

An audit of documented preoperative evaluation of surgery patients at Universitas Academic Hospital, Bloemfontein

W Swart^a and A Kuhn^{a*}

^aFaculty of Health Sciences, Department of Anaesthesiology, University of the Free State, Bloemfontein, South Africa

*Corresponding author, email: anneritakuhn@gmail.com

Background: The anaesthetic preoperative evaluation of a patient is the clinical foundation of perioperative patient management, and can potentially reduce operative morbidity and enhance patient outcomes. Generally, anaesthetists complete a standardised preoperative anaesthetic record (PAR) form to improve the quality of the information obtained during their pre-anaesthetic visit. Previous studies reported an unacceptable standard of preoperative assessment recordkeeping. The aim of the study was to audit the documented preoperative anaesthetic evaluations of surgery patients at Universitas Academic Hospital, Bloemfontein.

Methods: For this retrospective study a sample of 81 patients, who underwent surgery during May 2013, was randomly selected. The information obtained from the standardised PAR form in each patient's file was audited using a self-generated checklist, based on the measures and criteria incorporated in the Global Quality Index.

Results: Although 100% of files retrieved contained the PAR form, none of these forms were fully completed according to the study checklist used. Criteria where less than 50% were completed correctly included: 'per os' status (1.2%), current medication (37.0%), preoperative diagnosis (38.3%), preoperative vital signs (43.2%), American Society of Anesthesiologists Physical Classification (44.4%), airway assessment (45.7%), anaesthetic history and complications (48.2%) and special investigation results (49.4%).

Conclusions: The documented preoperative evaluations were incomplete with regard to a number of criteria, as also found in studies conducted at two other national institutions. Training and evaluation regarding completion of preoperative assessment of patients by anaesthetists is needed at Universitas Academic Hospital.

Keywords: academic hospital, audit, preoperative anaesthetic record, surgery

Introduction

The anaesthetist is a perioperative medical specialist and the only physician who can truly evaluate the risks associated with anaesthesia, discuss these risks with the patient and manage them intraoperatively.¹ This preoperative anaesthetic evaluation of surgical patients becomes the foundation of the patient's perioperative management plan.

The preoperative status of the patient is determined by the medical condition for which the patient will undergo surgery as well as the patient's underlying physical condition. Adequate completion of a preoperative anaesthetic record (PAR) form is mandated in accordance with the standard of practice guidelines, set by the South African Society of Anaesthesiologists (SASA) in 2012.¹ Inadequate documentation or incomplete record keeping of a patient's preoperative status can be a major impediment in improving patient outcomes following surgery. A comprehensively completed preoperative evaluation document can also play an important role in the medico-legal arena. Claims against any practitioner may be negated by inclusion of pertinent facts. Similarly, the omission of detail by the practitioner might make a similar claim indefensible. This emphasises the fact that the information recorded should be complete and concise.

The aim of a preoperative evaluation is to obtain sufficient information regarding the patient's current and past medical history, and to determine the patient's intraoperative risk.² Generally, the preoperative evaluation of a surgical patient includes the following:

- obtaining a detailed case history;
- conducting a clinical examination;

- determining which laboratory tests and/or diagnostic studies would be appropriate to perform;
- developing a plan of medical intervention;
- discussing perioperative care and options for postoperative pain control;
- discussing anaesthesia risks;
- obtaining informed consent from the patient; and
- premedication may be prescribed.

Information pertaining to the patient's illness and physical condition will influence the proposed anaesthetic technique, pharmacological therapy during the surgery, and specific intraoperative monitoring. A preoperative evaluation also allows the patient to get acquainted with the anaesthetist who can clarify any uncertainty the patient may have about the surgical and anaesthetic procedure.

The current American Society of Anesthesiologists (ASA) risk classification system was developed in 1941 by Meyer Saklad to quantify the risk associated with anaesthesia and surgery based only on the patient's preoperative medical history.³ The purpose of this system is to identify opportunities to alter the risk, and to allow patients to make an informed decision. For example, modifiable risk factors that should be addressed are identified, such as poorly controlled hypertension or unstable ischaemic heart diseases.

The Australian Incident Monitoring Study (AIMS) reported that inadequate preoperative assessment and management were associated with a sixfold increase in patient mortality.⁴ The major

contributing factors were inadequate airway assessment, imperfect transmission of patient data and inadequate patient evaluation.⁵ In a different study of anaesthesia-related perioperative deaths, 53 of the 135 deaths involved inadequate preoperative assessment and management.²

Takata et al. and Ausset et al. concluded that the quality of information recorded during the preoperative visit can be improved by using a standardised form.^{5,6} In 2003 and 2010, two similar studies to determine the completeness of anaesthetic records were performed at the Christiaan Barnard Memorial Hospital in Cape Town, and at Dr George Mukhari Hospital in Ga-Rankuwa, respectively.^{7,8} Findings from both studies showed an unacceptable standard of recordkeeping and suggested a need for improvement in the completion of preoperative assessments by anaesthetists.

At Universitas Academic Hospital in Bloemfontein, the patient's attending anaesthetist conducts a preoperative evaluation one day prior to the elective surgery. The anaesthetist is responsible for documenting the preoperative evaluation findings on each patient's PAR form. The anaesthetist then collaborates with the prearranged consultant and final preoperative preparations are made. Although this method of preoperative preparation is routinely used at Universitas Academic Hospital, the findings from previous studies at the hospitals in Cape Town and Ga-Rankuwa,^{7,8} where similar preoperative preparations are used, suggested a need for further investigation.

Objectives

The aim of the study was to conduct an audit of the documented anaesthetic preoperative evaluation of surgery patients at Universitas Academic Hospital, Bloemfontein.

Methods

This was a retrospective descriptive study.

A hospital record book containing all the patients listed for elective and emergency surgery was used to systematically select the appropriate sample. In total, 545 patients were scheduled for surgery between May 1, 2013 and May 31, 2013. Every fifth patient scheduled for surgery during this one-month period was selected until a sample size of 109 patients was achieved. Only 85 files could be obtained from the medical records department of which four surgeries did not take place. Consequently, the sample size included 81 surgeries. This method of random sample selection was chosen to minimise sample bias and to ensure that the sample reflected the standard of recordkeeping in a diverse population.

Data collection

The selected patient files contained patient notes and PAR forms normally used by the anaesthetists at the hospital. A checklist was created by the researcher based on the criteria incorporated in the Global Quality Index (GQI) by Ausset et al.⁵ This list was used as a data-capturing form and as criteria by which the researcher could determine the diligence with which the attending anaesthetists completed each preoperative assessment.

Sixteen important criteria were selected from the GQI⁵ and phrased as a question for which only a 'yes-complete', 'yes-incomplete' or 'no' answer could be quantified. In order to score a 'yes-complete', 'yes-incomplete' or 'no' answer the information pertaining to each question was meticulously audited using predefined measures and criteria. The validity of the 16 questions for the data form regarding any information recorded on the PAR

form was justified by items being related to the most common adverse outcomes identified by Ausset et al.⁵ An additional question was added to determine the overall outcome of each PAR form. The checklist had 17 questions in total (Table 1).

For three of the criteria (vital signs, clinical examination findings and airway assessments) the percentage of information completed for the predetermined parameters were also captured.

Pilot study

The first 10 randomly selected patient files were used to assess the adequacy of the checklist and to identify any shortcomings. The checklist was considered acceptable, and the files from the pilot study were included in the main study.

Data analysis

Results were expressed as frequencies and percentages.

Ethical aspects

The study was approved by the Ethics Committee of the Faculty of Health Sciences, University of the Free State. The clinical manager of the Universitas Academic Hospital granted permission. The patient's details, surgical procedure, attending anaesthetist's name, and date and time of surgery were not made known to ensure anonymity and confidentiality.

Results

The standardised PAR form was present in 100% of the 81 selected patients' files. However, none of the PAR forms were completed in accordance with the predefined measures and criteria.

The results for each of the 17 questions from the self-generated checklist are presented graphically in Figure 1.

The predefined measures and criteria used in order to score a 'yes-complete' vs. 'yes-incomplete' or 'no' answer for each question are summarised in Table 1.

In 12 of the 17 criteria audited, the highest percentage of items was completed as per study criteria ('yes-complete'). Items with more than 60% compliance included 'premedication' (67.9%), 'allergies' (74.1%), 'surgical procedure' (67.9%), 'weight' (75.3%), 'age' (92.6%) and 'name' (92.6%).

The PAR form was present in all 81 patient files but one or more of the 16 subsequent questions were not completed according to the predefined measures and criteria.

Almost all (98.8%) of the PAR forms did not have an entry recorded for last oral intake. More than half of the forms had no recorded information for 'preoperative diagnosis' (59.3%), 'anaesthetic history and complications' (51.9%) and 'ASA status' (55.6%).

As shown in Figure 1, 43.2% of the PAR forms had recorded results for blood pressure (BP), pulse and respiration rate ('yes-complete') while 25.9% of forms had at least one recorded vital sign ('yes-incomplete'). Pulse rate was documented in two-thirds (67.9%) of the cases (Table 2).

In 58.0% of the cases the attending anaesthetists recorded all clinical examination findings in accordance with the criteria used while 17.3% of the PAR forms had at least one recorded clinical examination finding. The majority of PAR forms (74.1%) had

Table 1: Predefined criteria used to evaluate the completeness of the selected PAR forms

| | For outcome: Yes — complete | For outcome: Yes — incomplete | For outcome: No |
|---------------------------------------|---|--|---|
| Overall | | | |
| PAR form | PAR form present in the patient file and all 16 subsequent questions completed in accordance with the criteria used | PAR form present in the patient file but one or more of the 16 subsequent questions not completed in accordance with the criteria used | No PAR form in the patient file |
| General | | | |
| Patient's age | Patient's age provided | Patient's age provided but illegible | Field blank |
| Patient's name | Patient's name provided | Patient's name provided but illegible | Field blank |
| Patient's weight | Patient's weight recorded | Patient's weight recorded but illegible | Field blank |
| Medical history | | | |
| Allergies | Allergies recorded or 'no allergies' specified | Allergies recorded with uncertainty (question mark noted) | Field blank |
| Anaesthetic history and complications | Anaesthetic history complication or 'negative' were checked as required | Previous surgery was recorded but no anaesthetic history made known | Field blank or no check mark |
| Previous surgeries | Previous surgeries recorded and dates specified | Previous surgeries recorded but dates not specified | Field blank |
| Preoperative evaluation | | | |
| Surgical procedure | Section for 'proposed operation' completed | Surgical procedure provided but illegible | Field blank |
| Current medications | Medication(s) provided and dosage specified | Medication(s) provided but without specifying dosage | Field blank |
| Premedication prescribed | Premedication prescribed and dosage was specified | Premedication prescribed but without specifying dosage | No premedication prescribed |
| Preoperative diagnosis | Preoperative diagnosis recorded | Preoperative diagnosis recorded with uncertainty (question mark noted) | No preoperative diagnosis recorded |
| Preoperative vital signs | Respiration rate, pulse and blood pressure recorded | One or two, but not all, preoperative vital signs recorded | No preoperative vital signs recorded |
| Clinical examination findings | Cardiovascular, respiratory and neurological examination findings recorded | One or two, but not all, clinical findings recorded | No clinical examination findings recorded |
| Airway assessment | Neck and Mallampati assessment completed | Either neck or Mallampati assessment completed but not both | Field blank |
| 'Per os' status | Last oral intake recorded in section 'Immediate pre-op assessment' | Last oral intake recorded with uncertainty (question mark noted) | Field blank |
| ASA status | ASA risk classification recorded | Other risk classification recorded | Field blank |
| Special investigation results | Special investigations relevant to diagnosis and proposed surgery requested/done and recorded | One or more, but not all, special investigations relevant to diagnosis and proposed surgery requested/done and recorded | Field blank |

documented results from cardiovascular and respiratory examinations.

The airway assessment, which included a Mallampati and a neck assessment, was completed in only 45.7% of cases in accordance with the criteria used.

Discussion

Even though the standardised PAR form was present in all 81 patient files, none of the PAR forms were completed in accordance with all the predefined criteria used. This is similar to findings by Mokgwathi et al. indicating that only 1.3% of preoperative assessments of patients were completed in accordance with the modified criteria.⁸ Raff et al. reported a much higher rate: 29.9% of the anaesthetic records reviewed had met the minimum required standards.⁷

The majority of forms (92.6%) had an official hospital label on which the patient's name and age were indicated.

In this study, both elective and emergency surgeries were included. In 67.9% of cases the prescribed premedication with dosage was recorded. In emergency cases, where time constraints apply, premedication may not have been administered or recorded. No provision is made on the PAR form to indicate whether surgery is elective or an emergency. As a result it was not possible to distinguish between elective versus emergency surgery in order to determine whether the level of completeness was significantly different. Information on medications prescribed by surgeons is crucial as this can aid anaesthetists in anticipating possible drug interactions and planning for possible intraoperative administration requirements.

The preoperative diagnosis was documented correctly in only 38.3% of cases. Mokgwathi et al. reported that more than half of the PAR forms in their study lacked preoperative diagnosis.⁸ This may indicate a lack of insight into the importance of preoperative diagnosis, as this is needed to verify whether the proposed surgical procedure is appropriate. The assumption can be made that more than half of the patients at Universitas Academic Hospital may be

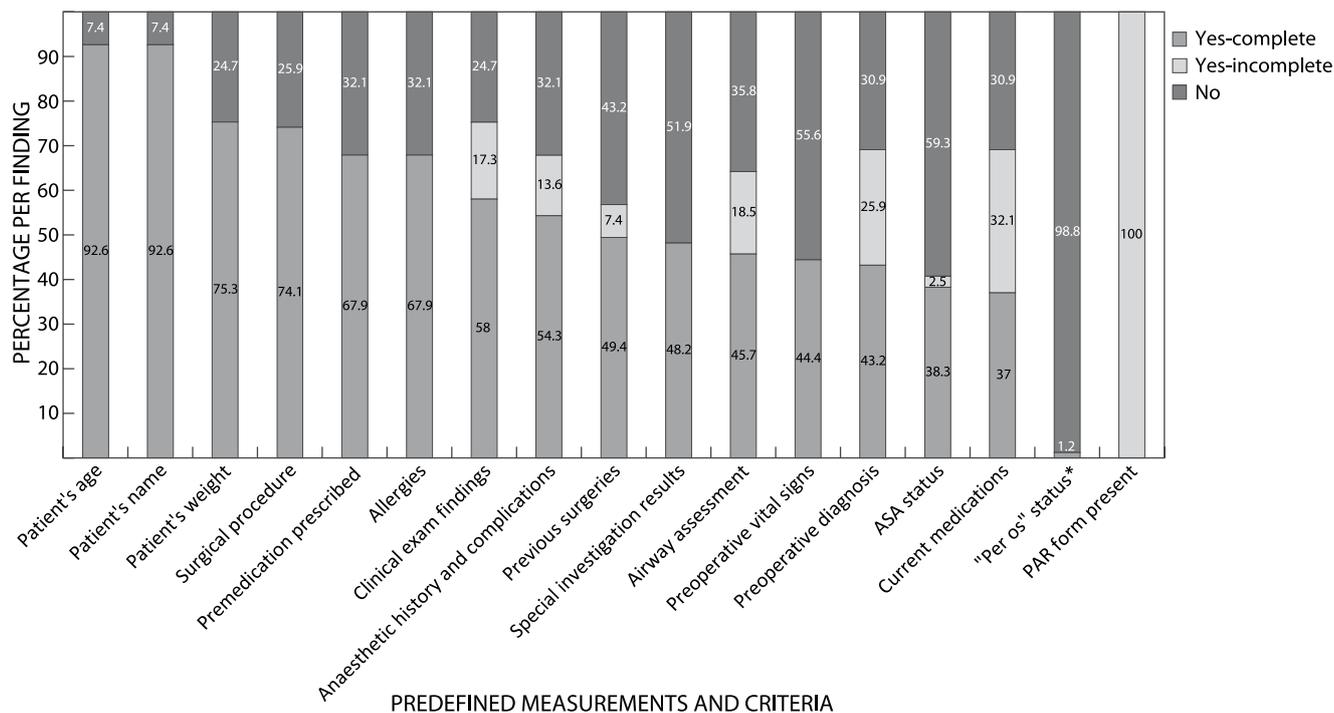


Figure 1: Distribution of audited PAR forms according to the predefined criteria.

anaesthetised without the anaesthetist knowing the preoperative diagnosis or whether the proposed surgical procedure is justified.

As a minimum requirement Fischer et al. recommend that the pre-anaesthetic examination include assessing and recording vital signs.² In this study, results for BP, pulse and respiration rate were all recorded in less than half of the cases (43.2%). The most frequently recorded vital sign was pulse rate (67.9%). Fischer et al. also noted that patients may have increased BP during the preoperative visit without a history of hypertension. This may be due to anxiety or missed doses of medication prior to the proposed procedure. As a result, the reading may not be an accurate reflection of the patient's BP and repeating the measurement can be informative. Hypertension can only be diagnosed by two or more readings greater than 140/90 mm Hg.²

In almost 60% of cases the clinical examination findings (cardiovascular, respiratory and neurological) were recorded in accordance with the study criteria, while a quarter of PAR forms (24.7%) had no recorded findings. Neurological findings were recorded in 59.3% of the cases, while 74.1% had findings on patients' cardiovascular and respiratory statuses. Cardiovascular complications are the most frequent serious perioperative adverse event, and it is estimated that cardiac morbidity will occur in 1–5% of unselected patients undergoing non-cardiac surgery.² Mokgwathi et al. found cardiopulmonary assessment findings recorded on 100% of the preoperative evaluation forms.⁸ Similarly, our findings suggest that anaesthetists at Universitas Academic Hospital also place emphasis on the assessment of patients' cardiopulmonary status.

Table 2: Percentage of information completed for vital signs, clinical examination and airway assessment (N = 81)

| | Yes — documented n (%) | No — not documented n (%) |
|--------------------------------------|---------------------------|------------------------------|
| Vital signs | | |
| Respiratory rate | 42 (51.9) | 39 (48.1) |
| Pulse | 55 (67.9) | 26 (32.1) |
| Blood pressure | 50 (61.7) | 31 (38.3) |
| Clinical examination findings | | |
| Cardiovascular | 60 (74.1) | 21 (25.9) |
| Respiratory | 60 (74.1) | 21 (25.9) |
| Neurological | 48 (59.3) | 33 (40.7) |
| Airway assessments | | |
| Mallampati assessment | 45 (55.6) | 36 (44.4) |
| Neck assessment | 40 (49.4) | 41 (50.6) |

Preoperative fasting is important in identifying aspiration risk factors, which may lead to modifying the anaesthetic plan. The prescribed fasting period was verified in only 1.2% of the PAR forms where the 'immediate pre-op reassessment' section was completed in accordance with the study criteria. This specific section is located on the bottom right-hand corner of the PAR form, which makes the section less noticeable and perhaps more likely to be overlooked.

Known allergies were documented in 74.1% of cases. The incidence of true anaphylactic reactions during anaesthesia is approximately 1 in 6 000: muscle relaxants account for 69% of these reactions, followed by latex (12%) and antibiotics (8%).² A careful history will ensure that any precipitating agents are avoided.

Current and prior medical problems and treatments, previous surgeries, and types of anaesthesia and anaesthesia-related complications need to be noted in order to obtain a complete history and preoperative evaluation. In only 54.3% of the PAR forms were previous surgeries recorded by specifying the surgery and date. Previous surgeries were not documented in 32.1% of the cases but it is unknown whether data from previous surgeries were omitted, or whether the patient did not have any previous surgeries. The section for 'previous anaesthetic history and complications' was completed correctly in only 48.2% of cases. Even if the patient had not undergone previous surgery or received anaesthetics, the criteria stipulate that the space provided on the PAR form reading 'negative' should be checked. In 51.9% of the PAR forms this section was left blank.

The proposed surgical procedure was recorded in only 67.9% of cases. Negligence in respect of completing this section on the PAR form may be a possibility, but it can also imply that in up to 32% of the surgeries in this study the proposed surgery was unknown to the attending anaesthetist at the time of the preoperative evaluation. This is concerning as the evaluation of the patient's medical and physical history regarding anaesthesia starts with the reason for the surgery and the planned procedure.

No single test can accurately predict difficult intubation. When challenging airways are identified, advance planning will ensure that the necessary equipment and skilled personnel are available. In our study, airway assessments were completed in accordance with the study criteria in less than 50% of cases. Overall, 55.6% of the PAR forms reported outcomes for the Mallampati assessment and 49.4% for the neck assessment.

Prescription and over-the-counter medications, including supplements and herbals, should be accurately recorded, along with dosages and schedules. Fischer et al. recommended that any recent but currently interrupted medications should be included.² Current medications taken by the patients were recorded on 37.0% of PAR forms. In 32.1% of cases, medications were listed without specifying the dosage. In 30.9% of cases the relevant section was left blank. This makes it difficult to determine whether the patient was taking medication but it was not recorded, or whether the patient was not on any prescribed or chronic medication.

Weight was recorded on 75.3% of the PAR forms audited. Weight is important when considering pharmacokinetics and pharmacodynamics, ventilation parameters, selection of airway equipment, anticipation of intravenous access problems, and fluid management.

The ASA classification system was designed to quantify the risk associated with anaesthesia and surgery, based only on the patient's preoperative medical condition. In this study only 44.4% of the PAR forms reviewed had a documented ASA classification status. Patients have the right to be informed during the consent process of possible complications and, if possible, associated morbidity and mortality with a specific procedure.

The section on special investigations was correctly completed in 49.4% of cases, i.e. special investigations relevant to diagnosis and proposed surgery were requested and/or done and subsequently documented. In 7.4% of the PAR forms, special investigations were recorded but were considered incomplete by the researcher considering the diagnosis and proposed surgery. For the remaining 43.2% of PAR forms this section was left blank. Special investigations are not required for all patients but a blank field is open for interpretation.

Study limitations

- A single, isolated random sample such as the one used in this study may not be representative of anaesthetic practice in the hospital at large.
- No randomised blinded anaesthetic outcomes study has yet been undertaken in South Africa to test whether pre-anaesthetic evaluations are of benefit.
- In this study, both elective and emergency surgeries were included. In emergency cases severe time constraints apply and premedication is not always indicated. This may have influenced the percentage of incomplete PAR forms.
- For the criterion 'premedication prescribed', a 'no' was allocated for the item when the field was blank indicating that no premedication was prescribed. However, it should be noted that it is possible that the anaesthetist could have deliberately omitted prescribing premedication for an elective surgery, in which case it could have been considered as 'yes-complete'. As the PAR form does not specifically provide a field for reason for omission, it was not possible to identify these scenarios and therefore a blank field was considered a 'no'.

Notwithstanding, the results from this study together with the results from the studies conducted by Raff et al.⁷ and Mokgwathi et al.⁸ are worrying.

Conclusion

This study found that the documented preoperative evaluation of surgery patients by the attending anaesthetists during May 2013 at the Universitas Academic Hospital was incomplete. Although the PAR form was present in all of the patients' files, none of these forms was completed in accordance with the study measures and criteria.

Of the 16 questions pertaining to information obtained during the preoperative evaluation, the anaesthetists at Universitas Academic Hospital usually documented the patient's name and age. The patient's weight, known allergies, surgical procedure and premedication prescribed were recorded in about 70% of cases. In contrast, the criterion 'per os' was completed on only 1.2% of the forms.

Between 50% and 60% of the following criteria had not been completed: preoperative diagnosis, ASA classification, and anaes-

thetic history and complications. On average 30% of the forms did not contain information on previous surgeries, preoperative vital signs and current medications. Special investigation results and airway assessment, including a neck and Mallampati assessment, were not completed consistently. In more than half of the cases the attending anaesthetist did record the relevant clinical examination findings, of which almost three-quarters held information on both the patient's cardiovascular and respiratory status.

The seriousness of the findings is further exemplified by the detrimental effect that any medical records may have in a malpractice suit. If information is missing from a patient's records it can be regarded as 'not done' which, when confronted in a lawsuit, brings the anaesthetist's competence into question. Even if legal action against practitioners is not taken, anaesthetists have an ethical responsibility to their patients as per the requirement laid down by the SASA, which mandates that a record of the anaesthetic technique, patient's responses to anaesthesia and other important medical information pertaining to the anaesthetic be documented.

The findings from this study suggest that the current practice of documenting preoperative evaluation at Universitas Academic Hospital is inadequate. This is based on the unacceptable standard of preoperative anaesthetic recordkeeping found in this study sample. This brings the accuracy of manual recordkeeping into question and places emphasis on the accuracy that a computer-generated programme may offer in recording clinical information. Also, given that the pre-anaesthetic visit generally occurs the day before surgery, factors such as time constraints and miscommunication between patient and anaesthetist may influence the accuracy with which the PAR form is completed. Internationally, the trend towards preparing and evaluating patients in a preoperative programme or clinic before their surgical date has increased. This especially applies to patients with multiple medical risks and comorbidities.

Anaesthetists have evolved from a specialty known to practice only in operating rooms to an acknowledged position as perioperative medicine specialists who comprehensively evaluate

and manage patients preoperatively, intraoperatively and post-operatively.² The findings from this study, however, raise concern over the efficiency with which the preoperative evaluation is conducted, given the inaccuracy with which the standardised PAR forms were completed. Given that preoperative assessment forms the framework of perioperative management, a need for improved preoperative examination and recordkeeping, as found in this study, is strongly indicated.

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