Height	ASA class	Mallampati class	Anesthesia technique	Intervention	Elective	Emergency	Surgeon name	Anesthetist name	Patient complains	Lab exams requested	Blood pressure	Pulse	Respiration rate	Color of membranes	Allergy	Physical exam	Consent form signed	Decision	Anesthetist name	Signature	Completed file	

Appendix 2. Tool used to measure the negligence

Period	Patients not assessed	Anesthetists busy in OR	Anesthetists negligent
20/7-29/7/2016			

Appendix3. Tool used to measure the communication between services

Period	Number of patients	Patients coming after communication	Patients coming without communication
20/7-29/7/2016			

Appendix 4. Matrix table to compare interventions

Interventions	Criteria				
	Impact	Time to effect	Feasibility	Cost	Total
1. Develop a policy on pre anesthesia assessment for emergency cases and its orientation to anesthesia staff.	4	4	5	4	17
2. Adopt policy of another hospital	3	3	3	2	11
3. Take a guideline for another hospital and use it	2	5	5	3	15

Appendix 5. Implementation plan: Gantt'chart

Tasks/activities	Responsible person	December 2016	January 2017	February 2017	March 2017	April 2017
Develop a policy on pre anesthesia assessment for emergency cases						
Request of pens And papers	In charge of anesthesia service	X				
Policy draft development	Anesthesia staff ,QI	X				
Policy verification	Clinical Director	X				
Policy approval	Hospital Director		X			
Training on the policy						
Book the room	In charge of anesthesia service		X			
Give invitation letters	In charge of anesthesia service		X			
Acquire suppliers (Pens,papers)	In charge of anesthesia service		X			
Training	In charge of anesthesia service		X			
Avail the policy in anesthesia policy and implementation						
Avail the policy in anesth service	In charge of anesthesia service			X		
Start application of the policy				X		
Monitoring						
Conduct supervision to see if the guideline is followed				X	X	X


Appendix6. Evaluation plan

Process indicators:

Indicator	Definition	Person	How	When
1. Availability of the developed policy on pre anesthesia assessment for emergency patients	The policy exists or not	In charge of anesthesia service	Observation in the anesthesia service	February/2017
2. Number of staff trained on the policy	Number of trained staff	In charge of anesthesia team	Attendance list and report of the training	End of January/2017

Outcome indicator:

Indicator	Definition	Person	How	When
% of pre anesthesia assessment for emergency patients	Emergency patients assessed over all emergency patients $\times 100$	Anesthesia team	check the completeness of the pre anesthesia assessment form	March/2017

<p>MINISTRY OF HEALTH</p>  <p>KIGALI CITY</p> <p>NYARUGENGE DISTRICT</p> <p>MUHIMA HOSPITAL</p> <p>P.O BOX 2456 KIGALI</p> <p>E-mail : hospitalmuhimad@gmail.com</p>	<p>Title: ANESTHESIA AND SEDATION GUIDELINE ON PRE ANESTHESIA ASSESSMENT FOR EMERGENCY CASES</p>		
		<p>Date:</p> <p>January 2017</p>	<p>Revision Date:</p> <p>January 2019</p>
	<p>Department: Theatre room</p>	<p>Applies To: Anesthetists/Anesthesiologists</p>	
	<p>Responsible Person: Anesthetists/ Anesthesiologists</p>	<p>Approval: Name/Title Anesthetist/ Anesthesiologists Clinical Director Hospital Director</p>	<p>Signatures/ Date:</p>

Policy purpose:

Ensure effective pre anesthesia assessment for emergency cases in order to prevent any anesthesia associated risks and improve the patient safety.

Policy Statement(s):

1. Muhima hospital ensures that before administration of anesthesia all emergency patients have received pre anesthesia assessment performed by qualified anesthetist.
2. Muhima hospital ensures that all equipment and materials required for pre anesthesia assessment are available and well functioning to prevent associated risks.

Definitions

- **Pre anaesthesia assessment:** The advisory practice defines the pre anaesthesia assessment as an evaluation done before delivering anaesthesia for surgical and non surgical procedures (2)
- **General Anaesthesia:** is the induction of a state of unconsciousness with the absence of pain sensation over the entire body, through the administration of anaesthesia drugs. It is used during certain medical and surgical procedures (5)
- **Local anaesthesia** is a drug that causes reversible local anaesthesia, generally for the aim of having a local analgesic effect, absence of pain sensation, although other local senses are often affected as well. Also, when it is used on specific nerve pathways (local anaesthetic nerve block), paralysis (loss of muscle power) can be achieved as well (30).
- **Regional anaesthesia** (or regional anaesthesia) is anaesthesia affecting a large part of the body, such as a limb or the lower half of the body. Regional anaesthetic techniques can be divided into central and peripheral techniques. The central techniques include so called neuraxial blockade (epidural anaesthesia, spinal anaesthesia). The peripheral techniques can be further divided into plexus blocks such as brachial plexus blocks, and single nerve blocks. Regional anaesthesia may be performed as a single shot or with a continuous catheter through which medication is given over a prolonged period (30).

Procedures

Pre anesthesia assessment for emergency cases

- The assessment is done by anesthetists on duty after being informed for emergency case.
- In collaboration with the doctor on duty, the anesthetist will evaluate the anticipated cases and see if they are fit for anesthesia.
- A review of the patient file and the interview of patient are done by anesthetist to get information about past anesthesia and surgical history as well as drug allergies and drug sensitivity.
- The anesthetist shall do a systematic physical examination with emphasis on cardiac, respiratory systems and airway assessment and assigns the ASA classification.
- The anesthetist shall review the laboratory results and ask any other required laboratory exam.
- He/she shall explain all possible option of anesthesia, risks of each, pain management to be used and give time to patient to ask questions.
- He/she shall see the medications the patient is taking on to stop or to be continued.
- He/she shall explain the fasting protocol where applicable.
- The anesthetist shall obtain the consent form for decided cases and for anticipated cases; the consent will be signed after the final decision.
- The anesthetist on duty shall insure that everything is documented in the patient's file including his/her name and signature.

Note

Adherence to this policy is mandatory to all anesthetists. Failure to adhere will impact quarterly evaluation and incentives.

Appendix 8.

Tasks assignment form

Tasks /dates	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30
Pre anesthesia assessment /external help																														
Operating room																														
Cleaning materials																														
OR preparation																														

Appendix 9. Letter of ethical approval

REPUBLIQUE DU RWANDA



KIGALI CITY
NYARUGENGE DISTRICT
MUHIMA HOSPITAL
P.O. BOX 2456 KIGALI
Tel./Fax : +252 50 37 7
E-mail : muhimahospital@gmail.com

ETHICS COMMITTEE/ COMMITTEE D'ETHIQUE

19th October, 2016

Review Approval Notice

Dear NYIRAMAHO Odette

Re: Your request to conduct a research at Muhima hospital.

During the meeting of ethic committee of Muhima District Hospital that was held on 18th, October 2016 to evaluate your demand we are pleased to inform you that the Muhima Hospital Ethic Committee has approved your request.

You are required to submit progress report(s) regularly as dictated by your proposal. Furthermore, you must notify the committee of any proposal change(s) or amendment(s), serious or unexpected outcomes related to the conduct of the research, or research termination for any reason. The committee expects to receive a final report at the end of the research.

Yours sincerely,

Dr BUTERA Yvan
Chair Person, Ethics Committee



Appendix 10

Muhima District Hospital pre anesthesia assessment form

Department of.....Ward.....Bed number.....

Date (dd/mm/yyyy).....

Weight.....Height.....ASA class.....Mallampati class.....

Anesthesia technique.....Type of intervention.....

Elective Yes No Urgent Yes No

Surgeon.....

Anesthetist.....

Presenting complains.....

Surgeon request.....

Vital signs	BP	Pulse	Respiration	Color of membranes
Allergy drug	latex			Other
PHYSICAL EXAMINATION				
	Normal	Abnormal	Comments	
Head				
Eyes, Ears, Throat				
Neck				
Thorax				
Heart				
Lungs				
Abdomen				
Liver				
Kidney				
Pelvis				
Extremities				
CNS				
Dermatology exam				
Pain				
Laboratory results				
Radiology results				
Consent for operation	Yes No	Consent for anesthesia	Yes No	
Consent for blood/blood products	Yes No	Alternatives		

Decision.....

Name and signature of anesthetist.....

Appendix 11

Masaka hospital pre anesthesia assessment form

Department of.....Ward.....Bed number.....

Date (dd/mm/yyyy).....

Weight.....Height.....ASA class.....Mallampati class.....

Anesthesia technique.....Type of intervention.....

Elective Yes No Urgent Yes No

Surgeon.....

Anesthetist.....

Presenting complains.....

Surgeon request.....

Vital signs	BP	Pulse	Respiration	Color of membranes
Allergy drug	latex			Other
PHYSICAL EXAMINATION				
	Normal	Abnormal	Comments	
Head				
Eyes, Ears, Throat				
Neck				
Thorax				
Heart				
Lungs				
Abdomen				
Liver				
Kidney				
Pelvis				
Extremities				
CNS				
Dermatology exam				
Pain				
Laboratory results				
Radiology results				
Consent for operation	Yes No	Consent for anesthesia	Yes No	
Consent for blood/blood products	Yes No	Alternatives		

Decision.....

Name and signature of anesthetist.....

Appendix 12

Ruhengeri Hospital pre anesthesia assessment form

Department of.....Ward.....Bed number.....

Date (dd/mm/yyyy).....

Weight.....Height.....ASA class.....Mallampati class.....

Anesthesia technique.....Type of intervention.....

Elective Yes No Urgent Yes No

Surgeon.....

Anesthetist.....

Presenting complains.....

Surgeon request.....

Vital signs	BP	Pulse	Respiration	Color of membranes
Allergy drug	latex			Other
PHYSICAL EXAMINATION				
	Normal		Abnormal	Comments
Head				
Eyes, Ears, Throat				
Neck				
Thorax				
Heart				
Lungs				
Abdomen				
Liver				
Kidney				
Pelvis				
Extremities				
CNS				
Dermatology exam				
Pain				
Laboratory results				
Radiology results				
Consent for operation	Yes	No	Consent for anesthesia	Yes No
Consent for blood/blood products	Yes	No	Alternatives	

Decision.....

Name and signature of anesthetist.....

Appendix 13

Modified standardized pre operative evaluation form components

Name

Age

Airway

Cardiopulmonary status

Surgical procedure

Preoperative diagnosis

Preoperative vital signs

Per oral status

Medications

Allergies

Weight

ASA

Anesthetic history and complications

Assessment

Plan

Appendix 14

Items	Pre intervention completeness rate	Post intervention completeness rate
Department	0	100
Ward	0	99
Bed	0	99
Date	0	100
Weight	0	90
Height	0	100
ASA class	0	95
Mallampati class	0	95
Anesthesia technique	0	100
Intervention	0	95
Elective	0	100
Emergency	0	100
Surgeon name	0	93
Anesthetist name	0	100
Patient complains	0	100
Lab exams requested	0	100
Blood pressure	0	100
Pulse	0	92
Respiration rate	0	95
Color of membranes	0	90
Allergy	0	92
Physical exam	0	100
Consent form signed	0	100
Decision	0	100
Anesthetist name	0	100
Signature	0	96