Substance use disorder in South African departments of anaesthesiology: Profile and management experiences

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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.

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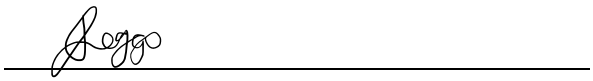
Declaration

I, Tahlia Jeggo, 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.



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Abstract

Background

Substance use disorder (SUD) is the most common cause of impairment amongst physicians and anaesthesiology is one of the specialities with the highest rates of SUD. The aim of this study was to describe the experiences of clinical heads of departments of anaesthesiology with regards to management of SUD and to profile SUD amongst anaesthetists in academic public sector hospitals in South Africa over the past 10 years (January 2009 – December 2018).

Methods

This was a prospective, contextual, descriptive study. A survey was sent to clinical heads of academic departments of anaesthesiology throughout South Africa via SurveyMonkey. Questions addressed the clinical heads of departments' experience and training on SUD management and specific cases of SUD, including substances abused and identifying signs.

Results

The sample realisation was 69%. Sixty-five percent of academic departments of anaesthesiology had a wellness committee, 25% had a formal policy on SUD management and 10% offer formal education or training to their employees. Ten percent of the clinical heads of department had received training on SUD management. With regards to SUD management, 65% of clinical heads of department felt equipped and 55% felt confident. The major limiting factor in reporting a case of SUD was a fear of harmful consequences or disciplinary action against the employee. Twenty confirmed cases of SUD were reported, with 94.7% of departments reporting one or more suspected case of SUD. Opioids were abused in 65% of the confirmed cases reported and fentanyl was the most common opioid abused. Two deaths were reported.

Conclusion

This study emphasises the problem of SUD amongst anaesthetists and highlights the limited training on SUD management received by clinical heads of departments, as well as the limited formal training of anaesthetists about SUD.

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Abbreviations

DSM-4	The Diagnostic and Statistical Manual of Mental Disorders- 4th edition
DSM-5	The Diagnostic and Statistical Manual of Mental Disorders- 5th edition
HOD	Clinical Head of Department
HPCSA	Health Professions Council of South Africa
PHP	Physician health program
SASA	South African Society of Anaesthesiologists
SUD	Substance use disorder
USA	United States of America

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 South African Journal of Anaesthesia and Analgesia, the journal to which it is intended to be submitted.

Section 1: Review of the literature

1.1 Introduction

Substance use disorder (SUD) is the leading cause of impairment amongst physicians (1). It is reported that 8 – 12% of physicians will develop SUD during their careers (2). The incidence of SUD in physicians is similar to the rate found in the general population (3); however, physicians tend to abuse alcohol and prescription drugs more than illicit substances, as seen in the general population (4). Anaesthesiology is one of the specialities with the highest incidence of SUD (5). SUD will be defined, and SUD amongst physicians, in particular anaesthetists, will be further explored.

1.2 History of substance use disorder amongst medical professionals

Substance abuse amongst medical professionals has been well documented throughout time (3). Some of the founding fathers of modern medicine suffered from substance abuse including William Halstead, a surgeon and one of the founders of The Johns Hopkins Medical School; Sigmund Freud, the well-known Austrian neurologist; and Freeman Allen, a pioneering physician anaesthetist (5). Historically, some medical professionals became addicted to substances such as morphine and cocaine after self-experimenting with these substances, whilst trying to find a clinical use (3, 5).

In England, parliament passed the Dangerous Drug Control Act in 1920, requiring addicts to be registered. This was done in an attempt to control addiction. Nearly 25% of those registered were healthcare professionals (6).

The Federation of State Medical Boards (7) in the United States of America (USA) classified drug and alcohol addiction amongst medical doctors as a disciplinary issue in 1958 and identified a need for probation and rehabilitation. Furthermore, in 1973 the American Medical Association formally recognised physician impairment in a landmark report (8). It stated: “It is a physician’s ethical responsibility to take cognizance of a colleague’s inability to practice medicine

adequately by reason of physical or mental illness including alcoholism and drug dependence" (8). This led to the initiation of programs aimed at identifying and helping impaired physicians in the USA. In the 1980s, the American Society of Addiction Medicine was formed, which resulted in increased research and improvement in treatment, education and awareness of SUD (3).

From a South African perspective, the Health Professions Act No. 56 of 1974 (9) refers to impairment amongst physicians. Impairment is defined in a supplement to the act as "a mental or physical condition or; the abuse of or dependence on chemical substances, which has adversely affected a student's or practitioner's competence, attitude, judgement and performance" (10). Despite impairment, and specifically substance abuse, being noted in the act, there is a paucity of research and limited guidelines in the South African literature.

1.3 Defining substance use disorder

In 2013, The Diagnostic and Statistical Manual of Mental Disorders – Fifth Edition (DSM-5) (11) recategorised substance dependence and abuse (12) as SUD, under the category of substance-related disorders. It is referred to as "a cluster of cognitive, behavioural and psychological symptoms" (11). SUD is subdivided into mild, moderate or severe, depending on the number of criteria out of 11 that are present (see Table 1). Mild SUD is diagnosed when two to three criteria are present, moderate SUD requires four to five criteria, and severe SUD is diagnosed when six to seven criteria are present (13). SUD is applied to 10 different classes of substances including alcohol; caffeine; cannabis; hallucinogens; inhalants; opioids; sedatives, hypnotics and anxiolytics; stimulants; tobacco and other or unknown substances (11). Much of the literature still refers to substance dependence or substance abuse. Table I highlights the differences.

Table I. DSM-4 (12) and DSM-5 (11) criteria for substance use disorders

	Criteria	DSM- 4 Substance dependence ≥3 criteria	DSM- 4 Substance abuse ≥1 criterion	DSM-5 Substance use disorder ≥2 criteria
1.	Withdrawal	X	-	X
2.	Tolerance	X	-	X
3.	Larger amounts used or used for a period longer than intended	X	-	X
4.	Persistent desire or uncontrolled efforts to quit or control use	X	-	X
5.	Large amount of time spent using, obtaining or recovering from substance	X	-	X
6.	Physical or psychological problems related to use	X	-	X
7.	Use in physically hazardous situations	-	X	X
8.	Persistent use despite social or interpersonal problems related to use	-	X	X
9.	Neglected major role due to use (work, school or home)	-	X	X
10.	Legal problems	-	X	-
11.	Stopping or reducing important social, occupational or recreational activities due to substance use	-	-	X
12.	Craving	-	-	X

1.4 Substance use disorders amongst physicians

Due to the sensitivity of the topic and limitations in studies performed, the exact prevalence of SUD amongst physicians is unknown. However, as a result of studies, surveys of treatment programs, surveys of program directors and assessment of mortality statistics, it is thought that the incidence of SUD amongst physicians is similar to the rate amongst the general public at around 8 – 12% (4). Illicit substances are more commonly abused by the general public, whereas alcohol and prescription drugs are commonly abused by physicians (4).

In a survey sent to program directors of Emergency Medicine residency programs in the USA in 1993, 33 (49%) reported having a case of suspected substance

dependence, 22 (33%) having a confirmed resident with SUD and 9 (13%) having hired a resident with SUD who had completed rehabilitation (14).

In 2011, Oreskovich et al (15) performed a large study amongst physicians in the USA to establish the prevalence of SUD, as well as compare the prevalence between medical specialities. The Alcohol Use Disorder Identification Tool – Version C was used to assess for alcohol abuse and found that 15.3% of physicians had a score showing alcohol dependence or abuse. The study further assessed prescription drug and illicit substance abuse. Anaesthesiologists were found to have the fourth highest rate of SUD amongst the specialities (15).

In 2009, Skipper et al (16) released results from a five-year cohort study that reviewed physician health programs (PHPs) in the USA from 1995 – 2001. Data involving 862 physicians was analysed. The incidence of SUD amongst anaesthetists was 2 – 2.7 times greater than other specialities. The higher rate of SUD amongst anaesthetists compared to other specialities was similarly noted in other substance abuse centres in the USA (16). In a study done in Florida USA, 5.6% of licensed physicians were anaesthetists, but anaesthetists accounted for 25% of all physicians with SUD (17). A study looking at cause of death amongst physicians in the USA showed the substance-related death rate, between 1979 – 1995, to be three times higher in anaesthetists, compared with internists (18).

1.5 Substance use disorder amongst anaesthetists

1.5.1 United States of America

Data on SUD has been collected via surveys sent to heads of departments of anaesthesiology. A survey sent to heads of academic departments of anaesthesiology in the USA found that between 1970 – 1980, 78% of anaesthesiology programs had at least one suspected case of SUD. The most common substances abused were fentanyl and pethidine (19).

In 1997, a survey sent to the heads of departments of anaesthesiology at various institutions in the USA, found that the incidence of SUD was 1% amongst faculty members and 1.6% amongst anaesthesiology residents between 1990 – 1996. Fentanyl was the most common substance abused. Other substances reported

included sufentanil, cocaine, nitrous oxide, pethidine, benzodiazepines, ketamine and propofol. In 18% of reported cases, SUD was only identified once the anaesthetist had overdosed and required resuscitation or was found dead (20). A similar survey done between 1997 – 2007, found an incidence of SUD of 1.2% amongst anaesthesiology residents. Again, fentanyl was the most common substance abused (21).

A study done by Warner et al (22), looked at SUD amongst anaesthesiology residents in the USA from 1 July 1975 to 1 July 2009. The incidence of SUD was 2.16 per 1000 resident years. There was a higher incidence in males (2.68 per 1000 resident years) than females (0.65 per 1000 resident years). Intravenous opioids were the most common substance abused, followed by alcohol, oral opioids, marijuana, cocaine, anaesthetic and hypnotic agents. There were 28 residents that died due to SUD during their training years. The incidence of SUD increased from the year 2003 onwards, highlighting an increasing problem of SUD amongst anaesthesiology residents (22).

Skipper et al (16) assessed all the data from PHPs in the USA from 1995 – 2001. They found that 86% of anaesthesiologists with SUD were male, and that opioids were the primary drug abused by 55% of anaesthesiologists with SUD. Alcohol abuse was found in 28% of cases. This differed from non-anaesthetist physicians, where alcohol was abused in 52% of cases and opioids in only 32% (16).

In 2011, Hyman et al (23) conducted a survey amongst anaesthesiologists in the USA to show the extent of substance use. Over 72% of anaesthesiologists involved reported substance use within the past year. Alcohol accounted for 76.6% of substances (48.5% used alcohol only), tobacco accounted for 24% of substances and 18.7% used cannabis. In all cases of cannabis use, it was used in combination with another substance (23).

1.5.2 Canada

In a study by Boulis et al (24) performed amongst Canadian university-affiliated departments of anaesthesiology between 2004 – 2014 , there were 24 cases of SUD identified from 48 departments. Opioids (fentanyl in particular) were found to be the most commonly abused substance, with 20.8% of cases abusing multiple

substances. SUD was suspected in 10 cases due to changes in behaviour, with a further three cases suspected after a patient death. Substance use was witnessed in nine cases (24).

1.5.3 New Zealand and Australia

In Australia and New Zealand, surveys have been sent to the heads of departments of anaesthesiology over roughly ten-year intervals to assess the trend of SUD. The first survey assessed the period from 1981 – 1991 (25), the second 1994 – 2003 (26) and the third 2004 – 2013 (27). The results are summarised in Table II.

Table II. SUD amongst anaesthetists in Australia and New Zealand (25-27)

	1981 – 1991 (25)	1994 – 2003 (26)	2004 – 2013 (27)
Incidence	17 cases reported 1.3% of registrars	44 cases reported 1.17 per 1000 anaesthetist years 1.37 per 1000 registrar years	61 cases reported 1.2 per 1000 anaesthetist years 1.5 per 1000 registrar years
Gender		Male (80%)	Male (66%) 1 per 1000 female years. 0.8 per 1000 male years
Age		25 – 35 (65%)	30 – 39 (52%)
Substance abused (some anaesthetists used more than one substance)	Opioids 12% Benzodiazepines 12% Alcohol 12% Induction agents 6% Recreational drugs 24% Pethidine 29%	Opioids 66% Benzodiazepines 5% Alcohol 12% Induction agents 20% Recreational drugs 7% Inhalational agents 5%	Opioids 32% Benzodiazepines 16% Alcohol 27% Propofol 41% Recreational drugs 5% Inhalational agents 5% Polysubstance 25%
Identification of SUD	Identified by colleague 35% Overdose 18% Self-reported 12%	Abnormal conduct 63% Observed abuse 37% Incompetence 27% Death 15% Accident/death of patient 10%	Abnormal conduct 14% Observed abuse 18% Intoxication 30% Death 7% (all involved propofol)

	1981 – 1991 (25)	1994 – 2003 (26)	2004 – 2013 (27)
Outcomes	33% of the opioid users returned to theatre and all relapsed	48% returned to anaesthesia 19% full recovery Overall, only 29% of the total returned to successful employment in any field. 24% death eventual outcome Relapse 22%	68% returned to work 55% returned to anaesthesia 32% full recovery 80% successful return to work in group treated for 12 months 18% death eventual outcome Relapse 11%
Suicide (from all cause)		18 cases reported	19 cases reported • registrars 3x higher risk than consultant • females > males
Department Policy		15% had a formal intervention policy	37% had welfare officers

Although the incidence of SUD was similar over the three study periods, the substances abused changed. Propofol has become the most commonly abused drug, which is concerning given its associated high death rate (see section 1.6.2 Propofol). Alcohol abuse has also increased.

1.5.4 United Kingdom and Ireland

Berry et al (28) surveyed 304 departments of anaesthesiology in the United Kingdom and Ireland and reported 130 cases of substance abuse between 1989 – 1999. Of the reported cases, 18% of cases occurred in junior registrars, 8% in senior registrars and 34.6% in consultants. Furthermore, the survey found that over 80% of reported cases were male, with 43% occurring in 30 – 39 year olds. Alcohol accounted for 59% of cases and opioids 34.6%. More departments, hospitals and trusts had an alcohol misuse policy in place than a drug misuse policy. Thirty-six percent of cases were identified due to intoxication at work, 16% due to abnormal prescriptions and 5% as a result of being found dead or unconscious with drug paraphernalia. In 30% of cases, the anaesthetist was successfully rehabilitated and was able to return to work in theatre. Death was the eventual outcome in 6.4% of the cases (28).

Since 2006, physicians with SUD practising in the United Kingdom are reported to the General Medical Council, who may apply restrictions to their practise. This may include complying with blood or urine tests for alcohol, drugs or metabolites (29). There are also support groups available for impaired physicians including the National Health Service Practitioner Health Programme and the Sick Doctors Trust, which offers a 24-hour support service to doctors suffering with addiction (30).

1.5.5 South Africa and developing countries

The Health Professions Council of South Africa (HPCSA) Health Committee reported that there were 283 medical professionals (233 physicians) on record with impairment in 2013. Of these, 92 (33%) had SUD (31). In 2018, the reported number of impaired medical professionals was 345, with more than half being due to substance related and addictive disorders (32).

Van der Westhuizen et al (33), assessed the prevalence of substance use amongst anaesthetists in South Africa in 2018. An online questionnaire modified from the Alcohol, Smoking and Substance Involvement Screening Test, an internationally validated screening tool, was used and data were obtained from 364 responses. Alcohol use was reported by 92.8% of respondents, with 1% falling into a high-risk category and 14.2% being moderate-risk users. Sedatives or sleeping pills were used by 34.4% of respondents, with 12.6% falling into a moderate-risk use. The use of amphetamine type stimulants, including speed, ecstasy, diet pills or Ritalin, was reported by 15.1%. Opioid use was only reported by 3.4% and hallucinogen use was reported by 5.4%. There was no significant difference in prevalence between male and females, or between anaesthetists practising in state hospitals compared to private practice (33).

The Latin America Confederation of Societies of Anesthesiologist's Occupational Risk Committee reported in 2013 that there were 156 cases of substance abuse amongst anaesthetists in the previous 10 years. Opioid abuse accounted for 121 of cases, 20 cases were related to sedatives and hypnotics were used in 15 cases. In 2000, a study had reported that 16% of Latin American anaesthetists used illicit drugs (34).

The multiple studies on SUD amongst anaesthetists highlight a variety of substances abused, with opioids and alcohol being the most common.

1.6 Substances abused by anaesthetists

There are multiple prescription drugs abused by anaesthetists. Anaesthetists are exposed to these substances on a daily basis in theatre and administer them to patients. They are required to have a good working knowledge of these substances.

1.6.1 Opioids

A retrospective study done by Warner et al (22) amongst anaesthetic registrars from 1975 – 2009 reported that opioids accounted for 62% of substances abused in cases of SUD (22).

Opioid use can provide intense feelings of pleasure. Opioids work on the mu-receptors on neurons in the brain, and trigger reward processes. The mesolimbic system in the brain generates signals, resulting in the release of the neurotransmitter dopamine, which results in pleasurable feelings. This encourages repeated substance use, and eventually results in craving and dependence (35).

Opioid withdrawal can include symptoms such as cravings, anxiety, irritability, shivering, vomiting, diarrhoea and insomnia. There is an upregulation of neurons in the locus coeruleus in the brain, with an increasing amount of the neurotransmitter noradrenaline being released. Noradrenaline release is suppressed with opioid use, but when opioids are not present there is an excessive amount of noradrenaline released resulting in the symptoms of withdrawal. Dependence develops, as opioids are taken to prevent these symptoms (36). Tolerance to opioids develops over time, as the opioid receptors become less sensitive and have a decreased response to opioid stimulation. This results in increasing doses of opioids being used (35).

In the USA, there is an opioid crisis amongst the general population, secondary to opioid misuse and over prescription. It is reported that there are up to 33 000 deaths in the general population related to opioid use each year (36).

Opioids abused by anaesthetists include fentanyl, sufentanil, remifentanil, morphine and pethidine. Booth et al (20) surveyed academic anaesthesiology programs in the USA, and opioids accounted for three of the top five substances abused, with fentanyl accounting for the majority. Fentanyl and sufentanil contributed to 62.9% of the cases.

1.6.2 Propofol

Propofol (2,6-diisopropylphenol) has been the induction agent of choice in many countries, since its introduction in the 1980s. Historically, propofol was not seen as a drug with abuse potential and the first case of abuse was only noted in 1992 (37). Propofol has a potential for abuse at subanaesthetic doses, as it causes dopamine release in the nucleus accumbens in the brain, which is associated with the reward system (38). Feelings of euphoria, elation, sexual disinhibition and pleasure have been reported with propofol use (37), although some people find its effects unpleasant (39).

Propofol has a rapid onset of effect due to its high lipid solubility and it accumulates rapidly in the brain. It also has a fast offset by redistribution, with rapid clinical recovery (37). Propofol tolerance occurs and results in higher and more frequent doses being required for pleasurable effects. This is the reason for its high associated mortality rates. High doses blunt the respiratory drive, resulting in respiratory depression, hypoxic brain damage or death. It also blunts airway reflexes and aspiration can occur. Withdrawal symptoms include craving, somnolence, anxiety, stress and hyperhydrosis (37).

A study performed in the USA (38) surveyed departments of anaesthesiology and found that 18% had one or more individuals that were abusing propofol between 1995 – 2004. The incidence was 0.1%. This was a five-fold increase compared with a previous study performed between 1990 – 1997. There were seven deaths reported (a mortality rate of 28%), with propofol abuse only being identified when the anaesthetist was found dead. Only 12% of anaesthetists with propofol use disorder successfully continued to practice anaesthesia (38). In a survey done in Australia and New Zealand (27) the mortality rate was 48% amongst anaesthetists with propofol use disorder.

In some theatres, propofol use is often not monitored or accounted for, which allows easy access for substance abusers. Fewer cases of propofol abuse have been noted in centres where there is tighter control and regulation of propofol (37).

1.6.3 Alcohol

Problematic alcohol use includes risky use, binge drinking and alcohol use disorder. Consuming an amount of alcohol that puts one at risk of health consequences is classified as risky alcohol use (40). The National Institute on Alcohol Abuse and Alcoholism (41) classifies this amount as more than 14 standard drinks per week and more than four drinks on any day in men under 65, and more than seven standard drinks per week or more than three drinks on any day in females and anyone over 65. The institute defines binge drinking as “a pattern of drinking that brings blood alcohol concentration levels to 0.08g/dl” (41).

Some theories exist to explain why some people develop alcohol use disorders. Firstly, it could be due to the neurochemical effect that alcohol has on the reward centre in the brain. Secondly, is could be due to negative-affect regulation. Alcohol is used to alleviate negative feelings or thoughts. Genetics is also thought to play a role. Certain genes can decrease the risk of alcohol use disorder or increase the risk of alcohol-related comorbidities (40).

In 2011, a study carried out in the USA by Oreskovich et al (15) found that 15.3% of physicians had an Alcohol Use Disorder Identification Tool – Version C score consistent with alcohol abuse or dependence . Alcohol is often used in combination with other substances.

1.6.4 Inhalational agents

Abuse of nitrous oxide, isoflurane, sevoflurane, halothane and desflurane have all been noted, with an increasing prevalence since 2000 (42). In the Victorian period, ether was used for recreational purposes due to its dysphoric and hallucinogenic properties. Similarly, nitrous oxide produces euphoria and is often used as a recreational drug (42). It is hypothesised that volatile agents act on neural networks and signal conduction, resulting in enhanced facilitation of inhibitory

signalling via γ-aminobutyric acid A and glycine, as well as diminished excitatory neurotransmission via N-methyl-D-aspartate, nicotinic and opioid receptors.

A survey about inhalational anaesthetic abuse by Wilson et al (43) in the USA found that 22% of anaesthesia training programs reported at least one case of inhalational agent abuse. Nitrous oxide accounted for 47% of cases, followed by isoflurane, sevoflurane, halothane and then desflurane. The anaesthetist was sent for rehabilitation in 48% of the cases, with 47% of the rehabilitated anaesthetists successfully returning to theatre, and 20% relapsing on return to work. The overall mortality rate for inhalational agent abuse was 26%. Finally, it was noted that only 7% of departments accounted for their inhalational agents and controlled them, as they do with their other scheduled drugs (43). As with propofol, limited accountability and monitoring of inhalational agents makes detection more difficult (37).

1.6.5 Benzodiazepines

Benzodiazepines were noted to have a risk for addiction and dependence in 1961. They are often initially prescribed for insomnia or anxiety, and after chronic use become misused, resulting in dependence. Benzodiazepines are most frequently involved in polysubstance abuse. Benzodiazepines can have psychoactive properties (37). A study by Fry et al (27), in New Zealand and Australia, reported that benzodiazepines were the drug abused in 16% of cases of SUD in anaesthetists. Similarly, a study by Warner et al (22), noted benzodiazepines account for 12% of SUD cases in anaesthetic registrars.

1.6.6 Ketamine

Ketamine is a N-methyl-D-aspartate receptor antagonist that is a structural analogue of phencyclidine. It causes dissociative anaesthesia and has hallucinogenic effects, making it a popular substance for abuse. Ketamine is a cardiac stable anaesthetic agent and does not inhibit respiratory drive or airway reflexes, therefore there is less mortality associated with abuse and overdose. Side effects reported include ulcerative colitis, cognitive impairment, impaired ability to pay attention, flashbacks and tolerance. Magnetic resonance imaging

done on chronic abusers found atrophic areas and multifocal degeneration of brain tissue (37).

All anaesthetists are exposed to many of the abused substances on a daily basis, yet not all anaesthetists develop SUD. There are certain risk factors that place an anaesthetist at higher risk for developing SUD.

1.7 Risk factors for substance use

The risk factors for substance use amongst anaesthetists are multifactorial and overlap with risk factors in the general population. Some people are genetically more susceptible to developing SUD. Family history is one of the biggest risk factors for developing SUD (30) and predicting relapse (44). Males are at higher risk of developing SUD than females (45).

Substances are often used and abused as a form of self-treatment for psychological issues or used as a coping mechanism to deal with stressful situations or anxiety (44). A survey done by Hyman et al (23) found that 40% of anaesthetists used substances as a form of stress management . The stress associated with the occupation could unmask psychological illnesses such as personality, mood or behavioural disorders, which places a physician at higher risk for developing SUD (3). The responsibility associated with the profession, working long hours, studying and relationships at home contribute to the stress. A study performed in the USA (15) assessed whether alcohol abuse was associated with burnout, depression and suicidal ideation. It found that physicians who screened positive for depression were more likely to have an alcohol use disorder (15).

Physicians enrolled in PHPs in the USA described common reasons for abuse of prescription drugs. This included substance use as a management for physical pain, emotional or psychiatric distress or stressful situations. They also described substance use for recreational purposes and to avoid withdrawal symptoms (46).

A risk factor for substance use in anaesthetists specifically, is easy access to anaesthetic drugs and the easy availability of substances (30). This influences the type of substances abused; however, it does not necessarily precipitate the problem or affect the prevalence (3). The dangers with anaesthetic drugs are the

potency, tolerance and addictive properties. The average time from the first misuse of anaesthetic drugs to the detection of SUD is four months, whereas with alcohol it may take years before abuse is detected (45).

Gold et al (17), Merlo et al (46) and Gold et al (47) have done much research into the exposure hypothesis, which reports that anaesthetists are at higher risk for developing SUD due to previous exposure. They found that fentanyl and propofol become aerosolised and thus, anaesthetists have second-hand exposure to these drugs. The aerosolised particles were measured in theatre and found to be at the highest concentrations around the patient's head, where the anaesthetist usually stands. They proposed that exposure to aerosolised particles of propofol and fentanyl alter the reward pathway and produce neurobiological sensitisation of the mesolimbic pathway in certain people with a genetic predisposition. This is activated after exposure in theatre and places anaesthetists at higher risk for developing fentanyl or propofol dependency (17, 39, 47).

Despite all the risk factors, it is often difficult to identify SUD amongst anaesthetists. However, early identification is important as anaesthesiology registrars have more than double the risk of death as a result of substance use than any other speciality (48).

1.8 Identification of substance use disorder

Some of the signs and symptoms of SUD in anaesthetists include:

- behaviour changes
- change in clinical performance
- inappropriate behaviour
- mood swings including periods of euphoria, anger, depression and irritability
- physical changes including pallor, weight change, always wearing long sleeves
- urgent request for breaks
- requesting extra nights or weekend calls (49)

- signing out large amounts of narcotics with inappropriate quantities given to patients and patients complaining of extreme pain in recovery room
- refusing lunch or coffee breaks
- withdrawal from family, friends and activities (45).

SUD in physicians in general is underreported, and some cases of SUD are only found once a physician has overdosed and is found unconscious or dead (27). There is still a stigma around SUD and a fear of incorrectly labelling a colleague without adequate proof. There is also the risk of damaging a colleague or hospital's reputation (3), as well as a risk of adverse financial, social or legal outcomes (2), which makes it difficult to confront or report a colleague. In general, physicians are poor at identifying their own illnesses and avoid seeking help. This is likely due to the fear of stigma, the consequences they will face and a feeling of shame (45).

The HPCSA (10) refers to a "conspiracy of silence". This is the aversion of medical practitioners to report or confront a colleague with impairment or SUD, and instead cover up their mistakes. They attribute this to the following factors:

- "an unwillingness to become personally involved in the 'personal affairs' of another person;
- a fear of having to confront a colleague and the personal, collegial, professional, and possible financial consequences of such confrontation;
- a fear of possible litigation and claims for damages which may ensue;
- a fear of being accused of pursuing personal feuds or 'witch hunts';
- a fear of harmful consequences of disciplinary actions which may result from reporting to Council both for the reported and reporting colleague" (10).

However, physicians have a duty to report impaired colleagues. This duty is two-fold. On one hand physicians need to protect patients against incompetent or unsafe practitioners, and on the other hand, they have an ethical obligation to give medical assistance to a person in need, in this instance the physician with SUD (10).

In order to encourage physicians to report impaired colleagues, the HPCSA's strategy includes the encouragement of physicians to self-report. The HPCSA has also introduced guidelines to protect a physician who reports a colleague. This physician cannot be held liable for any claim of defamation, civil claims or negative consequences resulting from reporting a colleague (10).

Farber et al (50) surveyed physicians in the USA to assess if they would report colleagues with impairment. More physicians reported that they would report a case of SUD than a case concerning cognitive or psychological issues. Their reasoning was that it was more important to protect the good of society, than the individual. Of the respondents, 22% had previously reported a colleague, and 39% were aware of guidelines for impairment (50).

Identifying SUD in an anaesthetist is the first step towards treatment. There are varying SUD management strategies internationally.

1.9 Management of substance use disorder

The USA has PHPs, which were developed to assist impaired physicians and are governed by the state medical board. These were started in the 1970s by volunteer physicians as a way to assist their colleagues who were suffering from SUD and mental health issues and have since become formalised programs. The programs are in place to assist with detection, treatment facilitation and monitoring of impaired physicians. Management is individualised for each case; some require inpatient management and all attend outpatient programs. Furthermore, they assist as an intermediate between the physician and regulatory boards (51).

McLellan et al (51) assessed the effectiveness of PHPs in the USA and found that 80.7% of physicians completed the program and returned to work under supervision. Urine tests for drugs and alcohol done over a five-year period after returning to work were positive in 19%. After five years, 78.7% of physicians who completed the program were licensed and working, 10.8% had their licence revoked, 3.5% had retired and 3.7% had died (51).

Some anaesthesiology programs focus on prevention of SUD and are educating young anaesthetists early in their careers about the dangers and outcomes of

SUD. Other hospitals are placing more focus on assessing drug prescriptions and wastage and assessing hospital charts, so that SUD can be identified early (52). Boulis et al (24) reported that 77% of anaesthesia training programs in Canada had a mandatory two and a half hours per year training on SUD for residents, but only 10% insisted on formal education on SUD for consultants. However, 53% of program directors did not think that extensive education would decrease the incidence of SUD (24).

The Accreditation Council for Graduate Medical Education (53) in the USA, require training institutions to have written policies about how SUD will be managed and ensure residents get training about physician SUD. The American Society of Anaesthesiology also recommends that all departments of anaesthesiology have a SUD policy in place to allow for a safe working environment (48). Boulis et al (24) found that 75% of Canadian anaesthetic departments did not have a designated person or committee for substance abuse.

In a survey sent to program directors of Emergency Medicine residency programs in the USA, directors were asked about their training on SUD management. No formal education or only informal, on-the-job training was reported by 30% of the program directors; however, only 3 (4.5%) reported that they did not have resources available to deal with a cases of SUD (14).

The Department of Anaesthesiology at Mount Sinai Hospital in New York has developed a program for anaesthesiology residents who are addicted to opioids (54). The program entails abstinence from all mood-altering drugs, facilitated group psychotherapy, attendance of self-help fellowships such as narcotics anonymous and random alcohol and drug screening. Once the resident has completed inpatient treatment and is in recovery, they begin working in a simulator centre doing non-clinical teaching for at least one year before they are allowed to participate in clinical practice. They receive the same salary as a resident to cover treatment expenses and allow them to focus on recovery. When these residents start clinical work, their work hours are reduced to not more than 40 hours a week with no overtime for the first three months. Thereafter, the resident starts overtime, with an average of 40 work hours a week for another nine months. Once this is successfully completed the resident is allowed to return to full clinical practice.

Between 1995 and 2006, five residents were placed on this program. All five completed the first three months of clinical practice, but two relapsed when call responsibilities were added. One anaesthetist relapsed nine years after successfully completing the program (54).

The Cleveland Clinic Anaesthesiology Institute implemented a comprehensive Substance Abuse Prevention Protocol, focussing on prevention of SUD. The protocol involves the following elements:

- a comprehensive screening program to identify individual risk factors prior to hiring personnel in anaesthesia positions
- staff education and training about SUD and risks
- drug security to improve detection of diversion
- random drug screening (48).

In South Africa, the HPCSA has a Health Committee. All cases of impairment should be reported to this committee. Once a case has been reported, the Health Committee performs an informal assessment. Permission and voluntary cooperation for the informal assessment must be granted by the impaired physician. If the physician refuses to cooperate, a formal assessment will take place. Should a positive finding be made by either method of investigation the committee can conditionally suspend or limit the physician's registration or practice or remove the physicians name from the register (10).

Rehabilitation is individualised, and the cost of the rehabilitation is the responsibility of the physician (10). The treating doctor or supervisor should submit three-monthly progress reports for the first 12 months, then six-monthly reports, then annual reports. If it is assessed that there has been progress and compliance, the limitations to practice may be removed (31). Non-compliance with the requirements of the health committee will result in the case being referred to a disciplinary committee. All reports are to be kept confidential and will only be made public if ordered by a court of law.

The Workgroup on Impairment in Students and Practitioners of Medicine and Dentistry (10) has recommended that conditional employment opportunities with adequate supervision should be available at public hospitals or institutions. They

also noted that further research is required on impairment and the management thereof in a South African setting (10).

The South African Society of Anaesthesiologists has introduced a Wellness in Anaesthesia Support Group. They are involved in educating anaesthetists about wellness and offer support and counselling to the anaesthetic community for a variety of psychological issues, including SUD (55).

A study done in the USA (14) looked at SUD from the perspective of Emergency Medicine program directors and asked about resources to assist with managing a case of SUD. Of the program directors, 86% reported a handbook regarding impairment issues would be helpful, 72% reported formal policies would assist them and 49% reported that a workshop on the topic would be helpful. The program directors' knowledge on SUD issues was assessed and 92% had slight to moderate knowledge on recognition of SUD, with 8% having extensive knowledge. With regards to the process of intervention, 92% had slight to moderate knowledge, and 82% had slight to moderate knowledge on re-entry guidelines (14).

1.10 Re-entry into theatre

Re-entry into theatre after management for SUD is controversial due to the access to anaesthetic agents, including opioids, and the high risk of relapse (44). It proves to be an ethical dilemma, as there is a risk of patient harm, risk of legal consequences and the risk of death.

Bryson (21) found a relapse rate of 29% in residents in the USA who were allowed to continue in anaesthesiology, with a 3% death rate . There is no evidence to show that anaesthetists who return to clinical practice after treatment have an increased risk for relapse than those who change speciality or profession; however, the risk of death is greater if they do relapse (54) .

Furthermore, Bryson (21) gathered information from anaesthesiology program directors of training centres in the USA regarding their experiences and opinions on allowing residents with SUD to continue training. Of the program directors

surveyed, 62% had experienced residents with SUD. The response from the directors included the following:

- 30% felt that re-introduction into theatre should not be allowed
- 15% felt that residents should have 60 – 90 days of inpatient treatment followed by delayed re-introduction into theatre
- 15% felt that 60 – 90 days of inpatient treatment followed by immediate re-introduction into theatre was appropriate
- 4.3% opted for 30 days of inpatient treatment followed by immediate re-introduction into theatre
- 35.7% had no specific opinion (21).

In a survey sent to anaesthesiology residency program directors in Canada, 60% stated that they would re-employ an anaesthetist with SUD once they had completed rehabilitation. Seventy-nine percent of these directors did not agree with random drug testing (24).

1.11 Conclusion

SUD poses a substantial threat to all physicians, but anaesthetists in particular. Anaesthetists more frequently abuse prescription drugs than illicit drugs, which contributes to the high mortality and overdose rates. There are many risk factors predisposing anaesthetists to SUD. Due to the stigma of SUD and psychiatric illness, there is a low rate of self-identification and help seeking behaviour. Re-entry of an anaesthetist into theatre after treatment is controversial, due to the high rate of relapse and death. There is an increased awareness of SUD amongst anaesthetists, but further research and training are required to enhance management.

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3. The submission must be in UK English, typed in Microsoft Word or RTF with no double spaces after the full stops, double paragraph spacing, font size 10 and font type: Times New Roman.
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5. The full contact details of corresponding author (Tel, fax, e-mail, postal address) must be on the manuscript.
6. There must be an abstract and keywords.

7. References must strictly be in Vancouver format. (Reference numbers must be strictly numerical and be typed in superscript, not be in brackets and must be placed AFTER the full stop or comma.)
8. It must be clear where every figure and table should be placed in the text. If possible, tables and figures must be placed in the text where appropriate. If too large or impractical, they may be featured at the end of the manuscript or uploaded as separate supplementary files.
9. All photographs must be at 300dpi and clearly marked according to the figure numbers in the text. (Figure 1, Table II, etc.)
10. All numbers below ten, without percentages or units, must be written in words.
11. Figure numbers: Arabic, table numbers: Roman

Section 3: Draft article

Substance use disorder in South African departments of anaesthesiology: Profile and management experiences

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Key words: Substance use disorder, anaesthetist, abuse

Abstract

Background

Substance use disorder (SUD) is the most common cause of impairment amongst physicians, and anaesthesiology is one of the specialities with the highest rates of SUD. The aim of this study was to describe the experiences of clinical heads of departments of anaesthesiology with regards to management of SUD and to profile SUD amongst anaesthetists in academic public sector hospitals in South Africa over the past 10 years (January 2009 – December 2018).

Methods

This was a prospective, contextual, descriptive study. A survey was sent to clinical heads of academic departments of anaesthesiology throughout South Africa via SurveyMonkey. Questions addressed the clinical heads of departments' experience and training on SUD management and specific cases of SUD, including substances abused and identifying signs.

Results

The sample realisation was 69%. Sixty-five percent of academic departments of anaesthesiology had a wellness committee, 25% had a formal policy on SUD management and 10% offer formal education or training to their employees. Ten percent of the clinical heads of department had received training on SUD management. With regards to SUD management, 65% of clinical heads of department felt equipped and 55% felt confident. The major limiting factor in reporting a case of SUD was a fear of harmful consequences or disciplinary action against the employee. Twenty confirmed cases of SUD were reported, with 94.7% of departments reporting one or more suspected cases of SUD. Opioids were abused in 65% of the confirmed cases reported and fentanyl was the most common opioid abused. Two deaths were reported.

Conclusion

This study emphasises the problem of SUD amongst anaesthetists and highlights the limited training on SUD management received by clinical heads of departments, as well as the limited formal training of anaesthetists about SUD.

Introduction

Physician impairment was formally recognised by the American Medical Association in 1973 (1). In South Africa, the Health Professions Act No. 56 of 1974 (2) referred to impairment, which was further denoted as mental and physical conditions, as well as abuse of, or dependence on chemical substances (3). Substance use disorder (SUD) is the most common cause of impairment amongst physicians (4).

SUD is defined in The Diagnostic and Statistical Manual of Mental Disorders: Fifth Edition (5) under substance-related disorders as “a cluster of cognitive, behavioural and psychological symptoms”. The disorder covers 10 different classes of substances and is composed of 11 different criteria, with the presence of two or more criteria required to make a diagnosis (5).

The incidence of SUD in physicians is similar to that of the general population. However, physicians tend to abuse alcohol and prescription drugs more than illicit substances, as seen in the general population (6). Anaesthetists, emergency medicine specialists and psychiatrists have been found to have a higher rate of SUD compared with other specialities (7).

Opioids (fentanyl in particular), alcohol, propofol, benzodiazepines and inhalational agents are the most commonly abused substances amongst anaesthetists (8). Due to the nature of these substances, there is a high mortality rate associated SUD (9, 10). SUD is often only identified in an anaesthetist once they have overdosed and are found unconscious or dead (11).

Heads of departments of anaesthesiology are often tasked with the management and reporting of SUD. However, SUD needs to be identified before it can be reported. This can be difficult due to the stigma surrounding SUD amongst anaesthetists, which limits help seeking behaviour (12), as well as the “conspiracy of silence” when it comes to reporting colleagues (3). The Health Professions Council of South Africa (HPCSA) (3) has guidelines for SUD management, and a Health Committee to manage impaired physicians.

Due to the availability of support groups in South Africa, such as the South African Society of Anaesthesiologists (SASA) Wellness in Anaesthesia Support Group (13), and increased awareness through the publication of editorials in the South African Journal of Anaesthesia and Analgesia on physician impairment and SUD (14-16), issues of SUD amongst anaesthetists as well as physician impairment in general are beginning to be noted and addressed. A study by Van Der Westhuizen et al (17) assessed the prevalence of substance use in anaesthesia practitioners in South Arica in 2018, however, a paucity of data on SUD amongst anaesthetists in South Africa still exists.

The aim of this study was to describe the experiences of clinical heads of departments of anaesthesiology with regards to the management of SUD and to profile SUD amongst anaesthetists in academic public sector hospitals in South Africa over the past 10 years (January 2009 – December 2018).

Methods

Approval to conduct the study was obtained from the Human Research Ethics Committee (Medical) (HREC R14/49) and other relevant authorities. A prospective, contextual, descriptive research design was followed in this study.

The study population was clinical heads of departments of anaesthesiology in academic public sector hospitals in South Africa (further referred to as HODs). Twenty-nine academic departments of anaesthesiology associated with the eight South African universities were identified and invited to participate in the survey. The sample size was realised by the response rate. A response rate of 60% (18 departments) was considered acceptable.

Data were collected via a self-administered survey on SurveyMonkey. A literature review was performed and surveys by Fry (18) and Fry et al (11) were identified and modified for Section 2 of the survey, with permission from Fry. A draft survey was compiled and reviewed by two senior specialist anaesthesiologists from the University of the Witwatersrand's Department of Anaesthesiology, who are members of the Wellness Committee, to ensure face and content validity. Their comments were incorporated into the final survey.

The survey consisted of two sections and requested the following data. Section 1 asked general questions about the department including: presence of a wellness initiative, a policy on SUD management and whether training on SUD is offered to employees. It also asked about the HOD's personal experience with regards to management of SUD including: training received, availability of SUD management resources, confidence in managing a case of SUD, factors impacting a decision to report an employee, allowing an anaesthetist with SUD to re-enter theatre and whether or not they would employ someone who had completed rehabilitation. Section 2 had questions about cases of SUD in each department over the study period including: substance abused, who reported or identified the problem, the presence of signs suggestive of abuse, relapse and faculty support in managing a case of SUD. Substance in this study referred to alcohol, hallucinogens, inhalants, opioids, sedatives, hypnotics, anxiolytics and stimulants. Caffeine, cannabis and tobacco were not included.

An email was sent to the HODs at all 29 hospitals. The study was explained in an information letter and contained a link to SurveyMonkey. The HODs were asked to complete the study even if there had been no cases of SUD in their department and were encouraged to consult with colleagues to obtain information for the study period if they had not been employed in the department for the whole study period. A follow-up reminder email was sent after two weeks, and then again after another two weeks to the HODs who had not responded.

Data were captured onto a Microsoft Excel spread sheet and analysed in consultation with a biostatistician using Stata version 15 (StataCorp, USA). Descriptive statistics were used. Categorical variables were described using frequencies and percentages and compared using Fisher's Exact tests. A p-value of 0.05 or less was considered statistically significant. Confidence was determined as a score of 3 or more out of 5 and HODs were considered experienced if they had been in their role for five years or longer.

Results

Of the 29 HODs, 21 (72.4%) responded. One (3.4%) HOD opted out of the study, therefore the sample realisation was 69.0%. The length of time that the HODs were employed at the hospital and as HOD is shown in Table I.

Table I. HODs length of time of employment

	Employed at current hospital		Employed as HOD	
Years	**Number (n = 20)**	**Percentage**	**Number (n = 20)**	**Percentage**
< 1	1	5	1	5
1	0	0	3	15
2 – 4	3	15	6	30
5 - 10	6	25	5	20
≥ 10	10	50	5	25

Of the departments, 13 (65.0%) had a wellness committee, but only 5 (25.0%) had a formal policy regarding SUD management. Only 2 (10.0%) of the departments offer formal education or training about SUD to their employees.

Only 2 (10.0%) HODs had received formal training on SUD management, with 6 (30.0%) being aware of resources available to assist with the management of a case of SUD. Of the HODs, 11 (55.0%) were aware of the HPCSA regulations with regards to SUD. Despite the limited available education and training on management of SUD, 13 (65.0%) HODs reported that they felt equipped to manage a case of SUD. When asked about resources that would assist managing a case of SUD, 17 (85.0%) reported a handbook regarding SUD management, 20 (100%) stated SUD guidelines and 19 (95.0%) reported that a workshop would be helpful.

HOD's level of confidence in managing SUD is shown in Figure 1. Of the HODs, 11 (55.0%) were confident in managing a case of SUD. There was no association between the confidence and the experience of the HOD ($p = 1.0$). Previously managing a case of SUD did not affect the confidence of the HOD in managing subsequent SUD ($p = 0.66$).

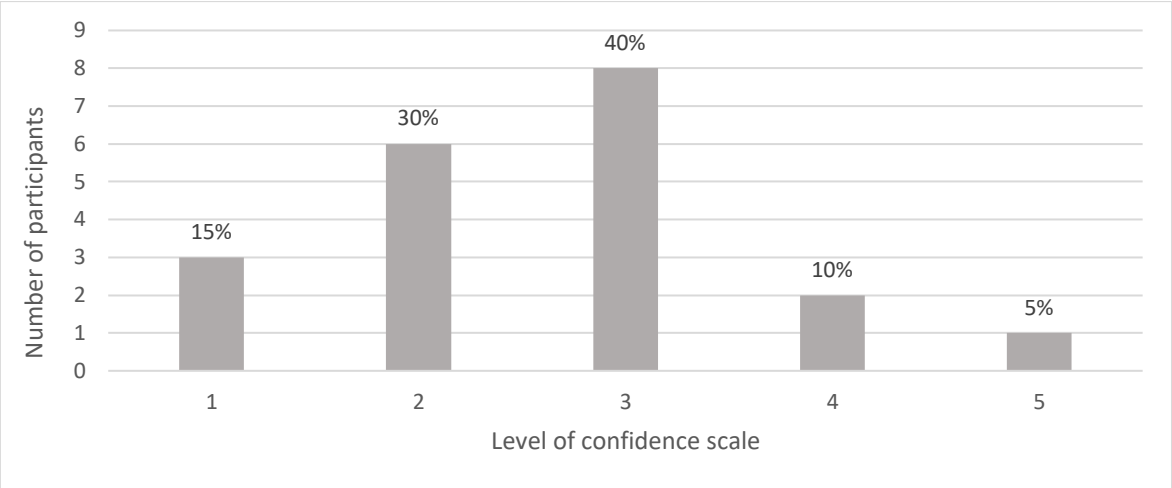

Figure 1. HODs level of confidence in managing SUD

Nine (45.0%) HODs felt that there was a “conspiracy of silence” amongst employees when it came to reporting colleagues with suspected impairment. Factors impacting a HOD’s decision to report or confront an employee with suspected SUD can be seen in Table II.

Table II. Factors impacting HODs decision to report or confront employees

Factor	Number (n = 20)	Percentage
Unwilling to become involved in employees personal affairs	1	5
Professional consequences to yourself due to confrontation	3	15
Personal financial consequences	2	10
Personal litigation or claims for damage	4	20
Being accused of a personal feud or witch-hunt	6	30
Personal harmful consequences or disciplinary actions	5	25
Harmful consequences/disciplinary action against employee	7	35

Eleven (55.0%) of the HODs stated that anaesthetists should be allowed to return to practise anaesthesiology after completing rehabilitation, 3 (15.0%) were undecided and 6 (30.0%) disagreed. Nine (45.0%) HODs reported that they would employ an anaesthetist with SUD, 7 (35.0%) would not and 4 (20.0%) were undecided. The influence of having previously managed a case of SUD made no impact on the HODs’ opinion on employing a rehabilitated anaesthetist ($p = 0.36$).

One HOD did not answer any of the remaining questions. Eleven (57.9%) HODs had at least one confirmed case and one suspected case of SUD in their department within the study period. Seven (36.8%) only suspected a case of SUD and only 1 (5.3%) had no suspected or confirmed cases. Between the 11 departments, there were 20 confirmed cases of SUD. Two of the departments had 4 confirmed cases each, 3 departments reported 2 cases, and 6 reported 1 case each. There were 40 suspected cases reported by the 18 (94.7%) departments. Of the HODs that reported a confirmed case, 9 (81.8%) received support from their department, when managing the case of SUD.

There were a variety of substances reported in the 20 confirmed cases, as seen in Table III, with 8 (40.0%) cases abusing multiple substances. Opioids were abused in 13 (65.0%) of the cases reported.

Table III. Substances abused by anaesthetists

Substance	Number (n = 20)	Percentage
Fentanyl	8	40
Morphine	4	20
Sufentanil	3	15
Remifentanil	1	5
Pethidine	1	5
Benzodiazepines	5	25
Alcohol	3	15
Ketamine	3	15
Propofol	2	10
Isoflurane	1	5
Methcathinone	2	10
Methamphetamines	1	5
Unknown	3	15

The HODs recognised different signs suggestive of abuse in anaesthetists with SUD, which are shown in Table IV. More than one sign was present in 11 (55.0%) cases.

Table IV. Signs identified suggestive of abuse

Sign	Number (n = 20)	Percentage
Abnormal behaviour or mood	13	65
Absenteeism	10	50
Incompetence	8	40
Intoxication at work	6	30
Observed abuse	3	15
Excessive prescribing of drugs	3	15
Patient injury	3	15
Overdose	2	10
No signs	3	15

The individual reporting the case to the HOD also varied as seen in Table V, with the majority of cases (50.0%) being reported by a colleague within the department. Amongst the 11 HODs who reported a case of SUD, 6 (54.5%) reported that an anaesthetist had relapsed after attending rehabilitation.

Table V. Person who reported the case of SUD to the HOD

Person reported	Number (n = 20)	Percentage
Colleague within the department	10	50
Nursing sister	3	15
Self-reported	3	15
Family member	1	5
Colleague from another department	1	5
Found dead	2	10

The cases of SUD were reported to different authorities as shown in Table VI. Some HODs reported cases to more than one authority.

Table VI. Authority SUD reported to

	Number (n = 11)	Percentage
Hospital management	5	45.5
HPCSA	4	36.4
Academic HOD	2	18.2
Department of health	1	9.1
Department wellness committee	1	9.1
Not personally reported	1	9.1

Discussion

SUD is the leading cause of physician impairment and has a high prevalence amongst anaesthetists, therefore it is an important issue to address.

In this study, 57.9% of academic departments of anaesthesiology in South Africa reported confirmed cases of SUD. Due to difficulty determining the actual number of anaesthetists employed in the academic departments of anaesthesiology, the incidence could not be determined. This study found 20 cases of SUD amongst 11 of the 19 departments that completed the survey. A study done by Fry et al (11), amongst anaesthetists in Australia and New Zealand, found 61 cases of SUD in 39 of 106 departments surveyed and a study done amongst Canadian anaesthetists by Boulis et al (19), found 24 cases of SUD in 15 of 48 departments that responded to the survey. All three studies assessed a 10-year period. It is difficult to compare the studies due to differences in calculations and reporting, but the high number of cases, despite the lower number of departments in this study, is concerning. Additionally, 94.7% of HODs in this study reported that they had suspected a case of SUD during the study period. Therefore, the actual number of cases of SUD could be higher.

Similar to findings in studies from the United States of America (USA) (20-22) and Canada (19), opioids were the most commonly abused substance in this study, with fentanyl abuse reported in 40% of cases. Fentanyl is the opioid most commonly abused by anaesthetists due to its availability, rapid onset of action and favourable pharmacokinetic profile (23). In this study, there were two cases of propofol abuse reported, with one resulting in death. Fry et al (11) found that

propofol accounted for 41% of cases of SUD amongst anaesthetists in Australia and New Zealand between January 2004 – December 2013, with a mortality rate of 48% (11). Tolerance to propofol develops quickly, resulting in higher doses being used and therefore it is associated with a high mortality rate.

Alcohol accounted for 59% of cases in a study done amongst anaesthetists in the United Kingdom and Ireland (24), but it was only reported in 15% of cases in this study. Van Der Westhuizen et al (17), assessed substance use amongst anaesthesia practitioners in South Africa in 2018 and found moderate risk usage of alcohol in 12.1% of respondents and high risk usage in 0.8%. It is possible that the incidence of alcohol use disorder was underreported in this study as it is more difficult to detect. Isoflurane abuse was the only inhalational agent reported in this study. There was one case reported and it was only identified when the anaesthetist was found dead at home. Inhalational agent abuse is difficult to detect and cases are often only identified when a person is found dead due to accidental overdose (25).

In this study, abnormal mood or behaviour was the most identified sign suggesting SUD. Overdose accounted for 10% and no signs were present in 15% of cases. In an Australian and New Zealand study, intoxication was reported as the identifying sign in 30% of cases and abnormal conduct accounted for only 18% of cases (11).

The Accreditation Council for Graduate Medical Education (26) in the USA require training institutions to have written policies on physician impairment and offer registrars training on SUD. In South Africa, the HPCSA does not have any guidelines or requirements for departmental impairment policies or substance use education. Only 25% of the South African academic departments of anaesthesiology had a formal policy on SUD management, and only 10% offer SUD training to employees. Berry et al (24) surveyed heads of departments of anaesthesiology in the United Kingdom and Ireland and found that 18.5% of departments, 47.9% of hospitals and 49.7% of trusts had a drug misuse policy. Alcohol misuse policies were found more commonly.

Despite the low incidence of SUD policy and education, 65% of South African academic departments of anaesthesiology had a wellness committee or initiative.

This demonstrates an increased awareness of impairment in South African academic departments, which could be attributed to education done by SASA and SASA Wellness in Anaesthesia Support Group. This awareness creates a good platform for the development of further SUD education and policy making.

HODs are often responsible for confronting and reporting employees suspected of SUD and this study found that there is limited training on SUD management for HODs of academic departments of anaesthesiology, as only 10% of HODs received formal training. Despite the lack of training, 55% reported that they were aware of the HPCSA guidelines on impairment and 65% felt equipped to manage a case of SUD. In this study, HODs reported that resources including SUD guidelines, SUD management workshops and a handbook regarding SUD management would assist them in handling SUD. Development of resources for impairment and SUD management should be encouraged in South Africa.

There are many factors impacting an HOD's decision to report a case of SUD or confront an anaesthetist suspected of SUD. The limiting factor most commonly reported in this study was the risk of harmful consequences or disciplinary action against the employee. This supports the HPCSA's report of a "conspiracy of silence", which is the aversion of medical practitioners to report or confront a colleague with impairment or SUD, and instead cover up their mistakes (3). Forty-five percent of HODs in this study suspected that a "conspiracy of silence" exists amongst their employees, which limits reporting to HODs or wellness committees. A survey done amongst physicians in the USA found that 22% had previously reported an impaired colleague and found that physicians were more likely to report a case of SUD, than cognitive or psychological impairment, as this was seen as protecting the good of society (27).

Another factor limiting the reporting of SUD, reported by 30% of HODs in this study, is the risk of being accused of a personal feud or witch-hunt. The HPCSA has tried to relieve this fear and encourage reporting of impaired practitioners by introducing a guideline that prevents a reporting physician from being held liable for any claims of defamation, civil claims or negative consequences resulting from reporting a colleague (3). Improving awareness of the HPCSA guidelines could allay fears and concerns over reporting colleagues.

Allowing an anaesthetist to return to practice anaesthesia after completing rehabilitation is controversial due to the risk of relapse and consequent patient harm (28). A survey of Canadian anaesthesiology program directors found that 60% would employ an anaesthetist who had completed rehabilitation (19). In the USA, 34.4% of anaesthesiology program directors felt that anaesthetists with SUD should be allowed to re-enter theatre after varying amounts of time in rehabilitation (23). In this study, 55% of HODs felt that anaesthetists with SUD should be allowed to continue to practice anaesthesiology after completing rehabilitation and 45% reported that they would employ an anaesthetist who had completed rehabilitation.

The study does have some limitations. The survey was only completed by HODs in academic public sector hospitals, and therefore may not be generalisable to all anaesthetists in South Africa. The results also depended on the accurate recall of the HODs, however, 75% of the HODs had been employed in their current department for more than five years representing good institutional memory.

Conclusion

Although this study emphasises the problem of SUD amongst anaesthetists, it also illustrates awareness of physician impairment in South African academic departments of anaesthesiology. This study highlights the limited training of South African anaesthetists about SUD and the training of HODs on SUD management, as well as the need for further educational resources, policy development and SUD prevention programs. SUD amongst anaesthetists is a serious problem and one that needs to be addressed to prevent further morbidity and mortality.

Conflict of interest

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

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Section 4: Proposal

Substance use disorder in South African departments of anaesthesiology: Profile and management experiences

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4.1 Introduction and problem statement

Physician impairment has been recognised by the American Medical Association since 1973 (1). Impairment includes mental and physical conditions, as well as abuse of, or dependence on chemical substances (2). Substance use disorder (SUD) has been found to be the most common cause of impairment amongst physicians (3).

SUD is defined in The Diagnostic and Statistical Manual of Mental Disorders: Fifth Edition (4) under substance-related disorders as a "a cluster of cognitive, behavioural and psychological symptoms". The diagnosis depends on a pattern of behaviour related to the use of a specific substance. The disorder is composed of 11 different criteria, with the presence of two or more criteria required to make a diagnosis. Furthermore, there are 10 different classes of substances that SUD can be applied to (4). Prior to 2013, SUD was referred to as either substance abuse or substance dependence (5). Therefore, much of the literature still refers to substance abuse or dependence, instead of SUD.

The incidence of SUD in physicians is similar to that found in the general population. However, physicians tend to abuse alcohol and prescription drugs more than illicit substances, as seen in the general population (6). Anaesthetists, emergency medicine specialists and psychiatrists have been found to have a higher rate of SUD compared with other specialities (7).

A survey done by Fry et al (8) in Australia and New Zealand illustrates the importance of SUD amongst anaesthetists. They found the incidence of SUD amongst anaesthetists between 2004 – 2013, to be 1.2 per 1000 anaesthetist years (8). Anaesthetists who abused substances were more likely to be registrars than consultants, male, and aged between 30 – 39 years. Propofol, fentanyl, and alcohol were the most commonly abused substances in this study. Only 32% of the anaesthetists with SUD made a full recovery and continued to practise anaesthesiology. The mortality rate as a result of SUD was 18%. They also found that only 37% of departments had a welfare officer (8).

Opioids (fentanyl in particular), alcohol, propofol, benzodiazepines and inhalational agents are the most commonly abused substances amongst anaesthetists (9). Due to the nature of these substances, there is a high mortality rate amongst anaesthetists with SUD (10, 11). SUD is often only identified in an anaesthetist once they have overdosed and are found unconscious or dead (8).

There is a stigma surrounding SUD amongst anaesthetists, which limits help seeking behaviour (1). This also affects the reporting of suspected colleagues. There is a “conspiracy of silence” when it comes to reporting colleagues (2), with many physicians facing an ethical dilemma between the safety of patients and the privacy of an impaired colleague and the potential financial, social, professional and legal consequences their colleague may face (12).

Heads of departments of anaesthesiology are often tasked with the management and reporting of SUD. A study carried out in the United States of America amongst emergency medicine program directors (13) found that 31% of directors had moderate knowledge and only 5% had extensive knowledge on the process of intervention with regards to impairment issues. It also found that 30% of directors had not received any formal training or education on the management of an employee with SUD (13).

Varying management protocols are used in different hospitals and departments of anaesthesiology globally. Education of medical officers and registrars about the dangers of substance use, as well as assessing anaesthetic charts and individual anaesthetists drug usage in theatre is the mainstay of prevention and identification in many hospitals (14). In a South African context, the Health Professions Council of South Africa (2) has guidelines for the management of impaired physicians, although these are not specific to anaesthetists. A survey carried out amongst multiple departments of anaesthesiology in the United Kingdom and Ireland by Berry et al (15), found that 19.3% of departments, 47.9% of hospitals and 58.8% of trusts had an alcohol misuse policy in place, whereas only 18.5% of departments, 40.8% of hospitals and 49.7% of trusts had a drug misuse policy in place.

It has been debated whether an anaesthetist should be allowed to continue practising anaesthesiology once diagnosed and treated for a SUD (16). It poses

possible risks to patients and the anaesthetist involved. There is also no consensus on the management program that should be followed, how long an anaesthetist should be away from theatre, and how quickly responsibility should be reintroduced if they do return to practise anaesthesiology (16). Although it has not been shown that an anaesthetist who returns to practise anaesthesiology after being treated for a SUD has a higher risk of relapse, they do have a higher risk of death as a result if they do relapse (17).

With the availability of support groups in South Africa, such as the South African Society of Anaesthesiologists Wellness in Anaesthesia Support Group and increased awareness through the publication of editorials in the South African Journal of Anaesthesia and Analgesia on physician impairment and SUD (18, 19), issues of SUD amongst anaesthetists as well as physician impairment in general are beginning to be noted and addressed. However, there is still limited research published on SUD amongst anaesthetists in South Africa. Profiling SUD in South African anaesthetists, as well as the experiences of clinical heads of departments of academic hospitals in South Africa, will assist in defining the condition in a South African context, as well as assisting in the development of future prevention and management plans.

4.2 Aim and objectives

4.2.1 Aim

The aim of this study is to describe the experiences of Clinical Heads of Departments of Anaesthesiology with regards to the management of SUD and profile SUD amongst anaesthetists in academic public sector hospitals in South Africa over the past 10 years (January 2009 – December 2018).

4.2.2 Objectives

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

- the number of departments of anaesthesiology that currently have a wellness initiative and policy on SUD

- the clinical heads of departments of anaesthesiology's training and knowledge about SUD management
- how confident clinical heads of departments of anaesthesiology are, in managing SUD
- the factors limiting reporting of an impaired anaesthetist
- the willingness of clinical heads of departments to employ someone with SUD who has completed rehabilitation.

The secondary objectives of this study are to:

- the different substances abused by anaesthetists
- the presentation and trajectory of SUD amongst anaesthetists
- to whom cases of SUD are reported
- the association between the clinical heads of department's confidence of managing SUD and their experience
- the association of having previously managed a case of SUD and the clinical heads of department's opinion on employing a rehabilitated anaesthetist.

4.3 Research assumptions

The following definitions will be used in this study.

Anaesthetist: is any qualified doctor working in a department of anaesthesiology including interns, medical officers, registrars and consultants.

Department of Anaesthesiology: is a department in a public sector hospital, that is affiliated to a university, and offers anaesthesiology services.

Academic Head of Department of Anaesthesiology: is the person in charge of a university Department of Anaesthesiology.

Clinical Head of Department of Anaesthesiology: is the person in charge of a Department of Anaesthesiology in a specific hospital. The Clinical Head of Department can also be an Academic Head of Department. In this study they are referred to as Head of Department (HOD).

Substance use disorder: is defined by The Diagnostic and Statistical Manual of Mental Disorders: Fifth Edition (4). For a diagnosis to be made it requires two or more criteria to be met from the following 11 criteria.

- Impaired control over substance use:
    - a lot of time spent using, obtaining or recovering from a substance
    - persistent desire or controlled efforts to quit or control use
    - use of a larger amount or for a longer period than intended
    - craving.
- Social impairment:
    - neglected major role due to use (work, school or home)
    - persistent use despite social or interpersonal problems related to use
    - stopping or reducing important social, occupational or recreational activities due to substance use.
- Risky use of the substance:
    - use in physically hazardous situations
    - continued use despite persistent physical or psychological problems related to use.
- Pharmacological criteria
    - tolerance
    - withdrawal (4).

Substance: in this study refers to alcohol, hallucinogens, inhalants, opioids, sedatives, hypnotics, cannabis, anxiolytics, and stimulants. Caffeine and tobacco are not included.

Trajectory: includes the management and outcome of a case of SUD.

4.4 Demarcation of study field

The study will be conducted in departments of anaesthesiology in academic public sector hospitals in South Africa.

There are eight universities in South Africa with an Academic Department of Anaesthesiology, each with an academic head of department. Each academic

department is affiliated with public sector hospitals within their region. Twenty-nine academic public sector hospitals were identified and invited to participate in the study. Each hospital has a clinical head of department of anaesthesiology. These include:

- Sefako Makgatho University: Dr George Mukhari Academic Hospital
- Stellenbosch University: Tygerberg Hospital, Karl Bremer Hospital, Paarl Hospital, Worcester Hospital
- University of Cape Town: Groote Schuur Hospital, New Somerset Hospital, Red Cross War Memorial Hospital
- University of the Free State: Combined department at Pelonomi, Universitas and National Hospitals, 3-Military Hospital, Kimberley Hospital.
- University of KwaZulu Natal: Addington Hospital, Inkosi Albert Luthuli Central Hospital, King Edward VIII Hospital, Mahatma Gandhi Memorial Hospital, Pietermaritzburg Complex, Prince Mshiyeni Memorial Hospital, Port Shepstone Hospital
- University of Pretoria: Kalafong Hospital, Steve Biko Academic Hospital, 1-Military Hospital
- University of the Witwatersrand: Chris Hani Baragwanath Academic Hospital, Charlotte Maxeke Johannesburg Academic Hospital, Helen Joseph Hospital, Rahima Moosa Mother Child Hospital, Klerksdorp Hospital
- Walter Sisulu University: East London Hospital Complex, Mthatha Hospital Complex, Port Elizabeth Hospital Complex.

4.5 Ethical considerations

Approval to conduct the study will be obtained from the Human Research Ethics Committee (Medical) and the Graduate Studies Committee of the University of the Witwatersrand. Approval has been obtained from the Head of Department of Anaesthesiology at the University of the Witwatersrand (Appendix 1). The study has also been endorsed by the South African Society of Anaesthesiologists Wellness in Anaesthesia Support Group (Appendix 2).

A survey (Appendix 3) will be sent out via a SurveyMonkey link with an information letter (Appendix 4), and if the survey is returned, it is implied that consent to

participate in the study has been granted. The Clinical Heads of Departments of Anaesthesiology who receive the survey will be provided with a list of phone numbers for organisations who can assist with counselling or management of SUD, attached to the bottom of the information sheet.

Anonymity is ensured throughout the study, as the survey will be distributed via SurveyMonkey to the clinical heads of the department of anaesthesiology at each academic hospital. There will be no identifying questions about the clinical head of department filling out the survey, or the hospital involved. Furthermore, no names of individual anaesthetists are requested in the survey. Only the researcher and supervisors will have access to the raw data and this will be kept confidential at all times. Raw data will be stored securely for six years after completion of the study in a password protected database.

The study will be conducted according to the principles of the Declaration of Helsinki (20) and the South African Guidelines for Good Clinical Practice (21).

4.6 Research methodology

4.6.1 Research design

A prospective, contextual, descriptive research design will be followed in this study.

A prospective study is defined by Brink et al (22) as one in which “data about a presumed cause are first collected, and then the effect or outcome is measured.” The study is prospective as data will be collected and then the outcome will be measured.

A contextual study refers to a study done within a particular population group or a “small scale world” (23). This study will describe the experiences of SUD management by clinical heads of departments as well as profile SUD in South African anaesthetists in academic public sector hospitals.

Descriptive research, as defined by Kerlinger and Lee in Burns and Grove (24), is “the exploration and phenomena in real-life situations; it provides an accurate

account of characteristics of particular individuals, situations or groups." This study will describe the experiences of Clinical Heads of Departments of Anaesthesia in South Africa with regards to management of SUD, without any intervention occurring.

4.6.2 Study population

The study population is Clinical Heads of Departments of Anaesthesiology in academic public sector hospitals in South Africa.

4.6.3 Study sample

Sample size

All 29 identified academic departments of anaesthesiology in public sector hospitals are invited to participate in the survey. The sample size will be realised by the response rate. According to Schutt (25), a response rate "below 60% was unacceptable", therefore a response rate of 60% (18 departments) would be considered acceptable.

Sampling method

In this study, a purposive sampling method will be used. Purposive sampling is a type of non-probability sampling and as stated in Brink et al (22), it is a "technique based on the judgement of the researcher regarding participants or objects that are typical or representative of the study phenomenon, or who are especially knowledgeable about the question at hand." The benefit of purposive sampling is "that it allows the researcher to select the sample based on knowledge of the phenomena being studied" (22). This study will be performed amongst clinical heads of departments of anaesthesiology in academic public sector hospitals in South Africa.

Inclusion and exclusion criteria

The inclusion criterion for this study is all clinical heads of departments of anaesthesiology in academic public sector hospitals in South Africa. There are no exclusion criteria.

4.7 Data collection

4.7.1 Development of the survey

A survey will be used as the instrument for data collection because it:

- gathers accurate and complete information
- will direct questions towards the specified information required
- allows data collection from a large group of people
- is easy for the respondent to fill out (22).

Two senior anaesthesiologists from the University of the Witwatersrand's Department of Anaesthesiology, who are members of the wellness committee, reviewed the draft survey to ensure face and content validity. Their comments were incorporated into the final survey. Section 2 of the survey is modelled on surveys used by Fry (26) and Fry et al (8). Fry has granted permission to use and adapt the surveys (Appendix 5). The surveys have been adapted to a South African context.

The survey (Appendix 3) will consist of two sections and request the following data.

Section 1 will ask general questions about the department including: presence of a wellness initiative, a policy on SUD management and if training is offered to employees on SUD. It will also ask about the clinical head of department's personal experience with regards to management of SUD including: training received, availability of SUD management resources, confidence in managing a case of SUD, factors impacting their decision to report an employee, allowing an anaesthetist with SUD to re-enter theatre and whether or not they would employ someone who had completed rehabilitation.

Section 2 will include questions about cases of SUD in each department in the past 10 years. This will include questions on:

- the substance abused
- who reported or identified the problem
- presence of signs suggestive of abuse
- relapse

- faculty support in managing a case of SUD.

4.7.2 Data collection

Data will be collected primarily via a self-administered survey. It should not take participants longer than 15 minutes to collate the data and to complete the survey.

An email will be sent to the clinical heads of department at all 29 hospitals. The study will explained in an information letter (Appendix 4) and contain a link to SurveyMonkey. The clinical head of department will be asked to complete the survey (Appendix 3), even if there have been no cases of SUD in their department. If they have not been in their department for the duration of the study period, they will be encouraged to consult with colleagues to obtain the last 10 years information. If the information is still not known, despite consulting colleagues, they will be encouraged to still fill out the survey for the period that they know. They will be given a time period of two weeks to return the survey. A follow up reminder email will be sent after two weeks, and then again after another two weeks to the clinical heads of department who have not responded.

4.8 Data analysis

Data will be captured onto a Microsoft Excel spread sheet and analysed in consultation with a biostatistician using Stata version 15 (StataCorp, USA). Descriptive statistics will be used. Categorical variables will be described using frequencies and percentages and compared using Fisher's Exact tests. A p-value of 0.05 or less will be considered statistically significant. Confidence will be determined as a score of 3 or more out of 5 and clinical heads of departments will be considered experienced if they have been in their role for five years or longer.

4.9 Significance of the study

SUD amongst anaesthetists is an international problem, and much international research (8, 15, 27) has been done with regards to understanding the problem and evaluating prevention and management programs. Limited research could be identified in South African literature regarding SUD amongst anaesthetists. Profiling SUD and the management experiences of clinical heads of departments of

anaesthesiology in South Africa with regards to SUD will assist in the development of future preventative and management programs.

4.10 Validity and reliability of the study

Validity is defined by Botma et al (28) as “the degree to which a measurement represents a true value” and reliability as representing “the consistency of the measure achieved.”

The validity and reliability of the study will be ensured by:

- using an appropriate research method
- using a published survey (8, 26) that was adapted to a South African context and reviewed by two senior anaesthesiologists, who are members of the wellness committee, thereby ensuring content and face validity
- completion of a standardised survey by participants
- appropriate statistical testing in consultation with a biostatistician.

4.11 Potential limitations

The study design does have some limitations. The contextual design of the study includes anaesthetists in South Africa working in academic public sector hospitals only, and therefore may not be generalisable to all anaesthetists.

The sample size will be determined by the willingness of the clinical heads of departments of anaesthesiology in academic public sector hospitals to participate in the survey. A small sample size could limit the validity of the study.

Limited institutional memory and the duration of time the clinical head of department has been employed in the department, could limit the number of cases, as well as the accuracy of the details reported. The results also depend on the honesty of the answers of the clinical heads of department.

4.12 Project outline

4.12.1 Time frame

Activity	Nov 2018	Dec 2018	Jan 2018	Feb 2019	July 2019	Aug 2019	Sept 2019	Oct 2019	Nov 2019	Dec 2019
Proposal preparation										
Literature review										
Proposal submission										
Ethics approval										
Postgraduate approval										
Data collection										
Data analysis										
Draft article										
Submission										

4.12.2 Budget

Item	Number	Cost (R)	Total (R)
Printing	1200	1	1200
Binding	3	200	600
Phone calls	45	8	360
Survey software	1	450	450
Total			2160

The cost of the paper and printing for the postgraduate application will be incurred by the Department of Anaesthesiology at the University of the Witwatersrand. The cost of the binding, phone calls and survey software will be incurred by the researcher.

4.13 References

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4.14 Appendices

4.14.1 Appendix 1 Letter to the Head of Department of Anaesthesiology

Tahlia Jeggo
Anaesthesiology registrar
University of the Witwatersrand
Student number: 0603070M

9 January 2019

Dr Lines
Principal Specialist
Head of Department of Anaesthesiology
University of the Witwatersrand

Dear Dr Lines,

RE: Permission to conduct a study

I would like to request permission to conduct the M Med study titled: Substance use disorder in South African departments of anaesthesiology: Profile and management experiences.

The aim of my study is to describe the experiences of Clinical Heads of Departments of Anaesthesiology with regards to the management of substance use disorder as well as profile substance use disorder amongst anaesthetists in academic public sector hospitals in South Africa over the past 10 years (January 2009 - December 2018).

Substance use disorder is the leading cause of physician impairment. It has been well described in international literature, however, there is limited South African data. Profiling substance use disorder amongst South African anaesthetists, as well as the experience of Clinical Heads of Departments will assist to determine the magnitude of the problem as well as assist in future preventative and management programs.

Yours sincerely,

Tahlia Jeggo

Approval granted:

Dr D. Lines

4.14.2 Appendix 2 Letter of provisional endorsement from SASA Wellness in Anaesthesia Support group

SOUTH AFRICAN SOCIETY OF ANAESTHESIOLOGISTS
Official Group Of SAMA
Association Not For Gain
T: +27 (0) 86 010 3137 (toll free) T: +27 (0) 908 1489 F +27 (0) 86 242 9804
E: sasa@sasaweb.com
PO Box 22511, Glenashley, 4022 South Africa
www.sasaweb.com
VAT Registration Number: 4680223379

08 July 2019

Dr Tahlia Jeggo
127 Linden Street
Sandown
Johannesburg

Dear Dr Jeggo

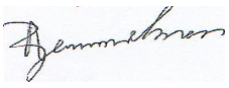
Re: Letter of Support for MMED Study

Further to your request for endorsement of your MMED, Substance use disorder in South African departments of anaesthesiology: Profile and management experiences, SASA as well as The Wellness in Anaesthesia Support Group, agrees to endorse your study pending ethical approval.

We would like to caution you on your timing of the distribution of your survey, with regards to other surveys to avoid survey fatigue by respondents.

Should you have any questions, please do not hesitate to contact us.

Kind Regards,



Ms Natalie Zimmelman
SASA CEO

4.14.3 Appendix 3 Survey

Substance use disorder in South African departments of anaesthesiology: Profile and management experiences

Instructions

Please answer the following questions. Section 2 refers to your current hospital's Department of Anaesthesiology, for the period **January 2009 to December 2018**.

Definitions used in the study:

Substance use disorder is defined by the DSM-5. For a diagnosis to be made it requires two or more criteria to be met from the following 11 criteria.

- Impaired control over substance use:
    - a lot of time spent using, obtaining or recovering from a substance
    - persistent desire or controlled efforts to quit or control use
    - use of a larger amount or for a longer period than intended
    - craving.

- Social impairment:
    - neglected major role due to use (work, school or home)
    - persistent use despite social or interpersonal problems related to use
    - stopping or reducing important social, occupational or recreational activities due to substance use.

- Risky use of the substance:
    - use in physically hazardous situations
    - continued use despite persistent physical or psychological problems related to use.

- Pharmacological criteria:
    - tolerance
    - withdrawal.

Substance for the purpose of this study includes alcohol, hallucinogens, inhalants, opioids, sedatives, hypnotics, cannabis, anxiolytics and stimulants. Caffeine and tobacco are not included in this study.

Anaesthetist includes all medical officers, registrars and consultants.

SECTION 1:
Please mark the box with an X.

1.1 Does your department have a wellness committee or initiative?	
No	
Yes	

1.2 Does your department have a formal policy regarding substance use disorder?	
No	
Yes	

1.3 Does your department offer any formal training or education about substance use disorder to anaesthetists employed in the department?	
No	
Yes (please elaborate)	

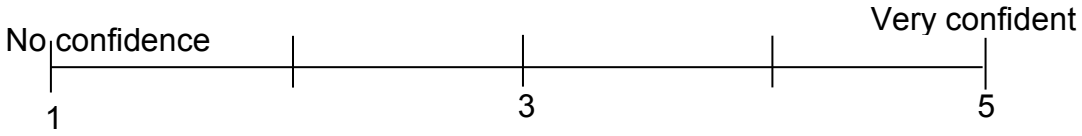
1.4 As HOD, have you received any training on dealing with employees with substance use disorder?	
No	
Yes (please elaborate)	

1.5 Which of the following would assist you in dealing with a case of substance use disorder? (Please mark an X in the appropriate box)	**No**	**Yes**
a. Handbook on management of SUD		
b. Guidelines for management		
c. Workshop on management		
d. Other (please specify)		

1.6 Are you aware of any resources available to HODs with regards to substance use disorder management?	
No	
Yes (Please elaborate)	

1.7 Do you feel equipped to manage an employee with substance use disorder?	
No	
Yes	

1.8 On a scale of 1-5 how confident do you feel to manage a case of substance use disorder? (please circle answer)



The HPCSA refers to a 'conspiracy of silence'. This relates to the reluctance or unwillingness of a person to report a colleague with suspected impairment.

1.9 Do you think there is a tendency amongst anaesthetists in your department to protect one another and not report suspected impairment?	
No	
Yes	

1.10 Would the following impact your decision to report or confront an employee with regards to substance use disorder? (Please circle answer)		
a. Unwillingness to become personally involved in the employees personal affairs.	Yes	No
b. The risk of professional consequences to yourself as a result of confrontation.	Yes	No
c. The risk of personal financial consequences.	Yes	No
d. The risk of personal litigation or claims for damage.	Yes	No
e. The risk of being accused of a personal feud or 'witch hunt'.	Yes	No
f. A fear of personal harmful consequences or disciplinary action.	Yes	No
g. A fear of harmful consequences or disciplinary action against your employee.	Yes	No

1.11 Are you aware of the law with regards to substance use disorder?	
No	
Yes	

1.12 Would you employ an anaesthetist with substance use disorder, who had completed rehabilitation?	
No	
Yes	
Unsure	

1.13 Do you think an anaesthetist with substance use disorder should be allowed to return to practise anaesthesiology after completing rehabilitation?	
Yes	
No	
Undecided	

SECTION 2:

Please mark the box with an X.

Questions refer to your current Department of Anaesthesiology for the period January 2009 – December 2018.

2.1 How long have you worked at your current hospital?	
0 – 1 year	
1 – 2 years	
2 – 5 years	
5 – 10 years	
10 – 20 years	
>20 years	

2.2 How long have you been Clinical Head of Department?	
0 – 1 year	
1 – 2 years	
2 – 5 years	
5 – 10 years	
10 – 20 years	
>20 years	

2.3 Have you ever <u>suspected</u> substance use disorder amongst an anaesthetist in your department?	
No	
Yes (If yes, please specify how many suspected cases)	

2.4 Have there been any <u>confirmed</u> cases of substance use disorder amongst anaesthetists in your department in the last 10 years (Jan 2009- Dec 2018)?	
No	
Yes (if yes, please specify how many confirmed cases)	

2.5 What substance was abused?	Case 1	Case 2	Case 3	Case 4	Case 5
Alcohol					
Fentanyl					
Sufentanil					
Morphine					
Benzodiazepines					
Ketamine					
Propofol					
Sevoflurane					
Isoflurane					
Nitrous oxide					
Cocaine					
Heroin					
Unknown					
Other (please specify)					

2.6 Who reported or identified the problem?	Case 1	Case 2	Case 3	Case 4	Case 5
Nursing sister					
Colleague within the department					
Colleague from another department					
Family member					
Self-reported					
Other (Please elaborate)					

2.7 Were there any signs suggestive of abuse?	Case 1	Case 2	Case 3	Case 4	Case 5
Absenteeism					
Incompetence					
Patient injury					
Intoxication at work					
Observed abuse					
Overdose					
Abnormal behaviour or mood					
Excessive prescribing of drugs					
Other (please elaborate)					

2.8 Did the anaesthetist relapse after rehabilitation?	Case 1	Case 2	Case 3	Case 4	Case 5
No					
Yes					
Unsure					

2.9 Who did you report the case to? (Please specify)	Case 1	Case 2	Case 3	Case 4	Case 5

2.10 Did your academic department give you any support when dealing with a case of substance use disorder?	
No	
Yes	

Thank you for your participation.

4.14.4 Appendix 4 Information letter

Dear Colleague,

My name is Tahlia Jeggo. I am a registrar in the Department of Anaesthesiology at the University of the Witwatersrand. I would like to invite you to participate in my MMed research project titled: **Substance use disorder in South African departments of anaesthesiology: Profile and management experiences.**

The aim of the study is to describe the experiences of Clinical Heads of Departments of Anaesthesiology with regards to the management of substance use disorder and profile substance use disorder amongst anaesthetists in academic public sector hospitals in South Africa over the past 10 years (January 2009 - December 2018). Substance use disorder amongst anaesthetists has been well described in international literature, however, there is limited South African data. This study will help to profile substance use disorder amongst anaesthetists in South Africa and assist in the development of future prevention and management plans.

I would like to ask you, as the Clinical Head of Department of Anaesthesiology at your hospital, to fill out the survey on behalf of your hospital's department, taking into account any cases of substance use disorder from January 2009 to December 2018. I encourage you to consult previous Heads of Department from your hospital as well as other members of your department if required; so as much information as possible can be included in the study. If, despite consultation, you do not have information for the entire study period, please still fill out the survey for the period that you know.

Participation in the study is voluntary and consent will be implied by completion of the survey. It should not take more than 15 minutes to collate the data and complete the survey.

The survey will be completed via SurveyMonkey. Your name and hospital will not be identified on the survey. No personal details of any anaesthetist is requested. All information will be kept confidential, and only the researcher and supervisors will have access to the raw data.

The survey consists of two sections. Please complete the survey, even if you have never managed a case of substance use disorder. Section 1 includes general questions about the department, as well as your experience with regards to managing cases of substance use disorder. Section 2 includes questions about cases of substance use disorder. Please fill out the questions for each case.

The study has been endorsed by SASA Wellness in Anaesthesia Support Group. If, after completing the questionnaire, you feel that you or any anaesthetists in your department require support regarding substance abuse, support group details are provided at the end of the letter.

Please ensure the above information is understood before completing the survey. Your time is greatly appreciated. Any questions regarding this study can be directed to:

- Professor Penny (The Chairman of the HREC): 0117172301
- Tahlia Jeggo (Researcher): 0741837778

Yours Sincerely,

Tahlia Jeggo

Support group contact details:

- SASA Wellness in Anaesthesia Support Group:
  - Ms Natalie Zimmerman SASA CEO: 082 331 7846 ceo@sasaweb.com
  - Dr Caroline Lee (Gauteng): 082 777 2136 dreamdocsa@gmail.com
  - Dr Allan Hold (KZN): 082 655 7792 allanhold@me.com
  - Dr Bhavika Daya (KZN): 083 787 1177 bhavikadaya@gmail.com
  - Dr Megan Jaworska (Cape): 082 371 2383 madzia2908@gmail.com

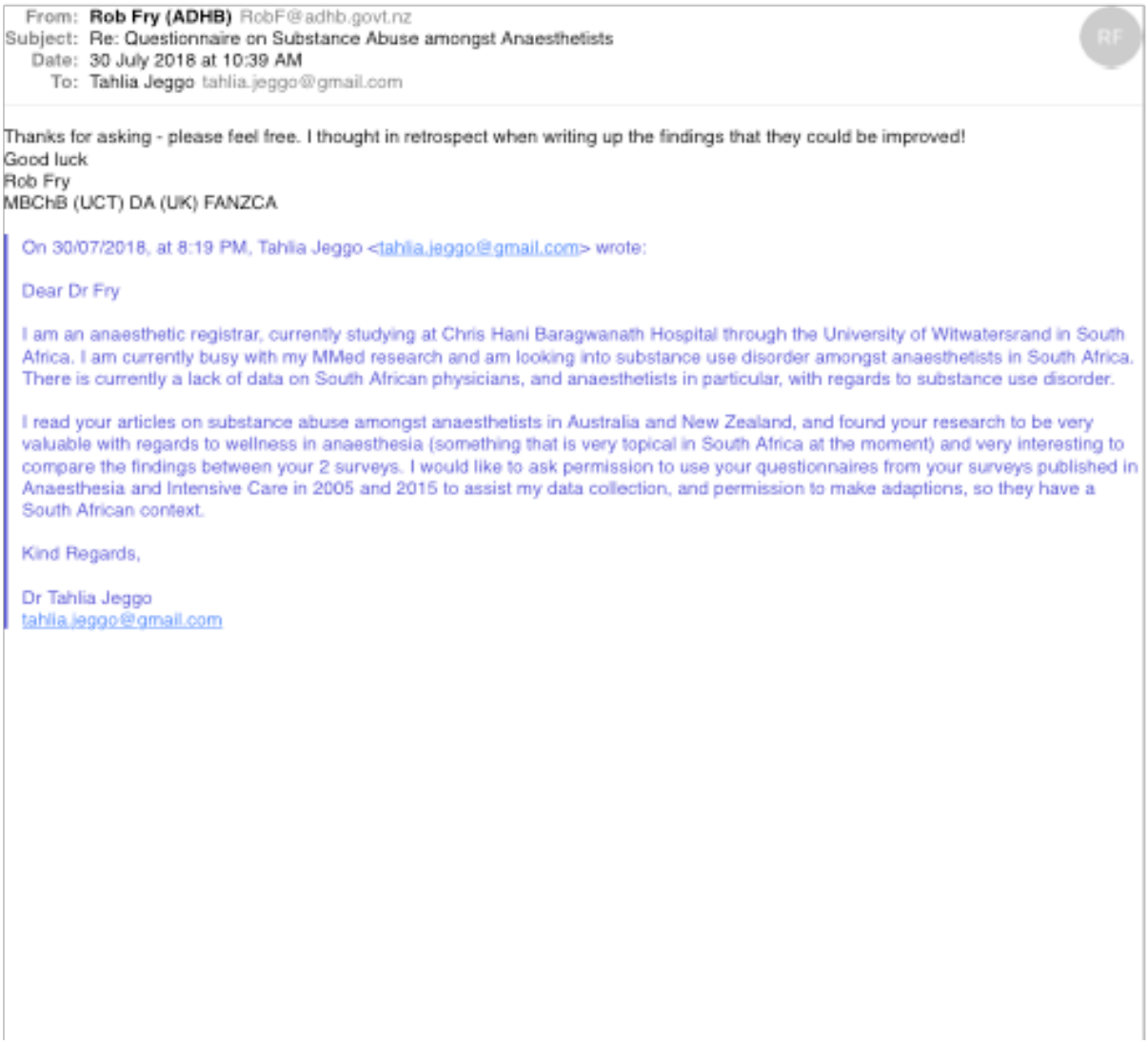
- South African Depression and Anxiety Group:
  - Substance Abuse Helpline: 0800 121314/ SMS 32312
  - Suicide crisis line: 0800 567 567
  - SADAG: 011 262 6396

- Alcoholics Anonymous: National Helpline 0861 435 722

- Narcotics Anonymous: 083 900 6962

- Drugwise: 011 728 6668

4.14.5 Appendix 5 Letter of permission for use of survey from Dr R. Fry



From: **Rob Fry (ADHB)** RobF@adhb.govt.nz
Subject: Re: Questionnaire on Substance Abuse amongst Anaesthetists
Date: 30 July 2018 at 10:39 AM
To: Tahlia Jeggo tahlia.jeggo@gmail.com

Thanks for asking - please feel free. I thought in retrospect when writing up the findings that they could be improved!
Good luck
Rob Fry
MBChB (UCT) DA (UK) FANZCA

> On 30/07/2018, at 8:19 PM, Tahlia Jeggo <tahlia.jeggo@gmail.com> wrote:
>
> Dear Dr Fry
>
> I am an anaesthetic registrar, currently studying at Chris Hani Baragwanath Hospital through the University of Witwatersrand in South Africa. I am currently busy with my MMed research and am looking into substance use disorder amongst anaesthetists in South Africa. There is currently a lack of data on South African physicians, and anaesthetists in particular, with regards to substance use disorder.
>
> I read your articles on substance abuse amongst anaesthetists in Australia and New Zealand, and found your research to be very valuable with regards to wellness in anaesthesia (something that is very topical in South Africa at the moment) and very interesting to compare the findings between your 2 surveys. I would like to ask permission to use your questionnaires from your surveys published in Anaesthesia and Intensive Care in 2005 and 2015 to assist my data collection, and permission to make adaptions, so they have a South African context.
>
> Kind Regards,
>
> Dr Tahlia Jeggo
> tahlia.jeggo@gmail.com

Section 5: Annexures

5.1 Ethics approval

UNIVERSITY OF THE WITWATERSRAND, JOHANNESBURG

HUMAN RESEARCH ETHICS COMMITTEE (MEDICAL)

Office of the Deputy Vice-Chancellor (Research & Post Graduate Affairs)

TO: Dr T Jeggo
School of Clinical Medicine
Department of Anaesthesiology
Chris Hani Baragwanath Hospital

E-mail: tahlia.jeggo@gmail.com

CC: Supervisor: Professor J Scribante <Juan.Scribante@wits.ac.za>
and <HREC-Medical.ResearchOffice@wits.ac.za>

FROM: Iain Burns
Human Research Ethics Committee (Medical)
Tel: 011 717 1252

E-mail: Iain.Burns@wits.ac.za

DATE: 18/03/2019

REF: *R14/49*

PROTOCOL NO: **M180833** *(This is your ethics application study reference number. Please quote this reference number in all correspondence relating to this study)*

PROJECT TITLE: *Substance use disorder in South African departments of anaesthesiology: profile and management experiences*

Please find attached the Clearance Certificate for the above project. I hope it goes well and that an article in a recognized publication comes out of it. This will reflect well on your professional standing and contribute to the Government funding of the University.

MSWorks2000/Iain0007/Clearscan.wps

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

29 March 2019
Person No: 0603070M
PAG

Dr TA Jeggo
3 Cindywood
140 Rivonia Road
Sandown
2196
South Africa

Dear Dr Tahlia Jeggo

Master of Medicine in Anaesthesia: Approval of Title

We have pleasure in advising that your proposal entitled *Substance use disorder in South African departments of anaesthesiology: profile and management experiences* 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

0603070m:TURNITIN_article.docx

ORIGINALITY REPORT

12%	6%	8%	7%
SIMILARITY INDEX	INTERNET SOURCES	PUBLICATIONS	STUDENT PAPERS

PRIMARY SOURCES

1	Submitted to University of Witwatersrand Student Paper	1%
2	link.springer.com Internet Source	<1%
3	Submitted to University of Florida Student Paper	<1%
4	docplayer.net Internet Source	<1%
5	Megan Sanders, Helen Perrie, Juan Scribante. "The Perceptions and Effects of Sleep Deprivation in a Department of Anesthesiology", Sleep Medicine Research, 2018 Publication	<1%
6	"Textbook of Addiction Treatment: International Perspectives", Springer Nature, 2015 Publication	<1%
7	"Physician Mental Health and Well-Being", Springer Nature, 2017 Publication	<1%