



## Research Paper

# Clinical audit on the practice of documentation at preanesthetic evaluation in a specialized university hospital

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## ARTICLE INFO

## Article history:

Received 21 May 2018

Accepted 17 October 2018

Available online 23 October 2018

## Keywords:

Preanesthetic evaluation

Documentation

Medical documentation

Clinical record keeping

## ABSTRACT

**Introduction:** Performing preanesthetic evaluation, documenting and keeping readily accessible record are responsibilities of anesthetists. Documentation can improve overall patient outcome. It also has an irreplaceable role in medico-legal aspects. Documentation is one of the challenges in providing quality care. The objective of the study was to evaluate documentation practice during preanesthetic visits.

**Method:** A descriptive study was conducted in a university hospital. Predefined twenty-two indicators were prepared according to modified global quality index (GQI). SPSS version-20 was used for analysis.

**Results:** A total of 122 pre-anesthetic evaluation tools (PAETs) were reviewed. None of PAETs found fully completed according to the indicators. Trends differ between elective and emergency conditions. Indicators with high completion rate (>90%) were signed a consent, past medical history (PMH), history of medication, allergy, anesthesia and surgery, cardiopulmonary examination, airway examination, pre-operative diagnosis and planned procedure. Anesthetic plan, vital signs, a name, per-oral status, pre-medication, and age were found with below average (<50%) completion rate.

**Conclusion and recommendations:** Documentation practice during the pre-anesthetic visit was below the standard. Unclear instructions should be replaced with standardized contents. Providing regular trainings on clinical documentation for students and staffs, and introducing modern electronic-based documentation system may improve the practice.

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## 1. Introduction

Preanesthetic evaluation is clinical base and framework for perioperative patient management. It potentially minimizes perioperative morbidity and mortality. The main goals of preanesthetic evaluation are to obtain vital information about current and past medical history, settle assessments, stratify risks, essential clinical optimization and prepare a plan of management before anesthesia and surgery [1]. Preanesthetic evaluations enhance patient safety, resource utilization and reduce cost, delay, and cancellation [2–4]. Inadequate preoperative evaluation and poor patient preparation are two of the commonest causes of anesthetic complications [5]. The Australian Incident Monitoring Study (AIMS) reported that inadequate preoperative assessment and management were directly related to increased mortality [6]. A study on anesthesia-related perioperative deaths showed that 53 of the 135 deaths (39.25%) involved inadequate preoperative assessment and

management [1]. Hence, well elaborated preanesthetic evaluation prior to administration of anesthesia by anesthesia professional is very mandatory. Preanesthetic evaluation has several components that can be broadly classified into five major components, that are identification, history, physical examination, laboratory studies and informed consent [2]. Documentation is an important part of medical practice. Good documentation may improve patient and easy the transfer of information from one care provider to another [7]. Documentation of preanesthetic evaluation and informed consent should present in patient's chart. It is very important for both quality assurance and medico-legal purposes [5]. Inadequate documentation and poor record-keeping are challenges for quality care and better patient outcome [8]. The American Society of Anesthesiologists (ASA) ethical guidelines for the practice of anesthesiology stated that "anesthesiologists have ethical responsibilities to their patients and should provide a preoperative evaluation." It also should include readily accessible medical record [9]. Completed and a well-written document is very important during perioperative management and safeguards in medico-legal courts [10]. Inappropriate documentation has potential risk

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for medical malpractice liability [11]. Real-time documentation at the end of service is recommended. But this may not be always possible due to workload [12,13]. Other factors that can affect documentation practice are a use of tools, practitioner interest, and availability of information [7]. “I did it; I just forgot to write it down... would someone be able to give a legal account of one’s care if it is not documented?” Different institutions use different formats of preanesthetic evaluation. Using standardized preanesthetic evaluation tool (PAET) can help to elaborate and keep quality information. Naik SV et al. (2017) investigated the use of standardized form and found it can improve quality of preanesthetic evaluation and overall patient outcome [8]. Another study has shown that using a standardized tool improved global quality index (GQI) by 26% [14]. The design of PAET has a significant effect on the completion rate of components of preanesthetic evaluation [7]. The general objective of the current study was to assess the practice of documentation at preanesthetic evaluation and completeness of PAETs. We aimed to improve the practice of documentation and quality of preanesthetic service in the specialized teaching hospital.

## 2. Methodology

A hospital-based descriptive study was conducted in University of Gondar Hospital (UoGH). The hospital is a specialized referral and teaching institution found in Gondar town, Amhara regional state. There were 3 main operation theatres, 2 obstetric, 2 gynecologic and 1 ophthalmologic operation theatres in the hospital. Operation records of the hospital showed that approximately 4000 surgical operations were performed annually in the previous years. As a teaching hospital, many parties are involved in preanesthetic evaluations. At the time of data collection, 87 undergraduate students, 21 postgraduate students, 18 senior and junior anesthetic staffs, overall, 126 anesthetic personnel were actively engaged in preanesthetic evaluations. Approval was obtained from the departmental council. The identities of the anesthetic personnel were kept confidential.

To conduct the audit project, documents of all 122 consecutive patients come for both elective and emergency operations were reviewed. A checklist was developed by the investigators based on the indicators in the modified GQI. Twenty-two important items

were selected from the GQI and labeled as “Yes” for complete documentation or checked negative, “Illegible” for partial documentation and “No” if left blank. For each item, completeness was predefined by components of the item [Table 1]. Preanesthetic evaluation tools (PAETs) used by the anesthetists at the university hospital were reviewed after corresponding anesthetists completed each preoperative assessment. Expected completion rate was 100% for all indicators. Indicators with >90% completion rate were marked as acceptable. Completion rate of <50% was considered as areas of critically need improvement. The data was checked, coded, entered and cleaned using SPSS version 20. Descriptive analysis was performed. Cross-tabulations were done when appropriate. Results were expressed in frequencies and percentage.

## 3. Result

A total of 122 PAETs used to assess patients to be undergone both elective and emergency surgical operations were reviewed during the study period. Out of which, 53 (43.4%) were for elective and 69 (56.6%) were for emergency operations. Sixty-seven (54.9%) were of male patients and 55 (45.1%) were of female patients.

We found none of PAETs fully completed according to indicators. Indicators with high completion rate (>90%) were signed a consent, past medical history (PMH), medication history, allergy, anesthetic and surgical history, respiratory examination, cardiovascular examination, airway examination, preoperative diagnosis and planned procedure. Anesthetic plan, vital signs, a name, NPO status, premedication, age were found with below average (<50%) completion rate. The trends differ between elective and emergency operations [Tables 2 and 3].

Large numbers of PAETs 115 (94.3%) had illegible names of patients. They only had a first name or first name with a middle name. Only on 5 (4.1%) PAETs, the last name was mentioned. The remaining 2 (1.6%) had no name record.

Legible per-oral status of patients was documented only on 11 (9%) PAETs. On 57 (46.7%) PAETs, the field that describes per-oral status left blank and the remaining 54 (44.3%), either duration or type of meal mentioned. Out of these, on the majority 51 (94.4%) duration was recorded and type of meal documented only on 3 (5.6%) PAETs.

**Table 1**  
Indicators drawn from modified GQI criteria and PAET used in UoGH.

Indicators	Predefined components for completeness (or checked negative)
Patient’s name	Name of the patient including last name
Age	Value with unit
Sex	
Date of visit	Date/month/year
Name of the anesthetist	
Past medical history	Previous or coexisting illness with duration and treatment. Staging if available.
Preoperative diagnosis	
Surgical procedure	
Anesthetic history	Surgical procedure, anesthetic type, time and any complication occurred.
Medications	Type, dose and route
Allergies	Triggers and extent of reaction.
Per-oral status	At least meal type and duration
Preoperative vital signs	At least heart rate, respiratory rate and blood pressure
Weight	Value with unit
Airway	At least Mallampati view, thyro-mental distance, jaw slide and neck movement
Dentitions	Site and status (healthy, non-natural, broken, loosen or lost)
Cardiovascular examination	At least auscultation note
Respiratory examination	At least inspection and auscultation note
ASA class	Class (E for emergency)
Pre-medication	Type, dose and route
Plan	At least plan A (the first plan) and what was discussed with the patient
Consent	Signed consent available

**Table 2**

Completion rate of indicators of identification and history. (Frequency and percentage (n (%)), N = 122.

Indicators	Overall			Elective (53 (43.4))			Emergency (69 (56.6))		
	Yes	Illegible	No	Yes	Illegible	No	Yes	Illegible	No
Name of patient	5 (4.1)	115 (94.3)	2 (1.6)	1 (1.9)	52 (98.1)	0 (0)	4 (5.8)	63 (91.3)	2 (2.9)
Age	42 (34.4)	78 (63.9)	2 (1.6)	25 (47.2)	28 (52.8)	0 (0)	17 (24.6)	50 (72.5)	2 (2.9)
Sex	100 (82)	0 (0)	22 (18)	40 (75.5)	0 (0)	13 (24.5)	60 (87)	0 (0)	9 (13)
Date of visit	100 (82)	0 (0)	22 (18)	42 (79.2)	0 (0)	11 (20.8)	58 (84.1)	0 (0)	11 (15.1)
Name of anesthetist	87 (71.3)	0 (0)	35 (28.7)	40 (75.5)	0 (0)	13 (24.5)	47 (68.1)	0 (0)	22 (31.9)
Past medical history	121 (99.2)	0 (0)	1 (0.8)	53 (100)	0 (0)	0 (0)	68 (98.6)	0 (0)	1 (1.4)
Preoperative diagnosis	113 (92.6)	0 (0)	9 (7.4)	50 (94.3)	0 (0)	3 (5.7)	63 (91.3)	0 (0)	6 (8.7)
Surgical procedure	113 (92.6)	0 (0)	9 (7.4)	50 (94.3)	0 (0)	3 (5.7)	63 (91.3)	0 (0)	6 (8.7)
Anesthetic history	118 (96.7)	2 (1.6)	2 (1.6)	52 (98.1)	1 (1.9)	0 (0)	66 (95.7)	1 (1.4)	2 (2.9)
Medications	113 (92.6)	2 (1.6)	7 (5.7)	48 (90.6)	1 (1.9)	4 (7.5)	65 (94.2)	1 (1.4)	3 (4.3)
Allergy	119 (97.5)	0 (0)	3 (2.5)	53 (100)	0 (0)	0 (0)	66 (95.7)	0 (0)	3 (4.3)
Per-oral status	11 (9)	54 (44.3)	57 (46.7)	4 (7.5)	15 (28.3)	34 (64.2)	7 (10.1)	39 (56.5)	23 (33.3)

**Table 3**

Completion rate of indicators of physical examination and miscellaneous (Frequency and percentage (n (%)), N = 122.

Indicators	Overall ((56.6))			Elective (53 (43.4))			Emergency (69 (56.6))		
	Yes	Illegible	No	Yes	Illegible	No	Yes	Illegible	No
Vital signs	1 (0.8)	74 (60.7)	47 (38.5)	0 (0)	36 (67.9)	17 (32.1)	1 (1.4)	38 (55.1)	30 (43.5)
Weight	65 (53.3)	0 (0)	57 (46.7)	35 (66)	0 (0)	18 (34)	30 (43.5)	0 (0)	39 (56.5)
Airway	114 (93.4)	2 (1.6)	6 (4.9)	52 (98.1)	1 (1.9)	0 (0)	62 (89.9)	1 (1.4)	6 (8.7)
Dentition	103 (84.4)	1 (0.8)	18 (14.8)	49 (92.5)	1 (1.9)	3 (5.7)	54 (78.3)	0 (0)	15 (21.7)
Cardiovascular examination	116 (95.1)	1 (0.8)	5 (4.1)	51 (96.2)	0 (0)	2 (3.8)	65 (94.2)	1 (1.4)	3 (4.3)
Respiratory examination	117 (95.9)	1 (0.8)	4 (3.3)	53 (100)	0 (0)	0 (0)	64 (92.8)	1 (1.4)	4 (5.8)
ASA physical status	87 (71.3)	14 (11.5)	21 (17.2)	44 (83)	0 (0)	9 (17)	43 (62.3)	14 (20.3)	12 (17.4)
Signed consent	122 (100)	0 (0)	0 (0)	53 (100)	0 (0)	0 (0)	69 (100)	0 (0)	0 (0)
Premedication	12 (9.8)	3 (2.5)	107 (87.7)	5 (9.4)	2 (3.8)	46 (86.8)	7 (10.1)	1 (1.4)	61 (88.4)
Anesthetic plan	0 (0)	0 (0)	122 (0)	0 (0)	0 (0)	53 (100)	0 (0)	0 (0)	69 (100)

Regarding vital signs, only 1 (0.8) PAET has included all the predefined vital signs (heart rate, respiratory rate, and blood pressure). Whereas on 74 (60.7%) documents either one or two of them were recorded. Overall, heart rate was recorded on 72 (59%), blood pressure on 45 (36.9) and respiratory rate only 1 (0.8) PAETs. From combinations, 43 (59.7%) PAET had both heart rate and blood pressure. Forty-seven (38.5%) had no any vital sign records.

#### 4. Discussion

Preanesthetic evaluation helps to understand patient's condition and facilitates perioperative care [14,15]. It also can influence satisfaction of surgical patients towards perioperative care [16]. An Australian study showed that inadequate preoperative evaluation is associated with anesthesia-related mortality and major morbidities need unplanned high dependency unit admissions. It also identified poor communication as a contributing factor. Hence it recommended fully documented assessment and accurate information exchange during assessment and care [17]. Furthermore, failure to document relevant data itself is considered as a major breach and deviation from the standard of care then make liable [18].

Marco AP et al. (2003) compared using non-structured and structured forms for preanesthetic evaluation and found completion rate was higher in the group used structured form [7]. Based on the indicators used, none of PAETs are complete. This finding was in accordance with a study done in South Africa [19]. In the current study, PAETs used to assess patients scheduled for elective operations had higher completion rate with most of the indicators than those used in emergency conditions. Medical documentation is found to be a major obstacle efficient treatment in emergency conditions [20]. This finding can be explained by time constraint in emergency operations.

Patient identity is a basic component of medical records. A name is one of the identifiers used in clinical practice [21]. In the current study, most of the names recorded (94.5%) were illegible as they did not include full name (First, middle and last). The large difference compared to other studies might be due to legibility criteria [19,22]. In the taxonomy of medical errors, record problems were classified as process errors [23]. Inadequate identification contributes to these errors [24]. In addition to other benefits in management, preoperative diagnosis and surgical procedure have identification role in the operation theatre [10,25]. Both had documentation rate of 92.6%.

Medication history is an integral part of any medical assessment [26]. Details of drug type, dose, route and previous adverse events must be recorded. Help to recognize possible interactions and need for perioperative administration [10]. Medication errors are associated with potentially dangerous harms to patients [27]. Medication documentation errors were estimated between 3.5% and 13.3% [27,28]. Recently an American study found perioperative medication errors 5.3%. Out of this, 64.7% were serious, 33.3% were significant and 2.0% were life-threatening [29]. Studies identified less clear preoperative instructions as contributing factors for perioperative medication errors [30,31]. In our study, medication history records were complete in 113 (92.6%) PAETs. Whereas premedication orders were completely documented only in 12 (9.8%) PAETs. Trends in.

Documentation of allergic history was 97.5%. Compared to other studies, it was higher completion rate [19,22]. The incidence of allergic reactions during anesthesia is estimated 1: 10,000–20,000. The leading causative agents are neuromuscular blockers, antibiotics and latex [32,33]. Careful evaluation and documentation can help to identify and avoid triggers.

One of the determinants of pulmonary aspiration during anesthesia is oral intake. Documenting per-oral status helps to

identify risk and modifying plan [10]. Previous studies showed poor documentation of per-oral status [19,22]. In this study, only on 9% of PAETs legible per-oral status documented. The time duration from last meal was recorded more frequently than the type of meal.

Documentation of vital signs is a component of preanesthetic evaluation as a minimal requirement during [9]. Alarming; in the current study, only 1 PAET was found with a complete record of vital signs (at least heart rate, respiratory rate, and blood pressure). It is the only document on which respiratory rate was recorded. Even though there are gaps in recording all vital signs, multiple studies have announced that respiratory rate became a neglected vital sign. However, the altered respiratory rate is a crucial predictor of serious conditions [34–36].

Weight has a central role to calculate the dosage of drugs, ventilation parameters, airway equipment size, fluid requirement [10]. In this study, only 53.3% of the documents had a weight recorded. Mokgwathi GT et al. (2011) found a comparable result in Dr. George Mukhari Hospital [22].

It is not surprising if we found airway tests documented on the majority (93.4%) of PAETs because the airway is a primary concern of anesthetists. Airway assessment is still challenging and no single or comprehensive test can accurately predict difficult airway [19,37]. In UoGH, anesthetists commonly use the combination of Mallampati class, thyromental distance, jaw slide and range of neck motion to assess the airway. Along with airway, dental assessment should be done and clearly documented. A dental injury is one of the commonest events that can occur in the perioperative period and anesthetists may become liable [38,39]. Dental records were found in 84.4% PAETs.

Cardiopulmonary complications are potentially the most serious events that can occur during anesthesia. Through decades, cardiopulmonary events are still leading cause of morbidity and mortality for patients during the perioperative period [40–42]. Anesthetists at UoGH tend to provide emphasis on the assessment of cardiopulmonary status. More than 95% of PAETs had cardiopulmonary assessment notes. This is in-line with previous studies [22,43]. In relation to this, ASA physical status is commonly used for stratification of perioperative outcomes. We found 71.3% PAETs had appropriate ASA physical status record.

An anesthetic plan should be included in PAETs as GQI recommendations [10]. None of PAETs had notes regarding the anesthetic plan. In contrary to this, there was a study in which anesthetic plan was checked in 96% forms [22]. We thought this discrepancy occurred because of less clear instruction on the field dedicated to an anesthetic plan on a PAET used in UoGH. On the other side, signed consent was found in all PAETs. Even though sign for consent was present in all PAETs, compared to standards for clinical audit developed by RCoA in 2012, we found instructions did not meet those standards [44].

As reasons for areas of poor documentation practice; most of the preanesthetic evaluations were done by students and junior staffs. Hence, active involvement and supervision by senior anesthetic staffs may be helpful. In emergency conditions, time has a central role. Since single anesthetist is responsible for a theatre in the hospital, it may increase the workload while limited time is available. So increasing numbers of anesthetists per theatre may be necessary. Additionally, timely communication between surgical and anesthetic staffs can help to solve this problem. Inappropriate attitude towards documentation should be corrected by providing training. Utilization of traditional paper-based manual documentation can be a reason for poor documentation practice. Introducing electronic-based documentation system in the hospital can maximize the quality of information obtained and documentation practice [13,20].

## 5. Conclusions and recommendations

Preanesthetic evaluation tools used to assess patients were found incomplete below the standard. Less clear instructions regarding anesthetic plan and informed consent should be replaced with standardized contents. Providing regular training on clinical documentation and for students and staffs may improve the practice. Maintain availability of devices useful during preanesthetic evaluation. Introduce modern electronic-based documentation system to the hospital may help to solve problems in documentation practice.

### Ethical approval

Ethical approval letter was obtained from departmental counsel.

### Funding

University of Gondar.

### Author contribution

Authors were actively participating in all conducting this study. They thoroughly performed literature searching, writing a proposal and supervise of data collection. We were equally engaged in data management, analysis and write-up phases. They also presented the study for peer review in the departmental counsel in which other stakeholders were invited.

### Conflict of interest statement

The authors declare no conflict of interest.

### Guarantor

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### Research Registration Number

Not required.

### Appendix A. Supplementary data

Supplementary data to this article can be found online at <https://doi.org/10.1016/j.ijso.2018.10.006>.

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