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CLINICAL RESEARCH

Drug abuse amongst anesthetists in Brazil: a national survey

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Abstract

Background: The prevalence of Substance Use Disorders (SUD) and acceptance of drug testing among anesthetists in Brazil has not been determined.

Methods: An internet-based survey was performed to investigate the prevalence of SUD among anesthetists in Brazil, to explore the attitudes of anesthetists regarding whether SUD jeopardizes the health of an impaired provider or their patient, and to determine the provider's perspective regarding acceptance and effectiveness of drug testing to reduce SUD. The questionnaire was distributed via social media. REDCap was utilized to capture data. A sample size of 350 to achieve a confidence level of 95% and confidence interval of 5 was estimated. Study report was based on STROBE and CHERRIES statements.

Results: The survey was returned from 1,295 individuals. Most individuals knew an anesthesia provider with a SUD (82.07%), while 23% admitted personal use. The most common identified substances of abuse were opioids (67.05%). Very few respondents worked in a setting that performs drug testing ($n = 17$, 1.33%). Most individuals believed that drug testing could improve personal safety (82.83%) or the safety of patients (85.41%). Individuals with a personal history of SUD were less likely to believe in the effectiveness of drug testing to reduce one's own risk (74.92% vs. 85.18%, $p < 0.0001$) or improve the safety of patients (76.27% vs. 88.13%, $p < 0.001$).

Conclusions: SUDs are common among anesthetists in Brazil. Drug testing would be accepted as a viable means to reduce the incidence although a larger study should be performed to investigate the logistical feasibility.

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Introduction

Substance Use Disorders (SUD) are a family of diseases that are pandemic throughout society. Healthcare personnel are not immune to these conditions or their impact which commonly includes death.¹ Anesthesiologists are not spared from this illness and may be at higher risk for addiction and substance associated death.²⁻⁴

This problem extends across countries and anesthesiologists in Brazil are vulnerable.⁵⁻⁷ Although anesthesiologists only comprise 3% to 5% of the physicians in Brazil, they make up a far higher percentage in recovery programs, similar to the United States.⁸⁻¹⁰ Recent data in the United States has demonstrated that this problem may be increasing among trainees in anesthesiology.² Education and substance control measures have been the mainstay of preventative efforts, although they have been largely ineffective.⁴ Several institutions in the United States have implemented random drug testing in an effort to reduce this problem.¹¹⁻¹³ Results have indicated success.¹⁴

This survey is aimed to determine the perception of anesthesiologists and anesthesiology residents in Brazil about the prevalence of SUDs, the perceived impact on provider and patient safety, and their attitude towards the use of drug testing to reduce SUD among healthcare providers in anesthesia.

Methods

Ethical approval for this study was provided by the Institutional Review Board of Hospital Sírio-Libanês, in São Paulo, Brazil (CAAE 226224319.0.0000.5461. IBR Chairperson: Dr. Bernardo Garicochea. Date of approval: November 27th, 2019). Study protocol and questionnaire development started mid-2019, guided by the STrengthening the Reporting of OBServational studies in Epidemiology (STROBE) for cross-sectional studies and the Checklist for Reporting Results of Internet E-Surveys (CHERRIES) guidelines.^{15,16} Twenty people from different healthcare areas participated in the survey questionnaire validation process.¹⁷ An English version of the questionnaire was prepared, validated, and transcultural checked to be analyzed by a North American contributor (MGF), an expert on the topic. His comments were incorporated, translated to Brazilian Portuguese, re-validated, and re-checked for transcultural differences.

To build the Electronic Questionnaire (eQ), and to collect and manage data, REDCap, a secure, web-based software platform designed to support data capture for research studies was used.¹⁸ Conditional branching was utilized to make the eQ more intuitive. In questions where drug classes were alternatives (e.g., prescribed stimulants), examples were provided (e.g., methylphenidate). After eQ development, its usability and technical functionality were tested by asking a few anesthetists to use it (their answers were not inputted). Comments were incorporated, and a final version was piloted by the eQ team, after inspection from a third-part reviewer, not a member of the research team.

Social media was used for eQ publishing. Thus, snowball sampling technique was utilized. The eQ link was primar-

ily distributed using instant messages, mobile apps, and through social media channels, including WhatsApp, Telegram, Facebook, and Instagram. The survey link was also emailed to national experts in anesthesia research, and they were asked to share it with their anesthesia groups. There were two main distribution moments, sent on day 1 and on day 10. The eQ was opened for participation from January 16, 2020 to January 30, 2020. No incentives were offered, and participation was voluntary.

Approval of the electronic informed consent was mandatory for survey participation. Neither name, email address, nor other identifying information was collected to maintain anonymity. The questionnaire contained a total of 30 objective questions, plus one last box for comments. An answer time of approximately 3 minutes was estimated. Respondents could review and change their answers before final submission.

Considering a population of approximately 25,000 anesthesiologists in Brazil,¹⁹ confidence level of 95%, and a confidence interval of 5, a sample size of approximately 350 interviewees was estimated. Any anesthesiologist or anesthesiologist's resident living in Brazil were eligible to answer the questionnaire.

Statistics

Categorical data were considered as proportions. Differences between those with and without a personal history of substance use were assessed with a Chi-Square test. In the event of small cell counts, Fisher's Exact Test was employed. For all analyses two-sided *p*-values < 0.05 were considered statistically significant. SAS 9.4 software (SAS Institute Inc., Cary, NC) was utilized.

Results

Demographic results are included in [Table 1](#). The number of individuals participating in the survey was 1,295. Informed consent was accepted by 1,286 individuals, and 978 affiliated members of the Brazilian Society of Anesthesiology (SBA) completed the survey.

Respondent characteristics

Individuals indicating gender were equally split among male (642) and female (640) physicians. Nearly half of those responding were older than 40 years of age (44.6%) and in practice for more than 11 years (43.3%). Over half of those responding were from southeast Brazil (52.5%).

Knowledge of substance use among colleagues

A high number of individuals knew of at least one colleague who had abused a substance in order to change his/her mental status (*n* = 1053, 82.07%), and nearly half of those knew of 3-5 colleagues (*n* = 477, 45.34%). The most commonly identified substance was opioids (67%) followed by marijuana (52.3%). Sleep induction medications (e.g., zolpidem, antidepressants, and antipsychotics, but not propofol), when used in an abusive way, were indi-

Table 1 Respondent characteristics.

	Respondents	No personal history of substance use (n = 988)	Personal history of substance use (n = 295)	p-value
Affiliated member of the Brazilian Society of Anesthesiology (SBA)	978 (76.29)	769 (77.83)	209 (71.33)	0.02
Male gender	642 (50.08)	484 (49.04)	157 (53.40)	0.19
Age, years				< 0.0001
≤ 24	5 (0.39)	4 (0.41)	1 (0.34)	
25–29	152 (11.85)	99 (10.03)	53 (17.97)	
30–34	309 (24.08)	218 (22.09)	91 (30.85)	
35–39	245 (19.10)	190 (19.25)	55 (18.64)	
≥ 40	572 (44.58)	476 (48.23)	95 (32.20)	
Years practicing anesthesia after residency				< 0.0001
Current resident/trainee	184 (14.39)	124 (12.60)	60 (20.34)	
≤ 5	338 (26.43)	235 (23.88)	103 (34.92)	
6–10	203 (15.87)	163 (16.57)	40 (13.56)	
≥ 11	554 (43.32)	462 (46.95)	92 (31.19)	
Work region^a				
South	312 (24.43)	223 (22.73)	88 (29.83)	0.01
Southeast	670 (52.47)	513 (52.29)	157 (53.22)	0.78
Midwest	83 (6.50)	61 (6.22)	22 (7.46)	0.45
Northeast	180 (14.10)	155 (15.80)	25 (8.47)	0.002
North	38 (2.98)	33 (3.36)	5 (1.69)	0.14

Data is presented as n (%).

^a Respondents could select all that apply. Not all respondents are affiliated to SBA.

cated by 45.6%, whereas benzodiazepines were cited by 40% of responders (Table 2). Anesthetic agents (e.g., inhalational anesthetics, ketamine, and propofol) were reported by 38.3%. The majority of colleagues found to abuse substances were required to withdraw at least temporarily from professional activities (70.3%). Approximately half of those individuals either did not return to practice or returned but ultimately left practice. Nearly all individuals responding to the survey believed that SUD either jeopardized a physician's life (93.1%) or jeopardized patient care (88.2%).

Personal use of substances

Respondents were asked about their own personal use of substances. Two hundred ninety-five individuals acknowledged a personal history of SUD (23%). The most common substance of abuse was illegal recreational use of marijuana (43.2%) followed by sleep induction medications (e.g., zolpidem, antidepressants, and antipsychotics, but not propofol – 42.9%), and prescribed stimulants (e.g., methylphenidate – 36.4%). A high percentage of individuals acknowledged use of illicit substances during and after residency (41.52%) indicating that use during residency is likely to continue into independent practice (Table 3). The number of individuals that acknowledged illicit use of opioids was 4.4% (n = 13). Few individuals who acknowledged the use of substances took time away from practice (n = 8; 2.72%). Less than half of individuals that abused substances believed that they risked their own well-being (36.18%) or patient safety (23.81%) by their personal use.

Attitudes and personal experience regarding occupational drug testing

A very small percentage of anesthesiologists currently work in a practice or institution that performs drug testing (n = 17, 1.33%) but a higher percentage indicated that they had been subject to testing at some point in their career (n = 60, 4.68%). Random drug testing was acknowledged by 7 individuals. The vast majority of individuals responding to the survey indicated that they believed random drug testing could improve personal (82.83%) and patient (85.41%) safety but individuals that admitted to the use of illicit substances were significantly less likely to believe that random drug testing could improve their own safety or that of their patients (Table 4). Acceptance of pre-placement (pre-employment), random, and reasonable suspicion ("For-cause") drug test was endorsed by nearly 90%. A total of 244 individuals responded that they did not agree with drug testing. Cited reasons included violation of privacy (68.4%), knowledge that the presence of a substance does not mean a substance is being abused (43.4%), and the fear of false negative results (30.3%).

Discussion

The careers and lives of many anesthesiologists have been lost to SUD since the beginning of the specialty. Education and substance control have been largely ineffective and the incidence among trainees has continued to increase.^{2,4}

Table 2 Substance use^a by colleagues.

	Respondents	No personal history of substance use (n = 988)	Personal history of substance use (n = 295)	p-value
Known colleague substance use	1053 (82.07)	791 (80.06)	261 (88.78)	0.001
Number of colleagues known to use				< 0.0001
1–2	325 (30.89)	269 (34.05)	56 (21.46)	
3–5	477 (45.34)	357 (45.19)	119 (45.59)	
6–10	140 (13.31)	102 (12.91)	38 (14.56)	
> 10	110 (10.46)	62 (7.85)	48 (18.39)	
Substances utilized^b				
Illicit stimulants	339 (32.38)	237 (30.19)	101 (38.70)	0.01
Prescribed stimulants	382 (36.49)	222 (28.28)	160 (61.30)	< 0.0001
Anesthetic agents	401 (38.30)	311 (39.62)	89 (34.10)	0.11
Opioids	702 (67.05)	576 (73.38)	125 (47.89)	< 0.0001
Marijuana	548 (52.34)	364 (46.37)	183 (70.11)	< 0.0001
Benzodiazepines	420 (40.11)	283 (36.05)	137 (52.49)	< 0.0001
Sleep induction/Maintenance medications	478 (45.65)	314 (40.00)	164 (62.84)	< 0.0001
Other ^c	26 (2.48)	19 (2.42)	7 (2.68)	0.81
Time when use observed				0.001
Both during and after residency	571 (54.64)	408 (52.04)	163 (62.45)	
During residency	196 (18.76)	144 (18.37)	52 (19.92)	
After residency	278 (26.60)	232 (29.59)	46 (17.62)	
Colleague withdrawn from professional activities due to substance use	737 (70.26)	595 (75.60)	142 (54.41)	< 0.0001
Colleague returned to original professional activities				0.56
Yes	282 (38.37)	234 (39.39)	48 (34.04)	
Yes, needed to withdraw later	274 (37.28)	221 (37.21)	53 (37.59)	
Did not return	92 (12.52)	71 (11.95)	21 (14.89)	
Unknown	87 (11.84)	68 (11.45)	19 (13.48)	
Respondent believed their colleague might have increased their occupational hazard	979 (93.15)	757 (95.94)	221 (84.67)	< 0.0001
Respondent believed their colleague might have jeopardized patient safety	923 (88.16)	723 (91.87)	199 (76.83)	< 0.0001

Data is presented as n (%).

^a Note: Substance use is defined as ‘ever used or uses any substance with the potential of abuse to change mental status.

^b Respondents could select all that apply.

^c Other included alcohol, diethylpropion, crack, ecstasy, gamma-hydroxybutyrate, lysergic acid diethylamide, methamphetamine, fentanyl, toluene inhalation, lisdexamfetamine;

Nearly 20% of anesthesiologists fortunate to survive an initial diagnosis of SUD will die of their disease during their career.²⁰ Our national survey of anesthesiologists and residents in Brazil revealed several key findings. The first is that most individuals practicing anesthesia or in training know of a colleague who has abused substances (82%) and that a high percentage have recreationally used a substance at least once in their career (23%). A very high percentage of individuals believe that the use of substances with the potential of addiction is a threat to personal and patient safeties although this belief is less common among those that actually abuse drugs. Drug testing is uncommon in Brazil despite the belief that it would enhance provider and patient safeties.

The incidence of SUD among anesthesiologists in Brazil is unclear. Alves’ study of resident physicians in Brazil attending outpatient treatment for SUD revealed that anesthesiology and surgery were second only to internal medicine as the most involved specialties.⁸ The authors also demonstrated that anesthesiologists make up a far higher incidence of addicted physicians requiring treatment (approximately 20%) when compared to the numbers of practicing physicians (3–5% of physicians). Impaired anesthesiologists in Brazil are predominantly male, in their 30s, abuse opioids, and refer for care early due to pressure from colleagues or governing bodies.⁷

Individuals that have a personal history of SUD know more impaired colleagues than those that do not abuse

Table 3 Personal substance use^a.

	Personal history of substance use (n = 295)
Personal substance use (current or history)	295 (100.00)
Substances utilized ^b	
Illicit stimulants	55 (18.7)
Prescribed stimulants	107 (36.4)
Anesthetic agents	22 (7.5)
Opioids	13 (4.4)
Marijuana	127 (43.2)
Benzodiazepines	89 (30.3)
Sleep induction/maintenance medications	126 (42.96)
Other ^c	7 (2.4)
Time when used	
Both during and after residency	120 (41.52)
During residency	74 (25.61)
After residency	95 (32.87)
Respondent took time away from their professional activities due to substance use	8 (2.72)
Returned to professional activities	
Yes	6 (75.00)
Yes, required time away	1 (12.50)
Did not return	1 (12.50)
Respondent believed they increased their occupational hazard	106 (36.18)
Respondent believed they jeopardized patient safety	70 (23.81)

Data is presented as n (%).

^a Note: Substance use is defined as 'ever used or uses any substance with the potential of abuse to change mental status.

^b Respondents could select all that apply.

^c Other included mushrooms, ecstasy, lysergic acid diethylamide, marijuana, sertraline, and tramadol.

drugs (88.78% vs. 80.06%; $p = 0.001$). This may be due to social networks that contain more individuals that abuse substances. Opioids were the most commonly identified substance abused by a colleague (67.05%) reflecting prior studies in Brazil.⁷ The incidence of self-reported SUD was 23% in our study with illegal recreational marijuana being the most commonly abused illicit substance. Opioid use was reported by 1% ($n = 13$) of those surveyed and 4.4% of individuals that did use drugs.

Over 50% of those reporting a personal history of SUD were either current resident physicians or within the first 5 years after completion of residency similar to data reported by Alexander et al.²¹ This study did reveal that 31% of those with a SUD were in practice for over 11 years either indicating that anesthesiologists will develop a SUD years into practice or that many who entered recovery continued to successfully practice in the specialty. Most of the individuals known to abuse substances (70.26%) withdrew from professional practice at least temporarily. Over half of those that were discovered to have a SUD either never returned to the practice of anesthesia or returned and later withdrew. Under

the best of conditions recovery rates for addicted anesthesiologists, based upon 5 years of monitoring, is slightly over 70%.²² Recent data indicated a high projected rate (38%) of relapse within 30 years and a death rate of 19%.²⁰

Most, but not all, anesthesiologists in this survey believe that SUD increases risk for both the physicians as well as the patients being treated under their care. Individuals with a personal history of SUD though were statistically less likely to acknowledge the associated risk to care providers (84.7% vs. 95.9%; $p < 0.0001$) or patients (76.8% vs. 91.9%; $p < 0.001$). This apparently indicates that some physicians that abuse substances do not believe that there is the potential for self or patient harm. Physicians often avoid reporting incompetent colleagues due to a lack of confidence in systems, fears of retribution, lack of knowledge of reporting routes, and the notion that someone else is likely addressing the problem.²³

Physicians in this survey were questioned about their experience and attitude toward drug testing. Only 1.33% ($n = 17$) of surveyed individuals reported that their institution currently performs drug testing and less than half reported that random testing was a component ($n = 7$). A far higher number of anesthesiologists (4.68%; $n = 60$) had been subject to drug testing at some point during their career. This may reflect individuals that trained in international institutions that have drug testing or military facilities. Most anesthesiologists in this survey believed that random drug testing can be used to improve the safety of the individual anesthesiologist and patient, but those individuals with a history of SUD were significantly less likely to hold this view. Such individuals may believe that they can manage the condition themselves. Individuals may also believe that there are means to adulterate tests to avoid detection of a substance.

Anesthesiologists were questioned about reasons why they may disagree with drug testing and the most common notion was that testing was a violation of individual privacy and that the mere presence of a substance did not necessarily define impairment. Lemon et al. surveyed physician attitudes toward drug testing in 1992. Most physicians surveyed at the time believed that physician drug use was either a minor or non-existent problem, but the attitudes were similar to this study.²⁴ More than half (60%) believed that testing infringed on the physician's right to privacy but 87% would submit to testing if required by a hospital.

There are multiple weaknesses in this study. Individuals could access and open the REDCap link and answer the eQ more than once. Definitions of SUD are open to interpretation. The release of a survey via social media may attract more young physicians that are more media savvy, although almost 45% of those responding to the survey were over 45 years of age.²⁵ This may be due to the reluctance of early career physicians to complete the survey while more senior anesthesiologists may know of more colleagues that have suffered from SUD. The use of an electronic survey may have created some concerns regarding anonymity, although the platform used has clear-stated strict privacy rules. Finally, drug abuse-related subjects are sensitive topics, which may reflect in the fidelity of some answers.

Table 4 Testing characteristics.

	Respondents	No personal history of substance use ^a (n = 988)	Personal history of substance use ^a (n = 295)	p-value
Institution currently performs employment drug testing	17 (1.33)	7 (0.71)	10 (3.39)	0.0004
Testing timing ^b				0.16
Random	7 (43.75)	3 (42.86)	4 (44.44)	
Pre-employment	6 (37.50)	4 (57.14)	2 (22.22)	
For cause/ 'reasonable suspicion'	3 (18.75)	0 (0)	3 (33.33)	
Respondent believes that random drug screening can be used to improve safety for anesthesiologists/residents	1061 (82.83)	839 (85.18)	221 (74.92)	< 0.0001
Respondent believes that random drug screening can be used to improve patient safety	1095 (85.41)	869 (88.13)	225 (76.27)	< 0.0001
Respondent would accept pre-employment drug testing	1151 (89.71)	918 (93.01)	232 (78.64)	< 0.0001
Respondent would accept random drug screening	1137 (88.62)	911 (92.30)	225 (76.27)	< 0.0001
Respondent would accept a drug test if their performance was determined to be impaired	1137 (88.83)	884 (89.66)	252 (86.01)	0.08
Drugs respondent believes are important to be tested for ^{a,b}				
Illicit stimulants	976 (86.52)	772 (88.13)	203 (80.88)	0.003
Prescribed stimulants	415 (36.79)	350 (39.95)	64 (25.50)	< 0.0001
Anesthetic agents	932 (82.62)	713 (81.39)	218 (86.85)	0.04
Opioids	1083 (96.01)	840 (95.89)	242 (96.41)	0.71
Marijuana	636 (56.38)	527 (60.16)	108 (43.03)	< 0.0001
Benzodiazepines	583 (51.68)	473 (54.00)	109 (43.43)	0.003
Sleep induction/maintenance medications	374 (33.16)	308 (35.16)	65 (25.90)	0.01
Other ^c	34 (3.01)	28 (3.20)	6 (2.39)	0.51
Reasons to disagree with drug testing ^{b,d}				
Not effective	34 (13.93)	22 (14.97)	12 (12.37)	0.57
Risk of false-positive results	74 (30.33)	52 (35.37)	22 (22.68)	0.03
Cost	20 (8.20)	18 (12.24)	2 (2.06)	0.005
Lack of established guidelines	66 (27.05)	44 (29.93)	22 (22.68)	0.21
Presence of a drug does not define impairment	106 (43.44)	41 (27.89)	65 (67.01)	< 0.0001
Violation of privacy	167 (68.44)	99 (67.35)	68 (70.10)	0.65
Other	27 (11.07)	18 (12.24)	9 (9.28)	0.47
Personally, been subject to drug testing	60 (4.68)	43 (4.36)	17 (5.78)	0.31

Data is presented as n (%).

^a Only assessed among people who indicated they would accept drug testing (pre-employment, random, or performance-based) or believed it would improve safety (of either patients or healthcare workers).

^b Respondents could select all that apply.

^c Other included alcohol, anabolic steroids or performance-enhancing drugs, ecstasy, lysergic acid diethylamide, lisdexamfetamine, and zolpidem.

^d Only assessed among people who indicated they would not accept drug testing or did not think it would improve safety.

* Note: Substance use is defined as 'ever used or uses any substance with the potential of abuse to change mental status.

The community of anesthesia providers in Brazil is not spared of the diseases that are SUDs. Brazilian anesthesiologists do recognize that drug may place their health and the safety of the patient in jeopardy, but when acknowledging drug use, they are less likely to admit that they represent a risk to the patient. Drug testing is rarely utilized in Brazil but would be accepted by anesthesiologists despite concerns about testing. We believe that a more widespread survey of SUD in Brazil as well may reveal the scope of the problem of SUD and efforts to reduce the incidence. Drug testing is a potential tool in this fight, but proper research is critical to gain improved understanding.

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The study was funded by departmental resources.

Conflicts of interest

Professor Fitzsimons is the Chairperson of the American Society of Anesthesiologists (ASA) Substance Use Disorders Prevention Advisory Panel and leads the drug testing program in the Department of Anesthesia, Critical Care, and Pain Medicine at the Massachusetts General Hospital. De

Sousa, Muller, Quintão, and Simões declare that they have no conflict of interest.

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