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Debriefing following specific critical events in a department of anaesthesiology

Mithasha Gayaparsad

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, 2020

Declaration

I, Mithasha Gayaparsad, 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.



19 June , 2020

Abstract

Background

Critical events occur commonly in anaesthesiology. Stress experienced by anaesthetists following such events may be overwhelming. Debriefing, as a part of a Critical Incident Stress Management (CISM) strategy, has been shown to alleviate stress following critical events.

Methods

A contextual, prospective, descriptive study was conducted using convenience sampling. A questionnaire was distributed in the Department of Anaesthesiology at the University of the Witwatersrand exploring critical events and debriefing practices.

Results

Data from 148 participants were included for analysis. Of these, 98.6% remembered at least one critical event occurring in the last year and 79.1% were interested in debriefing. Only 68.9% of the included participants have received some form of debriefing and 81.4% found debriefing useful. Significantly more juniors than seniors participated in debriefing ($p = 0.0006$) and found it useful ($p = 0.0319$) but were less likely to feel supported by the department following a critical event ($p = 0.0042$). Participants ranked barriers to debriefing which included theatre pressure (80.4%), time constraints (77.0%), fear of blame (70.3%), lack of critical event reporting (66.2%) and no trained facilitator (62.8%).

Conclusion

This study illustrates that many critical events occur which are stressful and have an impact on anaesthetists. There is an interest in debriefing following critical events which, if implemented consistently, may improve the perception of departmental support. Improving these support structures may protect the mental wellbeing of anaesthetists in the workplace. Further work should focus on the practical implementation of CISM strategies following critical events in this setting.

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Abbreviations

CISD	Critical incident stress debriefing
CISM	Critical incident stress management
PTSD	Post-traumatic stress disorder
Wits	The University of the Witwatersrand

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 rest of the Research Report in order to comply with the author guidelines of the Anaesthesia and Intensive Care, the journal to which it is intended to be submitted.

Section 1: Review of the literature

1.1 Introduction

Debriefing is a process whereby information about a critical event is shared, analysed, reflected upon (1) and emotions are normalised (2). In this way, the negative psychological effects of stress resulting from the event may be mitigated (3, 4) and mental workload reduced (5). A background to the need for debriefing in anaesthesiology will be given, followed by a definition of critical events, generally and then in anaesthesiology and how these events impact on health professionals. Critical incident stress management (CISM) and its components will be explained, followed by a brief overview of the history of debriefing. The structure of the debriefing process will be described and its applicability to simulation will be explored. Debriefing has various applications outside of, and within, the health sector; the literature related to this will be highlighted and then studies focusing on the application of debriefing in anaesthesiology will be presented. Finally, the literature considering the usefulness and harm of debriefing will also be discussed.

1.2 The need for debriefing in anaesthesiology

Anaesthesiology is a stressful discipline (6-11) and anaesthetists often find themselves at the forefront of life and death crises (12). During their training, anaesthetists become specialists in the prevention and management of harm to patients undergoing anaesthesia (13-15). Operating rooms are high pressure environments where critical events occur (16) even in the hands of those who are expertly trained (17). The experience of events that are perceived as traumatic may have physical (8, 18) and psychological repercussions for an individual (8, 13, 19). While a certain level of stress is known to be beneficial to performance in an occupation that is demanding (9), the psychological impact of overwhelming stress following these events may be underestimated (20) and its negative effect on clinical practice overlooked. Mishandled stress may build up over time (4) and lead to problems with substance abuse (3, 21), anxiety, stress disorders (3), suicidal thoughts (8, 13), poor work performance, burnout (8, 22) and increased absenteeism (4, 9, 23).

Through the use of debriefing as a part of a CISM programme (2), anaesthetists could be allowed the space and freedom to work through their emotions following critical events in the work place (1, 24). Furthermore, debriefing after critical events in medicine and especially after crisis simulation has been shown to be a valuable educational tool, leading to a reduction in stress levels (7), fewer mistakes and improved patient management (1, 24), as well as, improved team work and communication (25).

1.3 Critical events

In medical practice, a critical event is “any sudden unexpected event that has an emotional impact sufficient to overwhelm the usual effective coping skills of an individual or a group and that causes significant psychological distress in usually healthy persons” (3). Critical events usually relate to aspects of patient care that have led to negative outcomes, potentially involving death, near-death mishaps or injuries (26).

1.3.1 Critical events in anaesthesiology

According to Agbamu et al (17), a critical event in anaesthesiology has been defined as an “untoward and preventable mishap associated with the administration of general or regional anaesthesia, and which leads to, or could have led to an undesirable patient outcome.”

In a study amongst Australian anaesthetic trainees in 2005, critical events in anaesthesiology were listed to include; intraoperative death, litigious matters, paediatric on-table resuscitation, trauma cases with a poor outcome, obstetric emergency, resuscitation with a bad outcome (especially including failed paediatric or obstetric resuscitation), abusive confrontation with work colleagues, iatrogenic injury to patient, anaphylaxis, difficult airway and intubation, confrontation with patients and their family, drug errors and needle stick injuries (27).

The incidence of anaesthetic related critical events may be difficult to quantify. Bainbridge et al (28) looked at over 20 million general anaesthetics in their 2012 review of the literature concerning data from developed and developing countries. The authors found that the mortality related solely to the provision of anaesthesia

had declined from 52 per million in the 1970s to 34 per million in the 1990s and that the greatest rate of decline occurred in developed countries (28). Agbamu et al (17) identified critical events and near misses over a five-month period in Nigeria in 2017. These events included airway difficulties, blood pressure and pulse changes, hypothermia, as well as difficult intravenous access, occurring with an overall incidence of 6.1% (17).

The perioperative death of a patient is possibly one of the most significant critical events that is encountered in anaesthetic practice. A study conducted by Todesco et al (29) in 2010 found that in their population of Canadian anaesthetists, over half had experienced an unanticipated perioperative death. In the South African context, Lundgren (30), in 2011, studied the perioperative death rates in two hospitals in Johannesburg. The author found that anaesthetic-related deaths occurred at a rate of 0.4 per 10 000, higher than what had been found in developed countries (30).

In 2017, Nel (31) concluded that critical events may be under-reported in South Africa due to barriers such as litigation fears, lack of support and departmental discipline. Nonetheless, regardless of the incidence, any critical event occurring in anaesthetic practice may have an effect on the anaesthetist.

1.4 Effect of critical events on health care practitioners

Health care practitioners and especially anaesthetists, will frequently be exposed to critical events during their career (3, 15). Experiencing these events may lead to stress. Caine and Ter-Bagdasarian (3) define stress as a basic reaction that an organism may have in response to any demand placed on it. After exposure to frequent and severe critical events, abnormal stress patterns may develop and lead to physical, psychological and behavioural problems (3, 8).

Nyssen and Hansez (6) explored factors contributing to stress in anaesthetists in developed countries in their review of the literature. Fear of harming patients and excessive mental and physical workload were amongst the top causative factors identified. Feeling alone and unsupported were stated to be contributory factors (6). A study conducted in 2014 in the Department of Anaesthesiology, at The University of the Witwatersrand (Wits), found that anaesthetic registrars have

higher stress levels than South Africans not in the medical profession (32). Nyssen and Hansez (6) identify that these risk factors for experiencing stress may also contribute to the development of burnout.

Burnout has been defined specifically to include emotional exhaustion, reduced personal accomplishment and depersonalisation (33). It is not guaranteed that high levels of stress in the workplace will lead to burnout or a stress disorder, but a connection between these is indisputable. A lack of educational and emotional support is implicated in increasing stress levels and burnout amongst anaesthetists, which is said to have an international incidence as high as 40% (6). In the South African context, a study done amongst anaesthetists at Wits in 2015, found that a fifth of participants surveyed had a high level of burnout (22). Furthermore, van der Walt (34) highlights that the appropriate management of stress at an institutional level may have a positive impact on the incidence of this syndrome amongst South African anaesthetists.

The consequences of stress and burnout have been described as a spectrum of symptoms, including irritable mood, sleep disorders and nightmares, memory and attention deficits, anxiety, eating disorders and substance abuse (3, 6). When clustered together, these symptoms form the basis of the diagnosis of any one of a spectrum of mental health disorders resulting from high stress levels (3, 18). In a 2011 review of the literature, Gurunathan (35) found that anaesthesiologists have an increased risk of drug abuse and depression, which are risk factors for suicide. This is supported by other literature suggesting that anaesthesiologists have an increased mortality risk from suicide compared with other medical fields (21, 23, 36, 37), especially if suffering from post-traumatic stress disorder (PTSD) (18). Moreover, the mortality risk from any cause is increased in those who have stress disorders (18).

Shalev et al (38) state that PTSD is the most important psychological effect of experiencing a traumatic event. According to the fifth edition of The Diagnostic and Statistical Manual of Mental Disorders, PTSD belongs to a new group of disorders classified as “Trauma and Stress Related Disorders” (39). Extrinsic factors such as occupation contribute to the experience of stress and the likelihood of developing a stress disorder (38). Occupations listed include military services, police services

and paramedic services responding to disasters and mass trauma (38). Such careers centre around exposure to frequent critical events with high levels of stress, analogous to events and resultant stress regularly experienced by anaesthetists.

Perioperative deaths, amongst other critical events in anaesthesiology, pose a challenge to the psyche of anaesthetists. Todesco et al (29) found that 34% of respondents who had experienced an intraoperative death felt that there was no support for them following the event. Respondents felt responsible for the death and at least 10% thought about the event on a daily basis for more than a year following its occurrence (29). Feelings of guilt and fear of blame were common (29). A study conducted in Nigeria, in 2014, found that 86% of anaesthetists felt psychologically affected by perioperative deaths (40). Symptoms that were frequently reported in this study were sleep disturbances, flashbacks, depression and guilt (40). These feelings are echoed in the South African context and illustrated by the following quote from a study by Jithoo and Sommerville (41):

> *I think the biggest question in my mind was whether it was the right choice of anaesthetic; The family were understanding – they accepted it… but I didn't accept it… Because even up to this point I can't say what went wrong.*

The psychological sequelae of stress are vast, but the somatic effects should not be overlooked. An increased risk for cancer, bowel disease, thromboembolic disease and cardiovascular disease (3) has been associated with stress disorders, especially PTSD (18). These findings are similar to an American study looking at the mortality risks for anaesthesiologists, documenting an increased risk of death secondary to cerebrovascular disease (36). Furthermore, chronic pain, headaches and hypertensive disorders have been associated with stress (3) and contribute to a high rate of absenteeism from work (4, 29), all of which may impact on service delivery.

Anaesthetists may seek coping strategies to alleviate the stress experienced during critical events. Coping strategies might include healthy hobbies and seeking support from home structures (23) or more maladaptive behaviours such as

substance abuse (14, 18, 21, 29). The end result may be detrimental to the well-being of the affected anaesthetist, family relationships and to the management of patients. An increased level of support of anaesthetists in the workplace may result in better relationships in all spheres of life and less likelihood of resorting to damaging behaviours (8).

1.5 Critical incident stress management

CISM is intended to be an institutional strategy for the management of critical events (3, 42). It is an umbrella term that encompasses psychological debriefing and critical incident stress debriefing (CISD) (1-3, 42, 43). Ultimately, the aim of CISM is to have strategies in place within an institution that “accelerates the normal recovery of formerly healthy people who are experiencing painful reactions in response to abnormal events” and help employees deal with future events more adequately (3). CISD was developed in 1974 by Mitchell (42). Dyregrov (44) and Curtis (45) developed psychological debriefing along parallel lines. The various forms of debriefing have different definitions, but common themes remain. The process is employed as a method whereby information about a critical event is shared, analysed, reflected (1) and emotions normalised (2).

In addition to analysing the details of events that occurred to improve strategy and skill, the intention of debriefing widened to include the alleviation of the long-term negative sequelae of stress, such as PTSD, that resulted from the experience of critical events (42, 44). It was identified that medical professionals often deal with critical events in the workplace resulting from the life-and-death nature of the occupation. Thus, the adaptation of debriefing for health professionals was proposed following simulated scenarios (46, 47) and real-life critical events in medicine (1, 24, 48-51). Anaesthetists have been said to be particularly vulnerable to the stress of critical events (14).

Pack (2) describes CISM as encompassing many components including CISD, defusing, family support, peer support, trauma education and follow up. A similar model is suggested by Caine and Ter-Bagdasarian (3). Social workers using CISM protocols in New Zealand found that protocols incorporating CISD are the gold standard for the management of stress following critical events (2). Furthermore,

Aitkenhead (13) and White and Akerele (14) suggest that all departments of anaesthesiology should have systems in place to support employees in the aftermath of a critical event to reduce resultant stress, as a standard of practice in clinical governance (52).

1.6 History of debriefing

Debriefing originated from military and aviation training (1). The task of documenting events during World War II began with conducting interviews with soldiers after combat, analysing what happened during these missions. The goal of these interviews was to gather details about the events that had occurred, in an attempt to improve war strategies. Feedback was provided to the troops after these sessions. It has been routinely adopted after real time and simulated combat experiences to enhance training and learning. Similarly, debriefing has been effectively used in aviation training to improve skills (1).

1.7 The process of debriefing as part of a CISM strategy

After the occurrence of a critical event, the need for debriefing should be identified by the employer (15, 25). It is suggested that all departments have systems in place to be able to psychologically support employees in the aftermath of any critical event, should the need be identified (2, 3). The initial debriefing session should be aimed at reflecting on what has happened, explore emotions surrounding the event and provide feedback on what has transpired during the critical event. During this session, the instructor who should be well trained in debriefing, should be able to identify persons who may benefit from further debriefing sessions on an individual basis (3, 25, 44).

Mitchell (42) described the debriefing process as occurring in a structured seven-step process with groups of people who have suffered the same traumatic event. The basic structure incorporates a session held within the first 10 days following the event, with participants in a group setting, ideally led by a trained facilitator (42). This is reiterated by other authors finding that this approach is the most beneficial to participants (2, 3, 44, 45, 53, 54). The session itself should be at least two-to-three hours in length (3). Shorter sessions have been shown to be

deleterious to the healing process (55). This format formed the basis of debriefing as applied within and outside the health care sector, especially following simulated disasters (1). All staff involved in a critical event should be encouraged to attend debriefing sessions in a manner that ensures their voluntary participation (24).

The steps to debriefing described by Mitchell (42) include an introduction to the debriefing session, clarification of facts, thoughts and reactions related to the event as well as teaching and re-entry, which involves a summary and reflection of the session. This seven-step process has been widely adapted. Hanna and Romana (25) describe an eight-step debriefing session that was introduced by Lim et al (56). Cambridge University condensed these steps into a three-step model for use in post-simulation training, as described by Gardner (1). Kessler et al (24) suggest that debriefing occurs in three phases: description, analysis and application to the future. The varying techniques of debriefing may also contribute to the controversy surrounding its efficacy.

A debriefer needs to be appropriately trained, as the quality and benefits of debriefing are directly related to the capabilities of the facilitator (3, 25, 44, 45, 53, 54). An important barrier to the implementation of debriefing is a lack of appropriately trained debriefers (24). Participants in a Canadian study on debriefing after paediatric resuscitation “agreed that the facilitator has a strong impact on the quality of debriefing” (57). Furthermore, guidelines on the management of critical events released, in 2005, by The Association of Anaesthetists of Great Britain and Ireland (20) state that CISD led by trained facilitators “may assist individuals to recover from the traumatic event.”

The use of debriefing tools to aid shorter, more immediate debriefing sessions has been a further adaptation to the original debriefing process described by Mitchell (42). These are intended to guide debriefing facilitators involved in the event, but who may not be trained in formal debriefing methods (55), through the various phases of debriefing (24). These are designed as a tick-sheet format so that all steps in the debriefing process are followed. During simulation, these tools, including video playback, have been shown to assist the debriefing process and enhance the learning experience (24). It has also been suggested that debriefing could be conducted straight after the occurrence of an event in theatre (58).

Regular post-operative debriefings have been introduced in the literature as an abridged version of a full, focused CISD. These have been suggested to occur after an adverse event at the end of an operation and consist of a brief interview (1), rather than a two-hour debriefing session, led by a trained debriefer (58). By understanding the nature of the adverse event, steps can be followed, which would aid in the avoidance of such adverse events in the future (1). Equipment issues may also be highlighted and corrected at this stage before the next case is started (58). In this manner the team undergoes an initial “defusing”, rather than a debriefing session, which could allow them to continue to work safely (48, 57). Formal debriefing could then take place at a later time (42, 44, 45, 57).

Defusing is a term that should be separated from debriefing by its informality (48, 59). In the setting of traumatic events, it should be held within hours of the event with the primary purpose of being a conversation about what has transpired (3). The goal of these meetings is to reduce anxiety and re-empower participants (59). Kessler et al (24) term these “hot” or “warm” debriefings since they occur very soon after the triggering event. The advantage to these closely timed sessions is that all members involved in the event are likely to be present and events that occurred are remembered in detail (1). Conversely, team members may not be emotionally ready to explore, in depth, the events that had transpired (24).

As part of ongoing CISM strategies, time off after a critical event and debriefing may be necessary to allow involved staff to work through their feelings, identify what happened (13) and determine if it is safe to continue with the list (14). Not surprisingly, while most anaesthetists feel that this type of protocol would be beneficial, it is agreed that it is not always feasible (14, 29). Staffing issues, theatre delays, the anaesthetists own sense of responsibility to his patients, pressure from surgeons and patients’ families may necessitate lists continuing after a critical event has occurred (13, 14, 41). Furthermore, time off should be individualised as not every critical event will have the same impact on the anaesthetist (29, 41).

1.8 Simulation training and debriefing

A central part of simulation training is debriefing. Used here as an educational tool, debriefing encompasses one of the key elements of adult learning: reflecting on

experiences (24). There is a wealth of literature focusing on the educational benefits of simulation training (7, 60-63) and it is recognised that debriefing may be a vital component of this process (1, 5, 47, 63) as learning is strongly connected to meaningful experiences and the reflection thereof (49, 62). By repeated simulations of different scenarios, participants are able to observe one another, enhance their own skills and improve on their management of these crises (24, 63). The goal is for these improvements to be made and translated into real-life scenarios (1, 24).

Gouin et al (7) reported an improvement in non-technical skills, such as communication and team work, throughout their study involving anaesthetists and simulated events. The authors reported that critical event simulation resulted in a significant amount of initial stress for anaesthetic registrars, irrespective of the participant's level of experience. However, by repeating the same simulations over time, the stress levels of the participants decreased and the management of the simulated emergencies improved. The authors note that physiological measurements of stress, such as heart rate, remained unchanged throughout the course of their study, suggesting a psychological improvement over time and with no appreciable physiological difference (7).

1.9 Various applications of debriefing

1.9.1 Outside of medicine

The process of debriefing has been applied to many areas outside of medicine. Trauma victims including victims of sexual assault and those involved in car accidents, soldiers and victims of natural disasters have all been involved in debriefing processes (52, 64-66). The impact that debriefing had on military personnel is illustrated by the following quote from Lovell-Hawker (67):

> *I haven't been able to talk to anyone about this. I can't tell my wife, because then she would feel traumatised too. I couldn't tell my colleagues, because they had all seen similar atrocities and were already coping with too much. The thing which kept me going was knowing I would be able to talk about it during this debriefing. That saved me from going under.*

1.9.2 Emergency medicine

Magyar and Theophilos (59) emphasise that critical events frequently occur in emergency departments and recommend that physicians should be debriefed in the days following an acute event. They suggest that these debriefings should be offered to all personnel involved with the event, but that participation should be voluntary. An emphasis is placed on having a trained debriefer lead the meeting. Establishing debriefing protocols may allow debriefing to be reliably implemented and physicians to be referred for further help where appropriate (59). Kessler et al (24) showed enhanced employee performance and improved patient outcomes when debriefings were held after emergency department resuscitations.

1.9.3 Paediatrics

The medical management of children is difficult. The innocence of youth and a doctor's own parental feelings of responsibility may make paediatric resuscitation poignant. According to Sandhu et al (57) when negative outcomes occur, staff may experience overwhelming feelings of guilt and mount an abnormal stress response, which could be alleviated with debriefing. The authors found that paediatric resuscitations occur at least once a month but that debriefing following resuscitation attempts is not routine. If debriefing did occur, there was no guarantee that it would be conducted by a trained facilitator. According to the study, 61.7% of the debriefers had no training in debriefing (57). Rationalising emotions after a paediatric resuscitation, regardless of the outcome, has been shown to be in demand (52, 57). These emotions can be adequately explored during debriefing if given the opportunity.

1.9.4 Obstetrics

Life threatening emergencies occur with a high frequency in labour wards and obstetrics theatres, requiring health professionals to adapt constantly. The unique nature of this environment involves health professionals working to ensure the safety of mothers and children. Resulting emotions and pressure may escalate when either the mother's or foetus' life is at risk. Communication between team members is essential for these emergencies to be appropriately managed and for the prevention of stress, worsening of anxiety and burnout symptoms (58).

Perioperative huddles were introduced into obstetric practice by McQuaid-Hanson and Pian-Smith (58) and proved to be beneficial, allowing staff to communicate effectively with one another without fear. Furthermore, huddles are reported to improve patient safety and increase theatre efficiency (58).

1.9.5 Anaesthesiology

Theatre

Intraoperative complications are likely to occur at some point in the careers of the theatre team (68). Leong et al (16) found that there was an improvement in team cohesiveness and the abolishment of the hierarchy of theatre teams through the introduction of daily briefing and debriefing sessions, which led to increased team positivity and improved “team climate”. Briefing before the beginning of a theatre list allows team members to introduce themselves properly and share their anticipated concerns about the list. Support amongst team members is fostered during briefing and potential technical disasters throughout the day, mitigated. Furthermore, practical issues related to timing and theatre efficiency could be explored and improved (58). Briefing and debriefing following critical events in theatre has also been said to improve patient safety (69).

Patients

Critical events may also involve patients and have a negative impact on them and their families. Patients who live through critical events resulting from the provision of anaesthesia, such as awareness under anaesthesia, may develop conditions ranging from stress and anxiety disorders to intense phobias (37). These patients should be identified immediately following the mishap and interviewed (37). This interview seeks to understand the patient’s feelings surrounding the adverse event. It also provides the anaesthetist with the opportunity to clarify and explain what occurred (37). Concerning symptoms of ongoing stress can be identified and a referral to a psychiatrist or psychologist made where appropriate (37). Thus, whilst not a formal debriefing session, these interviews may help patients in the same way by exploring emotions, normalising feelings, providing feedback and information surrounding what transpired and identifying the need for further help (37, 45).

1.10 Application of debriefing in anaesthesiology

There is a paucity of evidence concerning the application of debriefing in anaesthesiology following critical events in developing countries. However, in a qualitative study conducted by Jithoo and Sommerville (41) regarding the experience anaesthetic registrars had with perioperative deaths in South Africa, the impact of these critical events on the anaesthetist is shown. The following quote highlights the usefulness of debriefing:

> *I've, in my 7 years, had one debriefing session for a trauma case. No management input, no consultant input, no departmental input. You just did the next case. I think [debriefing] would have made a huge difference, because I was questioning myself and no one in that circle who could understand the scenario was there to speak to me on that level. I think the most important thing is the learning experience you can take from this; as long as you can learn from things, that makes it a lot easier to deal with.*

An Australian study conducted in 2005 by Tan (27) focussed on the application of debriefing after critical events for anaesthetic registrars and found that all participants had experienced at least one critical event, as defined by the study, in their careers. Debriefing helped these trainees cope with critical events, irrespective of their level of experience. The author also discovered that most anaesthetic trainees found it difficult to concentrate in the aftermath of a critical event and they felt more supported by the department if debriefing had occurred (27).

Debriefing, however, was not routine. Only 64% of participants had received some form of debriefing following a critical event in their career, with junior staff being debriefed more commonly than seniors (27). Similarly, White and Akerele (14) found that less than one-third of their anaesthetists had participated in debriefing following an intraoperative death. Barriers to the implementation of debriefing in anaesthesiology may include compromised service delivery and time pressure, as well as a lack of perceived interest, inappropriate settings, fear of blame or judgement regarding the event and poor support from management as stated by Sandhu et al (57).

Tan (27) showed that anaesthetic trainees preferred to be debriefed by a consultant who was not involved with the case. This is in contrast to Canadian paediatric emergency department staff who felt that the physician leading the resuscitation should lead the debriefing session (57). Since these consultants may not necessarily be trained in the provision of debriefing, this again contrasts with Mitchell (42) who originally described formal debriefing to occur at the instruction of a trained facilitator. Importantly, Tan (27) stated that anaesthetic registrars found debriefing following critical events useful, even though it rarely occurred. This is reflective of literature regarding debriefing in other settings, outside and within medical spheres (2, 27, 57, 66, 70, 71).

1.11 Advantages and disadvantages of debriefing

1.11.1 Advantages

“The benefits of CISD include better mental health of the group, improved teamwork, reduced resignation rates of senior and junior staff, and improved productivity” (37). Sandhu et al (57) cite the American Heart Association Guidelines for Cardiopulmonary Resuscitation and Emergency Cardiovascular Care stating that debriefing following cardiopulmonary arrest “improves subsequent CPR performance in-hospital and results in higher rate of return of spontaneous circulation. Debriefing of actual resuscitation events can be a useful strategy to improve future performance.” Furthermore, the authors describe the debriefing process as an avenue to release emotions and return the following day with a clear mind (57). The goal of this process is to allow people to return to normal functioning as soon as possible after a critical event (3, 27).

Through debriefing after critical events, coping skills are enhanced and staff morale is increased (66, 68). Fewer employees feel the need to leave the profession (2) and there is a decrease in the need for sick leave and absenteeism (66, 68). A decrease in monetary compensation and a decreased use of mental health care services, alleviating the financial burden that may result from complicated stress has been reported (66, 68).

Caine and Ter-Bagdasarian (3) state that the cost of managing stress is extremely high, both at an institutional and individual level. An improvement in theatre

efficiency lends itself to overall improvements in cost-effectiveness and resource management. By preventing the negative consequences of stress, through strategies such as CISM, institutions may increase work efficiency, reduce absenteeism and disability and save money; while individuals save on personal health care costs (3).

Debriefing enhances group cohesion and team work and leads to improvement in patient management through an improvement in non-technical skills, such as communication (7, 57). The focus of a study by Ciporen et al (61) in 2018, was to improve crisis resource management and team work through the simulation of critical events in the workplace. Simulations involving anaesthetists and neurosurgeons working together during these critical events followed by debriefing was shown to improve team work and patient care (61). Furthermore, the introduction of perioperative briefings and debriefings improved theatre efficiency and time management, with a reduction in adverse events (16, 58, 68).

Preoperative briefings were termed “preoperative huddles” by McQuaid-Hanson and Pian-Smith (58). These were introduced in 2017 and led to an improvement in patient safety, theatre efficiency, communication and team work, findings were analogous to Leong et al (16), also in 2017. A decreased incidence of preventable errors has also been shown following the implementation of huddles (58).

1.11.2 Disadvantages

A systematic review by Rose et al (72), in 2002, focused primarily on randomised controlled trials which reported negative results concerning debriefing. A later review of the evidence by Hawker et al (66), in 2011, stated that these trials, which showed potential harm related to debriefing outweighing the benefit, received attention despite multiple confounding factors.

Firstly, Mayou et al (55), focussed on debriefing non-medical victims of traumatic events, individually, within the first 24 hours following the event, which is in direct contradiction to protocols described by Mitchell (42). Furthermore, the people conducting the debriefing sessions were not trained. It was a limitation of their study that the patients who had undergone debriefing had also suffered a traumatic event of a higher stress calibre than the control group (55).

Secondly, Bisson et al (73) showed that the early debriefing of victims of burn trauma was associated with poor outcomes, specifically worsening stress symptoms. This correlates with the recommendation that debriefing should not be conducted too soon after the event but should rather be performed when the victim is ready. Again, by deviating from the prescribed format of CISD, the authors found negative results and made recommendations based on this (73).

Devilly and Varker (43) showed that if a victim group has a high level of incident stress and is debriefed, they will still have higher levels of stress and anxiety at a follow up date, compared with a group with lower levels of incident stress that was not debriefed. This suggests that if the degree of initial stress experienced is profound, it may have a prolonged duration, irrespective of debriefing and the levels of stress may even be compounded by debriefing. It was concluded that the debriefing process may not be helpful and could, in fact, do harm. It was also suggested that debriefing may interfere with a person's natural coping mechanisms and "pathologises experiences once the event is past a certain threshold of distress" (43).

Logistical barriers to the implementation of debriefing may be considered a disadvantage. Debriefing takes time and may impact on service delivery (24). Theatre list delays and immediate staff shortages may again not allow for theatre lists to be paused or employees to take time off after the incident (15, 29, 58). Debriefing should be conducted by a trained facilitator (2, 3, 24, 44, 45, 53, 54), implying that trained facilitators should be sought or that facilitator training would be required. Debriefing should also be conducted in an appropriate venue, which in a hospital environment, may be difficult to secure (24).

1.12 Summary

"For a debriefing program to succeed, a culture of safety for patients and staff must be reinforced" (24). Anaesthesiology is a stressful discipline (6) that is centred on the management of critically ill patients and critical events do occur (13, 14, 17, 27, 38, 42). Central to the successful performance of the anaesthetist is the prevention of harm to patients in theatre (14). The stress that may be experienced during the occurrence of these critical events may accumulate,

particularly when combined with other sources of stress in the work place and in the personal lives of anaesthetists. Stress can have adverse health effects and lead to lower work productivity. Chronic, compounded stress may lead to physical and mental health disorders (38). Furthermore, financial implications of the management of stress are immense, both on an institutional and personal level (3, 15, 25).

Debriefing in the appropriate setting, following traumatic events can be beneficial to group participants (25, 27, 42, 44, 58, 66). Key elements identified from the literature which would improve positive outcomes include focused, voluntary group sessions with a trained facilitator, lasting for a minimum of two hours, involving all participants (25, 27, 42, 44, 58, 66). As part of a CISM strategy, defusing could occur immediately after the event with the team members, allowing debriefing to follow at a later stage (3, 13, 15, 42, 52).

Strategies, such as CISM, should be implemented by management and should include debriefing as one of the domains (2, 19, 20). Central to the process of debriefing is the creation of a non-toxic, non-judgemental environment (74), which is safe from punitive measures (24, 44, 45, 52-54). Participants should be allowed the space and freedom to explore emotions (1, 24, 52). The result is improved team work and group cohesion, with better subsequent patient management (1, 5, 16, 24, 54, 58). Furthermore, the goal is to return individuals to their normal state of functioning as soon as possible after a critical event (3, 27), allowing them to continue to work in an environment that is supported (2).

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Section 2: Author's guidelines

Anaesthesia and Intensive Care (Anaes Intens Care)

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Anaesthesia and Intensive Care recognises and conforms to the International Standards for Authors and Editors as defined by the Committee on Publication Ethics.

1. Editorial Policies

The overriding mission of *Anaesthesia and Intensive Care* is to publish papers that have educational value and scientific merit for clinicians and researchers associated with anaesthesia, intensive care medicine, and pain medicine. The educational value must apply to a wide range of readers and not be limited to a particular region or country, with the exceptions of Australia and New Zealand. The scientific merit will be judged on the novelty of the work, the validity of the methodology and the soundness of the interpretation of the findings.

Papers must have sufficient clinical relevance to be of interest to practising clinicians or clinical researchers. Animal studies of a basic science nature will rarely be accepted.

In relation to specific paper types:

- Randomised clinical trials should comply with the recommendations of the CONSORT statement and utilise its associated checklist and flow diagram.
- Clinical studies, including case-controlled and cohort studies, should include appropriate statistical analysis to support their conclusions.
- Review articles, whether systematic or narrative, should through critical analysis ‘add value’ to our knowledge in relation to any specific topic and not merely summarise current knowledge.
- Audits will be published only if their findings are likely to be applicable well outside the institution or institutions in which they were conducted.
- Surveys must have a response rate that ensures the findings are representative of the population under study.
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Submissions will be assessed either by the Chief Editor or an Editor assigned by the Chief Editor. Those submissions (other than correspondence) considered potentially suitable for publication will be sent out for external review.

All papers must represent original work. *The Journal uses plagiarism detection software and reserves the right to inform the authors' institutions if plagiarism is detected.* As plagiarism has implications for all authors included on a paper, all authors should ensure that plagiarism has not been committed.

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Manuscripts requiring revision should be resubmitted within three months. The Journal reserves the right to request a new submission, with repeat peer review, should the revision not be resubmitted within six months.

2. Manuscripts

Manuscripts should be prepared in accordance with the International Committee of Medical Journal Editors (ICMJE) *Recommendations for the Conduct, Reporting, Editing and Publication of Scholarly Work in Medical Journals*, updated 2013.

Papers are accepted on the understanding that no substantial part has been, or will be, published elsewhere. This does not refer to the publication of abstracts of presentations at scientific meetings, as long as these are clearly identified as abstracts and do not include data that were not presented at the meeting. Papers accepted for publication remain the copyright of the Journal. The Editor reserves the right to style and shorten material accepted for publication and to determine the priority and time of publication.

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All papers are to be submitted to *Anaesthesia and Intensive Care* using the submissions website. When authors enter a new submission the "Terms and Conditions for *Anaesthesia and Intensive Care* Submissions" will appear as the first step of the process. All authors must read and accept these before they can progress any further in the submission process.

Papers involving more than one author must be accompanied by a statement signed by all authors declaring that they have read and accept the "Terms and Conditions for *Anaesthesia and Intensive Care* Submissions" as outlined in the

submission process. This statement should be scanned and submitted as part of the manuscript, or uploaded to the website separately. The role of each author in the study must also be described briefly.

The authors must also make a declaration to the effect that “This manuscript is an honest, accurate and transparent account of the study, case or topic being reported; that no important aspects have been omitted; and that any discrepancies from the study as planned (and, if relevant, registered) have been explained” as proposed by Altman and Moher (Altman DG, Moher H. Declaration of transparency for each research article. BMJ 2013; 347:f4796).

The terms and conditions are written in line with the *Electronic Transactions Act 1999* (Cth).

2.1 Conflict of interest

Authors must declare in their manuscript whether or not they have a conflict of interest, i.e. personal, professional or business affiliation relevant to the paper, as described by the ICMJE. If any of the authors have a conflict of interest, the ICMJE Conflict of Interest disclosure form must be completed and submitted with the manuscript. Sources of funding, equipment or other support must be given.

2.2 Registration of clinical trials

Clinical trials must be registered with a Public Trials Registry as recommended by the ICMJE. In Australia and New Zealand it is recommended that trials are registered with the Australian New Zealand Clinical Trials Registry. For trials commenced between January 2009 and December 2011, retrospective registration of the trials will be accepted. For trials commenced after December 2011, prospective registration is required. The trial registration number must be stated in the manuscript.

2.3 Minimum Standards for Statistical Reporting

Statistical Analysis

Statistical methods should be presented in sufficient detail for readers to assess the appropriateness of the analysis and to verify the findings if necessary. Authors should refer to standard statistical texts and references for details on statistical analytical techniques and obtain statistical advice where necessary. Particular attention should be paid to the following:

1. Descriptive terms and inferential tests should be appropriate for the type of data being analysed.

2. Inferential tests are not required when data are of a descriptive nature.

3. For clinical investigations, the primary hypothesis should be clearly outlined and conclusions should relate mostly to this outcome.

4. Secondary and subgroup outcomes should be considered as supportive or hypothesis generating.

5. Inferential tests are not required to compare baseline characteristics in a randomised trial. Descriptive statistics are more appropriate.

6. A power calculation is required for all primary outcomes, specifying the minimum clinically important effect size used to estimate the required sample size for the study. Alternatively, the implications of the absence of a power calculation should be explained in the Discussion.

7. Actual *P* values should be presented for all comparisons (avoid $P<0.05$, $P>0.05$ or *P*=NS).

8. For positive findings, emphasis should be placed on the observed effect size and its clinical importance as well as the P value.

9. The use of confidence intervals is encouraged.

10. Negative findings should be described as ‘not statistically significantly different’, avoiding ‘no difference’. Ideally a comment should be added about the maximum true effect size that could have been missed.

11. Multiple simultaneous comparisons should be minimised. When present, they usually require a statistical correction. Alternatively, the implications of a lack of correction should be explained in the Discussion.

12. For diagnostic tests, sensitivity and specificity should be presented. For continuous predictors, ideally this should include receiver operating characteristic (ROC) curves.

13. For comparison of measurement methods, the bias and precision should be described.

14. Correlation should be used to describe the degree of association between variables without any assumptions of dependence. Simple regression is used to predict or explain the value of an outcome variable (dependent variable) from another variable (independent variable).

15. For multivariable analyses, to avoid over fitting of data, at least 20 subjects are required for each independent variable when using linear regression, and at least 10 outcome events for each independent variable when using logistic or Cox proportional hazards regression. Criteria for entering or removing variables should be described, and ideally these should be based on biological plausibility as well as P values. If adjusted analyses are reported, unadjusted analyses should also be reported. It should be clear whether modeling is intended to be descriptive or explanatory, and the assumptions underlying the analytic technique chosen should be described. If predictive utility is being considered, then the area under the ROC curve and calibration of the model should be reported. The limitations of the analysis should be discussed, including the caveat that the strength of an association between a variable and an outcome is only one of many criteria for causation.

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Standard error of the mean (SEM) is acceptable in figures for the sake of graphical clarity, provided that the numbers of observations are clearly stated.

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Monographs:
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Chapter in a book:
Du Bose TD Jr, Cogan MD, Rector FC Jr. Acid Base Disorders. In: Brenner BM, ed. Brenner & Rector's The Kidney, 5th ed. Philadelphia, Pennsylvania: WB Saunders Company 1996. p. 929-998.

Websites:
Australian and New Zealand College of Anaesthetists. Recommendations on Monitoring During Anaesthesia. From http://www.anzca.edu.au/publications/profdocs/profstandards/ps18_2000.htm. Accessed January 2014.

References to 'unpublished observations' and 'personal communications' should not be listed as references but should be noted in the text in parenthesis, e.g. (J. Jones, personal communication). References to papers which have been accepted for publication but not yet published should be included in the references, with the words “in press” included in place of the volume and page numbers.

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Section 3: Draft article

Debriefing following specific critical events in a department of anaesthesiology

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Key words: debriefing, anaesthesiology, critical event, stress, burnout

Summary

Background

Critical events occur commonly in anaesthesiology. Stress experienced by anaesthetists following such events may be overwhelming. Debriefing, as a part of a Critical Incident Stress Management (CISM) strategy, has been shown to alleviate stress following critical events.

Methods

A contextual, prospective, descriptive study was conducted using convenience sampling. A questionnaire was distributed in the Department of Anaesthesiology at the University of the Witwatersrand exploring critical events and debriefing practices.

Results

Data from 148 participants were included for analysis. Of these, 98.6% remembered at least one critical event occurring in the last year and 79.1% were interested in debriefing. Only 68.9% of the included participants have received some form of debriefing and 81.4% found debriefing useful. Significantly more juniors than seniors participated in debriefing ($p = 0.0006$) and found it useful ($p = 0.0319$) but were less likely to feel supported by the department following a critical event ($p = 0.0042$). Participants ranked barriers to debriefing which included theatre pressure (80.4%), time constraints (77.0%), fear of blame (70.3%), lack of critical event reporting (66.2%) and no trained facilitator (62.8%).

Conclusion

This study illustrates that many critical events occur which are stressful and have an impact on anaesthetists. There is an interest in debriefing following critical events which, if implemented consistently, may improve the perception of departmental support. Improving these support structures may protect the mental wellbeing of anaesthetists in the workplace. Further work should focus on the practical implementation of CISM strategies following critical events in this setting.

Introduction

In recent years, there has been more attention paid to the mental wellbeing of anaesthetists (1, 2) because anaesthesiology is a stressful discipline (2-7). Overwhelming stress may accumulate in the anaesthetist after frequent critical events (2, 3) and may have negative effects, such as poor work performance (8), increased absenteeism (8, 9), burnout (3, 10) and mental health problems including anxiety disorders, depression and substance abuse (3, 8, 11). Chronic physical conditions such as hypertension and related cardiovascular disease may also result from ongoing, untreated stress (8).

The incidence of critical events in anaesthesiology is not known with certainty. In a review by Bainbridge et al (12) regarding perioperative deaths in developed and developing countries, in 2012, it was found that the mortality related solely to the provision of anaesthesia had declined from 52 per million in the 1970s, to 34 per million in the 1990s. The authors note that the greatest rate of decline occurred in developed countries. Agbamu et al (13) identified an incidence of 6.1%, in Nigeria, in 2017. In South Africa, Nel (14) concluded, in 2017, that critical events may be under-reported due to barriers such as litigation fears, lack of support and departmental discipline. Any one event, however, may have an effect on the anaesthetist.

During debriefing, as part of a Critical Incident Stress Management (CISM) strategy (15), participants are guided through various steps by a facilitator (16). Through this process, feelings of guilt should be assuaged (17) and emotions may be normalised (18). If mistakes have been made, debriefing should provide an adequate, safe space for learning (18), without blame or judgement (19). It has been suggested that debriefing after critical events could be beneficial in the alleviation of stress symptoms and is valued by participants (20-23). It can also lead to improved team work, performance (24) and improved clinical management of subsequent patients (18, 24-28). The coping skills of the anaesthetist may be improved allowing for a quicker return to normal functioning following a critical event (8).

Furthermore, there is literature stating that debriefing is important and useful (20, 23)

to anaesthetists (21, 22, 29). In 2005, White and Akerele (22) conducted a study in London and found that 71% of anaesthetists thought that debriefing was appropriate following a critical incident, such as a death in theatre. Also in 2005, in Australia, Tan (21) showed that junior and senior anaesthetists felt debriefing helped them cope better with critical events. Gazoni et al (29) reported in 2012, in The United States of America, that at least 75% of the anaesthetists in their study said that debriefing would be helpful following critical events. There is much debate and little agreement on, the best way to conduct debriefing sessions (30-33), formally or informally, within the setting of theatre (11, 26), in order to minimise delays and maximise theatre efficiency.

The implementation of debriefing services in anaesthesiology following a critical event may be met with logistical barriers such as limited resources and time constraints (19, 28) and some employees may also require time off after the event (19, 33). This may have a negative impact on service delivery. According to Sandhu et al (20), the most frequently cited barrier to the execution of debriefing following critical events is a lack of appropriately trained facilitators. Other barriers include participants experiencing feelings of judgement during the session as well as lack of employee and managerial interest in debriefing (20).

The literature suggests that institutions should have systems in place, such as CISM which incorporates debriefing, so that employees are supported following critical events (8, 9, 11, 15, 19, 34). This may result in improved work satisfaction (35, 36) and performance (11), while mitigating the negative psychological consequences of the stress resulting from the event (8, 24, 37). Currently, there is a paucity of evidence in developing countries focusing on debriefing practices following critical events in anaesthesiology. It remains unclear whether debriefing presently occurs following critical events and whether there is a demand for debriefing to be more reliably implemented after such events. Institutional stress management strategies may be improved by identifying the burden of critical events, resultant stress and current debriefing practices. The aim of this study was to describe debriefing following specific critical events amongst anaesthetists in the Department of Anaesthesiology at Wits.

Materials and methods

Ethics approval was obtained from the Human Research Ethics Committee (Medical) and other relevant authorities. A contextual, prospective, descriptive research design was followed in this study.

The study population consisted of the anaesthetists working in the department and a convenience sampling method was used. The sample size was determined in consultation with a biostatistician using the study conducted by Tan (21) who distributed the questionnaire amongst 650 Australian anaesthesiology registrars with a response rate of 64%. The Department of Anaesthesiology at Wits has a population of 208. A minimum sample size of 143 respondents was calculated with a 95% confidence interval and a 5% margin of error. In this study, junior anaesthetists comprised medical officers and registrars, while senior anaesthetists referred to consultants.

Tan (21) developed a questionnaire for use in his study, in 2005. This was adapted, with permission from the author, for use in this study. It was then reviewed by three senior anaesthesiologists in the Department of Anaesthesiology, after which final corrections were made, ensuring content and face validity. The self-administered questionnaire consisted of four sections. Section 1 contained non-identifying demographic data. Section 2 concentrated on the stress related to critical events. Section 3 asked about debriefing processes following critical events. Section 4 explored suggestions to improve current debriefing practices.

One author (MG) distributed questionnaires at academic departmental meetings to voluntary participants. Those present at the meeting were informed of the study and invited to take part. Consent was implied on completion of the questionnaires, which were returned by participants folded, into a sealed box located at the door of the venue maintaining anonymity and confidentiality. Questionnaires that were returned blank or illegible were assigned a study number for response rate calculation, but were not included in the data analysis. One author (MG) was present at all meetings to answer questions.

Data capture was done using Microsoft Excel 2018. Data were analysed using Stata version 15 (StataCorp, USA) in consultation with a biostatistician.

Categorical variables were described using frequencies and percentages. Comparisons between junior and senior anaesthetists were made using Chi-squared or Fisher's exact tests. A p-value of <0.05 was considered statistically significant.

Results

All 152 questionnaires handed out were returned, of which 4 were blank and excluded. This resulted in a sample realisation of 97.4%, representing 71.2% of anaesthetists in the department. The participant characteristics are shown in Table I. "Insert Table I here."

Of the 148 participants, 146 (98.6%) remember at least one of the specified critical events occurring in the last year. The specified critical events remembered over the last year as well as a comparison between junior and senior participants and the number of critical events remembered, are shown in Table II. Significantly more juniors than seniors vividly remember events such as trauma with a bad outcome, needle stick injury, obstetric resuscitation and resuscitation with a bad outcome, whereas significantly more seniors remember the death of a colleague. "Insert Table II here."

Table III shows the total number of critical events experienced in the participants' careers and if their concentration was affected following these events. "Insert Table III here."

When asked about the existence of debriefing protocols in the department, 67 (45.3%) participants said there were none, 54 (36.5%) did not know, 26 (17.6%) said these existed and 1 (0.7%) participant did not answer.

The majority of participants, 102 (68.9%), had received some form of debriefing following critical events. Compared with seniors, significantly more juniors (27.4% versus 72.5%) are participating in debriefing following a critical event ($p = 0.0006$) and 57.8% of juniors versus 42.2% of seniors find debriefing useful ($p = 0.0319$). However, significantly less junior anaesthetists (59.6% versus 75.9% of senior anaesthetists) are likely to feel supported by the department following a critical event ($p = 0.0042$). Details of support following critical events, time off and the

adequacy of handover meetings as a debriefing session, are shown in Figure 1. “Insert Figure 1 here.”

Figure 2 shows the frequency, impact and leadership of debriefing and coping mechanisms used following critical events, whether debriefed or not. Participants could choose more than one option for coping mechanisms and the leader of the debriefing. “Insert Figure 2 here.”

The opinion of juniors and seniors regarding whether debriefing should follow specified critical events, is shown in Table IV. Significantly more seniors than juniors agree that debriefing should be implemented following difficult airway events, injury to the patient, obstetric resuscitation, paediatric resuscitation, unexpected death on the table and death of a colleague. “Insert Table IV here.”

Some participants, 19 (12.8%), suggested other critical events that may require debriefing and these included events involving staff in the work or home environment 10 (52.6%), various near misses 8 (42.1%) and 1 (5.3%) participant mentioned research.

Of the 148 participants, 67 (45.3%) concurred that a consultant involved with the event should lead, 64 (43.2%) concurred on a consultant not involved, 62 (41.9%) concurred on a psychologist and less commonly, a debriefing team, 26 (17.6%), a mentor, 23 (15.5%) and a senior registrar, 5 (3.4%). Participants were allowed to choose more than one option. Other suggestions for leaders of debriefing sessions were proposed by 3 (2.0%) participants and included, “whoever the person feels comfortable with”, “no leader, all contribute” and “senior anaesthetic personnel”.

Of the participants, 78 (52.7%) concurred that there should be a combination of group and individual debriefing. Other options were less commonly chosen and included medical staff only, 31 (20.9%), all medical and nursing staff, 21 (14.2%), individual only debriefing, 17 (11.5%) and 1 (0.7%) participant did not answer.

Participants’ ranking of suggested topics to discuss during debriefing is shown in Figure 3, using a scale where 1 is least important and 6 is most important. The majority of participants ranked all the suggest topics as most important and some provided their own opinion on what could be discussed. These opinions, however,

did not differ from what was suggested, except for the inclusion of post-mortem findings, if applicable to the critical event. “Insert Figure 3 here.”

Participants rated a list of barriers against the implementation of debriefing, as shown in Figure 4. “Insert Figure 4 here.”

Discussion

In our study, only 69.7% of participants reported experiencing more than five critical events in their career as opposed to Tan (21) who reported 93%. However, 98.6% of participants in our study vividly remember at least one critical event occurring over the last year. Significantly more juniors than seniors recollected critical events over the last year such as trauma with a bad outcome, needle stick injury, obstetric resuscitation and resuscitation with a bad outcome, whereas significantly more seniors recollected the death of a colleague. This could be due to junior anaesthetists often being at the “front lines” of the provision of anaesthesia at Wits and may thus recall these events more vividly. As a consequence of their long-standing careers, senior anaesthetists may not place as much importance on these events due to a shift in perspective but are perhaps more likely to have experienced the death of a colleague and thus recall this event vividly.

Of the total number of participants, 87.3% experienced a period of reduced concentration following a critical event similar to what is stated by Caine and Ter-Bagdasarian (8), Nyssen and Hansez (38) and found by Tan (21). In our study, 54.6% of the participants reported that this lasted days, however, three participants reported problems with concentration lasting years after the event. This is reflective of the literature showing that the critical events occurring in anaesthesiology have an impact on the anaesthetist (13, 39) and result in occupational related stress and associated symptoms (40).

Gazoni et al (29) showed that participants in their study felt compromised in the ability to provide further anaesthetic services immediately following a critical event and it is suggested that employees should be given time off following critical events that are emotionally taxing (22, 34). In our study, only 4.1% of the

anaesthetists were offered time off, findings in keeping with Tan (21). As stated by Todesco et al (39) and Jithoo and Sommerville (41) a possible reason is that not all critical events will affect anaesthetists in the same manner and thus time off following critical events should be individualised according to need. While anaesthetists feel that time off would be beneficial in reducing stress following critical events, it is agreed that this is not always feasible (22, 39) perhaps due to the negative impact it may have on service delivery. Of the participants in our study, 77.0% and 80.4% respectively, concur that time constraints and theatre time pressure are barriers to the implementation of debriefing following critical events.

An interest in debriefing was shown by 79.1% of the participants in our study, despite poor awareness of the existence of debriefing protocols in the department. Significantly less juniors than seniors are likely to feel supported by the department following a critical event. Of the senior and junior anaesthetists who felt supported, 74.2% have received some form of debriefing following critical events. This is possibly explained through the varying needs of individuals regarding support following critical events. While some anaesthetists may require a large amount of support following a seemingly minor event, others may not and it is not guaranteed that debriefing, as a stand alone intervention, is the support some anaesthetists seek.

Furthermore, although significantly more junior anaesthetists participate in debriefing, they are less likely to feel supported following a critical event. This may emphasise that implementing debriefing following critical events as a solitary strategy, versus it being a part of a comprehensive wellness program, may be ineffective in improving the perception of departmental support. Again, this may allude to varying levels of support required by individuals following critical events.

Only 68.9% of the total number of participants have received some form of debriefing, similar to the 64% found by Tan (21). Of those who have received debriefing, 81.4% found it useful but only 2% of participants in our study have consistently participated in debriefing after all experienced critical events. Significantly more juniors than seniors are participating in debriefing, which is in keeping with findings in other literature (15, 20, 21, 23, 31, 42). It is unsurprising that participants agree with the suggested topics to discuss during debriefing. Of note,

however, is that few participants have had a consistent experience with debriefing following critical events and perhaps have a poor understanding of how these sessions are conducted and what is discussed.

Despite this, in our study, 69.6% of the participants who do have some experience with debriefing reported that it dealt with the psychological issues surrounding critical events adequately and 82.4% felt that it helped alleviate stress. Significantly more juniors than seniors found debriefing useful corresponding to the study conducted by Tan (21). Perhaps because of their long-standing experience in anaesthesia, significantly more seniors than juniors in our study agree that certain critical events should be followed by debriefing including difficult airway events, injury to the patient, obstetric resuscitation, paediatric resuscitation, unexpected death on the table and the death of a colleague. Junior anaesthetists may not have accrued enough experience in their careers to be able to identify which critical events will have a long-term impact on them and which events should be followed by debriefing.

Participants in our study concurred that a consultant should lead the debriefing session whether involved or not, reiterating findings made by Sandhu et al (20) and Tan (21). Moreover, 41.9% of the participants in our study concurred that a psychologist, who is likely to be more formally trained as a debriefer, should lead the debriefing session. It is widely acknowledged that having a capable facilitator is a key component of the process, linking the quality and benefit of debriefing to the level of training of the facilitator (8, 16, 20, 25, 37, 43-45). Notably, 62.8% of participants in our study agree that not having a trained debriefing facilitator is barrier to the implementation of debriefing.

One of the goals of debriefing, apart from mitigating stress reactions to traumatic events, is to identify employees in a group setting, who may require further help on an individual level (8, 37, 43, 44). In our study, 52.7% of participants feel that group and individual debriefing is appropriate. Furthermore, in line with evidence stating that individual only debriefing may be harmful (32), only 11.5% of participants reported that they would prefer one-on-one debriefing following a critical event.

There are some limitations to our study. Recall bias may affect the results of our study in that memories of critical events with extremely negative outcomes may be recalled more clearly than others. Furthermore, this study was done contextually at Wits and the results may not be generalisable to other contexts, such as other medical disciplines.

Departmental support of anaesthetists may be enhanced through the regular occurrence of structured debriefing sessions with trained facilitators, as part of a CISM strategy. The establishment of training programmes for willing anaesthesiologists to become debriefers may enhance the accessibility, reliability and quality of debriefing, following critical events, within the department. Furthermore, multidisciplinary debriefing is an area that has received little attention in the literature and is a potential area for future research.

In conclusion, our study illustrates that a wide range of critical events occurs in the Department of Anaesthesiology at Wits. These events are stressful and have an impact on both junior and senior anaesthetists. There is interest in debriefing following critical events which is reported to be helpful in the alleviation of stress and which may enhance the perception of departmental support, especially from a junior anaesthetist's perspective. Improving these support structures may protect the mental wellbeing of anaesthetists in the workplace, with additional improvements in productivity and efficiency. Further work should focus on the manner in which CISM strategies may practically be applied in our setting.

Conflict of interest

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

Acknowledgement

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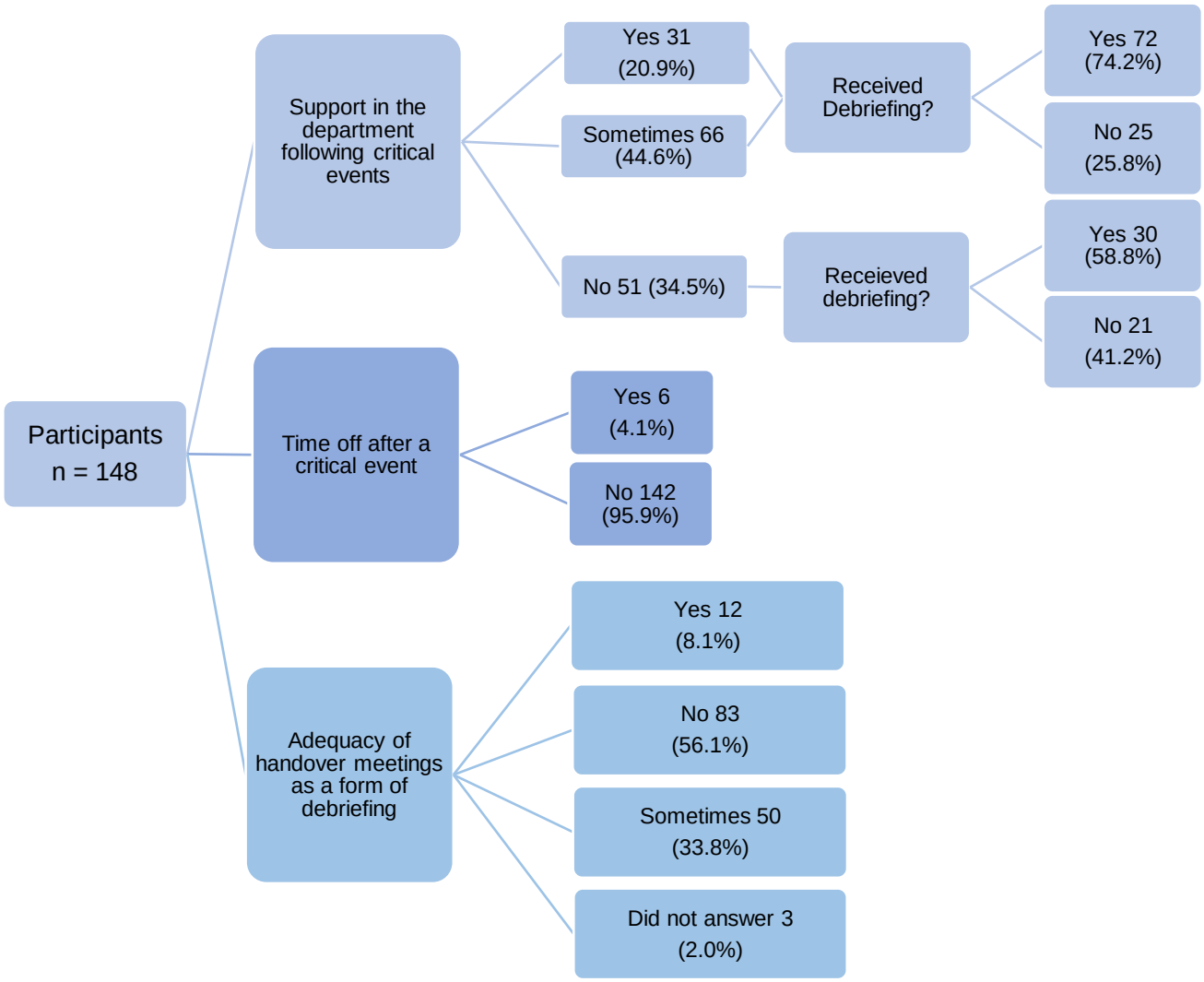


Figure 1 – Background on current critical event interventions

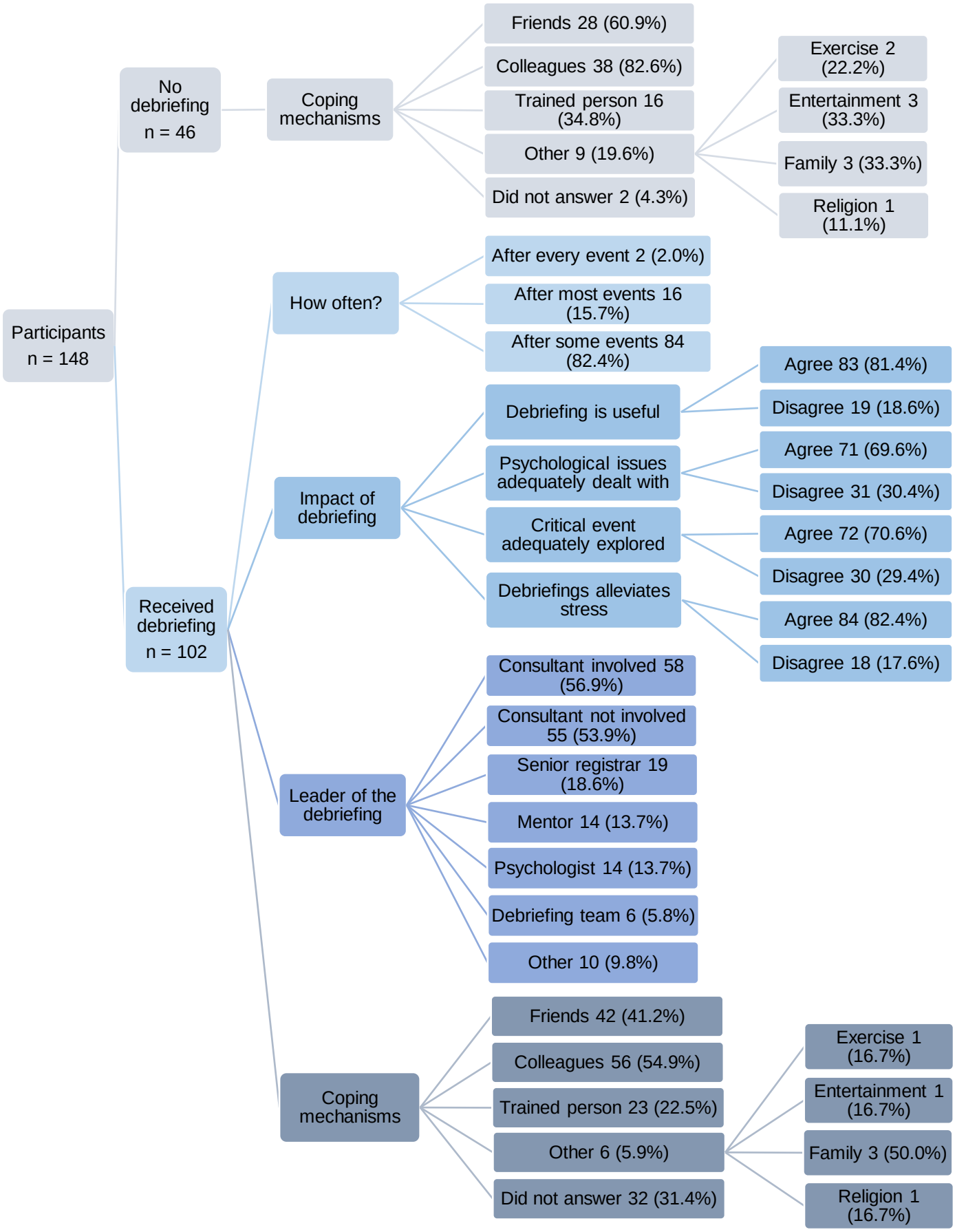


Figure 2 – Frequency, impact and leadership of debriefing and coping mechanisms used following critical events

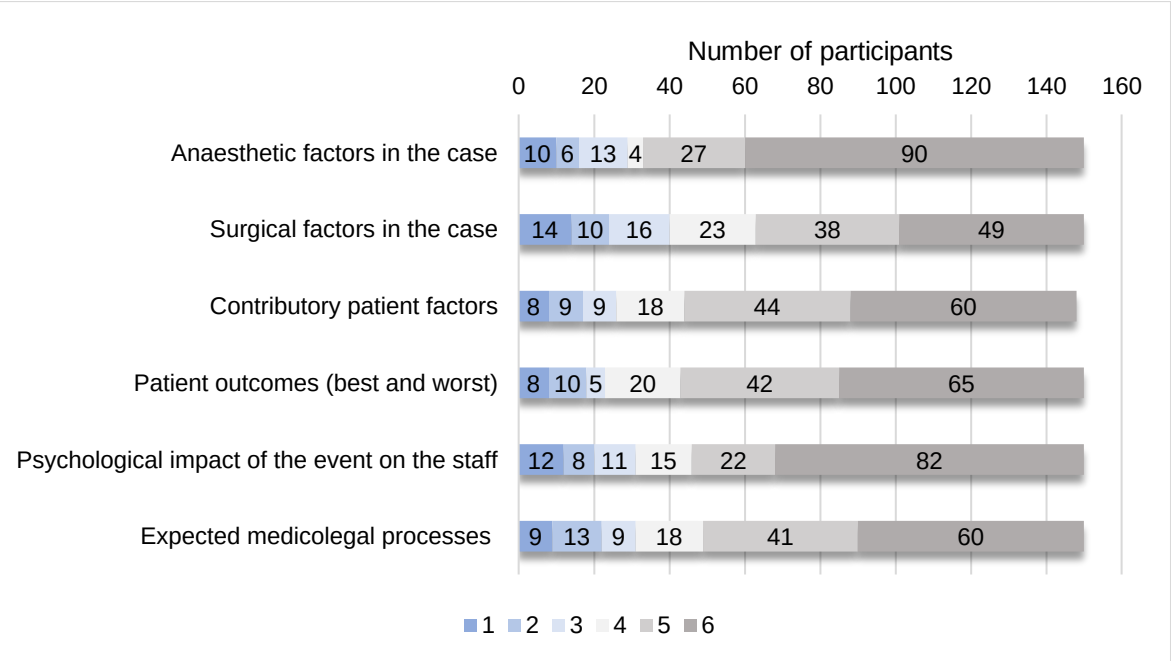


Figure 3 – Rating of suggested topics to discuss during debriefing

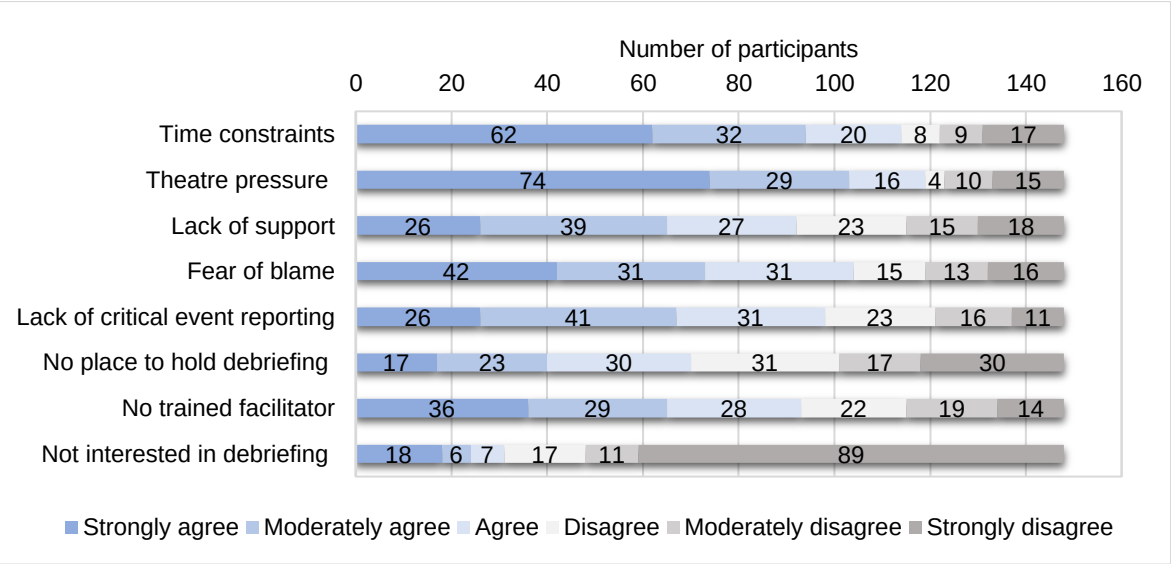


Figure 4 – Barriers against the implementation of debriefing

Table I – Participant characteristics

Characteristics (n = 148)	Number	Percentage
Sex		
Male	46	31.1
Female	102	68.9
Age		
21 – 30	32	21.6
31 – 40	91	61.5
41 – 50	11	7.4
> 50	14	9.5
Years of experience		
< 5	59	39.9
5 – 10	58	39.2
>10	31	20.9
Professional designation		
Medical officer	21	14.2
Registrar	73	49.3
Consultant	54	36.5

Table II – Specified critical events remembered in the last year by participants

Events	Number of events n (%)			Designation n (%)				p-value
	0	1 - 4	>5	Junior		Senior		
				Yes	No	Yes	No	
Difficult airway	25 (16.9)	102 (68.9)	21 (14.2)	78 (83.0)	16 (17.0)	45 (83.3)	9 (16.7)	0.9557
Difficult intubation	23 (15.5)	109 (73.6)	16 (10.8)	80 (85.1)	14 (14.9)	45 (83.3)	9 (16.7)	0.7744
Trauma with a bad outcome	**41 (27.7)**	**87 (58.8)**	**20 (13.5)**	**78 (83.0)**	**16 (17.0)**	**29 (53.7)**	**25 (46.3)**	**0.0001**
Anaphylaxis	121 (81.8)	27 (18.2)	0 (0.0)	20 (21.3)	74 (78.7)	7 (13.0)	47 (87.0)	0.2074
Injury to patient	97 (65.5)	51 (34.5)	0 (0.0)	36 (38.3)	58 (61.7)	15 (27.8)	39 (72.2)	0.1948
Needle stick injury	**108 (73.0)**	**40 (27.0)**	**0 (0.0)**	**33 (35.1)**	**61 (64.9)**	**7 (13.0)**	**47 (87.0)**	**0.0035**
Drug administration error	72 (48.6)	75 (50.7)	1 (0.7)	49 (52.1)	45 (47.9)	27 (50.0)	27 (50.0)	0.8031
Confrontation with patients	90 (60.8)	56 (37.8)	2 (1.4)	38 (40.4)	56 (59.6)	20 (37.0)	34 (63.0)	0.6844
Abusive confrontation with work colleagues	57 (38.5)	86 (58.1)	5 (3.4)	60 (63.8)	34 (36.2)	31 (54.7)	23 (42.6)	0.4396
Obstetric resuscitation	**60 (40.5)**	**76 (51.4)**	**12 (8.1)**	**67 (71.3)**	**27 (28.7)**	**21 (38.9)**	**33 (61.1)**	**0.0001**
Paediatric resuscitation	71 (48.0)	72 (48.6)	5 (3.4)	50 (53.2)	44 (46.8)	27 (50.0)	27 (50.0)	0.7083
Resuscitation with a bad outcome	**51 (34.5)**	**84 (56.8)**	**13 (8.8)**	**69 (73.4)**	**25 (26.6)**	**28 (51.9)**	**26 (48.1)**	**0.0079**
Expected death on table	67 (45.3)	78 (52.7)	3 (2.0)	52 (55.3)	42 (44.7)	29 (53.7)	25 (46.3)	0.8493
Unexpected death on table	95 (64.2)	52 (35.1)	1 (0.7)	39 (41.5)	55 (58.5)	14 (25.9)	40 (74.1)	0.0573
Death of a colleague	**73 (49.3)**	**73 (49.3)**	**2 (1.4)**	**37 (39.4)**	**57 (60.6)**	**38 (70.4)**	**16 (29.6)**	**0.0003**
Litigation	144 (97.3)	4 (2.7)	0 (0.0)	3 (3.2)	91 (96.8)	1 (1.9)	53 (98.1)	0.6285
Unfavourable examination outcomes	125 (84.5)	22 (14.9)	1 (0.7)	18 (19.1)	76 (80.9)	5 (9.3)	49 (90.7)	0.1099

Table III – Total number of critical events experienced and difficulty concentrating

	Number	Percentage
Total number of critical events		
Did not answer	3	2.0
1 – 2	14	9.7
3 – 5	29	20.0
>5	101	69.7
Difficulty concentrating		
Yes	130	87.3
Period of reduced concentration		
Did not answer	1	0.8
Hours	37	28.5
Days	71	54.6
Weeks	15	11.5
Months	3	2.3
Years	3	2.3

Table IV – Opinion on specified critical events that should be followed by debriefing

Events	Junior n (%)		Senior n (%)		p-value
	Agree	Disagree	Agree	Disagree	
Difficult airway	**72 (76.6)**	**22 (23.4)**	**49 (90.7)**	**5 (9.3)**	**0.0320**
Difficult intubation	72 (76.6)	22 (23.4)	46 (85.2)	8 (14.8)	0.2108
Trauma with a bad outcome	72 (76.6)	22 (23.4)	47 (87.0)	7 (13.0)	0.1234
Anaphylaxis	71 (75.5)	23 (24.5)	47 (87.0)	7 (13.0)	0.0937
Injury to patient	**72 (76.6)**	**22 (23.4)**	**49 (90.7)**	**5 (9.3)**	**0.0320**
Needle stick injury	76 (80.9)	18 (19.1)	44 (81.5)	10 (18.5)	0.9249
Drug administration error	71 (75.5)	23 (24.5)	45 (83.3)	9 (16.7)	0.2671
Confrontation with patients	71 (75.5)	23 (24.5)	45 (83.3)	9 (16.7)	0.2671
Abusive confrontation with work colleagues	74 (78.7)	20 (21.3)	49 (90.7)	5 (9.3)	0.0603
Obstetric resuscitation	**75 (79.8)**	**19 (20.2)**	**50 (92.6)**	**4 (7.4)**	**0.0385**
Paediatric resuscitation	**75 (79.8)**	**19 (20.2)**	**50 (92.6)**	**4 (7.4)**	**0.0385**
Resuscitation with a bad outcome	72 (76.6)	22 (23.4)	48 (88.9)	6 (11.1)	0.6604
Expected death on table	71 (75.5)	23 (24.5)	47 (87.0)	7 (13.0)	0.0937
Unexpected death on table	**73 (77.7)**	**21 (22.3)**	**50 (92.6)**	**4 (7.4)**	**0.0196**
Death of a colleague	**72 (76.6)**	**22 (23.4)**	**49 (90.7)**	**5 (9.3)**	**0.0320**
Litigation	74 (78.7)	20 (21.3)	49 (90.7)	5 (9.3)	0.0603
Unfavourable examination outcomes	75 (79.8)	19 (20.2)	47 (87.0)	7 (13.0)	0.2645

Section 4: Proposal

Debriefing following specific critical events in a department of anaesthesiology

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4.1 Introduction and problem statement

It is acknowledged that anaesthesiology is a stressful discipline (1, 2). Aitkenhead (3) states that “the stress associated with death or serious injury occurring in association with anaesthesia may be considerable.” In recent years, there has been more attention paid to the mental wellbeing of health professionals, including anaesthetists (1, 4). A study, conducted in the Department of Anaesthesiology at the University of the Witwatersrand (Wits) in 2015, found that registrars in the department are more stressed than other communities in South Africa (5). This stress may accumulate in an individual, especially after frequent and recurrent critical events (1, 2). The accumulation of stress may have negative effects on anaesthetists including poor work performance (6), increased absenteeism (6, 7), burnout (2, 8) and mental health problems such as anxiety disorders, depression and substance abuse (2, 6, 9). Furthermore, chronic physical conditions such as hypertension, and related cardiovascular disease, may result from ongoing, untreated stress (6).

The experience of stress by anaesthetists may peak after involvement in any critical event encountered in anaesthetic practice. The true incidence of critical events, such as a death on table, is not known. Bainbridge et al (10) did an extensive review of the literature pertaining to perioperative death in developed and developing countries in 2012 and found the incidence of anaesthetic related mortality to be declining in both settings, but more so in developed countries. In 2017, Nel (11) concluded that, critical events may be under-reported in South Africa due to barriers such as litigation fears, lack of support and departmental discipline. This distorts the incidence of critical events, but any one event may have an effect on the health professional, irrespective of designation. It has been suggested that debriefing after critical events may be beneficial in the alleviation of stress symptoms and is valued by participants (12-15).

Debriefing was originally described and used in medicine after simulation training (16). The translatability of debriefing into real-life scenarios, however, could not be ignored (17). Furthermore, as an educative and reflective process (18), the benefit of debriefing on learning and skill enhancement in medicine is certain (12, 19). Other benefits include improved coping skills in the anaesthetist and a quicker

return to normal functioning following a critical event (6). Moreover, debriefing may lead to a reduction in stress levels, improved team work, performance (20) and clinical management of subsequent patients (19-24). During formal debriefing, feelings of guilt are assuaged (25) and emotions may be normalised (24). If mistakes have been made, debriefing may provide an adequate and safe space for learning (24), without fear of blame or judgement (26). There is, however, an ongoing debate regarding the benefits of debriefing and the consequent development of stress disorders (27-31). Nevertheless, at least four studies found that the majority of personnel who have been exposed to critical events, followed by debriefing sessions, find these sessions useful and important (12-15).

In an editorial for The South African Journal of Anaesthesia and Analgesia, van der Walt (32) states that “organisational factors play a greater role than individual factors causing burnout.” Hospitals should consider employing protocols such as critical incident stress management to help employees deal with critical events and the psychological impact thereof (3, 6, 7, 9, 26, 33). Components of critical incident stress management include debriefing, which may take many forms, both formal and informal. McQuaid-Hanson and Pian-Smith (22) suggest postoperative informal debriefings. Sandhu et al (12) propose the use of debriefing tools which may guide facilitators through the debriefing process, to allow participants to gain the most from the experience. Bacon et al (9) recommend an “action card” be implemented after a critical event, to serve as a checklist reminding doctors of the proper course of action following these events. Zuckerman et al (34) reiterate the usefulness of checklists in critical situations.

An important aspect of debriefing, apart from mitigating psychological stress, is the identification of individuals who would require long-term interventions (9). Health professionals do not commonly seek medical help when needed (7, 26). By the identification of these individuals during debriefing, health professionals could be promptly referred and supported appropriately (9). Furthermore, identifying these professionals during the debriefing process would then also ease the pressure other employees may feel, concerning the recognition of the symptoms of burnout in their colleagues (26).

Health professionals find debriefing following critical events useful (12-14), but not

always available (35). The implementation of debriefing in the setting of theatre may be logistically difficult due to resource and time constraints (19), time delays (26) and some employees may require time off after the event (18, 26). According to Sandhu et al (12), the most frequently cited barrier to implementing debriefing is a lack of appropriately trained facilitators. Other barriers included participants experiencing feelings of judgement during debriefing as well as lack of employee and managerial interest in debriefing (12).

The interest in debriefing is variable internationally. In Australia, Tan (13) showed, in 2005, that junior anaesthetists place more value in the debriefing process than senior anaesthetists. Incongruously, in Ireland, Healy and Tyrell (15) found, in 2012, that the more experience a health professional had, the more value they placed in debriefing after critical events. In 2014, Canadian authors Sandhu et al (12) determined that 24% of the physicians who participated in the study, had no significant interest in being debriefed, compared with 46% of nurses. There is also much debate, and little agreement on, the best way to conduct debriefing sessions (18, 27-29), formally or informally, within the setting of theatre (9, 22), in order to minimise delays and maximise benefit and theatre efficiency.

Internationally, despite disagreements surrounding the manner in which it has been used, debriefing in clinical practice has been shown to be an important avenue for providing emotional support (6, 15) and stress relief for clinicians (9). Tan (13) showed that debriefing was considered to be useful for coping with the stress encountered following critical events, amongst anaesthesiology registrars in Australia in 2005. A study conducted in 2015 shows that anaesthetists at Wits have higher stress scores than non-medical individuals in South Africa (5). Another study, also in 2015, identified that burnout was noted to be high amongst doctors working at Wits (8). Currently, there are no studies describing the debriefing practices following critical events, and its usefulness in anaesthesiology, in South Africa.

4.2 Aim and objectives

4.2.1 Aim

The aim of this study is to describe debriefing following specific critical events amongst anaesthetists in the Department of Anaesthesiology at Wits.

4.2.2 Objectives

The primary objectives of this study are to**:**

- describe aspects of stress related to the experience of specific critical events
- describe debriefing following critical events
- explore suggestions to improve debriefing.

The secondary objectives of this study are to compare the following between juniors and seniors:

- participation in the debriefing process
- the usefulness of the debriefing process
- the feeling of support following a critical event.

4.3 Research assumptions

This section clarifies definitions that will be used in this study.

Anaesthetist: any persons working in the Department of Anaesthesiology. In this study, this includes all medical officers, registrars and consultants.

Medical officer: a doctor, qualified in terms of Health Professions Council of South Africa regulations as an independent practitioner, who is employed specifically in the field of anaesthesiology and who provides anaesthesia to patients under supervision. Medical officers with more than 10 years of anaesthesiology experience are considered career medical officers.

Registrar: a doctor specialising in anaesthesiology in accordance with regulations put forth by the College of Medicine of South Africa and who is registered by the Health Professions Council of South Africa as a trainee anaesthetist.

Consultant: a career medical officer in the field of anaesthesiology, or an anaesthesiologist.

Anaesthesiologist: a specialist in the field of anaesthesiology, registered as such with the Health Professions Council of South Africa.

Junior anaesthetist: in this study, junior anaesthetists will comprise medical officers and registrars.

Senior anaesthetist: senior anaesthetists will refer to consultants, in this study.

Debriefing: debriefing is a process whereby information about a critical event is shared, analysed and reflected upon and emotions normalised (24, 33). In this study, it includes any form of sharing emotions with colleagues or friends and family outside the department, as well as formal debriefing sessions with seniors in an educational setting or psychologists and professionals trained in debriefing for emotional support.

Critical event in anaesthesiology: a critical event in anaesthesiology is an "untoward and preventable mishap associated with the administration of general or regional anaesthesia, which leads to, or could lead to an undesirable patient outcome" (36) or "events that provoke strong emotional reactions from healthcare professionals, who may not function to the best of their abilities" (15).

In this study, specific critical events will be defined by the following list, identified in a study done by Tan (13), during an extensive literature review: difficult airway, difficult intubation, trauma with a bad outcome, anaphylaxis, injury to the patient, needle stick injury, drug administration error, abusive confrontation with work colleagues, confrontation with patients, obstetric resuscitation, paediatric resuscitation, resuscitation with a bad outcome, death under anaesthesia and litigation. In consultation with senior anaesthesiologists in the department, and an extensive literature review, "death of a colleague" (6) and "poor academic outcomes" was added to this list of specific critical events. The category, "death

under anaesthesia” was clarified further by senior anaesthesiologists. Following this, the final list of critical events explored in this study included “expected death on table” and “unexpected death on table.”

4.4 Demarcation of study field

This study will be conducted in the Department of Anaesthesiology affiliated to Wits, Johannesburg, South Africa. The staff complement of the department is 22 medical officers, 112 registrars and 74 consultants.

There are five hospitals affiliated to the department:

- Charlotte Maxeke Johannesburg Academic Hospital, a 1200-bed central hospital
- Chris Hani Baragwanath Academic Hospital, a 2888-bed central hospital
- Helen Joseph Hospital, a 500-bed regional hospital
- Rahima Moosa Mother and Child Hospital, a 338-bed regional hospital
- Wits Donald Gordon Medical Centre, a public private hospital with 190 beds.

4.5 Ethical considerations

The Human Research Ethics Committee (Medical) and the Graduate Studies Committee at Wits will be approached for approval. The Head of the Department of Anaesthesiology granted consent to conduct the study within the department at Wits (Appendix 1).

The self-completed questionnaires (Appendix 2) will be distributed to voluntary participants at departmental academic meetings. The convenor of the meeting will be approached for consent to address the attendees. The study will be explained to the potential participants and they will be invited to participate. Once they have agreed to participate, they will be given a questionnaire, to which an information letter will be attached (Appendix 3). The completion of questionnaires will imply consent.

Anonymity and confidentiality of the anaesthetists completing the questionnaires will be maintained and protected. No identifying data will be collected in the questionnaire so as to maintain anonymity and each questionnaire collected will be assigned a study number for data analysis purposes. Folded questionnaires will be returned by participants into a sealed box located at the door of the venue. Raw data will only be available to the researcher and supervisors to maintain confidentiality. Data will be kept securely for six years after the completion of the study, in a locked cupboard.

If participants feel that, during the completion of the questionnaire, unresolved issues from past critical events have been reopened, they will be referred to the Wellness Committee, affiliated to the Department of Anaesthesiology, for further help. The Head of the Department of Anaesthesiology at Wits will be notified of the final results of the study, if it is found that there is a demand and need for regular debriefing following critical events.

The study will be conducted according to the principles of the Declaration of Helsinki (37) and the South African Guidelines for Good Clinical Practice (38).

4.6 Research methodology

4.6.1 Research design

Research designs provide the framework within which a study may be conducted (39). A contextual, prospective, descriptive research design will be followed in this study.

A contextual research design is aimed at a specific population. This population is on a smaller “scale” compared to the world at large (40). This study is contextual because it will be conducted amongst the anaesthetists working at Wits.

Data will be collected from anaesthetists at the time that the study is taking place. Thus the study is prospective, that being one which follows a population over time to observe an outcome (41).

According to Burns and Grove (39), a descriptive study describes the characteristics of a population. In so doing, a question about the population may

be answered. This study seeks to answer questions regarding the stressful effect critical events have on anaesthetists, debriefing practices within the Department of Anaesthesiology and whether these may be improved on.

4.6.2 Study population

The study population consists of the anaesthetists working in the Department of Anaesthesiology at Wits.

4.6.3 Study sample

Sample size

The sample size for this study was determined in consultation with a biostatistician. Tan (13) distributed the questionnaire amongst Australian anaesthesiology registrars with a response rate of 64%. Of those who responded, 55% described aspects of debriefing, including that it is useful following specific critical events. Considering the Department of Anaesthesiology has a population of 208, a minimum sample size of 143 respondents would be required to describe debriefing following specific critical events at a 95% confidence interval and a 5% margin of error. This was calculated using the following formula: $n = (Z^2_{\propto/2}.P.q)/m^2$.

(Where: n = sample size; Z = 95% confidence interval; P = percentage of study phenomenon in the study population; q = 1-P and m = the margin of error).

Sampling method

A convenience sampling method will be used. According to Brink et al (41) this is a “non-probability sampling procedure that involves the selection of the most readily available people or objects for a study.” Data for this study will be collected by the distribution of questionnaires at academic departmental meetings.

Inclusion and exclusion criteria

All anaesthetists working in the Department of Anaesthesiology are considered eligible to participate in the study. Those excluded will be:

- interns and community service doctors
- anaesthetists who refuse to take part in the study
- illegible or blank questionnaires.

4.6.4 Data collection

Questionnaire development

A study by Tan (13) published in 2005, was identified, following an extensive literature review. Tan (13) distributed a questionnaire regarding debriefing practices to anaesthesiology registrars in Australia. A copy of the original questionnaire used by Tan (13) was requested and permission to use and adapt the questionnaire was obtained (Appendix 4). The questionnaire was adapted for use in this study for the South African context. It was then reviewed by three senior anaesthesiologists in the Department of Anaesthesiology, after which final corrections were made.

The self-administered questionnaire consists of four sections (Appendix 2). Section 1 will contain non-identifying demographic data. Section 2 concentrates on the stress related to critical events. Section 3 asks about debriefing processes following critical events. Section 4 explores suggestions to improve current debriefing practices.

Data collection

The researcher will distribute questionnaires at academic departmental meetings to voluntary participants. The convenor of each meeting will be approached to obtain permission to address the attendees. Those present at the meeting will be informed of the study and will be invited to take part. Those that agree will be given an information letter and questionnaire, which will take approximately 15 minutes to complete. All participants will be reassured about maintained anonymity and confidentiality. Once completed, the participant will return the questionnaires, folded, into a sealed box located at the door of the venue. Questionnaires that are returned blank or illegible will be assigned a study number for response rate calculation, but will not be included in the data analysis. The researcher will be present at all meetings to answer questions.

4.6.5 Data analysis

Data capture will be done using Microsoft Excel 2016. Data will be analysed using Stata version 15 (StataCorp, USA) in consultation with a biostatistician. Descriptive and inferential statistics will be used. Categorical variables will be described using frequencies and percentages. Comparisons between junior and senior anaesthetists will be made using Chi-squared or Fisher's exact tests. A p-value of <0.05 will be considered statistically significant.

4.7 Significance of the study

This study will provide insight into the stress experienced by anaesthetists after specific critical events in the Department of Anaesthesiology. Questions regarding current debriefing practices will be described and suggestions concerning the improvement of debriefing practices will be explored. If a need is identified, a debriefing protocol could be implemented such that debriefing reliably occurs following a critical event. In line with international literature, instituting protocols for debriefing after critical events may allow symptoms of stress related to critical events to be processed (9, 15), foster a more supportive work environment and improve work performance (20).

4.8 Validity and reliability of the study

According to Botma et al (42) validity "indicates whether the conclusions of the study are justified based on the design and interpretation" and "reliability represents the consistency of the measure achieved." The validity and reliability of this study will be ensured by:

- the use of an appropriate study design
- the use of a published questionnaire
- the draft questionnaire was reviewed by three senior anaesthesiologists
- data collection is done anonymously
- the researcher will be present at all meetings to answer questions
- appropriate statistical testing in consultation with a biostatistician.

4.9 Potential limitations

The limitations of this study relate to the non-randomised sampling method. The use of convenience sampling may not be an accurate representation of the population as a whole therefore, bias would be hard to control (42).

As the study has been contextualised to the Department of Anaesthesiology at Wits, results may not be generalisable to other anaesthetic departments. The results of this study are limited to subjective responses individual anaesthetists may have toward a critical event. Anaesthetists may not react in the same manner following similar critical events, nor will debriefing be needed for everyone after similar events.

4.10 Project outline

4.10.1 Time frame

Activity	Aug 2018	Sept 2018	Oct 2018	Nov 2018	Jan 2019	Feb 2019	Mar 2019	Apr 2019	May 2019	Jun 2019	Jul 2019
Proposal preparation											
Proposal submission											
Ethics approval											
Post graduate approval											
Data collection											
Data analysis											
Draft article											
Submission											

4.10.2 Budget

Item	**Number**	**Cost**	**Total**
Printing	1000	1	R 1000
Binding	4	250	R 1000
Grand total			**R 2000**

The Department of Anaesthesiology will bear the cost of printing and paper for the proposal, ethics and post graduate approvals.

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4.12 Appendices

Appendix 1: Permission from Head of Department

7 August 2018

Dear Dr Lines,

RE: Debriefing following specific critical events in a department of anaesthesiology

I would like to request permission to conduct a study with in the Department of Anaesthesiology.

The aim of this study is to describe debriefing following specific critical events amongst anaesthetists in the Department of Anaesthesiology at Wits.

Debriefing has been shown to help health professionals deal with the stress of critical events in the workplace. The practice of debriefing following critical events may also help prevent of the negative consequences of accumulated stress, such as poor concentration, poor work performance, absenteeism and mental health issues.

This study would entail the completion of self-administered questionnaires by participants and would be handed out at academic departmental academic meetings.

Approval applications from the Human Research Ethics Committee and Graduate Studies Committee has also been made.

Kind Regards,

Mithasha Gayaparsad

Approval granted:

Dr D Lines

Date: 7 August 2018

Appendix 2: Questionnaire

Debriefing after critical events in a department of anaesthesiology

The following definitions will be used in this study:

Debriefing: debriefing is a process whereby information about a critical event is shared, analysed and reflected upon. In this study, it includes any form of sharing emotions, experienced following a critical event, with colleagues or friends and family outside the department, as well as formal debriefing sessions with seniors in an educational setting or psychologists and professionals trained in debriefing for emotional support.

Critical event in anaesthesiology: a critical event in anaesthesiology is a troublesome and avoidable mishap related to the administration of anaesthesia (general or regional), which may lead to an undesirable patient outcome OR an event that provokes strong emotional reactions from health professionals, who may not function to the best of their abilities subsequently.

With the above in mind, please mark the appropriate boxes with an X.

Section 1: Demographics

1.1 Sex | Male | Female |

1.2 Age | 21 – 30 | 31 – 40 | 41 – 50 | >50 |

1.3 Years of experience | <5 | 5 – 10 | 11 – 20 | >20 |

1.4 Professional designation | Medical officer | Registrar | Consultant |

Section 2: Stress related to specific critical events

2.1 How many of the following specific critical events have occurred in the **last 12 months** that you **vividly remember**?

Critical event	**0**	**1**	**2**	**3**	**4**	**>5**
Difficult airway						
Difficult intubation						
Trauma with a bad outcome						
Anaphylaxis						
Injury to patient						
Needle stick injury						
Drug administration error						
Confrontation with patients						
Abusive confrontation with work colleagues						

Obstetric resuscitation						
Paediatric resuscitation						
Resuscitation with a bad outcome						
Expected death on table						
Unexpected death on table						
Death of a colleague						
Litigation						
Unfavourable examination outcomes						

2.2 In general, do you agree that you have difficulty concentrating/performing at work, immediately after a critical incident?

Yes	No

2.3 If so, for how long?

Hours	Days	Weeks	Months	Years

2.4 Were you offered an opportunity for time off/ leave after the critical event?

Yes	No	Sometimes

2.5 Are there formal guidelines on debriefing, following specific critical events, at the hospital where you are appointed?

Yes	No	I do not know

2.6 Do you feel that medical officers, registrars and consultants in the Department of Anaesthesiology, are well supported following a negative outcome critical event?

Yes	No	Sometimes

Section 3: Debriefing following critical events

3.1 How many of the specified critical events have you experienced in your career? (Refer to list on previous page).

0	1 – 2	3 – 5	5 – 10	> 10

3.2 Have you had debriefing/counselling after the events?

With every event	With most events	With some events	Never

If you have never received debriefing following critical events, proceed directly to question 3.8.

For the following table: 1 = Strongly agree; 2 = moderately agree; 3 = Agree; 4 = Disagree; 5 = moderately disagree; 6 = strongly disagree.

	1	**2**	**3**	**4**	**5**	**6**
3.3 If you have been debriefed following these critical events, would you agree that the debriefings have been useful for coping with the critical event?						
3.4 Would you agree that the psychological issues discussed during debriefing were adequately dealt with?						
3.5 Would you agree that the critical event was adequately explored?						
3.6 Would you agree that the debriefing session helped to alleviate some of the stress you experienced during the event?						

3.7 In your experience, who led the debriefing? (More than one option may apply).

Anaesthetic consultant involved with the case	Anaesthetic consultant **not** involved with the case	More senior anaesthetic registrar	Your anaesthetic mentor
Psychiatrist/psychologist trained in debriefing	A member of a debriefing team in your hospital/social worker	Other (please specify) …… …… ……	

3.8 If you were NOT debriefed after a critical event, please rank the usefulness of other coping mechanisms you used. (1= least important; 6 = most important):

Coping mechanism	**1**	**2**	**3**	**4**	**5**	**6**
Discussion with friends						
Discussion with medical colleagues						
Discussion with a person trained in counselling						
Other	Yes	No				

If other, please specify

……

……

……

3.10 Do you think that handover meetings are an adequate form of debriefing following critical events?

Yes	No	Sometimes

Section 4: Suggestions to improve debriefing practices

4.1 Do you think formal debriefing following these critical events would be useful? (1 = Strongly agree; 2 = moderately agree; 3 = Agree; 4 = Disagree; 5 = moderately disagree; 6 = strongly disagree):

Critical event	**1**	**2**	**3**	**4**	**5**	**6**
Difficult airway						
Difficult intubation						
Trauma with a bad outcome						
Anaphylaxis						
Injury to patient						
Needle stick injury						
Drug administration error						
Confrontation with patients						
Abusive confrontation with work colleagues						
Obstetric resuscitation						
Paediatric resuscitation						
Resuscitation with a bad outcome						
Expected death on table						
Unexpected death on table						
Death of a colleague						
Litigation						
Unfavourable examination outcomes						

4.2 In your opinion, who should lead the debriefing sessions?

Anaesthetic consultant involved with the case	Anaesthetic consultant **not** involved with the case	More senior anaesthetic registrar	Your anaesthetic mentor
Psychiatrist/psychologist trained in debriefing	A member of a debriefing team in your hospital	Other (please specify): …… ……. …… …….	

4.3 Who should be present at the debriefing?

All medical staff involved	All medical and nursing staff involved
The individual involved only	A combination of group and individual debriefing

4.4 Please rank the importance of the following topics to be discussed at a debriefing session (1= least important; 6 = most important):

	1	2	3	4	5	6
Anaesthetic factors in the case						
Surgical factors in the case						
Contributory patient factors						
Patient outcomes (best and worst)						
Psychological impact of the event on staff						
Expected medicolegal processes						

4.5 In your opinion, what other critical events, not listed here, should be included?

……

……

……

……

……

4.6 Would you agree that the following are barriers to the implementation of debriefing at Wits?
(1 = Strongly agree; 2 = moderately agree; 3 = Agree; 4 = Disagree; 5 = moderately disagree; 6 = strongly disagree).

Barriers	1	2	3	4	5	6
Time constraints in the days after the event						
Theatre pressure during the day						
Lack of managerial support						
Fear of blame or disciplinary action						
Lack of critical event reporting						
No appropriate place to hold the debriefing session						
No trained facilitator						
I am not interested in being debriefed following critical events						

Thank you for taking the time to complete this questionnaire.

Appendix 3: Information letter

August 2018

Dear Colleague,

Hello, my name is Mithasha Gayaparsad. I am a registrar in the Department of Anaesthesiology. I would like to invite you to participate in my study, titled, “Debriefing after critical events in a department of anesthesiology.” Approval from the Human Research Ethics Committee (HREC) has been obtained. (Reference number)

The aim of this study is to describe debriefing following specific critical events amongst anaesthetists in the Department of Anaesthesiology at Wits.

Participation in this study is on a voluntary basis and consent will be implied on the completion of the questionnaire. These questionnaires are self-administered and no identifying data will be collected, thus maintaining anonymity. Once completed please return the folded questionnaire into a sealed box at the door. Thereafter each questionnaire will be assigned a number for data analysis purposes. Only my supervisors and I will have access to the raw data ensuring confidentiality.

This questionnaire should take no longer than 15 minutes to complete. Please return all questionnaires, even if not complete. The completion of this questionnaire in a thorough and truthful manner however, may assist in the implementation of debriefing protocols following critical events in anaesthesiology in the department. In so doing, a culture of support for the anaesthetists working in the department is created, and the potential negative consequences of stress resulting from these critical events may be mitigated. Incentives will not be provided for the completion of the questionnaire. Before completion of the questionnaire the above information should be fully understood.

If, after the completion of this questionnaire, you feel that you may need debriefing regarding a specific event you have experienced, please contact a representative from the Wellness Committee. Details of the committee members may be found in the Department of Anaesthesiology tea rooms at the different hospitals.

Thank you for your time. It is greatly appreciated. Should you have any questions regarding the study, please do not hesitate to ask the following people:

- Professor Penny (Chairperson of the HREC): 011 717 2301
- Mithasha Gayaparsad (Researcher): 084 207 8477.

Yours sincerely,

Mithasha Gayaparsad

Appendix 4: Permission from the author

From: **Hock Tan** hocktan@me.com
Subject: Re: Debriefing
Date: 29 January 2018 at 00:24
To: Mithasha Gayaparsad gayaparsad@icloud.com

HT

Hi Mithasha,

Here are a few items I found from the deep past…


Questionairre.doc


1.doc


Critical Incident Support.doc

I am sure you can improve the questions and also improve the way the questions are formulated to enhance the survey. I was told these were not very well structured but I couldn't quite remember the details now after so long.

Cheers,
Hock

> On 22 Jan 2018, at 8:08 pm, Mithasha Gayaparsad <gayaparsad@icloud.com> wrote:
>
> Dear Hock,
>
> I hope this email finds you well. I am so happy that you were able to get back to me!!! Thank you so much for taking the time out to help!
>
> I have been practicing anaesthesia since 2015, and started my registrar time here at The University of the Witwatersrand (Wits), in July 2017. Our training at Wits takes the form of four years rotating through various hospitals that make up a "circuit" here in Johannesburg, including Chris Hani Baragwanath Academic Hospital and Charlotte Maxeke Johannesburg Academic Hospital. Whilst rotating, we are required to do specialist blocks including paediatrics, regionals, ICU, outreach programmes, neurovascular and cardiacs, as well as doing general rotations in which you may be allocated to cover lists for the other disciplines. The degree requires us to write two sets of exams - primaries (focused on the basic sciences, pharmacology and physics) and then finals towards the end of ones time.
>
> Another part of our training here requires us to complete a Masters Project, which I have just recently started working on. I am very interested in themes of wellness and mental health amongst anaesthetists. The inspiration for my MMed came to me last year, when I realised that I've been through so many "critical" events, with, in my opinion, very little support offered by the department. After a review of the literature, I came across the study you did in 2003. I found your study well thought out, with very interesting results. Our department also recently had to deal with the sudden, untimely loss of one of our colleagues. Our Wellness Committee then started to consider the benefits of structured debriefing sessions, and so since December, we have had two. I find that your study is still very relevant, 15 years later!
>
> My supervisors here are very keen to let me conduct a similar study, paralleling yours, here this year. I was hoping that I would be able to have a look at the questionnaire you gave to your study population? And with your permission, adapt the questionnaire for use here with us.
>
> Did you find that your study had an impact on how your anaesthetic department handled critical events? If you have any advice for me, before I start this project, it would be most welcome. How did you find the research process?
>
> I really do appreciate you taking the time to get back to me - thank you!
> I look forward to hearing back from you.
>
> Kind Regards,
> Mithasha
>
> > On 22 Jan 2018, at 03:34, Hock Tan <hocktan@me.com> wrote:
> >
> > Hi Mithasha,
> >
> > Thanks for your email. I am most happy to help out in whatever capacity - ask away any questions!
> >
> > What level trainee are you? Can you explain a bit about your anaesthetic training in South Africa?
> >
> > I look forward to your next email.
> >
> > Regards,
> > Hock
> >
> > Sent from my iPhone

Section 5: Annexures

5.1 Ethics approval

UNIVERSITY OF THE WITWATERSRAND JOHANNESBURG

R14/49 Dr Mithasha Gayaparsad

HUMAN RESEARCH ETHICS COMMITTEE (MEDICAL)

CLEARANCE CERTIFICATE NO. M180835

NAME: (Principal Investigator)	Dr Mithasha Gayaparsad
DEPARTMENT:	Anaesthesiology The University of the Witwaterand
PROJECT TITLE:	Debriefing following specific critical events in a department of anaesthesiology
DATE CONSIDERED:	31/08/2018
DECISION:	Approved unconditionally
CONDITIONS:	
SUPERVISOR:	Helen Perrie
APPROVED BY:	Doctor CB Penny, Chairperson, HREC (Medical)
DATE OF APPROVAL:	01/10/2018

This clearance certificate is valid for 5 years from 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 Third Floor, Faculty of Health Sciences, Phillip Tobias Building, 29 Princess of Wales Terrace, Parktown, 2193, University of the Witwatersrand. 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 resubmit the application to the Committee. **I agree to submit a yearly progress report**. The date for annual re-certification will be one year after the date of convened meeting where the study was initially reviewed. In this case, the study was initially reviewed in **August** and will therefore be due in the month of **August** each year. Unreported changes to the application may invalidate the clearance given by the HREC (Medical).

Principal Investigator Signature

10/18.
Date

PLEASE QUOTE THE PROTOCOL NUMBER IN ALL ENQUIRIES

5.2 Graduate studies approval

UNIVERSITY OF THE WITWATERSRAND, JOHANNESBURG

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

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

04 October 2018
Person No: 0601438R
PAG

Dr M Gayaparsad
Po Box 3124
2940
South Africa

Dear Dr Mithasha Gayaparsad

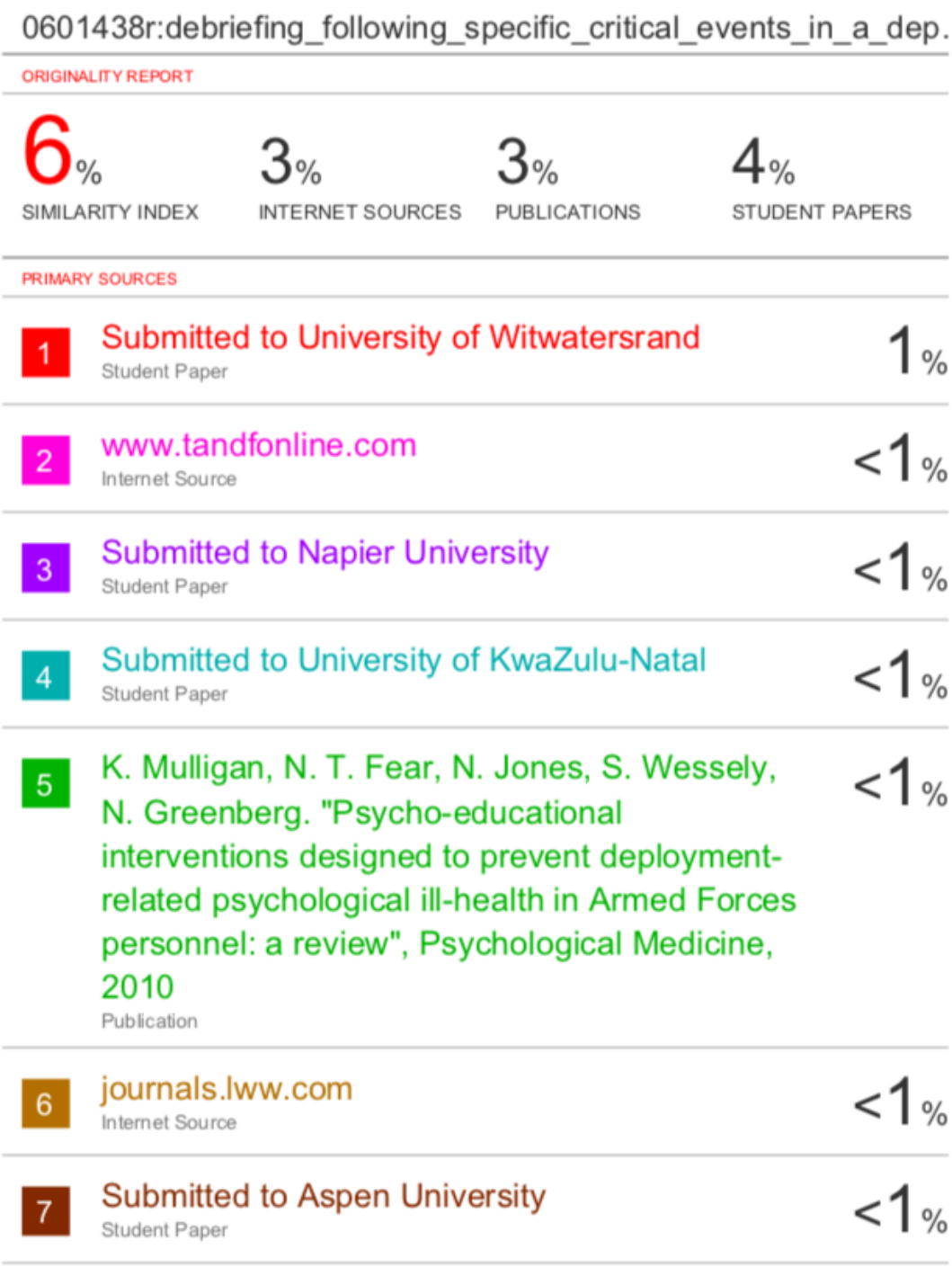
Master of Medicine in Anaesthesia: Approval of Title

We have pleasure in advising that your proposal entitled *Debriefing following specific critical events in a department of anaesthesiology* 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

Mrs Sandra Benn
Faculty Registrar
Faculty of Health Sciences

5.3 Turnitin report



0601438r:debriefing_following_specific_critical_events_in_a_dep.

ORIGINALITY REPORT

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