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SASA CONGRESS ABSTRACTS

Comparison of intra-arterial blood pressures versus two noninvasive measuring systems: a cross-sectional analytic study employing Bland–Altman and error grid analyses

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Background: Intra-arterial blood pressure (IABP) measurement is regarded as the "gold standard" of blood pressure measurement. Direct blood pressure measurement involves transducing and amplifying a repetitive pressure wave, generated by the cardiac contractions, usually via a fluid-filled line. Inaccuracies in measurement can often result from inadequate natural frequencies (fn) and damping ratios (ζ). The aim of this study was to determine the dynamic response characteristics of IABP measuring systems and to compare the pressures with those of two methods of measuring arterial blood pressure by noninvasive means.

Methods: We compared IABP simultaneously with two NIBP techniques: automated oscillometry (OsNIBP) and a mercury sphygmomanometer using Doppler ultrasound flow-detection (USNIBP). We calculated fn and ζ from monitor screen photographs of fast-flush tests. We determined statistical agreement using Bland–Altman analysis, and clinical importance of measurement differences using error-grid analysis.

Results: Bland–Altman analysis of 195 measurements revealed small mean differences, but with wide limits of agreement, such that no system was interchangeable. Error-grid analysis revealed that the majority of paired measurements were located in the "No-risk" zone (88% and 86% for systolic IABP-USNIBP and IABP-OscNIBP, respectively). The best predictor for a measurement pair to be located in the "Low-risk" zone was the per cent difference between systolic IABP-USNIBP (logistic regression c-statistic 0.974, sensitivity 100%, specificity 88.4%, cutoff criterion > 10.4%).

Mean fn was 16.5 Hz, range 4.8–33.0). Mean ζ 0.38, range 0.03–0.74). 11% of IABP were overdamped. ζ and fn were not predictive of zone location.

Conclusion: Textbooks recommend regular determination of fn and ζ, however, we concur with previous studies that this is unhelpful. We agree with recent recommendations that IABP preferably be compared with a reliable NIBP, and that differences of 20 mmHg should prompt review of the IABP system. We propose USNIBP systolic pressure measurements to be a simple, reliable and cost-effective NIBP method.

Prevalence of vitamin D deficiency amongst anaesthesia providers at the Universitas Academic Hospital

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Background: The main source of Vitamin D is skin exposure to sunlight. Vitamin D deficiency is common in people who have decreased sun exposure. Acute symptoms of vitamin D deficiency are mild and non-specific, but the long-term sequelae of the disease are extensive, severe and easily preventable. Anaesthesiologists spend a large portion of their days working indoors and are at risk of having vitamin D deficiency.

Objectives: The primary outcome of this study was to determine the prevalence of vitamin D deficiency amongst anaesthetists at the Universitas Academic Hospital Complex (UAHC). The secondary objective was to correlate deficiency with known risk factors.

Methods: A descriptive cross-sectional study was done on doctors who provide anaesthesia daily at UAHC. The study was explained during an academic meeting and members were invited to partake. On the scheduled date, consent was taken from participants. Blood was drawn and taken to a laboratory for analysis. Participants completed a questionnaire regarding the risk factors. They received an informational poster as well as access to their results if requested. Data was analysed by the department of Biostatistics at the University of the Free State

Results: Thirty-three members of staff volunteered to partake in the study. An overall deficiency rate of 39.39% was found. The only risk factor that statistically correlated with deficiency was age ($p = 0.03$).

Conclusion: Vitamin D deficiency is prevalent amongst anaesthetists at the UAHC when compared to available data. Awareness should be raised regarding the problem. An increase in age statistically correlates with a higher risk for deficiency.

Chemical and physical stability of an admixture of anaesthetic drugs

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Background: The ability to combine and use drugs in a single infusion device may be useful in resource-limited settings. This study examined the chemical stability of an opioid-sparing mixture of ketamine, lignocaine and magnesium sulphate when combined in a single syringe.

Methods: High-performance liquid chromatography and atomic absorption spectrophotometry were done on six syringes containing the three-drug mixture. Since most opioid-sparing techniques typically rely on a 24-hour infusion regime, we tested stability at the initial admixing and 24 hours later. Stability was defined as a measured drug concentration within 10% of expected, with the absence of precipitation or pH alterations. Pharmacokinetic simulations were conducted to further show that the achieved plasma drug concentrations were well within an effective analgesic range.

Results: All mixed drug concentration measurements were within the required 10% reference limit. No obvious precipitation or interaction occurred, and the pH remained stable. Drug stability was maintained for 24 hours. Pharmacokinetic simulations showed that ketamine and lignocaine were within their minimum analgesic effect concentrations.

Conclusion: Our results show that this three-drug mixture is chemically stable for up to 24 hours after mixing, with a pharmacokinetic simulation illustrating safe, clinically useful predicted plasma concentrations when using the described admixture

The prevalence of SARS-CoV-2 infection in an academic department of anaesthesiology

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Background: Anaesthetists are frontline workers who perform aerosol-generating procedures (AGPs) in enclosed environments, which exposes them to severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) and increases their risk of contracting SARS-CoV-2 infection and coronavirus disease 2019 (COVID-19). This study describes the prevalence of SARS-CoV-2 infection in the academic department of anaesthesiology of the University of the Witwatersrand prior to vaccination.

Methods: A cross-sectional, contextual, descriptive research design, using an anonymous electronic questionnaire, was followed in the study. Consecutive and convenience sampling methods were used. A *p*-value of < 0.05 was considered statistically significant.

Results: A total of 147 participants met the inclusion criteria. There were 90 (61.22%) females and 57 (38.78%) males. The mean age was 35.26 years for the 36 participants who tested positive (26.47%) for SARS-CoV-2. Hospital admission was required by 2.78% of participants with COVID-19. Male participants had a higher prevalence of having SARS-CoV-2 infection ($p = 0.045$). There were no statistically significant associations between SARS-CoV-2 infection and pregnancy ($p = 0.09$), asthma ($p = 0.11$), autoimmune disease ($p = 0.77$), obesity ($p = 0.9$), diabetes ($p = 0.96$), hypertension ($p = 0.9$) and smoking ($p = 0.69$). Commonly reported COVID-19-like symptoms included fatigue (68.33%), headaches (61.67%) and myalgia (58.33%). Of the participants with a positive SARS-CoV-2 test, 38.46% had reported travelling within 14 days of testing positive ($p < 0.001$). Community exposure to a person with SARS-CoV-2 was associated with participants contracting SARS-CoV-2 infection ($p = 0.001$).

Conclusion: AGPs are not a significant risk factor for anaesthetists in the context of work or community transmission of the virus. There was a statistically significant predisposition for contracting SARS-CoV-2 infection among males, participants who travelled and participants who had community exposure to a SARS-CoV-2 infected person.

Postoperative pulmonary complications in adult surgical patients in low- and middle-income countries: a systematic review and meta-analysis

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Background: After surgery, patients are at risk of developing postoperative pulmonary complications (PPCs). Our current understanding of PPCs is based on data from high-income countries.

Methods: A systematic review and meta-analysis to evaluate the incidence of PPCs in adult surgical patients from low- and middle-income countries (LMICs). The protocol was registered in the PROSPERO database (CRD42020212932).

Results: The search strategy was conducted on 27 March 2021 and 1 053 records were identified. The abstracts of 607 records were reviewed. Fifteen studies were included in the final review; of these, five were of high methodological quality. The overall pooled event rate for the incidence of PPCs was 22.4% (95% confidence interval [CI], 15.76–30.78%). In-hospital mortality in patients who developed PPCs was 33.1% (101/305). Follow-up for mortality outcome in the included studies varied. PPCs were identified as a risk factor for in-hospital mortality (odds ratio [OR] 18.2, CI 11.01–30.09). There were insufficient outcome data to determine the association of PPCs between elective versus emergency surgery, and cardio-thoracic versus non-cardiothoracic surgery. Advanced age was associated with the

development of PPCs (mean difference [MD] 4.7, 95% CI 0.63–8.70). Male sex was associated with the development of PPCs (OR 1.5, CI 1.17–2.02). PPCs were associated with increased length of hospital stay (LOS) (MD 6.5, 95% CI 4.04–8.96).

Conclusion: The incidence of PPCs was 22.4% following surgery in adult patients of LMICs and was influenced by differences in the definitions of PPCs used in the studies. PPCs were identified as a risk factor for in-hospital mortality. Data about the type of surgery, as well as patient characteristics, were poorly reported. Further research regarding PPCs in LMICs is needed to provide granular data for future use.

Evaluation of the use of a 3D printed video laryngoscope for tracheal intubation in a manikin

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Background: The video laryngoscope (VL) can achieve an improved laryngeal and glottic view, a higher intubation success rate in patients with a known or predicted difficult airway and a reduced incidence of laryngeal/airway trauma compared to direct laryngoscopy. Unfortunately, the cost and thus the availability of these devices are a major hindrance to their large-scale use in rural and resource-poor medical facilities worldwide. Innovation and novel ideas are needed to make video laryngoscopy more accessible.

Objective: Design and manufacture a VL with the help of additive manufacturing (AM), thereafter evaluate its usability on an intubation manikin by comparing it to the gold standard VL, the CMAC®, by measuring the time to first pass of the endotracheal tube.

Aim: This study aimed to determine if AM, commonly known as 3D printing, can be used to produce a VL blade that can be used to intubate a manikin.

Design: A randomised controlled crossover study was performed wherein 36 anaesthetists intubated a mannequin using both a novel 3D printed hyper angulated VL blade and a CMAC® VL using the D-Blade.

Participants: Consultants, registrars/trainees and medical officers working in the Department of Anaesthesiology at the University of the Free State in South Africa.

Main outcome measure: The time to first pass of the two different instruments used.

Results: The CMAC® had a statistically shorter time to 1st pass (median 13.8 seconds) compared to the 3D printed model (median 19.0 seconds; 95% confidence interval 1.0–6.2; $p = 0.0013$). There were no failed attempts for both devices.

Conclusion: Intubation times were faster with the CMAC® than with the novel device, however with a comparable success rate of intubation, 3D printing technology has the potential to improve access to video laryngoscopy.

The prevalence of caregiver anxiety in theatre at Universitas Academic Hospital

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Background: Anxiety is a worldwide health condition that is on the rise and there is a subsequent rise in caregiver anxiety. Previous research has focused on the effect of the perioperative period on paediatric patients' anxiety and the long-term effects thereof as well as on the effects of caregiver presence on the paediatric patient's anxiety. A few studies have been conducted on the effects of the perioperative period on the caregiver's anxiety when they accompany their child to hospital and theatre.

Aim: The purpose of this study was to determine the prevalence of caregiver anxiety in caregivers who accompany their children to theatre at Universitas Academic Hospital.

Methods: Ethics approval was obtained prior to the commencement of this prospective, observational, analytical, cross-sectional study. Caregivers of children (younger than 18 years of age) presenting to theatre for elective surgery were recruited over a two-month period. Participation was voluntary. A questionnaire which captured demographic and socio-economic data inter-alia and the State-Trait Anxiety Inventory (STAI) was completed with the caregivers after they had accompanied their child to theatre or witnessed the induction of anaesthesia. An STAI score of more than 40 points was considered to be indicative of clinically significant anxiety.

Results: One hundred and twelve caregivers were recruited. Most of the study population were females (96.4%), with an age range of 17–73 years. One hundred and four (93%) caregivers had clinically significant anxiety. This study found a prevalence of anxiety of 92.9% with a 95% confidence interval of 86.5–96.3%. No contributing factors to anxiety were identified.

Conclusion: This study found a high prevalence of caregiver anxiety at Universitas Academic Hospital, but was unable to isolate any factors that would put a caregiver at risk of developing clinically significant anxiety. Anaesthetists should be wary of parental anxiety during the perioperative period.

The spectrum of disease and short-term outcomes of obstetric patients with cardiac disease at a tertiary hospital in South Africa

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Background: Cardiac disease in pregnancy is a major contributor to indirect causes of maternal mortality, although the disease spectrum differs between high- and mid-to-low-income countries. Our study aims to assess the spectrum of cardiac disease and short-term outcomes in obstetric patients at a tertiary hospital in a mid-income country, including assessment of echocardiograms and applying risk-scoring systems.

Methods: A single-centre, retrospective, descriptive, cross-sectional study, consisting of all the obstetric patients with cardiac disease admitted between January 2018 and December 2019 to the Tygerberg Hospital Obstetric Critical Care Unit (n = 86). Cardiac complications secondary to preeclampsia were excluded.

Results: Three main groups were identified: valvular heart diseases (50%), cardiomyopathy (22%), and congenital heart diseases (21%). The majority (91%) of major and secondary cardiac outcomes were associated with cardiomyopathy and valvular disease. The presence of echo high-risk parameters was dependent on the cardiac class: cardiomyopathy and valvular disease had a higher association. Cardiac interventions were performed in 30 (34.8%) patients before pregnancy, 17 for valvular, 12 for congenital diseases and one for Takayasu's disease. Only three interventions were done during pregnancy and none postpartum. Peripartum ICU interventions (ventilation and haemodynamic support) were required by patients with cardiomyopathy (n = 12) and valvular disease (n = 11). The assumption that patients with these interventions would have a longer ICU stay is validated (ventilation, p = 0.027; inotropic support, p < 001). A significant correlation between gestation at first presentation and requiring ICU intervention was found.

Conclusion: Major and secondary cardiac outcomes were associated with cardiomyopathy and valvular disease in our cohort. Late presentation for first assessment is associated with more adverse short-term outcomes, an increased need for ICU interventions and longer ICU stay. Risk-scoring tools show an association with ICU interventions and stay.

Khaya-warmer: blood warming in a resource-constrained setting

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Background: Blood warming poses an immense challenge for healthcare workers in a resource-constrained setting due to financial limitations. Various methods of blood warming prior to transfusion have been studied extensively in the past, but no studies, to our knowledge, have looked at inline gravitational blood warming using a bottle of preheated water.

Objectives: Our aims were to test the efficiency of an improvised blood warmer (Khaya-warmer) to warm cold-packed red blood cells (PRBC) to a mean temperature of 35 °C, utilising consumables readily available in a resource-constrained setting.

Methods and measurement: This was a laboratory-based, experimental proof-of-concept study. A standard unit of PRBC was administered through a modified blood transfusion line. A predetermined length of the transfusion line tubing passed through a bottle containing 1 000 ml of water preheated to 46 °C. The temperatures of the ambient environment, cold PRBC, the warmed water and the warmed blood at the outflow were measured using a calibrated 4-probe electronic thermometer. Descriptive statistics were performed with the primary outcome to determine whether the Khaya-warmer can safely warm cold PRBC during a simulated transfusion to a mean outflow temperature of 35 °C. Secondary outcomes were the rate of transfusion as well as the cost of this improvised method.

Results: Twenty simulations were conducted. Mean outflow temperature achieved was 35.2 °C (95% CI: 35.1–35.4 °C). Mean simulation time was 9.01 minutes (95% CI: 8.68–10.16) with a mean flow rate of 25.36 ml/min (95% CI: 24.11–26.62).

Conclusion: The Khaya-warmer was effective in warming cold PRBC to a mean temperature of 35.2 °C using a safe and cost-effective method of PRBC warming. Potential future studies include investigating the effects of adjusting flow rates by using a pressure bag or a flow-regulating device and replacing the preheated water bottle with a thermally insulated flask.

Almost 30% reduction in carbon footprint using volatile anaesthesia – a quality improvement project introducing low-flow anaesthesia in a regional hospital

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Background: Climate change is the greatest public health threat. Volatile agents may contribute up to 50% of the theatre's carbon footprint. We performed an audit of general anaesthesia (GA) standard practice and a quality improvement project to reduce theatre's carbon emission, volatile and nitrous oxide usage by implementing a low-flow anaesthesia protocol in a regional hospital.

Methods: After HREC (039/2022) and institutional approval, we performed a prospective, single-centre, quasi-experimental, interrupted time series design study from 4 November 2021 to

23 July 2022. All GA cases with volatile agents were included. Exclusions were total intravenous anaesthesia, sole regional and local cases. Electronic theatre and ventilator data was reviewed for 2 000 GA hours baseline pre-intervention as well as 2 000 GA hours post-intervention, separated by a 2-week interruption period to implement the low-flow protocol (no data collection). Data collected were number of theatre cases; anaesthesia duration (min); type and amount of volatile used (ml); medical gas (oxygen, medical air, nitrous oxide) used (l). Carbon footprint of these volatile calculated is expressed as distance (km) travelled with a 1.6 l VW Polo.

Results: Over 8.5 months, 2 916 surgical cases were performed in 4 000 GA hours. Volatile anaesthesia produced 36 tonnes of CO_2.

Baseline data: One thousand four hundred and sixty-four cases performed consuming 20 047 ml isoflurane, 9 148 ml sevoflurane with 30 3606 l, 83 025 l, and 7 072 l of oxygen, air, and nitrous oxide.

Post-intervention data: One thousand four hundred and fifty-two cases consumed 17 072 ml isoflurane and 4 889 ml sevoflurane with 18 2764 l, 34 754 l and 2 059 l of oxygen, air, and nitrous oxide. Isoflurane, sevoflurane, and nitrous oxide consumption were reduced by 15%, 48% and 71%, respectively.

Conclusion: Implementation of a low-flow anaesthesia protocol reduced overall volatile consumption by 25%, medical gas usage by 45% and carbon emission by 29%. Our carbon dioxide equivalent (CO_2e) was reduced by 6 107 kg, equivalent to driving 22 939 km.

Effect of a carbohydrate lollipop on the gastric volume of fasted paediatric patients

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Background: Preoperative fasting is part of routine practice. Children subjected to prolonged preoperative fasting often suffer adverse effects. Consuming a preoperative lollipop may lessen their anxiety and have clinical benefits.

Aims: To assess the effect of consuming a lollipop on gastric volume and the feasibility of administering a lollipop to a child preoperatively.

Methods: In this prospective, repeated measures interventional study, we measured gastric antrum volume using ultrasound in children aged 2–18 years. We measured antrum volumes after participants had fasted for a minimum of 6 hours for solids and 2 hours for clear fluids. They then consumed a standard carbohydrate lollipop, and we repeated the antrum volume measurements after 1 hour.

Results: Of the 38 patients enrolled, 32 completed the study; four had ingested additional food or liquid, and two were diagnosed with a systemic disease the day after data collection. The gastric volume data were normally distributed. The mean volume change was 0.01 ml kg−1 (95% CI −0.02–0.05; $p = 0.460$). The mean post-lollipop volume was 0.51 ml kg−1 (95% CI 0.43–0.58).

Conclusion: Consuming a standard lollipop did not affect the gastric volume of fasted pediatric patients.

Investigating a low-cost, nasopharyngeal apnoeic oxygenation technique in a morbidly obese population: a randomised controlled study

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Background: Obese patients are at high risk for rapid desaturation during airway management. Apnoeic oxygenation techniques prolong safe apnoea time, improving safety during this critical period. This study investigated a low-cost approach, combining a nasopharyngeal airway and oxygen insufflation at 18 l/min.

Methods: A randomised controlled study was conducted on obese (BMI ≥ 35kg/m^2) patients presenting for elective surgery. Patients were allocated by block randomisation in a 1:2 ratio to a preoxygenation-only (NoAO) and an intervention (NICA-O_2) group. All patients were preoxygenated to an Et-O_2 > 80%, followed by a standardised induction of anaesthesia. The intervention group then received oxygen at 18 l/min via the nasopharyngeal catheter intervention, whilst the control group received no additional oxygen. The desaturation process was documented until a SpO_2 of 92%, or 600 s (10 minutes), was reached. This "safe apnoea time" was the primary outcome of the study. Secondary outcomes were rate of carbon dioxide accumulation and factors affecting the risk of desaturation.

Results: Thirty patients (NoAO = 10; NICA-O_2 = 20) were studied in a morbidly obese population (NoAO = 41.1 kg/m^2; NICA-O_2 = 42.5 kg/m^2). The median safe apnoea time was significantly longer (NoAO = 262 s [IQR 190–316]; NICA-O_2 = 600 s [IQR 600–600]) (Mann—Whitney U test, $p < 0.001$), and the risk of desaturation significantly lower (HR = 0.072, 95% CI 0.019–0.283]; Log-Rank test, $p < 0.001$) in the intervention group. All ten patients in the preoygenation-only, and three in the intervention group, desaturated to 92% within 600 s. The mean rate of carbon dioxide accumulation was significantly slower in the intervention group (NoAO = 0.47 ± 0.14 kPa/min; NICA-O_2 = 0.3 ± 0.09 kPa/min) (T-test, $p = 0.003$). There were no statistically significant factors associated with an increased risk of desaturation found.

Conclusion: This is an inexpensive, practical method that improves airway management safety, prolongs safe apnoea time,

and reduces the risk of desaturation in morbidly obese patients. It provides an effective, low-cost alternative to high-flow nasal oxygen for resource-constrained environments.

General anaesthesia for caesarean delivery for thrombocytopaenia in hypertensive disorders of pregnancy: findings from an obstetric airway management registry

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Background: Spinal anaesthesia (SA) is preferred for caesarean delivery. In women at risk of spinal-epidural haematoma, thrombocytopaenia should be excluded. In emergencies, this investigation may be hampered by unavailable or off-site laboratory services.

Methods: The obstetric airway management registry is active across training institutions of the University of Cape Town. This multicenter observational study aimed to estimate the proportion of patients receiving general anaesthesia (GA) for either confirmed or suspected thrombocytopaenia, not excluded due to the unavailability of results. We retrospectively traced platelet counts for suspected thrombocytopaenia, to establish the number of GA that could have been avoided. A decision aid for estimating risk/benefit of SA versus GA is proposed for the setting of hypertensive disorders of pregnancy and thrombocytopaenia.

Results: Thrombocytopaenia was the indication for GA in 100 of 591 patients (16.9%). In total, 48 of 591 (8.1%) had confirmed thrombocytopaenia, and 52 of 591 (8.8%) had suspected thrombocytopaenia. Of these patients, 91 of 100 had a hypertensive disorder of pregnancy. In suspected thrombocytopaenia, 46 of 52 (88.5%) platelet counts were traced. The median (interquartile range) platelet count was 178 × 109/L (93 – 233 × 109/L), and platelets exceeded 75 × 109/L in 41 of 46 patients (89.1%). In the five of 46 patients with retrospective thrombocytopaenia, two had HELLP syndrome, two had antepartum haemorrhage with preeclampsia, and one had isolated thrombocytopenia with preeclampsia.

Conclusion: In 17% of patients, the indication for GA was thrombocytopenia. Of these, 52 of 100, or nearly 9% of the total of 591, received GA because of the unavailability of platelet count. Early laboratory assessment is emphasised. Overall, 41 of 591 (6.9%) had a platelet count > 75 × 109/L and would not have needed GA if the platelet count were known. Using the decision aid to assess risk/benefit, there may be circumstances in which one justifiably opts for SA when a platelet count is indicated but unavailable.

A randomised control trial to compare quality of recovery between desflurane and isoflurane inhalational anaesthesia in patients receiving general anaesthesia for ophthalmological surgery at a tertiary hospital (DIQoR trial)

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Background: The patient's postoperative recovery experience is increasingly recognised as an important perioperative outcome. The 15-item Quality of Recovery scale (QoR-15) is a validated measure of postoperative patient comfort. Desflurane has a faster emergence from anaesthesia compared to other volatile anaesthetics, with a clearer sensorium postoperatively. It is uncertain whether this translates to better quality of recovery for the patient. This study compared QoR-15 scores between patients receiving desflurane or isoflurane for maintenance of general anaesthesia.

Methods: Adult patients undergoing ophthalmological surgery under general anaesthesia were randomly allocated to receive either desflurane or isoflurane for maintenance of anaesthesia. The median difference in postoperative QoR-15 scores between the two groups was tested for significance. Secondary outcomes investigated were vapour consumption and time spent in recovery.

Results: Data from 170 patients were analysed (85 desflurane, 85 isoflurane). The median postoperative QoR-15 score in the desflurane group was 145 (IQR 141–149) and in the isoflurane group 144 (IQR 139–147), which is not a statistically or clinically significant difference (p = 0.133, MICD = 8). No significant differences in QoR-15 scores were found in relation to sex, age or duration of surgery. In the desflurane group, median vapour consumption was 15.4 ml.hr^{-1} (IQR 12.5–19.3). Time spent in the recovery room was significantly different between the two groups, but this did not have an effect on QoR-15 scores.

Conclusion: The DIQoR trial is the first study in South Africa to use the QoR-15 as the primary outcome to assess the impact of an intervention in a randomised control trial. This study did not find evidence of a difference in postoperative QoR-15 scores between patients who received desflurane or those who received isoflurane for maintenance of general anaesthesia during ophthalmological surgery.

Note: Study funded by JPRF.

Intraoperative and immediate postoperative complications in paediatric patients undergoing adenotonsillectomies at Universitas Academic Hospital: incidence and predictors

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University of the Free State, South Africa

Background: Perioperative cardiorespiratory complications following paediatric adenotonsillectomy can possibly be

prevented if the at-risk children are identified preoperatively. The aims of this study were to determine the incidence of intraoperative and immediate postoperative complications in children after adenotonsillectomy at Universitas Academic Hospital and to identify markers predictive of developing intraoperative and immediate postoperative complications in children undergoing adenotonsillectomy.

Methods: Data was collected prospectively. The preoperative screening tools used in this study to screen all children booked for an elective adenotonsillectomy were the STBUR questionnaire, overnight pulse oximetry and transthoracic echocardiography. The children were admitted the day before surgery and were followed up for perioperative cardiorespiratory adverse events up to 24 hours postoperative. The STBUR questionnaire was completed by the parents or legal guardians of the children. A transthoracic echocardiography was performed preoperatively. Overnight pulse oximetry was determined the night before surgery. All data were recorded on a data form.

Results: Ten of 53 children (18.9%) had an intraoperative or immediate postoperative adverse event. The most common adverse event was intraoperative desaturation. Children who had adverse events were mostly male, below the age of 3 years, underweight for age with underlying comorbidities or symptoms of sleep-disordered breathing. Perioperative adverse events were associated with a McGill score of 2 or higher or an abnormal transthoracic echocardiogram. Children who scored three or more on the STBUR questionnaire were more likely to have a complication.

Conclusion: The results of this study show a high incidence of perioperative and immediate postoperative adverse events amongst children after adenotonsillectomy at Universitas Hospital. This emphasises the importance of identifying high-risk children preoperatively. The preoperative screening tools used in this study appear to be promising, practical and economical in identifying children with a risk of having complications and can be used in a resource-constrained setting.

Why American buffaloes are like the Death Star

Dr Adam Carpenter

University of Cape Town, South Africa

A brief look at comparative physiology as it relates to anaesthetists... is it ever normal to have three main bronchi? If you stabbed an elephant in the chest, what would happen? One arrow, two lungs, poor design?

Ice fish and a man in China. How low is low?

Effective circulating blood volume, slow heart rate, maximise O_2 in blood, keep them cool (34–35 °C) and a lot of luck!

Alarm fatigue

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Background: Studies have shown that the majority of alarms generated by continuous bedside monitoring devices used in the critical care unit and operating room are non-actionable. This cascade of inaccurate signals can cause healthcare personnel to endure sensory overload when attempting to distinguish between true and false alarms, resulting in desensitisation and alarm fatigue. This often leads to adverse events when true instability is not identified or addressed despite the alarm.

Methods: A literature review indicates that the scope of the problem is vast. As the variety of healthcare alerts increases, alarm fatigue is increasingly becoming a significant safety concern for both patients and healthcare professionals. The aim of this presentation is to delve into the widespread repercussions of alarm fatigue, including the diversity of factors that contribute to it, in an attempt to further understand this phenomenon and find strategies to improve the safety of our patients and the well-being of healthcare providers.

Results: This review sheds light on the current and prospective methods of identifying actionable and non-actionable alerts, as well as responding to them. It further highlights the obstacles to reducing alarm fatigue and adverse events by influencing alarm modes, sensitivity and specificity, and clinical activity. New modes sought to mitigate alarm fatigue will also be highlighted. Such modes include vibrotactile units that can emit varying degrees of signals, as well as clinical monitoring capabilities incorporating artificial intelligence that can reflect and replicate human cognitive/decision-making processes.

Conclusion: In summary, this talk will clarify how addressing alarm fatigue can enhance safety. To ensure that clear mechanisms for safe alarm handling are in place, a multifaceted strategy combining clinicians, leaders of healthcare institutions, industry and regulatory authorities will be required.

An anaesthetist's guide to preparing for doomsday

Dr Le Roux Jacobs

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In a world full of uncertainty, one can be met with many challenges. Global warming, wars, economic upset and pandemics are problems we as a human race are facing.

How do we prepare and plan for such events? If the past is anything to go by, the future is very uncertain. Lest we forget, we are still classified as a low-to-middle-income country with great needs in most sectors.

Life is all about perspective; instead of focusing on the negative, I propose we approach this in a different way. Join me as we plan to future-proof our anaesthetic practice and prepare for an adventure—let's go to Mars.

The environment that the medical team on the Mars mission will face has been likened to a poor resource scenario with limited space, equipment, drugs and support. Microgravity causes many fluid shifts and leaves relative hypovolaemia hidden – much like our compensating sick patients.

Two of the most common causes of anaesthesia death are failure to secure an airway and induction of anaesthesia in a hypovolemic patient.

Astronauts experience immune suppression. The mechanism of which is unknown. Many of our patients are immunocompromised. Astronauts are encouraged to have their appendixes and wisdom teeth removed prophylactically.

Vapour anaesthetic agents will not be allowed in closed environments like space. Our environmental concerns with vapour anaesthetic agents are similar.

What tools shall we have ready on our belts? Video laryngoscopy, regional anaesthesia, total intravenous anaesthesia, and point-of-care ultrasonography are just a few tools that can get us out of tricky spots.

We walk the thin line between respecting our history and moving our speciality forward. We must learn from our own and others' mistakes. We must have tools that we can use in any event—even space.

Music in the perioperative period: help or hindrance?

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According to Debasish Mridha: "Music can heal the wounds which medicine cannot touch." If this is true, can music also influence the theatre environment where both patient and surgical team experience ongoing stress?

As a music-lover, amateur pianist and wife to a professional guitarist, I have been conflicted by the pros and cons of music in theatre: I value the energy that music injects into my body and mind at 3 am on a call, and I've also found myself annoyed at the added noise pollution music can bring.

Background music in theatre: A 2021 survey evaluating the opinions of theatre staff regarding background music in theatre found that the majority of respondents (67%) felt background music had a positive effect on workers in the operating theatre, and 80% did not find it to be a distraction.

A systematic review found classical music with a low to medium volume can improve surgical task performance by increasing both accuracy and speed, but the review cautions about the distracting effect of loud "high beat" type music that my orthopaedic colleagues seem to enjoy.

The role of music during anaesthesia: A randomised controlled trial found that patients who had music of their choice played through headphones during general anaesthesia had more stable haemodynamics, a calmer recovery, and better patient satisfaction scores.

Music may be used instead of midazolam to calm patients before a peripheral nerve block. Patients undergoing lower limb orthopaedic surgery under spinal, who listened to instrumental music during the case, had lower anxiety levels and reduced sedative requirements.

Conclusion: In this talk, I will evaluate the impact of music on the patient and theatre staff alike. Laihla Gifty Akita once said, "Music is a great healer". Maybe it's time to include music in our multidisciplinary team and thereby provide patients with a more enjoyable perioperative experience.

Towards improved theatre efficiency. a study of procedural times for common elective surgical procedures at Tygerberg Hospital

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Background: The number of surgical procedures that can be accommodated in the allotted time of a theatre slate can be difficult to predict. In many hospitals, theatre slates are booked according to potentially inaccurate estimations of procedural times. Furthermore, inaccurate time predictions can contribute towards sub-optimal utilisation of theatre time. This study was conducted at Tygerberg Hospital (TBH), a tertiary institution, to evaluate theatre procedural time parameters and predictions.

Objectives: To determine the average duration of common elective surgical procedures in TBH. We also aimed to determine if there are discrepancies between the estimates of procedural times made by surgeons and the actual procedural times for common surgical procedures.

Methods: A single-centre retrospective observational study was conducted. Data from January to December 2019 was captured from the hospital's electronic theatre records. Thirty-two elective procedures were selected and data, including total procedural, surgical and non-surgical time, was recorded and analysed. The duration of the five most frequently occurring procedures from this retrospective data was compared prospectively, over a five-month period, with the estimated procedural times and analysed to determine level of agreement.

Results: The time parameters of thirty-two common elective surgical procedures performed in this institution were recorded and tabulated. The cohort was further divided into minor and major surgery groups. Average mean non-surgical time for minor and major surgery was 36 and 44 minutes, respectively.

Prospective data analysis showed a statistically significant underestimation of procedural time when compared to the actual duration of total abdominal hysterectomy ($p = 0.011$), total hip replacement ($p < 0.001$), transurethral resection of the prostate ($p < 0.001$) and above knee amputation ($p = 0.013$).

Average procedural time underestimation for the five procedures ranged between 33% to 61%.

Conclusion: We anticipate that this data will assist with the accuracy of future procedural time estimates and ultimately have a beneficial effect on theatre efficiency at TBH.

The Tygerberg anaesthetic trainee theatre education environment measure (ATEEM) study

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Background: The postgraduate learning experience is an important component of the training of an anaesthesiology specialist. This may affect the quality of patient care, patient outcomes, service delivery, and the overall quality of the anaesthesiologist produced. The Anaesthetic Trainee Theatre Educational Environmental Measure (ATEEM) is a validated, feasible tool used to objectively measure the anaesthesia trainees' perception of the in-theatre learning environment (LE). The aim of this study is to determine how the theatre learning environment is perceived by the postgraduate anaesthesia trainees in the Department of Anaesthesiology and Critical Care (DACC) at Tygerberg Hospital.

Methods: This was a single-centre, prospective, descriptive, cross-sectional survey-based study. The data was collected using an online adapted version of the ATEEM questionnaire. The study population included all anaesthesia registrars in the DACC who have completed at least three months of registrar time. Descriptive statistics were used to calculate the total scores.

Results: A total of 52 (96.2%) surveys were included in the study. Overall, the LE was found to be perceived as more positive than negative, independent of gender, language, or race. These results are in keeping with local and international findings.

Conclusion: The adapted ATEEM questionnaire was found to be a useful tool in measuring the perception of the LE. Overall, the LE was perceived to be more positive than negative, with areas that require room for improvement. In future, this tool has the potential to be used for continual educational quality improvement in the DACC.

Quality of anaesthesia care in elective surgery at a Western Cape academic hospital in South Africa: a perioperative patient satisfaction survey

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Background: Anaesthesia care routinely extends to ensuring that patients are safely discharged from the post anaesthesia care unit with a clearly written plan for continued postoperative care. There is thus limited opportunity to engage with patients postoperatively, especially if wanting to assess their experience with the anaesthesia care provided.

Receiving feedback from end-users allows for meaningful and efficient application of quality improvement strategies.

At a Western Cape academic hospital in South Africa, patients' experiences and levels of satisfaction with anaesthesia care were evaluated to identify aspects of anaesthesia that could be improved to ensure that patients receive the best and safest care possible during the perioperative period.

Methods: A total of 200 participants were interviewed within 24 hours postoperatively after elective surgery in various surgical disciplines. They completed a Perception of Quality in Anaesthesia (PQA) questionnaire with the help of an independent non-anaesthetist research assistant.

The objectives of this study were to primarily determine the degree of patient satisfaction with anaesthesia care and secondarily to use the data collected to identify aspects of anaesthesia care that could be improved.

Results: The overall patient satisfaction rate with anaesthesia care was 88.13% (95% CI 82.8–91.8).

There was a statistically significant correlation between the patient level of education and the addressing of concerns pertaining to anaesthesia care, where 75.76% of patients with a college certificate level of education felt that anaesthetists failed to address their concerns about their anaesthetic management ($p = 0.003$).

Conclusion: While the overall satisfaction rate with anaesthesia care was high at this hospital and did not differ significantly between patients in different demographic groups, the more educated patients felt that anaesthetists did not address their concerns about their anaesthesia care adequately. The importance of communication, providing information and addressing patient concerns must be emphasised during clinical anaesthesia training and practice.

Knowledge, attitudes and practices of South African anaesthesiology registrars towards perioperative point-of-care viscoelastic testing

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Background: Perioperative bleeding contributes significantly to patient morbidity and mortality, while the cost of blood products is substantial. Viscoelastic testing (VET) forms part of the armamentarium for perioperative patient blood management. Presently there is a lack of published literature on the knowledge, attitudes and practices (KAP) of medical practitioners regarding VET. The objective of this study was to describe the KAP of South African anaesthesiology registrars regarding perioperative point-of-care VET.

Methods: A descriptive, cross-sectional study whereby a novel, electronic self-administered questionnaire was used as the data collection instrument. The study population consisted of South African anaesthesiology registrars who were part of the South African Society of Anaesthesiologists' electronic mailing list.

Results: Seventy-one completed questionnaires were received. Sixty-nine per cent of registrars were found to have adequate knowledge. Senior registrars were more likely to have adequate knowledge than junior registrars (statistically significant, $p = 0.043$). Of registrars, 64.7% had a positive attitude score towards perioperative VET. All registrars felt they would benefit from a formal education platform on VET. The overall median self-rated confidence score for interpreting VET results was 6/10. Senior registrars had a median self-rated confidence score of 6 vs 5 for junior registrars (statistically significant, $p = 0.005$). Registrars stated that a lack of VET consumables and trained technologists to administer the test was the greatest barrier to requesting VETs for patients at their respective institutions.

Conclusion: Overall knowledge scores were encouraging, however there's room for improvement, particularly at the junior registrar level. Targeted educational interventions should be implemented at both a local and national level. The lack of national guidelines should be addressed by a multidisciplinary team. Locally developed guidelines can serve as a tool for improving registrar knowledge of VET and can be used for improving uniformity in practices and standards across the various registrar training circuits in South Africa.

How accurate are anaesthetists in the visual estimation of weight and height in healthy adult volunteers?

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Background: Anaesthetists use body weight and height routinely to make multiple calculations. Studies have shown healthcare workers (HCWs) are poor estimators of weight and height. However, a paucity of data exists in this area with relation to anaesthetists. This study aimed at ascertaining anaesthetists' ability to accurately estimate the weight and height of healthy adult volunteers on visual inspection.

Methods: This was a single-centre-based, descriptive, observational cross-sectional study. Study participants included members from the Department of Anaesthesia at a tertiary academic hospital in South Africa. Data from 65 observations of eight healthy adult models were captured weekly over a 4-week period during July 2022. The primary objective was to assess the accuracy of anaesthetists' visual estimation of weight and height of the models, as well as calculations of body mass index (BMI) and an intubating dose of rocuronium. The secondary outcome determined if there existed a difference in estimation accuracy based on participant demography.

Results: Only 45% of anaesthetists accurately estimated models' weight to within 10% of their actual weight and subsequently determined the dose of rocuronium to within 10% of the correctly calculated dose. A total of 98% of anaesthetists accurately estimated height to within 10% of actual model height. No estimation differences were found based on participant demography.

Conclusion: Anaesthetists are poor estimators of weight. This parallels previous studies conducted on other HCWs. Further research is required to determine the clinical significance of these error rates and to delineate an acceptable margin of error.

Incidence and determinants of self-extubation in a tertiary care surgical intensive care unit of Pakistan: a retrospective analysis

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Aga Khan University, Pakistan

Background: Self-extubation is reported as one of the most common events in adult intensive care units worldwide. It is very difficult for an intensivist to maintain a balance between sedation and self-extubation.

Aim: The aim of our study is to find out the incidence and determinants of self-extubation in a tertiary care surgical intensive care unit (SICU).

Methods: A retrospective analysis was done from the hospital database of those who were self-extubated in the surgical intensive care unit for six calendar years. A data collection form was used to collect personal details, drugs used for sedation, sedation agitation score, pain score, nurse ratio, and use of restraint at the time of extubation were noted.

Results: A total of 618 patients were admitted to the SICU who required mechanical ventilation during the six calendar years. An overall 2.1% incidence of self-extubation was calculated with a documented 13 self-extubation episodes. The mean age of patients was 38.46 ± 16.97 years, with the majority of them being males. Most of the patients at the time of self-extubation were not restrained (9; 69.2%). Nurse to patient ratio was also found to be 1:1. Most of the patients (7; 53.8%) were not on any sedative drug infusion and the mean sedation agitation score at that time was 4.46 ± 2.02, while the mean pain score was 5.31 ± 2.72. Reintubation was performed in most patients (10; 76.9%) who had self-extubated.

Conclusion: Our study revealed a lower incidence of self-extubation and found a significant relationship between the incidence of self-extubation and the drugs used for sedation.

Incidence of hypothermia in patients presenting for emergency surgery in a regional hospital

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Background: Perioperative hypothermia is common and detrimentally affects perioperative outcomes. There is a paucity of literature regarding the incidence and predisposing factors of perioperative hypothermia in emergency surgery. We aim to determine the incidence of perioperative hypothermia in patients presenting for emergency surgery in a regional hospital.

Methods: After departmental approval, we performed a single operator, prospective audit. Convenience sampling of all patients undergoing emergency surgery requiring general or regional anaesthesia over 6-months or first 100 patients. Tympanic temperature measurements were taken prior to induction and before exiting theatre. Patients were managed with routine care. Demographic data collected included age, gender, ASA classification, type of surgery and anaesthesia, start time and use of a forced-air warmer (FAW). The primary outcome was any perioperative hypothermia. Secondary outcomes were incidence of preoperative hypothermia, degree of hypothermia and presence of a FAW in hypothermic cases. Data presented as numbers, percentages, mean or interquartile range.

Results: A total of 108 patients were sampled in 6 months; 69% were ASA II, 8% were under 16 years, and 15% were over 60 years old, 56% received general anaesthesia and 63% with a case duration of 1–2 hours.

Overall incidence of hypothermia was 32% (35/108), irrespective of the anaesthesia performed. All cases of hypothermia were mild, and, intraoperatively, 91% (32/35) of hypothermic patients had a FAW.

Preoperatively hypothermia was 7% (8/108).

Hypothermia occurred in 35% of ASA I, 31% ASA II, all ASA IV patients and in 42% of orthopaedic surgeries. Thirty-two per cent of cases longer than 2 hours and 36% of patients 17–59 years old were hypothermic.

Conclusion: In our setting, 1 in 10 patients are hypothermic preoperatively and overall, 1 in 3 patients are mildly hypothermic perioperatively. Current warming strategies appear ineffective; increased vigilance and improved screening of high-risk patients could help prevent perioperative hypothermia during emergency surgery.

Annual carbon footprint of volatile anaesthesia for a regional hospital

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Background: Global warming is the greatest threat facing the 21st century.

We aim to measure and estimate our carbon footprint for volatile anaesthesia over 12 months.

Methods: After institutional approval, we performed a descriptive audit and electronic ventilator data review of all cases presenting for general anaesthesia for November 2021–October 2022.

Exclusions were local, regional only, and total intravenous anaesthesia (TIVA).

Data captured includes age, case duration, medical gas (oxygen, air), nitrous oxide, and volatile agents consumed.

Data presented as numbers, percentages, mean or interquartile ranges, and mathematical calculations of estimated CO_2.

Results: In our five theatres and endoscopy unit, 8 300 cases were captured. Ventilator data was incomplete for 20 days and excluded. General anaesthesia was performed in 4 172 cases; 2% (80/4 172) required TIVA and 98% (4 092/4 172) received volatile anaesthesia; 66% (2 705/4 092) only isoflurane and 7% (281/4092) sevoflurane only. Paediatric cases (age < 16 years) were 19% of the caseload, with a 50% gas induction rate.

Total anaesthesia hours were 5 735 hrs, with a median case duration time of 1 hour 14 min; 34% of cases were less than 1 hour and 17% longer than 2 hours duration.

In 345 days, our unit consumed 658 kL oxygen, 145 kL air, 11 kL nitrous oxide, 51 L isoflurane and 19 L sevoflurane. The nitrous oxide and volatiles produced 48 860 kg of eCO_2, equivalent to travelling 191 530 km.

Conclusion: Volatile agents account for 5% of a hospital's carbon footprint but may be as high as 50% of a theatre's footprint. A regional hospital produces 49 tonnes of eCO_2 from volatile anaesthesia per year, which is equivalent to travelling halfway to the moon with a 1.6 L Polo Vivo. Assuming the four Western Cape regional hospitals are similar, their combined annual environmental impact would be the same as travelling to the moon and back.

An assessment of the quality of informed consent for peripheral nerve blocks of the upper and lower limb at Tygerberg Hospital

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Background: Peripheral nerve blocks are frequently used as anaesthesia and analgesia for surgery to the limbs. The benefits of their use are numerous; however, their performance is not without risks. An adequate informed consent process gives patients autonomy when deciding to undergo peripheral nerve blocks. However, the complex and foreign nature of anaesthesia-related procedures, compounded by the unique challenges of the South African public health system, can make this process difficult. This study aimed to evaluate the quality of informed consent for peripheral nerve blocks for surgery of the limbs at Tygerberg hospital.

Methods: A descriptive cross-sectional study was conducted between September 2020 and March 2021 amongst 72 surgical patients at Tygerberg hospital who had received peripheral nerve blocks as anaesthesia or analgesia for surgery to their limbs. An audit of documentation was conducted together with an interview administered survey to ascertain patients' perceptions of the informed consent process and knowledge of the procedure.

Results: The folder audit revealed 9.7% documentation of informed consent in patient notes, none of which was adequate by HPCSA standards. In 85% of patients, predominantly good perceptions of the informed consent process were noted, however the common negative responses revealed a pervasive lack of understanding of the availability of alternative options and that consent for the procedure can be withdrawn at any time. Good or excellent knowledge scores were achieved in 66% of patients, but unprompted recall of risks and benefits was poor.

Conclusion: The current procedures in place that give patients autonomy when deciding to have peripheral nerve blocks are substandard. Together with poor documentation, not all the key principles of informed consent are convincingly satisfied. Modification of current procedures and the use of available patient information sheets may improve the quality of informed consent for peripheral nerve blocks at Tygerberg Hospital.

Knowledge and practices of anaesthetists regarding the disposal of waste anaesthetic gases and sharps in a department of anaesthesiology

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Background: Anaesthesia providers are exposed daily to hazardous sharps and waste anaesthetic gases (WAG), and improper waste management can lead to detrimental health outcomes and an unsafe work environment. In South Africa, hazardous healthcare waste management is governed by South African legislation, standards and guidelines. The study assessed the knowledge and practices of anaesthetists pertaining to WAG and sharps disposal.

Methods: A prospective, contextual, descriptive research design was used. The study population consisted of anaesthetists working in the Department of Anaesthesiology at the University of the Witwatersrand (Wits). The questionnaire was developed following a review of the national legislation, standards, guidelines and relevant literature, thereby ensuring content validity. The questionnaire was reviewed by three senior consultants. A convenience sampling method was used. The data were collected through a self-administered questionnaire and analysed using Stata version 15 (StataCorp, USA).

Results: The results indicated that most of the anaesthetists had inadequate knowledge of the legislation governing WAG and sharps disposal, as well as the procedure for WAG and sharps disposal. Only 24.2% achieved a score of more than 60%, which is considered adequate knowledge for this questionnaire. The knowledge of sharps disposal was greater (62.5%) than that of WAG disposal (38.5%). WAG and sharps disposal practices varied, and only a few attended training.

Conclusion: The knowledge of anaesthetists of WAG and sharps disposal was poor, with the knowledge of sharps being greater than that of WAG. Training attendance was low, but no significant difference in the adequacy of knowledge between those who received training and those who did not. The results were concerning, as anaesthetists in this study work in a high-risk environment due to few-functioning scavenging systems and the high prevalence rate of the human immunodeficiency virus (HIV).

Anaesthetic and recovery room nurses: utilisation of currently available knowledge and skills training resources

Dr Ina (HC) Vorster,[1] Prof. Sandra Spijkerman[2]

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[2]*University of Pretoria, South Africa*

Background: Even though they are viewed as essential members of the anaesthesia team, there is no registered qualification for anaesthetic and/or recovery room nurses available in South Africa. This lack of training opportunities for anaesthetic and/or recovery room nurses in South Africa threatens quality assurance in theatre, theatre team efficiency and subsequently patient safety.

So, if no accredited training opportunities are available, how do anaesthetic and recovery room nurses acquire the essential skills and knowledge needed and are they willing to accept responsibility for their own teaching and learning development?

Methods: An attempt was made to partially answer these questions through a research survey with the title: *Anaesthetic and recovery room nurse training in South Africa: exploring the utilisation of currently available resources*.

A once-off, English-medium, anonymous, self-administered and previously adapted survey questionnaire, with a mixed methods study design, was completed online by anaesthetic and recovery room nurses who had attended the Nurse refresher programme of the SASA 2021 Virtual Congress and had supplied their email contact details. Forty-six completed responses were received.

Results: The results of the study will shed light on the preferences of this group of nurses and might enhance future knowledge and skills training of anaesthetic and recovery room nurses in South Africa, as well as lead to further research in this field.

Note: This research study was done as partial fulfilment of the requirements for the Postgraduate Diploma in Health Professions

Education and Research. Prof. Sandra Spijkerman of UP was the supervisor of the research study.

Perioperative ultrasound use in adult surgical patients to confirm position of central venous catheter placement compared to chest X-ray at a tertiary academic hospital in central South Africa

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Background: Mechanical complications related to central venous catheter (CVC) placement are mostly malpositioning of the CVC or causing a pneumothorax. Verification of a CVC's position by chest x-ray (CXR) is usually performed postoperatively. This prospective observational study assessed the diagnostic accuracy of perioperative ultrasound and a "bubble test" to detect malposition and pneumothorax.

Methods: The study included 61 patients undergoing perioperative CVC placement. An ultrasound protocol was used to directly visualise the CVC, perform the "bubble test", and assess for the presence of a pneumothorax. The time from agitated saline injection to the visualisation of microbubbles in the right atrium was evaluated to determine the correct position of the CVC. The time required to carry out the ultrasound assessment was also compared to that of conducting the CXR.

Results: CXR identified 12 (19.7%) malpositions, whereas ultrasound identified eight (13.1%) malpositions. Ultrasound showed a sensitivity of 0.85 (95% CI 0.72–0.93) and a specificity of 0.5 (95% CI 0.16–0.84). The positive and negative predictive values were 0.92 (95% CI 0.80–0.98) and 0.33 (95% CI 0.10–0.65), respectively. The median time for ultrasound assessment was significantly shorter at 4 minutes (IQR 3–6 minutes) compared to performing a CXR that required a median time of 29 minutes (IQR 18–56 minutes) ($p < 0.0001$).

Conclusion: This study showed that ultrasound produced a high sensitivity and a moderate specificity to detect CVC malpositioning, supporting its use as a rapid bedside screening test to detect malpositioning of a CVC.

Utilisation of the post-anaesthetic high care unit at Tygerberg Hospital: a retrospective audit

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Background: The post-anaesthesia high care unit (PAHCU) at Tygerberg Hospital is a short-stay high care unit that provides continuous monitored care to patients identified preoperatively as having an elevated risk for postoperative complications. The study's aim was to describe the patient population, utilisation and efficiency of this unit and to investigate the correlation between patient comorbidities, surgery type and risk for exceeding a 24-hour stay.

Methods: This is a single-centre, retrospective descriptive audit of 1 020 patients' data admitted from 1 January 2019 to 31 December 2020. All patients admitted were included. The primary outcome was the utilisation and efficiency of the unit. Secondary outcomes were the indication for admission, modes of analgesia used and length of stay.

Results: Of the 1 020 patients, 69 (6.76%) patients exceeded 24-hour stay. In total, 889 (87.2%) were pre-planned admissions and 130 (12.8%) unplanned, one patient died, and 11 (1.07%) patients were transferred to ICU for further management. Bed occupancy was 86.8% during weekdays in 2019 and 58.13% in 2020. Patients with aortic stenosis had 4.36 (95% CI 1.23–15.41, $p = 0.022$) times the odds of exceeding a 24-hour PAHCU stay. Additional significant factors included ages < 40 ($p = 0.01$) and > 61 ($p = 0.006$), admission for epidural care ($p = 0.015$), haemodynamic monitoring ($p < 0.001$), and patients that was admitted from the general surgery department ($p = 0.014$).

Conclusion: PAHCU admissions are appropriate as the mortality rate, ICU transfer rate and patients exceeding a 24-hour stay were low. With a bed occupancy of 86.80% in 2019, the running of the unit can be considered efficient.

Initial assessment of a video laryngoscope quality score for intubation in obstetric general anaesthesia

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Background: Various grading systems have been developed to describe the view during laryngoscope and/or difficulty experienced during intubation, such as the Cormack–Lehane grading system, percentage of glottic opening and the Fremantle score. However, not all are validated for the use of a video laryngoscope(VL), and focus on the view obtained and ease of intubation, rather than the quality of the technique of the operator. There are no existing studies that examine VL technique to identify individual factors which correlate with performance in obstetric patients. We aimed to analyse intubations recorded in terms of a proposed video laryngoscope quality score (VLQS) using time to intubation as a surrogate outcome.

Methods: This retrospective, descriptive analysis assessed prospectively gathered intubation recordings from an existing Obstetric Airway Management Registry (ObAMR). It documents all cases of airway management in obstetric patients undergoing general anaesthesia at four different sites. Two hundred and sixty-six existing videos were screened, of which 70 met the inclusion criteria. Three unsuccessful intubations were reviewed separately; thus, a total of 67 videos were analysed. We designed an eight-point VQLS score based on perceived markers of quality of VL technique. Two investigators independently assessed the time to intubation, glottic view, Fremantle grading and VLQS.

Results: Preliminary results indicate an association between higher VLQS and shorter intubation times. Long intubation times were uniformly associated with poor VLQS, with the effect remaining consistent in linear regression. Inter-rater reliability of individual VLQS factors varied from poor to excellent. Further analysis demonstrates which VLQS factors are most consistently associated with rapid intubation.

Conclusion: Several presumed markers of quality of VL intubation technique were associated with more rapid intubation. Focusing training on improving these aspects may improve intubation times, but it still needs to be prospectively assessed and validated. Ultimately, this may increase success and reduce complications during intubations in the unpredictable difficult obstetric airway.

How do we learn? SASA 2021 research feedback

Dr Ina (HC) Vorster

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Even though they are an essential member of the anaesthesia team, there is no registered qualification for anaesthetic and/or recovery room nurses available in South Africa. This lack of training opportunities for anaesthetic and/or recovery room nurses in South Africa threatens quality assurance in theatre, theatre team efficiency and subsequently patient safety.

So, how do anaesthetic and recovery room nurses learn and develop?

An attempt was made to partially answer this question through a research survey with the title: *Anaesthetic and recovery room nurse training in South Africa: exploring the utilisation of currently available resources*.

A once-off, English-medium, anonymous, self-administered and previously adapted survey questionnaire, with a mixed methods study design, was completed online by anaesthetic and recovery room nurses who had attended the Nurse refresher programme of the SASA 2021 Virtual Congress and had supplied their email contact details. A total of 46 completed responses was received.

The survey included four categories: demographics, background training, acquisition of knowledge and skills and responses to some clinical scenarios.

The results of the study will be conveyed during the presentation and might enhance future knowledge and skills training of anaesthetic and recovery room nurses in South Africa, as well as lead to further research in this field.

Note: This research study was done as partial fulfilment of the requirements for the Post-graduate Diploma in Health Professions Education and Research.

This topic is not for any of the Nurse prizes due to conflict of interest but intended for the general Nurse programme

The opportunity will also be used to provide information about SASA Nurse membership, SASA Annual conference, Nurse Refresher courses and SASA Branch Nurse programmes.