

The clinical profile of patients referred for preoperative anaesthetic evaluation at Chris Hani Baragwanath Academic Hospital

Riyaadh Motalib

A research report submitted to the Faculty of Health Sciences, University of the Witwatersrand, Johannesburg in partial fulfilment of the requirements for the degree of Master of Medicine in the branch of Anaesthesiology.

Johannesburg, 2022

Declaration

I, Riyaadh Motalib declare that this research report is my own unaided work. It is being submitted for the Degree of Master of Medicine in the branch of Anaesthesiology at the University of the Witwatersrand, Johannesburg. It has not been submitted before for any degree or examination at any other University.



14 March 2022

Abstract

Background

Preoperative anaesthetic evaluation of patients that are due to undergo surgery is an integral component of providing safe anaesthesia to high-risk surgical patients. There is a paucity of data in South Africa regarding the clinical profile of patients referred for formal preoperative anaesthetic evaluation. The aim of this study was to describe the profile of patients referred for preoperative anaesthetic consultations at Chris Hani Baragwanath Academic Hospital based on their clinical and surgical factors, perioperative risk profile and anaesthetic recommendations.

Methods

A retrospective study using consecutive sampling was done by reviewing the 271 records of the preoperative anaesthetic consultations done from 1 January 2019 to 31 December 2019. Age was analysed as a continuous variable and is reported using mean and standard deviation. All other variables were categorical and are summarised using counts and percentages.

Results

The mean (SD) age of patients referred was 49.9 (19.3) years. There was a predominance (80.1%) of female patients, with obstetrics accounting for the majority (38.1%) of all referrals. Most patients had multiple comorbidities with hypertension prevailing as the most common comorbidity. Regarding risk stratification, most patients were classified as ASA-PS three (55.9%), with an effort tolerance of more than four METS (74.6%) and a RCRI score of one (51.0%). The anaesthetic recommendations made showed that 98.5% of patients were fit for anaesthesia of which 85.2% could proceed to surgery without delay and 14.8% required a delay in surgery for further optimisation. Modification of anaesthetic technique was recommended in 196 (74.2%) of these patients. From the 137 (51.9%) patients requiring further optimisation a total of 383 modalities of optimisation were requested. This encompassed 57 medical treatment modalities, 213 further investigations and 113 interdisciplinary consultations.

Conclusion

This study has given us further insight on the clinical profile and perioperative requirements of high-risk patients requiring surgery at CHBAH. It has emphasised the importance of the preoperative anaesthetic consultation in providing safe and quality care to all patients presenting for surgery.

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Abbreviations

ACC	American College of Cardiology
ACS NSQIP	American College of Surgeons National Surgical Quality Improvement Program
AHA	American Heart Association
APOC-GSH	Anaesthetic Pre-operative Clinic at Groote Schuur Hospital
ASA	American Society of Anesthesiologists
ASA-PS	American Society of Anesthesiologists' Physical Status
BMI	Body mass index
CHBAH	Chris Hani Baragwanath Academic Hospital
ESA	European Society of Anaesthesiology
ESC	European Society of Cardiology
HIV	Human immunodeficiency virus
ICU	Intensive care unit
MACE	Major adverse cardiac events
MDT	Multidisciplinary team
METS	Metabolic equivalents
RCRI	Revised Cardiac Risk Index
SASA	South African Society of Anaesthesiologists
SD	Standard deviation
SOP	Standard operating procedure

Statement

The Research Report consists of a literature review, draft article, study proposal and appendices. The study proposal is included for background reference and is not for examination.

The formatting of this Research Report complies with the University of the Witwatersrand's Style Guide for Theses, Dissertations and Research Reports. The formatting of the draft article may differ from the author guidelines of the Southern African Journal of Anaesthesia and Analgesia, the journal to which it is intended to be submitted, in order to comply with the university's style guide.

Section 1: Review of the literature

1.1 Introduction

More than 200 million people undergo a variety of surgical procedures around the world every year (1). There is a worldwide increase in both the complexity of medical comorbidities and surgical procedures, with a growing number of complex patients who are also having ambulatory surgery (1, 2). A preoperative evaluation plays a pivotal role in improving the surgical-anaesthetic safety and quality of care in all patients (3, 4). Australian studies have shown that 14% of perioperative complications and 39% of anaesthesia related deaths were attributed to inadequate and/or insufficient preoperative evaluation (3, 5).

1.2 The preoperative assessment

The preoperative evaluation refers to the meticulous assessment of a patient that is conducted by an anaesthetist prior to an anaesthetic-requiring procedure (3, 6). This allows one to formulate a safe anaesthetic plan after identifying and mitigating possible risks (7). The evaluation includes the pre-, intra- and postoperative periods with input from a multidisciplinary team (1, 7). It involves identifying patient-specific medical comorbidities and acute illnesses that are potentially correctable in order to decrease surgical risk and improve patient care (6, 7).

The South African Society of Anaesthesiologists (SASA) (8) as well as the American Society of Anesthesiologists (ASA) (9) have published guidelines highlighting the different aspects of a preoperative evaluation (2, 8, 9). These provide an aid regarding pre-anaesthesia care of patients who are due to undergo any procedure under anaesthesia or sedation (8). The preoperative anaesthetic evaluation involves review of medical records, conducting a detailed medical interview and physical examination, as well as appropriate diagnostic testing and review of the results thereof (2, 8-10). Decisions regarding stabilisation of medical conditions and the need for further investigations, sub-speciality consultations and anaesthesia reassessment are made (6, 10). Patients are informed about possible anaesthetic options available to them, as well as the associated risks and informed consent is obtained during the preoperative assessment (6).

Depending on the facility, there are various methods, ranging from general ward assessments to preoperative clinics whereby a preoperative assessment is done and this continues to evolve with time (1, 7). The ideal time of performing the preoperative assessment is as early as possible, which can be several days or weeks prior to surgery (11, 12). This allows time for implementation of required investigations, optimisation of medical comorbidities and further planning with the surgical team (13).

1.3 Anaesthetic preoperative evaluation clinics

Over the past few decades there has been a global increase in the development of preoperative anaesthetic evaluation clinics with numerous benefits being identified using this modality of preoperative evaluation (14). Consultations done in a preoperative anaesthetic clinic decrease the need for unnecessary or prolonged hospital admissions of patients prior to surgery, as once a problem is identified, further work-up, investigations and consultations can be done on an outpatient basis. This facilitates better utilisation of hospital beds and also helps to prevent day-of-surgery cancellation of cases (1, 6, 15). A study conducted at the University of Chicago Hospitals showed that patients assessed at the preoperative clinic were cancelled less than those who had not been consulted (16).

In addition, if patients are appropriately consulted preoperatively with their risk factors identified and interventions put in place, there is a decreased risk of complications arising in the postoperative period which may otherwise result in the need for a high dependency care bed and prolonged hospital stay which could increase hospital costs (1). The cost of running a preoperative clinic is mitigated by the savings realised by decreased cancellation of cases, more efficient use of theatre time, reduced preoperative hospital admission stay and decreased postoperative complications (1, 17).

Outpatient preoperative anaesthetic consultation and work-up can enhance patient satisfaction in multiple ways as it may prevent unnecessary and prolonged hospital admission both pre and postoperatively and may also allow for patients to be admitted on the day of surgery (15). The preoperative anaesthetic consultation can allay the stress and anxiety that patients experience regarding their surgical

and anaesthetic care (6, 15, 16). This has the benefit of offsetting the possible socioeconomic and emotional factors that patients and their families experience regarding missing work, extended family care and financial costs that can result from a longer hospital stay (14).

Although anaesthetic preoperative clinics have numerous benefits, there are also several limiting factors that need to be considered. The biggest of these is the resulting financial implications (17). A larger patient load will require more resources and a larger budget (16). Daily staff allocations, staff shortages and a high volume of patients also present a logistical problem which should be considered (17). It must also be noted that the anaesthesiologist that consults the patient in the preoperative clinic may not necessarily be the same person that is going to provide anaesthetic care during the procedure which can also be regarded as a disadvantage (10).

1.4 Risk stratification

After the patient's information has been consolidated and a patient profile has been developed, all patients need to be risk stratified to ensure that they are in optimal physical condition to undergo their planned surgery (11). An American Society of Anesthesiologists' Physical Status (ASA-PS) score, otherwise referred to as the ASA classification is assigned to a patient (18). This ASA classification is a worldwide subjective classification that ranges from class one to six and is used to stratify patients according to their underlying comorbidities (2, 18). Patients with a higher classification are said to be at high-risk for perioperative adverse events. However, this classification does not take into consideration the type of surgery (19).

A multifaceted approach to risk stratification which includes patient-specific variables, surgery-specific risk and the patient's functional capacity is recommended by various international guidelines such as those endorsed by the American College of Cardiology (ACC) and American Heart Association (AHA) (20) as well as the United Kingdom National Institute for Health and Care Excellence (12, 21, 22). Risk stratification continues to evolve with time with many risk stratification tools being developed to assist in identifying the high-risk patient (19). These include the ASA-PS classification (18), the Revised Cardiac Risk Index (RCRI) (23) and the American

College of Surgeons National Surgical Quality Improvement Program (ACS NSQIP) (24).

1.5 International literature on patient risk profiles

Assessment of the clinical profile data of patients seen within a hospital is invaluable to general patient management. The information obtained regarding the pathophysiological characteristics of the patient population presenting for surgery can assist the facility and its' staff to provide a safer, effective and better quality service (3). Data collected from preoperative assessments provides information for researchers to investigate epidemiological factors, the clinical profile and risk stratification of their patients. International studies have shown that the profile of patients referred for preoperative evaluation differs depending on different patient populations as well as each institute having different protocols and triage systems for referral (3). Despite previous and current literature highlighting the importance of patient profiling within the context of the preoperative assessment, only two international studies on patient profiles could be found (3, 15).

A study conducted at the Hospital Universitário Gaffrée e Guinle in Brazil (3) looking at the epidemiological profile of patients seen at their preoperative assessment clinic showed a predominance of female patients aged 18-59 years (mean age of 56.12 +- 15.3 years), of which 67.2% of these patients were overweight. Regarding medical comorbidities, 71.3% of patients referred had associated illnesses, of which hypertension affected half of the patients. This was followed by a high prevalence of diabetes mellitus, lung disease and dyslipidaemia. More than two thirds of patients used chronic medication of which antihypertensives and antidiabetic agents were the most commonly used drugs. Only 11% of patients were smokers. The majority (64.4%) of patients had an ASA-PS classification of ASA two. With regard to the functional classification of patients, 65.6% had a moderate functional capacity (METs $\geq$ four) and 12% had a low functional capacity (METs < four). The majority of patients were undergoing general surgical procedures, followed by urological and gynaecological surgeries. Only 6.7% of patients required further specialist referral with cardiology being the predominant speciality (3).

Another study at Toronto Hospital in Canada (15) showed that a total of 570 patients were referred to their pre-admission anaesthesia clinic over a one year period. The mean age of patients referred was 62.2 +- 16 years and 70% of all their referrals were also female. The majority (63%) of patients had an ASA-PS classification of two and 30% were classified as ASA-PS three. Sixty percent of patients were referred for cardiovascular related problems of which coronary artery disease and hypertension were the most common comorbidities. This was followed by endocrine and respiratory illnesses, with diabetes mellitus and asthma predominating in this group of patients. Orthopaedics, ophthalmology and general surgery were the most common specialities that referred patients for preoperative evaluation. Thirty-five percent of patients seen required further testing which encompassed haematological, biochemical, arterial blood gas analysis, radiological assessment as well as electrocardiography, echocardiography and pulmonary function tests (15). Nine percent of patients required specialist consultations with the majority of these being cardiology, endocrine and general medicine consultations (15).

1.6 South African literature on patient risk profiles

Within the South African context, there is a paucity of data available regarding the profile of patients referred for formal preoperative anaesthetic evaluation. A study done at the Anaesthetic Pre-operative Clinic at Groote Schuur Hospital in Cape Town in 2014 (25) included all 53 patients seen at their clinic over a one year period. Sixty-two percent of patients referred were above the age of 60 years and more than half of the patients seen were female. The surgical speciality that referred the highest number of patients was general surgery, followed by orthopaedics, gynaecology, urology, neurosurgery, otorhinolaryngology and vascular surgery. Regarding risk assessment, 81% of patients had an ASA-PS classification of three and above, and 40% of patients had a RCRI score of two and above. The outcomes of these consultations showed that 53% of patients could proceed to surgery without further investigation or treatment. Of the remaining 47% of patients, 21% required further optimisation prior to surgery, 18% required modification of their anaesthetic plan and 8% had to forego surgery. Amongst the 21% of patients who required optimisation, adjustment of chronic medication was the most common intervention

instituted. Eighteen percent of patients required sub-speciality referrals of which 11% were for cardiology review (25).

1.7 Conclusion

Chris Hani Baragwanath Academic Hospital (CHBAH) situated in Soweto, Johannesburg, serves a very large patient population who present with a multitude of illnesses. Whilst CHBAH does not have a designated preoperative assessment clinic, current practice at the hospital allows for referrals for anaesthetic consultations to be made on a daily basis across all surgical specialities. A registrar-consultant pair then consults these patients in the wards. The preoperative consultation allows for patients presenting for surgery to be adequately optimised and thus minimises surgical delays and cancellations within this hospital setting.

1.8 Summary

This literature review explores the importance of a preoperative anaesthetic evaluation in ensuring the provision of safe and quality anaesthesia to all patients and particularly to the high-risk patient presenting for surgery. Whilst many international studies have been done focusing on the advantages and results of the global trend of outpatient preoperative anaesthetic evaluation clinics, there is a paucity of data on the actual clinical profile of patients referred for formal preoperative anaesthetic evaluation both in the South African and international literature. This differs between healthcare facilities as each institution provides different healthcare services catering to different patient populations, with each facility also having different referral criteria for preoperative anaesthetic evaluation.

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Section 2: Author's guidelines

[Southern African Journal of Anaesthesia and Analgesia \(SAJAA\)](#)

Submitted manuscripts that are not in the correct format and without the required supporting documentation specified in these guidelines will be returned to the author(s) for correction and will delay publication.

AUTHORSHIP

Named authors must consent to publication **by signing a covering letter** which should be submitted as a supplementary file. Authorship should be based on substantial contribution to:

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- (ii) drafting or critical revision for important intellectual content; and
- (iii) approval of the version to be published. These conditions must all be met (uniform requirements for manuscripts submitted to biomedical journals; refer to www.icmje.org); and
- (iv) exact contribution of each author must be stated.

DECLARATION OF CONFLICT OF INTEREST

Authors must declare all sources of support for the research and any association with a product or subject that may constitute a conflict of interest. If there is no conflict of interest to declare please include the following statement: The authors declare no conflict of interest.

FUNDING SOURCE

All sources of funding should be declared. Also define the involvement of study sponsors in the study design, collection, analysis and interpretation of data; the writing of the manuscript; the decision to submit the manuscript for publication. If the study sponsors had no such involvement, this should be stated as follows: No funding source to be declared.

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Authors are advised to involve medical statisticians at the protocol stage of their research project: to plan sample size, and the selection of appropriate statistical tests for analysis and presentation.

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Identifying information should not be published in written descriptions, photographs, and pedigrees unless the information is essential for scientific purposes and the patient (or parent or guardian) gives informed written consent for publication. The patient should be shown the manuscript to be published. Refer to www.icmje.org.

ETHNIC CLASSIFICATION

The rationale for analysis based on racio-ethnic-cultural categorisation should be indicated.

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Shorter items are more likely to be accepted for publication, owing to space constraints and reader preferences.

Original articles

Original articles on research relevant to anaesthesia and analgesia should not exceed 3 200 words, no more than 30 references, with up to 6 tables or figures. A structured abstract under the following headings, Background, Methods, Results, and Conclusions is a requirement and should not exceed 300 words.

Clinical Review articles

Review articles relevant to anaesthesia and analgesia should not exceed 2 400 words, with a maximum of 20 references and no more than 6 tables or figures. A summary of 300 words or less is required.

Case reports

Case reports should not exceed 1 800 words with no more than 10 references. Figures are limited to 2 figures and may include images or photographs. The case report should have three headings: Summary (not exceeding 100 words), Case report (with no introduction) and Discussion. Case reports will be published online only. The summary and the URL will appear in the printed version.

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Scientific Letters should not exceed 2 400 words with a maximum of 10 references. Only one table or illustration is permissible. A structured abstract under the following headings, Background, Methods, Results, and Conclusions, is a requirement and should not exceed 250 words.

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This information must be provided for ALL authors and must be submitted as a supplementary file.

Email addresses of all author must be provided.

ORCID number of **ALL** authors must be provided - if authors do not have ORCID, please register at <https://orcid.org/>

Abbreviations

All abbreviations should be spelt out when first used and thereafter used consistently, e.g. 'intravenous (IV)' or 'Department of Health (DoH)'.

Scientific measurements

Scientific measurements must be expressed in SI units except blood pressure (mmHg) and haemoglobin (g/dl). Litres is denoted with a lowercase 'l' e.g. 'ml' for millilitres). Units should be preceded by a space (except for %), e.g. '40 kg' and '20 cm' but '50%'. Greater/smaller than signs (> and 40 years of age) should also be preceded by a space e.g. > 20 years. No spaces should precede $\pm$ and $^{\circ}$, i.e. '35 $\pm$ 6' and '19 $^{\circ}$ C'.

Numbers should be written as grouped per thousand-units, i.e. 4 000, 22 160...

Quotes should be placed in single quotation marks: i.e. The respondent stated: '...' Round **brackets** (parentheses) should be used, as opposed to square brackets, which are reserved for denoting concentrations or insertions in direct quotes.

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The manuscript must be in Microsoft Word or RTF document format. Text must be 1,5-spaced, in 12-point Times New Roman font, and contain no unnecessary formatting (such as text in boxes, except for Tables). *The manuscript must be free of track changes.*

Disclaimers should follow the Conclusion and it should be in the following order: Acknowledgements, Declaration conflict of interest, Funding source, Ethics declaration and ORCID.

ILLUSTRATIONS AND TABLES

If tables or illustrations submitted have been published elsewhere, the author(s) should provide consent to republication obtained from the copyright holder.

Tables may be embedded in the manuscript file **and** provided as '**supplementary files**'. They must be numbered in Arabic numerals (1,2,3...) and referred to consecutively in the text (e.g. 'Table 1'). Tables should be constructed carefully and simply for intelligible data representation. Unnecessarily complicated tables are strongly discouraged. Tables must be cell-based (i.e. not constructed with text boxes, tabs or enters) and accompanied by a concise title and column headings. Footnotes must be indicated with consecutive use of the following symbols: * † ‡ § ¶ || then ** †† ‡‡ etc.

Figures must be numbered in Arabic numerals and referred to in the text e.g. '(Figure 1)'. Figure legends: Figure 1: 'Title...'. All illustrations/figures/graphs must be of **high resolution/quality**: 300 dpi or more is preferable, but images must not be resized to increase resolution. Unformatted and uncompressed images must be attached as '**supplementary files**' upon submission (not embedded in the accompanying manuscript). TIFF and PNG formats are preferable; JPEG and PDF formats are accepted, but authors must be wary of image compression. Illustrations and graphs prepared in Microsoft PowerPoint or Excel must be accompanied by the original workbook.

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Authors must verify references from the original sources. *Only complete, correctly formatted reference lists will be accepted.* Reference lists may be generated with the use of reference manager software, but the final document must be delinked from the reference database or otherwise generated manually. Citations should be inserted in the text as superscript, e.g. These regulations are endorsed by the World Health Organization,² and others.^{3,4-6} The superscript reference number should come after the punctuation mark and should not be in brackets.

All references should be listed at the end of the article in numerical order of appearance in the **Vancouver style** (not alphabetical order). Approved abbreviations of journal titles must be used; see the List of Journals in Index Medicus. Names and initials of all authors should be given; if there are more than six authors, the first four names should be given followed by et al. First and last page, volume and issue numbers should be given. **Wherever possible, references must be accompanied**

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Section 3: Draft article

The clinical profile of patients referred for preoperative anaesthetic evaluation at Chris Hani Baragwanath Academic Hospital

Riyaadh Motalib, MBChB (UKZN), DA (SA)

Megan Wellbeloved, MBChB (UCT), Dip PEC (SA), DA (SA), FCA (SA), MMed (Anaes)

Department of Anaesthesiology, School of Clinical Medicine, Faculty of Health Sciences, University of the Witwatersrand

Corresponding Author

R Motalib

Department of Anaesthesiology
Chris Hani Baragwanath Academic Hospital
26 Chris Hani Rd
Diepkloof, Soweto
Johannesburg
1860

riyaadh0@gmail.com

+27 11 933 9334

Key words: preoperative anaesthetic assessment, preoperative anaesthetic evaluation, epidemiological profile, clinical profile, preoperative clinic

Abstract

Background

Preoperative anaesthetic evaluation of patients that are due to undergo surgery is an integral component of providing safe anaesthesia to high-risk surgical patients. There is a paucity of data in South Africa regarding the clinical profile of patients referred for formal preoperative anaesthetic evaluation. The aim of this study was to describe the profile of patients referred for preoperative anaesthetic consultations at Chris Hani Baragwanath Academic Hospital based on their clinical and surgical factors, perioperative risk profile and anaesthetic recommendations.

Methods

A retrospective study using consecutive sampling was done by reviewing the 271 records of the preoperative anaesthetic consultations done from 1 January 2019 to 31 December 2019. Age was analysed as a continuous variable and is reported using mean and standard deviation. All other variables were categorical and are summarised using counts and percentages.

Results

The mean (SD) age of patients referred was 49.9 (19.3) years. There was a predominance (80.1%) of female patients, with obstetrics accounting for the majority (38.1%) of all referrals. Most patients had multiple comorbidities with hypertension prevailing as the most common comorbidity. Regarding risk stratification, most patients were classified as ASA-PS three (55.9%), with an effort tolerance of more than four METS (74.6%) and a RCRI score of one (51.0%). The anaesthetic recommendations made showed that 98.5% of patients were fit for anaesthesia of which 85.2% could proceed to surgery without delay and 14.8% required a delay in surgery for further optimisation. Modification of anaesthetic technique was recommended in 196 (74.2%) of these patients. From the 137 (51.9%) patients requiring further optimisation a total of 383 modalities of optimisation were requested. This encompassed 57 medical treatment modalities, 213 further investigations and 113 interdisciplinary consultations.

Conclusion

This study has given us further insight on the clinical profile and perioperative requirements of high-risk patients requiring surgery at CHBAH. It has emphasised the importance of the preoperative anaesthetic consultation in providing safe and quality care to all patients presenting for surgery.

Introduction

More than 200 million people undergo a variety of surgical procedures around the world every year (1). There is a worldwide increase in both the complexity of medical comorbidities and surgical procedures, with a growing number of complex patients who are also having ambulatory surgery (1, 2). A preoperative evaluation, specifically when conducted formally in the form of a preoperative assessment, plays a pivotal role in improving the surgical-anaesthetic safety and quality of care in all patients (3, 4). The South African Society of Anaesthesiologists (SASA) (5) as well as the American Society of Anesthesiologists (ASA) (6) have published guidelines highlighting the different aspects of a preoperative evaluation (2, 5, 6). Australian studies have shown that 14% of perioperative complications and 39% of anaesthesia related deaths were attributed to inadequate and/or insufficient preoperative evaluation (3, 7).

A multifaceted approach to risk stratification which includes patient-specific variables, surgery-specific risk and the patient's functional capacity is recommended by various international guidelines (8-11). Risk stratification continues to evolve with time with many risk stratification tools being developed to assist in identifying the high-risk patient (12). These include the American Society of Anesthesiologists' Physical Status (ASA-PS) classification (13) and the Revised Cardiac Risk Index (RCRI) (14). Subjective assessment of functional status using questions to establish metabolic equivalents (METs) are also used (12). There are various methods and locations whereby a preoperative assessment is done (1, 15). This should be done timeously to allow for implementation of required interventions and patient optimisation (9, 16, 17).

Multicentre as well as individual centre surveys on risk profiles of patients presenting for preoperative assessment allows for facilities to improve upon healthcare provision more appropriately. This will consequently result in improved quality of care, patient satisfaction and efficiency in utilisation of hospital resources. Internationally (3, 18), two contextual studies have shown that the profile of patients referred for preoperative anaesthetic evaluation differs depending on different patient populations as well as each institute having different protocols and triage systems for

referral (3, 18). Within the South African context, there is also a paucity of data available regarding the profile of patients referred for formal preoperative anaesthetic evaluation.

Chris Hani Baragwanath Academic Hospital (CHBAH) situated in Soweto, Johannesburg, serves a very large patient population who present with a multitude of illnesses. Whilst CHBAH does not have a designated preoperative assessment clinic, current practice at the hospital allows for referrals for anaesthetic consultations to be made on a daily basis across all surgical specialities. A registrar-consultant pair then consults these patients in the wards. The preoperative anaesthetic consultation allows for patients presenting for surgery to be adequately optimised and thus minimises surgical delays and cancellations within this hospital setting.

The aim of this study was to retrospectively describe the profile of patients referred for preoperative anaesthetic consultations at CHBAH based on their clinical and surgical factors, perioperative risk profile and anaesthetic recommendations.

Methods

A retrospective, contextual, descriptive research study design was used after approval to conduct the study was obtained by the University of the Witwatersrand Human Research Ethics Committee (Medical) (M200879) and other relevant authorities.

The study was conducted in the Department of Anaesthesiology at CHBAH. CHBAH is a 2888 bed tertiary hospital. It has 25 operating theatres which cater to a wide variety of surgical specialities. This includes general surgery, trauma, obstetrics, gynaecology, paediatric surgery, urology, orthopaedics, burns, vascular surgery, neurosurgery, maxillofacial surgery, otorhinolaryngology, ophthalmology, audiology and interventional radiology. CHBAH does not have a cardiothoracic surgery department. On average 65 000 theatre cases are done annually.

The study population was the paper based records of the preoperative anaesthetic consultations done at CHBAH. The sample size was determined in consultation with

a biostatistician. The minimum sample size calculated was 157, with a 5% error, for a 95% confidence interval. However, all 271 preoperative anaesthetic consultation records were evaluated for the one year study period from 1 January 2019 to 31 December 2019. A consecutive sampling method was used. Records of patients under the age of 18 years were excluded. Duplicate records were included as not all patient information may have been available at the initial consultation and some patients were consulted for more than one procedure during the study period.

Data were captured by the primary author. Data were collected from the preoperative anaesthetic consultation record forms which were filed and kept in the Department of Anaesthesiology at CHBAH. Patients' data were captured directly onto a Microsoft Excel® data collection spreadsheet. Patient confidentiality was maintained as no patient identifying information was recorded on the data collection sheet as each patient was allocated a study number. A separate password protected Microsoft Excel® spreadsheet containing patient names, hospital numbers and study numbers was generated to ensure anonymity. Only the study number was used during data analysis. No records were removed from the hospital premises.

Data were collected according to demographics, surgical, clinical and social factors. Data collected also included risk stratification using the ASA-PS classification, RCRI score and effort tolerance. Anaesthetic recommendations made from the assessment were also documented.

Data were analysed in consultation with a biostatistician using the R Statistical Environment version 4.04 software. Age was analysed as a continuous variable and is reported using mean and standard deviation (SD). All other variables were categorical and are summarised using counts and percentages. The association between patient factors and recommendations made were analysed using Chi-squared tests where both variables were nominal. Where the data were ordinal (ASA-PS and RCRI scores), the data were analysed using a Cochran-Mantel-Haenszel test. There were missing data for certain variables and thus only datasets with complete records across these variables were used. A p-value of < 0.05 was considered statistically significant. All percentages were rounded off to one decimal place and therefore, may not add up to 100%.

Results

A total of 271 preoperative anaesthetic consultations were found for the period 1 January 2019 to 31 December 2019. From the 271 records, 217 (80.1%) were female and 54 (19.9%) were male. The mean (SD) age was 49.9 (19.3) years. The mean (SD) age of female patients was 47.4 (19.2) years and the mean (SD) age of male patients was 59.8 (16.8) years. Race, as well as socioeconomic status were not documented on the consultation forms.

The referring surgical discipline was documented in 218 records, whilst 200 records stipulated the proposed surgical procedure. The disciplines together with the most common surgical procedures are shown in Table 1. Each surgical procedure was categorised into low, intermediate and high risk based on the European Society of Cardiology (ESC) and the European Society of Anaesthesiology (ESA) guidelines (26). These categories are also shown in Table 1.

Table 1: Referring surgical disciplines and planned procedures of patients referred

	Number (n)	Percentage (%)
Referring surgical discipline	218	100.0
Obstetrics	83	38.1
Orthopaedics	43	19.7
Gynaecology	36	16.5
Urology	21	9.6
General surgery	18	8.3
Vascular surgery	12	5.5
Otorhinolaryngology	4	1.8
Neurosurgery	1	0.5
Most common surgical procedures	NA	NA
Obstetrics		
Caesarean section	81	NA
Gynaecology		
Total abdominal hysterectomy	12	NA
Diagnostic dilation and curettage	4	NA
Orthopaedics		
Femur intramedullary nail	8	NA
Open reduction and internal fixation femur	5	NA
Total hip replacement	5	NA
Open reduction and internal fixation humerus	4	NA
Urology		
Nephrectomy	4	NA
Surgical risk	200	100.0
Low risk	51	25.5
Intermediate risk	133	66.5
High risk	16	8

NA: Not applicable

Table 2 shows the most common comorbidities as well as the common classes of chronic medication that were used by 244 patients within the dataset. Note that some patients had multiple comorbidities and used more than one class or agent of medication, therefore percentages are not applicable. It was noted that weight, height and body mass index (BMI) were not included on the preoperative anaesthetic consultation form and thus not documented.

Table 2: Comorbidities and chronic medication of patients referred

	Number (n)
Most common comorbidities	
Hypertension	147
Anaemia	67
Human immunodeficiency virus	53
Diabetes mellitus	52
Hypertensive heart disease	45
Obesity	44
Cancer	40
Cardiac failure	36
Pulmonary hypertension	34
Chronic kidney disease	33
Chronic obstructive pulmonary disease	27
Dyslipidaemia	25
Obstructive sleep apnoea	23
Commonly used chronic medication	
Diuretics	112
Anti-coagulant/ anti-platelet agents	77
Beta-blockers	70
Chronic analgesia	67
Calcium-channel blockers	62
Angiotensin converting enzyme inhibitors	49
Anti-diabetic agents	44
Anti-retroviral agents	43
Corticosteroids	20

When looking at the social habits of this sample group, 267 and 266 of the preoperative anaesthetic consultation forms documented smoking and alcohol use respectively. It was noted that 59 (22.1%) patients were smokers, and 36 (61%) of these patients were male. Conversely, 192 (92.3%) of non-smokers were female. Only 27 (10.2%) patients reported alcohol use, of which 14 (51.9%) were male and 13 (48.1%) were female.

Table 3 shows the risk stratification data of patients referred. There were 265 complete records for ASA status, 255 complete records for effort tolerance, referred to as metabolic equivalents (METs) and 210 complete records for RCRI score. Specific risk factors under the RCRI score are also shown. Note that some patients would have different and/or more than one risk factor, hence a percentage calculation is not applicable.

Table 3: Risk stratification of patients referred

	Number (n)	Percentage (%)
ASA-PS score	265	100.0
ASA 1	1	0.4
ASA 2	104	39.2
ASA 3	148	55.9
ASA 4	12	4.5
ASA 5	0	0
ASA 6	0	0
Effort tolerance	255	100.1
METS < 4	65	25.5
METS 4-10	172	67.5
METS > 10	18	7.1
RCRI score	210	100.1
RCRI 0	47	22.4
RCRI 1	107	51.0
RCRI 2	49	23.3
RCRI 3	6	2.9
RCRI 4	1	0.5
RCRI 5	0	0
RCRI 6	0	0
RCRI risk factors	NA	NA
High risk surgery	119	NA
Congestive cardiac failure	49	NA
Renal insufficiency (creatinine > 177umol/l)	17	NA
Cerebrovascular disease	15	NA
Ischaemic heart disease	10	NA

NA: Not applicable

* Percentages may not add up to 100% because of rounding off to one decimal place.

From the 271 preoperative anaesthetic consultations done, there were three (1.1%) incomplete anaesthetic records. From the complete records, 264 (98.5%) patients were fit for anaesthesia. Two (0.75%) patients were deemed unfit for anaesthesia, with recommendations made for further medical management. Both patients had multiple comorbidities with ASA-PS scores of four, effort tolerance less than four METS and RCRI scores of three and four respectively. Two (0.75%) patients were consulted for post anaesthesia concerns following spinal anaesthesia for caesarean section. These were post-dural puncture headache and paraparesis post spinal anaesthesia. Further investigations and management were recommended.

Of the 264 patients who were deemed fit for anaesthesia, 225 (85.2%) patients could proceed to surgery without delay, while 39 (14.8%) patients required a delay in surgery for further optimisation. A total of 146 (55.3%) of these patients required post-operative high dependency care monitoring with either the intensive care unit (ICU) or high-care being their required post-operative destination. Figure 1 and Figure 2 show the recommendations made for these two groups of patients.

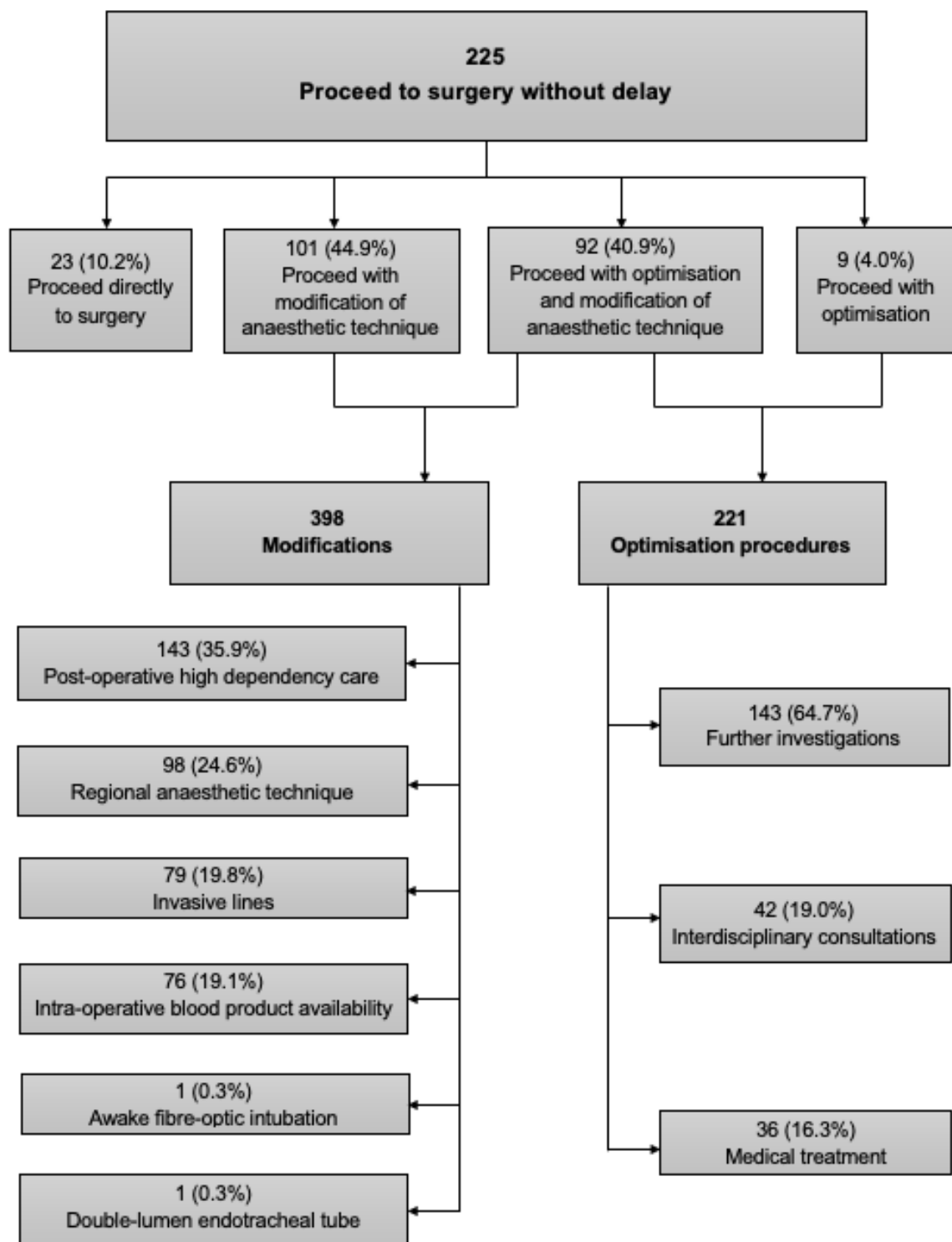


Figure 1: Anaesthetic recommendations made from the preoperative anaesthetic consultations of patients who could proceed to surgery without delay

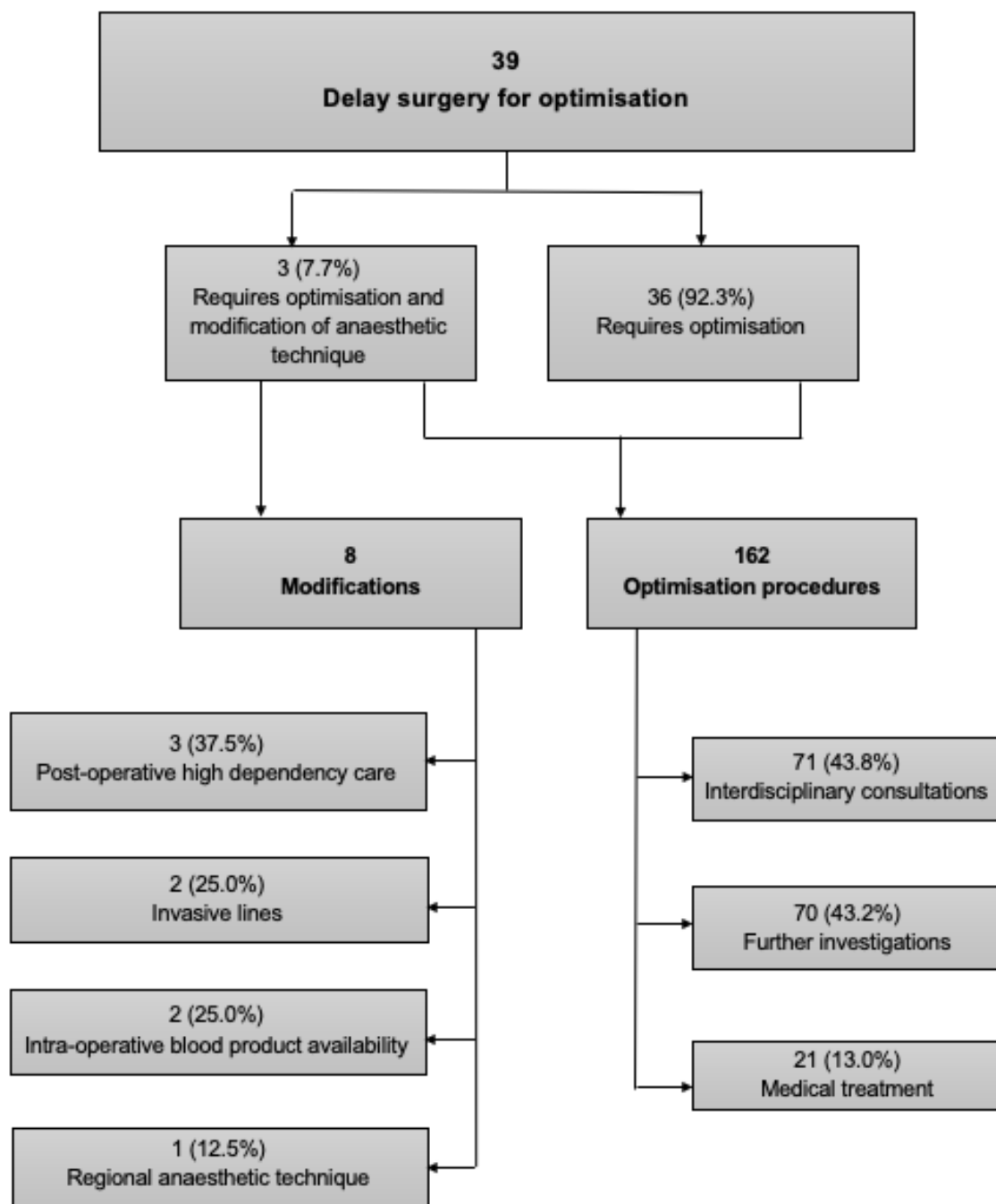


Figure 2: Anaesthetic recommendations made from the preoperative anaesthetic consultations of patients who required delay of surgery for further optimisation

Table 4 shows the modalities of optimisation recommended from these preoperative anaesthetic consultations.

Table 4: Further optimisation recommendations made from the preoperative anaesthetic consultations

Modality of optimisation	Number (n)	Percentage (%)
Medical treatment	57	NA*
Pharmacological treatment	41	71.9
Blood transfusion	14	24.6
Dialysis	1	1.8
Intubation and ventilation	1	1.8
Investigations	213	NA*
Blood test	54	25.4
Echocardiogram	40	18.8
Electrocardiogram	34	16.0
Arterial blood gas	33	15.5
X-ray	31	14.5
Pulmonary function test	12	5.6
Computed tomography scan	3	1.4
Computed tomography pulmonary angiogram	2	0.9
Angiogram	1	0.5
Doppler of leg	1	0.5
Exercise stress test	1	0.5
Magnetic resonance imaging	1	0.5
Interdisciplinary consultation	113	NA*
Repeat anaesthesiology consultation	43	38.1
Internal medicine	22	19.5
Cardiology	18	15.9
Multidisciplinary team meeting	12	10.6
Nephrology	3	2.7
Endocrinology	2	1.8
Intensivist/ critical care	2	1.8
Pulmonology	2	1.8
Radiology	2	1.8
Cardiothoracic surgery	1	0.9
Haematology	1	0.9
Otorhinolaryngology	1	0.9
Psychiatry	1	0.9
Trauma surgery	1	0.9
Urology	1	0.9
Vascular surgery	1	0.9

NA: Not applicable

* Percentages for each modality of optimisation are not applicable as each patient may have needed more than one medical treatment, investigation and interdisciplinary consultation. Within each modality, percentages are calculated using the total number for the modality as the denominator.

When looking at the association between the clinical factors of patients and the anaesthetic recommendations made during the preoperative anaesthetic consultations, the only statistically significant association was between ASA-PS classification and whether surgery was delayed, could proceed or could proceed with optimisation/modifications ($p = 0.011$). An ASA-PS classification of three was the most frequent score in the delay group (87% of patients in the group), while ASA-PS classification of two was the most frequent score in the proceed with surgery without delay group (78% of patients in the group). Patients in the proceed with modifications/optimisation category were split over ASA-PS two (42%) and ASA-PS three (55%).

There was no statistically significant association between age group being above or below 50 years ($p = 0.133$), sex ($p = 0.176$), smoking ($p = 0.071$), alcohol use ($p = 0.152$) and RCRI score ($p = 0.373$), and whether surgery was delayed, could proceed or could proceed with optimisation/modifications.

Discussion

A total of 271 patients above the age of 18 years were referred for formal preoperative anaesthetic evaluation during the one-year study period at CHBAH. This was less than the 570 and 491 patients referred to the established anaesthetic preoperative evaluation clinics in studies done in Canada (18) and Brazil (3) respectively. However, within the South African context this was greater than the 53 patients referred to the Anaesthetic Pre-operative Clinic at Groote Schuur Hospital (APOC-GSH) in Cape Town (20). This could be attributed to each institution having different referral criteria and surgical patient loads. CHBAH also allows for referrals to be made on a daily basis whereas the APOC-GSH was a weekly run clinic.

Direct comparisons of certain variables to findings obtained in other studies was difficult due to the use of different variables and statistical analysis. With a mean (SD) age of 49.9 (19.3) years, a much younger patient population was referred for preoperative anaesthetic evaluation at CHBAH when compared to those from the study done in Cape Town (a range of 30-87 years), and the two international studies (3, 18, 20). The mean (SD) ages of patients referred was 62.2 (16) years in the

Canadian study (18) and 56.2 (15.3) years in the Brazilian study (3). The younger mean age from our study may be attributed to obstetrics accounting for 38.1% of all referrals at CHBAH.

With 80.1% of referred patients being female, CHBAH saw a much larger female patient load compared to 58% in the Cape Town (20), 70% in the Canadian (18) and 64% in the Brazilian (3) studies. This may be as a result of obstetrics and gynaecology being the most common referring surgical discipline which collectively accounted for 54.6% of all referrals at CHBAH. This was in contrast to general surgery being the most common referring surgical discipline in both the Cape Town (20) and Brazilian (3) studies, accounting for 34% and 37.3% of all referrals respectively, whereas at CHBAH general surgery accounted for only 8.3% of all referrals. Orthopaedics was the second most common referring surgical discipline at CHBAH (19.7%) and in the Cape Town study (28%) but was the most common referring surgical discipline in the Canadian study (18). Despite vascular surgery making up only 5.5% of referrals in our study, this discipline accounted for the greatest number of high-risk surgical procedures (62.5%). These patients often have many underlying pre-existing comorbidities placing them at high risk of perioperative adverse events.

Obstetric patients made up the bulk of all referrals and all of these patients were referred for caesarean section. CHBAH performs caesarean sections for all levels of obstetric care. This was the overall most common surgical procedure in our study for which a preoperative anaesthetic evaluation was sought. The clinical profile of these obstetric patients showed that the majority of them were primarily referred for pre-existing cardiovascular comorbidities with cardiomyopathy, congenital heart disease, rheumatic heart disease and pulmonary hypertension prevailing as the most common reasons for referral. This can be alluded to concerns regarding possible cardiac decompensation during pregnancy as a result of pregnancy related physiological changes. Scoliosis and placenta praevia major were the most common non-cardiac reasons for referral. All of these patients may pose a challenge during labour and delivery and thus require adequate preoperative planning from the entire management team. Risk stratification of these obstetric patients showed that the majority had a good functional capacity (METs greater than four), with a RCRI score

of one and an ASA-PS score of two. Most of these patients could proceed to surgery with 64.2% of them requiring post-operative high dependency care monitoring.

Hypertension was the most common comorbidity encountered in our study, affecting 147 patients which was similar to findings in the Brazilian study (3) where it affected 50.1% of patients. This was much higher than the 19% of patients with hypertension in the developed world Canadian study (18). Anaemia (which may be a sequelae of chronic disease) and human immunodeficiency virus (HIV) were also listed amongst the three most common comorbidities in our study. Both these comorbidities were not noted in any of the studies done elsewhere, both locally and internationally (3, 18, 20). This is probably due to the high rates of HIV in South Africa. Of concern is that 18.9% of HIV positive patients in our study were not taking antiretroviral medication. This further highlights the different disease burdens and possible constraints in access to healthcare encountered in developing countries compared to developed countries, as well as the disparity in access to healthcare within the different provinces of South Africa. Obesity and obstructive sleep apnoea were also common comorbidities afflicting patients in our study. These two illnesses pose serious perioperative risks and therefore require additional perioperative planning.

Anti-hypertensives were the overall most common chronic medication being taken at CHBAH which was in keeping with hypertension being the most common comorbidity afflicting patients in our study. This was similar to the Brazilian study (3). However, diuretics were the most common class of anti-hypertensives used at CHBAH, whilst it was angiotensin converting enzyme inhibitors and angiotensin receptor blockers in the Brazilian study (3). This can be attributed to different drug classes being used for these different patient populations.

In our study 22.1% of patients were smokers compared to the 11% in the Brazilian study (3). This was despite a large proportion of this number being driven by the small amount of males in our study who accounted for more than two thirds of smokers in this sample. This could be a result of majority of female patients being pregnant with 93.8% of these pregnant patients being non-smokers in our study. Twenty-seven patients in our study population also had chronic obstructive pulmonary disease, indicating the burden of disease of smoking in our population.

Subjective effort tolerance reported by the patient is used as one of the tools of risk stratification in our setting because of our resource limited environment. A patient should be able to perform more than four METS to cope with the demands of major surgery (12). A quarter (25.5%) of patients had a poor functional capacity (METS less than four) at CHBAH which was slightly less than the 30% recorded in the Cape Town study (20) but double that of the 12.6% in the Brazilian study (3).

CHBAH had a majority (60.4%) of patients with an ASA-PS score of three and above which was less than the 81% in the Cape Town study (20). This subjective assessment places these South African patients as possibly being at higher risk for perioperative adverse events when compared to the Brazilian and Canadian studies that had a predominance of lower risk patients with an ASA-PS score of two (3, 18). However, it should be noted that this classification does not take into consideration the surgery-specific risk. Furthermore, half (50.9%) of the patients seen at CHBAH had a RCRI score of one placing them at low risk of perioperative major adverse cardiac events (MACE), with only 2.9% of patients classified as high-risk for MACE. This was in contrast to the 40% of patients being of moderate-to-high-risk in the Cape Town study (20). When looking further into the risk factors encompassing the RCRI score, undergoing high-risk surgery was the main risk factor recorded in CHBAH as opposed to it being ischaemic heart disease in the Cape Town study (20). This further highlights the different comorbidity profiles and patient populations seen at these two hospitals. The APOC-GSH in Cape Town may also have specific patient criteria for referral to their preoperative anaesthetic clinic, whereas there are no specific referral criteria at CHBAH which may influence the amount and profile of patients referred for assessment.

Of the 85.2% of patients that could proceed to surgery without delay in our study, only 10.2% could do so without any further optimisation in contrast to 53% in the Cape Town study (20). A total of 14.8% of patients in our study required a delay in surgery for further optimisation in comparison to 21% in the Cape Town study (20). This could be due to more patients in the Cape Town study being risk stratified as high-risk when compared to the patients in our study.

Further pharmacological optimisation was requested in only 41 patients in our study population and this could possibly be due to there being minimal room for further improvement of chronic conditions prior to surgery, as many of these patients were already on treatment. An important point to note is that despite 67 patients having anaemia, only 14 of them required preoperative blood transfusions, whilst 78 patients merely required intraoperative blood product availability. Despite there being no standard operating procedure (SOP) regarding blood transfusions at CHBAH, this could be due to more stringent blood transfusion triggers being adopted by individual anaesthetists which may be patient and surgical procedure dependent.

However, of note is that almost half (46.6%) of patients required further investigations when compared to the 17% in the Cape Town study (20) and 35% in the Canadian study (18). Despite patients' safety always being a priority, cognisance needs to be made of whether cancellation and delaying surgery by requesting further investigations and treatment will actually alter the anaesthetic management, as in the absence of any indication to perform a specific investigation, routine testing has not shown any improvement in patient outcomes and is also not cost-effective (21).

A repeat anaesthetic consultation was the most common interdisciplinary consultation requested at CHBAH, which was in contrast to it being cardiology in all the other studies noted (3, 18, 20). The predominance of repeat anaesthetic consultations being requested can be alluded to anaesthetists taking the role of perioperative physicians and thus often formulating their own plan of management for each individual patient with there often being limited potential for further significant preoperative optimisation. Multidisciplinary team (MDT) meetings were also requested in our study sample which was not recorded in any other studies that were looked at (3, 18, 20). This may be of great benefit as each member of the team brings their own unique skills and expertise to patient management. Despite high dependency care unit beds being a finite resource at CHBAH, it was requested in 55.3% of our study population. It remains unknown what proportion of these patients were actually eligible for postoperative high dependency care monitoring as CHBAH ICU requires all patients to be presented at an MDT meeting before an ICU bed may be allocated for elective surgical procedures. It is also unknown what proportion of

patients required postoperative high dependency care monitoring in all the studies compared to (3, 18, 20).

With the numerous benefits of outpatient anaesthetic preoperative evaluation clinics being documented in the medical literature (22), we recommend that this modality of preoperative assessment should be considered at CHBAH where current practice only allows for patients to be assessed as inpatients. However, the feasibility and resources required to operate one of these clinics in an already overburdened healthcare system is something that must also be taken into account. Therefore, considerations should be made to initially plan for a designated obstetric preoperative clinic as obstetrics accounted for more than a third of patients referred in our study.

We also recommend to have standardised protocols in place regarding referral criteria and requirements needed prior to preoperative anaesthetic consultation as an aid for the referring surgical disciplines to avoid unnecessary and repeat consultations. Formal training of anaesthetists in point of care transthoracic ultrasound is also recommended as apart from this decreasing the reliance on cardiology consultations for echocardiograms, it can also assist in preoperative assessment and intraoperative cardiac monitoring of patients. The current preoperative anaesthetic evaluation form used by the Department of Anaesthesiology should be updated and improved upon. Factors such as weight, height, BMI, proposed surgical procedure, proposed date of procedure as well as designated sections for risk stratification tools should be included on the form to ensure uniformity and completeness. Staff education on preoperative assessment and record keeping should be conducted as there were varying degrees of missing information on the preoperative evaluation forms.

There were certain limitations of this study. Being a contextual study conducted in a single centre, the results obtained are limited to the patient population seen at CHBAH. Further multicentre studies including both the public and private sectors should be considered in the future. Being a retrospective study, some preoperative anaesthetic records may have been illegible, inaccurate or incomplete as a result of poor record keeping. The assessment and recommendations made during the

preoperative anaesthetic consultations were subjective to the opinion of the anaesthetist conducting the consultation as different anaesthetists are assigned to preoperative anaesthetic consultations every day. The anaesthetist that does the consultation may also not necessarily be the same anaesthetist that conducts the anaesthesia on the day of surgery. Patients below the age of 18 years were excluded from this study and thus the clinical profile of patients in this age group who are seen at CHBAH remains unknown. It also remains unknown what the postoperative outcomes were for all these patients who were referred for preoperative anaesthetic evaluation.

Conclusion

The results obtained in this study gives us further insight into the clinical profile and perioperative requirements of high-risk patients requiring surgery at CHBAH. This can now allow for measures to be put in place to further improve current healthcare services and thus ensure that safe and quality care is afforded to all patients presenting for surgery at CHBAH.

Conflict of interest

The authors declare that we have no financial or personal relationships which may have inappropriately influenced us in writing this paper.

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Section 4: Proposal

The clinical profile of patients referred for preoperative anaesthetic evaluation at Chris Hani Baragwanath Academic Hospital

Riyaadh Motalib

0702468J

Supervisor	Megan Wellbeloved Department of Anaesthesiology
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4.1 Introduction and problem statement

More than 200 million people undergo a variety of surgical procedures around the world every year (1). There is a worldwide increase in both the complexity of medical comorbidities and surgical procedures, with a growing number of complex patients who are also having ambulatory surgery (1, 2). A preoperative evaluation plays a pivotal role in improving the surgical-anaesthetic safety and quality of care in all patients (3, 4). Australian studies have shown that 14% of anaesthetic/surgical complications and 39% of anaesthesia related deaths were attributed to inadequate and/or insufficient preoperative evaluation (3).

The preoperative evaluation refers to the meticulous assessment of a patient that is conducted by an anaesthetist prior to an anaesthetic-requiring procedure (3, 5). This allows one to formulate a safe anaesthetic plan after identifying and mitigating possible risks (6). The evaluation includes the pre-, intra- and postoperative periods with input from a multidisciplinary team (1, 6). It involves identifying patient-specific medical comorbidities and acute illnesses that are potentially correctable in order to decrease surgical risk and improve patient care (5, 6).

The South African Society of Anaesthesiologists (SASA) (7) as well as the American Society of Anesthesiologists (ASA) (8) have published guidelines highlighting the different aspects of a preoperative evaluation (2, 7, 8). These provide an aid regarding pre-anaesthesia care of patients who are due to undergo any procedure under anaesthesia or sedation (7). The preoperative anaesthetic evaluation also involves review of medical records, conducting a detailed medical interview and physical examination, as well as appropriate diagnostic testing and review of the results thereof (2, 7-9). Decisions regarding stabilisation of medical conditions and the need for further investigations, sub-speciality consultations and anaesthesia reassessment are made (5, 9). Patients are informed about possible anaesthetic options available to them, as well as the associated risks and informed consent is obtained during the preoperative assessment (5).

Depending on the facility, there are various methods, ranging from general ward assessments to preoperative clinics whereby a preoperative assessment is done and this continues to evolve with time (1, 6). The ideal time of performing the preoperative assessment is as early as possible, which can be several days or weeks prior to surgery (10, 11). This allows time for implementation of required investigations, optimisation of medical comorbidities and further planning with the surgical team (12).

After the patient's information has been consolidated and a patient profile has been developed, all patients need to be risk stratified to ensure that they are in optimal physical condition to undergo their planned surgery (10). An American Society of Anesthesiologists' Physical Status (ASA-PS) score is assigned to a patient (13). This ASA classification is a worldwide subjective classification that ranges from class I-VI and is used to stratify patients according to their underlying comorbidities (2, 13). Patients with a higher classification are said to be at high-risk for perioperative adverse events. However, this classification does not take into consideration the type of surgery (14).

A multifaceted approach to risk stratification which includes patient-specific variables, surgery-specific risk and the patient's functional capacity is recommended by various international guidelines such as those endorsed by the American College of Cardiology (ACC) and American Heart Association (AHA) (15) as well as the United Kingdom National Institute for Health and Care Excellence (11, 16, 17). Risk stratification continues to evolve with time with many risk stratification tools being developed to assist in identifying the high-risk patient (14). These include the ASA-PS classification (13), the Revised Cardiac Risk Index (RCRI) (18) and the American College of Surgeons National Surgical Quality Improvement Program (ACS NSQIP) (19).

Data collected from preoperative assessments provides information for researchers to investigate epidemiological factors, the clinical profile and risk stratification of their patients. Internationally, various contextual studies have shown that the profile of patients referred for preoperative evaluation differs depending on different patient

populations as well as each institute having different protocols and triage systems for referral (3).

A study done at the Hospital Universitário Gaffrée e Guinle in Brazil (3) looking at the epidemiological profile of patients seen at their preoperative assessment clinic showed a predominance of female patients aged 18-59 years (mean age of 56.12 $\pm$ 15.3 years), of which 67.2% of these patients were overweight. Regarding medical comorbidities, 71.3% of patients referred had associated illnesses, of which hypertension affected half of the patients. This was followed by a high prevalence of diabetes mellitus, lung disease and dyslipidaemia. More than two-thirds of patients used chronic medication of which antihypertensives and antidiabetic agents were the most commonly used drugs. Only 11% of patients were smokers. Majority (64.4%) of patients had an ASA-PS classification of ASA II. With regard to the functional classification of patients, 65.6% had a moderate functional capacity (METs $\geq$ 4) and 12% had a low functional capacity (METs < 4). The majority of patients were undergoing general surgical procedures, followed by urological and gynaecological surgeries. Only 6.7% of patients required further specialist referral with cardiology being the predominant speciality (3).

Another study done at Toronto Hospital in Canada (20) showed that a total of 570 patients were referred to their pre-admission anaesthesia clinic over a one year period. The mean age of patients referred was 62.2 $\pm$ 16 years and 70% of all their referrals were also female. The majority (63%) of patients had an ASA-PS classification of ASA II and 30% were classified as ASA III. Sixty percent of patients were referred for cardiovascular related problems of which coronary artery disease and hypertension were the most common comorbidities. This was followed by endocrine and respiratory illnesses, with diabetes mellitus and asthma predominating in this group of patients. Orthopaedics, ophthalmology and general surgery were the most common specialities that referred patients for preoperative evaluation. This reflected the distribution of patients at this hospital. Thirty-five percent of patients seen required further testing which encompassed haematological, biochemical, arterial blood gas analysis, radiological assessment as well as electrocardiography, echocardiography and pulmonary function tests (20).

Nine percent of patients required specialist consultations with the majority of these being cardiology, endocrine and general medicine consultations (20).

Within the South African context, there is a paucity of data available regarding the profile of patients referred for formal preoperative anaesthetic evaluation. A study done at the Anaesthetic Preoperative Clinic at Groote Schuur Hospital in Cape Town in 2014 (21) included all 53 patients seen at their clinic over a one year period. Sixty-two percent of patients referred were above the age of 60 years and more than half of the patients seen were female. The surgical speciality that referred the highest number of patients was general surgery, followed by orthopaedics, gynaecology, urology, neurosurgery, otorhinolaryngology and vascular surgery. Regarding risk assessment, 81% of patients had an ASA grading classification of three and above, and 40% of patients had a RCRI score of two and above. The outcomes of these consults showed that 53% of patients could proceed with surgery. Of the remaining 47% of patients, 21% required further optimisation prior to surgery, 18% required modification of their anaesthetic plan and 8% had to forego surgery. Amongst the 21% of patients that required optimisation, adjustment of chronic medication was the most common intervention instituted. Eighteen percent of patients required sub-speciality referrals of which 11% were for cardiology review (21).

Chris Hani Baragwanath Academic Hospital (CHBAH) situated in Soweto, Johannesburg, serves a very large patient population who present with a multitude of illnesses. Whilst CHBAH does not have a designated preoperative assessment clinic, current practice at the hospital allows for referrals for anaesthetic consultations to be made on a daily basis across all surgical specialities. A registrar-consultant pair then consults these patients in the wards. As the surgical burden placed on the hospital continues to grow, this allows for patients presenting for surgery to be adequately optimised and thus minimises surgical delays and cancellations. The clinical profile of patients being referred for preoperative anaesthetic consultations at CHBAH is not known.

4.2 Aim and objectives

4.2.1 Aim

The aim of this study is to retrospectively describe the profile of patients referred for preoperative anaesthetic consultations at CHBAH based on their clinical and surgical factors, perioperative risk profile and anaesthetic recommendations.

4.2.2 Objectives

The primary objectives of this study are to describe the following aspects of patients referred for preoperative anaesthetic consultations:

- demographics
- surgical factors
- clinical factors
- perioperative risk profile/ risk stratification
- anaesthetic recommendations:
 - proceed with surgery
 - modification of anaesthetic technique
 - delay surgery for optimisation
 - not fit for anaesthesia.

The secondary objective of this study is to determine if there is any association between patients' surgical and clinical factors to the anaesthetic recommendations made.

4.3 Research assumptions

The following definitions will be used in this study.

Anaesthetist: any qualified doctor working in the Department of Anaesthesiology including interns, medical officers, registrars and consultants.

Medical officer: a qualified doctor practising in the Department of Anaesthesiology under specialist supervision.

Career medical officer: a medical officer with more than 10 years of experience.

Registrar: a qualified doctor who is registered with the Health Professions Council of South Africa as a trainee anaesthetist.

Consultant: a specialist anaesthetist or career medical officer.

Preoperative consultation: a formal preoperative assessment done by an anaesthetist on a patient that is referred for an anaesthetic consultation by a surgeon.

Records: completed preoperative anaesthetic consultation assessment form.

Adult: a person 18 years and older.

Child: a person younger than 18 years.

Low risk surgery: superficial surgery, breast, dental, endocrine: thyroid, eye, reconstructive, carotid asymptomatic, minor gynaecological, urological and orthopaedic surgery (22).

Intermediate risk surgery: intraperitoneal, carotid symptomatic, peripheral arterial angioplasty, endovascular aneurysm repair, head and neck surgery, neurological or orthopaedic: major, urological or gynaecological: major, renal transplant, intra-thoracic (non-major) (22).

High risk surgery: aortic and major vascular surgery, open lower limb revascularisation or amputation or thromboembolectomy, duodeno-pancreatic surgery, liver resection, bile duct surgery, oesophagectomy, repair of perforated bowel, adrenal resection, total cystectomy, pneumonectomy, pulmonary or liver transplant (22).

Anaemia: haemoglobin of less than 10 (23).

4.4 Demarcation of study field

The study will be conducted in the Department of Anaesthesiology at CHBAH affiliated to the Faculty of Health Sciences of the University of the Witwatersrand. CHBAH is a 2888 bed tertiary hospital located in Soweto, Gauteng. It has 25 operating theatres which cater to a wide variety of surgical specialities. This includes general surgery, trauma, obstetrics, gynaecology, paediatric surgery,

urology, orthopaedics, burns, vascular surgery, neurosurgery, maxillofacial surgery, otorhinolaryngology, audiology, ophthalmology and interventional radiology. On average 65 000 cases are done annually.

4.5 Ethical considerations

Approval to conduct the study will be obtained from the Human Research Ethics Committee (Medical) and the Graduates Studies Committee of the University of the Witwatersrand. Permission to conduct the study will also be obtained from CHBAH's Medical Advisory Committee (Appendix 1). Approval to access the medical records will be obtained from the Head of the Department of Anaesthesiology at CHBAH (Appendix 2).

Anonymity and confidentiality:

This study will be done retrospectively. Data will be collected without patient identifying information being recorded on the data collection sheet as each patient will be allocated a study number. Neither the name of the patient nor the name of the anaesthetist will be recorded on the data collection sheet. A separate list with patient names, hospital numbers and study numbers will be generated and kept separately as a password protected Microsoft Excel® spreadsheet to ensure anonymity. Only the researcher and supervisor will have access to the raw data. All data will be securely stored electronically on a password protected database for six years after completion of the study.

This study will be conducted according to the principles of the Declaration of Helsinki (24) and the South African Guidelines for Good Clinical Practice (25).

4.6 Research methodology

4.6.1 Research design

The research design of a study refers to the set of logical steps taken by the researcher in order to answer the research question and thus maximise the validity of the study (26).

A retrospective, contextual, descriptive research design will be followed in this study. A retrospective study design measures variables that have occurred in the past (26). This is applicable to this study as the data will be obtained from previously completed anaesthetic records from 1st January 2019 to 31st December 2019. A contextual study is focused on a particular group of people and is representative of a “small scale world” (27). This study is contextual as it will only analyse records at CHBAH. A descriptive study aims to describe variables being investigated with the researcher not manipulating any of these variables (26). This study will describe the various variables of patients referred for preoperative evaluation at CHBAH.

4.6.2 Study population

The study population will be the records of the preoperative anaesthetic consultations done at CHBAH.

4.6.3 Study sample

Sample size

The sample size was determined in consultation with a biostatistician. The sample size was based on the number of preoperative anaesthetic consultations done and the number of elective procedures performed, as well as the data available from the preoperative consultation records over the one year study period. It was calculated that the minimum sample size would be $n=157$, with a 5% error, for a 95%

confidence interval. However, all 271 preoperative anaesthetic records will be evaluated for the entire year of the study period.

Sampling method

In this study a consecutive, convenience sampling will be used. Consecutive sampling refers to when every person from an accessible population that meets the inclusion criteria is admitted into the study over a specified time period or until the sample size is met (28). Convenience sampling refers to selecting the most conveniently available population as participants (28). A consecutive, convenience sampling method will be used as all records fulfilling the inclusion criteria will be used for data collection.

Inclusion and exclusion criteria

The inclusion criteria for this study are all the preoperative anaesthetic consultations done at CHBAH on all adult patients across all surgical disciplines during the one year study period. This will include incomplete and illegible preoperative anaesthetic records. Records of patients under the age of 18 years will be excluded.

4.6.4 Data collection

Data collection process

Data will be collected from CHBAH once all approvals to conduct the study have been obtained. Data will be collected from the preoperative anaesthetic consultations record forms which are filed and kept in the Department of Anaesthesiology at CHBAH (Appendix 3). All data will be collected by the primary researcher only. Patients' data will be captured directly onto a Microsoft Excel® data collection spreadsheet (Appendix 4). Data capturing will be done in the Department of Anaesthesiology at CHBAH by a single researcher. Records will not be removed from the hospital premises.

4.6.5 Data analysis

Data collected will be analysed using Microsoft Excel® and descriptive statistics. Means and standard deviation will be used to analyse continuous variables that are normally distributed, whilst medians and interquartile ranges will be used for not normally distributed variables. Categorical data will be analysed using frequencies, proportions and percentages (Appendix 5). The association between patient factors and recommendations made will be analysed using Chi-squared test for categorical variables and t-test or ANOVA for continuous data normally distributed. The Mann Whitney U test or Kruskal-Wallis test will be used if continuous data is not normally distributed.

4.7 Significance of the study

The data analysed from this study will provide insight into the profile of patients requiring preoperative anaesthetic consultations at CHBAH, which are done in order to improve patient outcomes, prevent avoidable complications, minimise theatre delays, improve resource utilisation and minimise costs and wastage of resources. This will improve the understanding regarding the reasons for referral, the surgical disciplines and procedures for which consultations are requested as well as the anaesthetic recommendations made during these consultations

4.8 Validity and reliability of the study

The validity of a study refers to whether a study is accurate and truthful in its findings (26, 29) and reliability is a measure of the stability of a study and whether it has the ability to be repeatable (26).

Steps to protect the validity and reliability of this study will include a single data collector, collecting data using appropriate techniques, analysis of a standard preoperative anaesthetic consultation form assessing the same parameters for each patient, ensuring the sample is representative, making use of inclusion and exclusion criteria and double-checking data at the time of data capture.

4.9 Potential limitations of the study

Limitations of a study are the restrictions, problems or weaknesses of a study which can increase the generalisability of the findings (26, 29).

This is a contextual study as it is limited to the population of patients receiving preoperative anaesthetic consultations at CHBAH. Therefore, the results may not be generalisable to patients at other hospitals. Potential limitations of this being a retrospective study is that some preoperative anaesthetic records may be illegible, inaccurate or incomplete as a result of poor record keeping. Some preoperative anaesthetic consultation records may also be missing. The assessment and recommendations made during the preoperative anaesthetic consultation is subjective to the level of experience of the anaesthetist performing the consultation.

4.10 Project outline

4.10.1 Time frame

Activity	Dec 2019	Jan 2020	Feb 2020	Mar 2020	Apr 2020	May 2020	Jun 2020	Jul 2020	Aug 2020	Sep 2020	Oct 2020	Nov 2020	Dec 2020	Jan 2021	Feb 2021	Mar 2021
Proposal preparation																
Literature review																
Proposal submission																
Postgraduate approval																
Ethics approval																
Data collection																
Data analysis																
Draft article																
Submission																

4.10.2 Budget

The Department of Anaesthesiology will bear the cost of printing and paper for the postgraduate approval.

Item	Price per page	Number of pages	Copies	Total
Proposal	R1	33	10	R330
Ethics	R1	10	25	R250
Post graduate form	R1	2	6	R12
Complete report	R1	100	4	R400
Grand total				R992

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4.12 Appendices

Appendix 1: Request to Medical Advisory Committee of Chris Hani Baragwanath Academic Hospital

Dr Riyaadh Motalib
Department of Anaesthesiology
University of the Witwatersrand

Attention: The Medical Advisory Committee of Chris Hani Baragwanath Academic Hospital

Re: The clinical profile of patients referred for preoperative anaesthetic evaluation at Chris Hani Baragwanath Academic Hospital

Dear Doctor

My name is Riyaadh Motalib and I am a registrar in the Department of Anaesthesiology at the University of the Witwatersrand. For the research component of my MMed (Anaesthesiology) I propose to conduct a retrospective survey of the clinical profile of patients referred for preoperative anaesthetic consultations at Chris Hani Baragwanath Academic Hospital. This project will be conducted under the supervision of Dr Megan Wellbeloved.

This survey will involve reviewing the preoperative anaesthetic consultation records for the period 1st January 2019 to 31st December 2019. The records will be the focus of the study and no patient identifying or medical staff information will be recorded. All records will be reviewed where they are stored in the Department of Anaesthesiology and will not be removed from the premises.

There will be no financial implications for Chris Hani Baragwanath Academic Hospital or the Gauteng Department of Health. A copy of the final report will be made available to you if requested.

I am hereby seeking your consent to have access to the preoperative anaesthetic records to conduct this research.

Yours sincerely
Dr Riyaadh Motalib
0761051108

riyaadh0@gmail.com

Appendix 2: Request to HOD of Anaesthesiology of Chris Hani Baragwanath Academic Hospital

Dr Riyaadh Motalib
Department of Anaesthesiology
University of the Witwatersrand

Attention: The HOD of Anaesthesiology of Chris Hani Baragwanath Academic Hospital

Re: The clinical profile of patients referred for preoperative anaesthetic evaluation at Chris Hani Baragwanath Academic Hospital

Dear Dr P. Mogane

My name is Riyaadh Motalib and I am a registrar in the Department of Anaesthesiology at the University of the Witwatersrand. For the research component of my MMed (Anaesthesiology) I propose to conduct a retrospective survey of the clinical profile of patients referred for preoperative anaesthetic consultations at Chris Hani Baragwanath Academic Hospital. This project will be conducted under the supervision of Dr Megan Wellbeloved.

This survey will involve reviewing the preoperative anaesthetic consultation records for the period 1st January 2019 to 31st December 2019. The records will be the focus of the study and no patient identifying or medical staff information will be recorded. All records will be reviewed where they are stored in the Department of Anaesthesiology and will not be removed from the premises.

There will be no financial implications for Chris Hani Baragwanath Academic Hospital or the Gauteng Department of Health. A copy of the final report will be made available to you if requested.

I am hereby seeking your consent to have access to the preoperative anaesthetic records to conduct this research.

Yours sincerely
Dr Riyaadh Motalib
0761051108

riyaadh0@gmail.com

Appendix 3: Preoperative anaesthesia consultation form

Anaesthesia Consultation
Chris Hani Baragwanath Academic Hospital

Date: _____ Seen by: _____
Time: _____

PATIENT DETAILS
Name: _____ Hospital no: _____ Age: _____ Gender: M / F

HISTORY
Medical: Tick as applicable

Hypertension	Diabetes	Myocardial infarction	Heart disease
Epilepsy	Thyroid problems	Coagulopathy	Stroke
Kidney disease	GORD	Asthma/bronchitis/COPD	Recent cold / flu
OSA features			
RVD	Arthritis		
Other (specify): _____			

Medications:

Aspirin use	Corticosteroid use
List drugs: _____	

Allergies:

None	Specify: _____
------	----------------

Surgical: _____

Anaesthetic:

Previous complications: _____

Social and Exercise:

Smoking: pack years	Alcohol: units/wk	Illicit drugs	Herbal/OTC
Effort Tolerance:			
ADL: eating, dressing, bathing		Light house work	
1 flight stairs		2 flights stairs	
Walk 1 to 2 blocks on level ground		Strenuous exercise	

EXAMINATION:

BP _____ PR _____ RR _____ SpO2 _____ T* _____

Jaundice	Anaemia	Cyanosis	Clubbing	Oedema	Lymphadenopathy
----------	---------	----------	----------	--------	-----------------

Fluid status Dehydrated Y/N _____

CNS:	GCS	/15	PEARL	Details:
	Neuro focal	Y/N		

CVS:	Pulse:	Regular	Irregular	Gallop	JVP N / ↑
	S1	S2	Murmurs		
	PHT features				

RESP:	Distressed	GAEB
	Added sounds:	Crackles Wheezes

ABDO:	Soft	Non-tender	Bowel sounds
-------	------	------------	--------------

AIRWAY:	MO	>3cm	<3cm	MP: I II III IV
	Dentition:	False teeth	Loose Crowns	
	Neck ROM:	Full	Limited	
	Beard	Short neck	Obese	

INVESTIGATIONS:

FBC: _____ U&E: _____

Other: _____

CXR: _____

ECG: _____

Echo: _____

PFTs: _____

ANAESTHETIC PLAN:

FURTHER INVESTIGATIONS:

Appendix 4: Data collection sheet

	<u>OBJECTIVES</u>	<u>OUTCOME VARIABLE</u>	
A	<u>PATIENT INFORMATION:</u>		
1.	Study number		
2.	Date		
B	<u>DEMOGRAPHICS:</u>		
1.	Age	1.1.	1.2. Unknown
2.	Sex	2.1. Male	
		2.2. Female	
C	<u>SURGICAL FACTORS:</u>		
1.	Surgical discipline	1.1.	1.2. Unknown
2.	Surgical procedure	2.1.	2.2. Unknown
3.	Class of surgery	3.1. Low risk	
		3.2. Intermediate risk	
		3.3. High risk	
		3.4. Unknown	
D	<u>CLINICAL FACTORS:</u>		
1.	Comorbidities	1.1. Cardiovascular	1.1.1. Hypertension
			1.1.2. Hypertensive heart disease
			1.1.3. Ischaemic heart disease
			1.1.4. Cardiac failure
			1.1.5. Cardiomyopathy (Specify)
			1.1.6 Valvular heart disease (Specify)
			1.1.7. Rheumatic heart disease
			1.1.8. Arrhythmia (Specify)
			1.1.9. Cor-pulmonale
			1.1.10. Congenital heart disease
			1.1.11. Peripheral vascular disease
			1.1.12. Dyslipidaemia
			1.1.13. Other (Specify)
		1.2. Respiratory	1.2.1. Asthma
			1.2.2. COPD
			1.2.3. Pulmonary tuberculosis

			1.2.4. Pulmonary hypertension
			1.2.5. OSA
			1.2.6 Other (Specify)
		1.3. Neurological	1.3.1. Cerebrovascular accident/ transient ischaemic attack
			1.3.2. Epilepsy
			1.3.3. Neuromuscular disorder (Specify)
			1.3.4. Psychiatric disorder (Specify)
			1.3.5. Other (Specify)
		1.4. Endocrine	1.4.1. Diabetes
			1.4.2. Hypothyroidism
			1.4.3. Hyperthyroidism
			1.4.4. Metabolic syndrome
			1.4.5. Obesity
			1.4.6. Other (Specify)
		1.5. Renal	1.5.1. Chronic kidney disease
			1.5.2. Other (Specify)
		1.6. Gastrointestinal tract	1.6.1. Gastro-oesophageal reflux disease
			1.6.2. Portal hypertension
			1.6.3. Other (Specify)
		1.7. Haematological	1.7.1. Coagulopathy (Specify)
			1.7.2. Deep vein thrombosis
			1.7.3. Other (Specify)
		1.8. Immunological	1.8.1. Retroviral disease
			1.8.2. Cancer (Specify)

			1.8.3. Other (Specify)
		1.9. Musculoskeletal	1.9.1. Arthritis (Specify)
			1.9.2. Osteoporosis
			1.9.3. Gout
			1.9.4. Scoliosis/ kyphoscoliosis
			1.9.5. Other (Specify)
		1.10 Other	1.10.1. (Specify)
2.	Chronic medication	2.1) Drug 2.2) Class of drug	
E	<u>SOCIAL FACTORS:</u>		
1.	Smoking	1.1. No	
		1.2. Yes	Pack years
2.	Alcohol use	2.1. No	
		2.2. Yes	
F	<u>PERI-OPERATIVE RISK PROFILE/ RISK STRATIFICATION:</u>		
1.	Effort tolerance: Metabolic equivalents (METS)	1.1. METS < 4	
		1.2. METS 4-10	
		1.3. METS > 10	
		1.4. Unknown	
2.	Revised Cardiac Risk Index	2.1. Coronary artery disease	
		2.2. Congestive cardiac failure	
		2.3. Cerebrovascular disease	
		2.4. Insulin dependent diabetes mellitus	
		2.5. Renal Insufficiency with creatinine > 177umol/L	
		2.6. High risk surgery	
		SCORE:	
		Unknown	
3.	ASA status	1	
		2	
		3	
		4	
		5	
		6	
		E	
		Unknown	
G	<u>RECOMMENDATIONS/ PLAN:</u>		
1.	Proceed with surgery	1. No	
		2. Yes	
2.	Modification of anaesthetic technique	1. Invasive lines	
		2. Regional technique	

		3. Post-operative high care/ intensive care unit bed	
		4. Blood products	
3.	Optimize prior to surgery	1. No	
		2. Yes	2.3.1. Medical treatment. (Specify)
			2.3.2. Further investigations. (Specify)
			2.3.3. Interdisciplinary consult. (Specify)
			2.3.4. Repeat anaesthetic consult.
4.	Not fit for anaesthesia	1. No	
		2. Yes	

Appendix 5: Data analysis sheet

	<u>OBJECTIVES</u>	<u>OUTCOME VARIABLE</u>		<u>DATA ANALYSIS</u>
A	<u>DEMOGRAPHICS:</u>			
1.	Age	Years		Normally distributed: means and standard deviation (SD). Not normally distributed: medians and interquartile ranges (IQR).
2.	Sex	Male Female		Frequency, proportion and percentages.
B	<u>SURGICAL FACTORS:</u>			
1.	Surgical discipline	Surgical discipline		Frequency, proportion and percentages.
2.	Surgical procedure	Surgical procedure		
3.	Class of surgery	3.1. Low risk		
		3.2. Intermediate risk		
		3.3. High risk		
C	<u>CLINICAL FACTORS:</u>			
1.	Comorbidities	1.1. Cardiovascular	1.1.1. Hypertension	Frequency, proportion and percentages.
			1.1.2. Hypertensive heart disease	
			1.1.3. Ischaemic heart disease	
			1.1.4. Cardiac failure	
			1.1.5. Cardiomyopathy (Specify)	
			1.1.6 Valvular heart disease (Specify)	
			1.1.7. Rheumatic heart disease	
			1.1.8. Arrhythmia (Specify)	

			1.1.9. Cor-pulmonale	
			1.1.10. Congenital heart disease	
			1.1.11. Peripheral vascular disease	
			1.1.12. Dyslipidaemia	
			1.1.13. Other (Specify)	
		1.2. Respiratory	1.2.1. Asthma	Frequency, proportion and percentages.
			1.2.2. COPD	
			1.2.3. Pulmonary tuberculosis	
			1.2.4. Pulmonary hypertension	
			1.2.5. OSA	
			1.2.6 Other (Specify)	
		1.3. Neurological	1.3.1. Cerebrovascular accident/ transient ischaemic attack	Frequency, proportion and percentages.
			1.3.2. Epilepsy	
			1.3.3. Neuromuscular disorder (Specify)	
			1.3.4. Psychiatric disorder (Specify)	
			1.3.5. Other (Specify)	
		1.4. Endocrine	1.4.1. Diabetes	Frequency, proportion and percentages.
			1.4.2. Hypothyroidism	
			1.4.3. Hyperthyroidism	
			1.4.4. Metabolic syndrome	
			1.4.5. Obesity	
			1.4.6. Other (Specify)	

		1.5. Renal	1.5.1. Chronic kidney disease	Frequency, proportion and percentages.
			1.5.2. Other (Specify)	
		1.6. Gastrointestinal tract	1.6.1. Gastro-oesophageal reflux disease	Frequency, proportion and percentages.
			1.6.2. Portal hypertension	
			1.6.3. Other (Specify)	
		1.7. Haematological	1.7.1. Coagulopathy (Specify)	Frequency, proportion and percentages.
			1.7.2. Deep vein thrombosis	
			1.7.3. Other (Specify)	
		1.8. Immunological	1.8.1. Retroviral disease	Frequency, proportion and percentages.
			1.8.2. Cancer (Specify)	
			1.8.3. Other (Specify)	
		1.9. Musculoskeletal	1.9.1. Arthritis (Specify)	Frequency, proportion and percentages.
			1.9.2. Osteoporosis	
			1.9.3. Gout	
			1.9.4. Scoliosis/kyphoscoliosis	
			1.9.5. Other (Specify)	
		1.10 Other	1.10.1. (Specify)	Frequency, proportion and percentages.
2.	Chronic medication	2.1) Drug 2.2) Class of drug		Frequency, proportion and percentages.
D	<u>SOCIAL FACTORS:</u>			
1.	Smoking	1.1. No		Frequency, proportion and percentages.
		1.2. Yes		
2.	Alcohol use	2.1. No		Frequency, proportion and
		2.2. Yes		

			percentages.
E	<u>PERI-OPERATIVE RISK PROFILE/ RISK STRATIFICATION:</u>		
1.	Effort tolerance: Metabolic equivalents (METS)	1.1. METS < 4	Medians and IQR.
		1.2. METS 4-10	
		1.3. METS > 10	
2.	Revised Cardiac Risk Index (RCRI)	2.1. Coronary artery disease	Medians and IQR.
		2.2. Congestive cardiac failure	
		2.3. Cerebrovascular disease	
		2.4. Insulin dependent diabetes mellitus	
		2.5. Renal Insufficiency with creatinine > 177umol/L	
		2.6. High risk surgery	
		SCORE:	
3.	ASA status	1	Frequency, proportion and percentages.
		2	
		3	
		4	
		5	
		6	
		E	
G	<u>RECOMMENDATIONS/ PLAN:</u>		
1.	Proceed with surgery	1. No	Frequency, proportion and percentages.
		2. Yes	
2.	Modification of anaesthetic technique	1. Invasive lines	Frequency, proportion and percentages.
		2. Regional technique	
		3. Post-operative high care/ intensive care unit bed	
		4. Blood products	
3.	Optimize prior to surgery	1. No	Frequency, proportion and percentages.
		2. Yes	
		2.3.1. Medical treatment. (Specify)	
		2.3.2. Further investigations. (Specify)	
		2.3.3. Interdisciplinary consult. (Specify)	

			2.3.4. Repeat anaesthetic consult.	
4.	Not fit for anaesthesia	1. No		Frequency, proportion and percentages.
		2. Yes		

Section 5: Annexures

5.1 Ethics approval



R14/49 Dr R Motalib

HUMAN RESEARCH ETHICS COMMITTEE (MEDICAL) CLEARANCE CERTIFICATE NO. M200879

NAME:
(Principal Investigator)

Dr R Motalib

DEPARTMENT:

School of Clinical Medicine
Department of Anaesthesiology
Medical School
University

PROJECT TITLE:

The clinical profile of patients referred for preoperative anaesthetic evaluation at Chris Hani Baragwanath Academic Hospital

DATE CONSIDERED:

28/08/2020

DECISION:

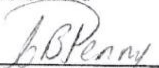
Approved unconditionally

CONDITIONS:

SUPERVISOR:

Dr M Wellbeloved

APPROVED BY:


Dr CB Penny, Chairperson, HREC (Medical)

DATE OF APPROVAL:

2020/10/13

This clearance certificate is valid for 5 years from the date of approval. Extension may be applied for.

DECLARATION OF INVESTIGATORS

To be completed in duplicate and **ONE COPY** returned to the Research Office Secretary on the 3rd Floor, Phillip Tobias Building, Parktown, University of the Witwatersrand, Johannesburg.
I/we fully understand the conditions under which I am/we are authorized to carry out the above-mentioned research and I/we undertake to ensure compliance with these conditions. Should any departure be contemplated, from the research protocol as approved, I/we undertake to submit details to the Committee. I agree to submit a yearly progress report. When a funder requires annual re-certification, the application date will be one year after the date when the study was initially reviewed. In this case, the study was initially reviewed in **August** and will therefore reports and re-certification will be due early in the month of **August** each year. Unreported changes to the application may invalidate the clearance given by the HREC (Medical).


Principal Investigator Signature

16/10/2020
Date

5.2 Graduate studies approval



Private Bag 3 Wits, 2050
Fax: 027117172119
Tel: 02711 7172076

Reference: Mrs Sandra Benn
E-mail: sandra.benn@wits.ac.za

07 June 2021
Person No: 0702468J
PAG

Dr R Motalib
P O Box 2752
Lenasia
1820
South Africa

Dear Dr Riyaadh Motalib

Master of Medicine in Anaesthesia: Approval of Title

We have pleasure in advising that your proposal entitled *The clinical profile of patients referred for preoperative anaesthetic evaluation at Chris Hani Baragwanath Academic Hospital* has been approved. Please note that any amendments to this title have to be endorsed by the Faculty's higher degrees committee and formally approved.

Yours sincerely

A handwritten signature in cursive script, appearing to read 'S. Benn'.

Mrs Sandra Benn
Faculty Registrar
Faculty of Health Sciences



5.3 National Health Research Database

Proposal Details: GP_202106_055



GAUTENG HEALTH RESEARCH COMMITTEE

APPLICATION DETAILS

TITLE OF RESEARCH PROJECT

The clinical profile of patients referred for preoperative anaesthetic evaluation at Chris Hani Baragwanath Academic Hospital

TYPE OF STUDY

Academic

STATUS OF APPLICATION

Pending (New Application)

STATUS OF PROJECT

On-Going

5.4 Turnitin report

7 October 2021

The chairperson
Graduate Studies Committee
Faculty of Health Sciences
University of the Witwatersrand

Dear Madam

Re: Mmed entitled: The clinical profile of patients referred for preoperative anaesthetic evaluation at Chris Hani Baragwanath Academic Hospital

Dr Riyaadh Motalib student number: 0702468J has submitted his research report to Turnitin which revealed a similarity index of 9%. These similarities appear not to be plagiarism but mainly the use of common terminology and phrases specific to the topic of his research.

Yours Sincerely



Megan Wellbeloved

ORIGINALITY REPORT

9%

SIMILARITY INDEX

5%

INTERNET SOURCES

8%

PUBLICATIONS

2%

STUDENT PAPERS

PRIMARY SOURCES

- | | | |
|-------|--|-----|
| 1 | <p>Monica Loureiro Santos, Cristiane de Oliveira Novaes, Antonio Carlos Iglesias.</p> <p>"Epidemiological profile of patients seen in the pre-anesthetic assessment clinic of a university hospital", Brazilian Journal of Anesthesiology (English Edition), 2017</p> <p>Publication</p> | 1 % |
| <hr/> | | |
| 2 | <p>"Perioperative Assessment of the Maxillofacial Surgery Patient", Springer Science and Business Media LLC, 2018</p> <p>Publication</p> | 1 % |
| <hr/> | | |
| 3 | <p>jeccm.amegroups.com</p> <p>Internet Source</p> | 1 % |
| <hr/> | | |
| 4 | <p>"Geriatric Anesthesiology", Springer Science and Business Media LLC, 2018</p> <p>Publication</p> | 1 % |
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| 5 | <p>James B. Conway, Jeff Goldberg, Frances Chung. "Preadmission anaesthesia consultation clinic", Canadian Journal of Anaesthesia, 1992</p> <p>Publication</p> | 1 % |