

Self-reported substance use, in dental and oral hygiene students at a university in South Africa

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TK Madiba¹, V Mostert², LM Sykes³

ABSTRACT

Background

A recent study amongst South African dental students found that a number of them had perceived moderate to severe stress and as a result, some have resorted to stimulant drugs.

Aim

The aim of the study was to assess substance use by dental and oral hygiene students at a university in South Africa.

Design

A cross-sectional design was used and all dental and oral hygiene students registered in 2019 at a university in South Africa were asked to participate.

Materials and Methods

A pretested, validated self-administered questionnaire was used to achieve the aim. The objectives were to identify which substances were used, where they were obtained, frequency and reasons for use, as well as the self-perceived benefits and side effects experienced. Data was analysed using SPSS version 27. The data was confidential and anonymity was ensured.

Results

A total of 303 (88%) agreed to participate with ages from 17 to 36 years and a mean of 22.3 years. Over two thirds 206 (67.9%) used substances. Almost half of the group

(44.6%) took one product, 16.5% took two, and 7% consumed between 3 and 5. The sources of substances ranged from peers, friends, acquaintances and pharmacies. Nearly twenty percent of the students used caffeine products, energy drinks, and methylphenidate. Almost 10% used anti-anxiety pills and anti-depressants whilst just above 11% used natural boosters and multivitamins. More than half of the students used the substances to stay awake and improve marks and 45(22%) of the users struggled to stop.

Conclusions

Over two thirds of students used substances, with almost half using one substance. There were multiple sources of substances. More than half of the students used them to stay awake and improve marks.

Key words: Stimulant drugs, methylphenidate, stress, academic performance.

BACKGROUND AND LITERATURE REVIEW

Dental students worldwide are experiencing increased pressure to cope with both their academic requirements and passing the theoretical component of their course, as well as the long clinical hours needed to achieve practical competence. Other stressors originate from insecurities felt when treating patients, negative instructor feedback, having to empathize and work on anxious patients who may also be in pain, being unable to treat all of those on the long waiting lists, and not being able to provide all patients with complex treatments due to system regulations or financial constraints. Additional stress, in some cases, is caused by emotional and personal issues as well as the financial strains of funding their studies.¹

Both local and international literature is replete with information about the stress perceived by dental students.²⁻⁴ Abbasi et.al. identified and reported on the high stress levels amongst dental students when compared to medical student peers.⁵

They commented that negative stress occurs when pressure is more than the person (student's) capability resulting in apprehension, insecurity and guilt which has a negative psychological impact.⁵ A recent study amongst South African dental students found that a number of them who had perceived moderate to severe stress had contemplated suicide, and many were being treated for depression.⁶ Other researchers discovered that some health science students have resorted to the use of

Author affiliations:

1. Prof Thomas K Madiba: *B.Dent Ther, BDS, DHSM, MChD (Community Dentistry)*, Department of Community Dentistry, School of Dentistry, University of Pretoria, Pretoria, South Africa. ORCID: 0000-0002-0171-0595
2. Dr Vanessa Mostert: *BChD*, Department of Prosthodontics, School of Dentistry, University of Pretoria, Pretoria, South Africa. ORCID: 0000-0003-4159-5699
3. Prof Leanne, M Sykes: *BSc, BDS, MDent, IRENSA, Dip Forensic Path, Dip ESMEA*, Head of Department of Prosthodontics, University of Pretoria, Pretoria, South Africa. ORCID: 0000-0002-2002-6238

Corresponding author:

Prof TK Madiba

Email: thommy.madiba@gmail.com

Tel: (012) 319-2417

Cell: 0845036175

Author contributions:

- | | |
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| 2. Vanessa Mostert | 33% |
| 3. Leanne Sykes | 32% |

stimulant drugs to enhance their academic performance or as a mechanism for coping with the pressure of their full schedules.⁷ The drugs used by these students are often obtained from peers or acquaintances, and they are often unaware of the dangers and possible adverse effects of the medication or of drug interactions.

The use of stimulants to enhance academic performance has attracted much attention in the media in recent years. A study undertaken on medical students at a South African University revealed that 68% of the 53 students used methylphenidate (MPH) for academic purposes.¹ Bhayat and Madiba in a recent (2017) study on dental students found that 45% of respondents were identified as having felt moderate stress and 42% severe stress.⁶ They also noted that 13% of respondents used recreational drugs and 3% contemplated suicide as a coping mechanism.⁶

A recent worrisome newspaper article on illegal prescription drug trade at the University where this study was carried out prompted this investigation.⁸ Two schedule six drugs, Ritalin and Concerta, the highest legally scheduled drugs available in South Africa, were reported to have been illegally advertised on student WhatsApp groups and had been sold to students over the past 18 months. The perpetrators were aware of the fact that their action was illegal, but felt justified in selling as they said they were helping the many students who were suffering from depression. In addition, it served as a good source of income for them.⁸

Substance use by students

The active ingredient of Ritalin and Concerta namely MPH, is listed in the South African Drug and Drug Trafficking Act Part II as a Dangerous Dependence-Producing substance and classified together with Opium and Morphine.⁹ A person who is caught using this without it being medically prescribed could be sentenced to 15 years in prison, and up to 20 years for dealers.⁸

Methylphenidate was first produced in 1944 and marketed by Ciba-Geigy Pharmaceutical Company as Ritalin. It was initially prescribed for conditions such as depression, chronic fatigue, and narcolepsy, however its use today is mainly limited to treating attention-deficit hyperactivity disorder (ADHD) in children ages 6 – 16 years.^{8,9} Ritalin acts much like cocaine through its calming effect on the brain.¹⁰⁻¹² It does so by enhancing the uptake of the neurotransmitters, dopamine and noradrenaline in the areas of the brain which control hyperactivity.^{11,13-14} Studies have also shown MPH to help increase a person's ability to perform complicated memory-associated tasks^{10,15} Others reported its benefits in helping narcoleptic patients to stay awake.¹⁶

Both of these effects could account for reasons that students use it when studying.¹⁷ They may also take it to counteract the side effects of other ill-disciplined behaviour such as late night partying and heavy alcohol use in order to stay awake in sessions the next day.¹

Unfortunately, the off-label use of MPH has not been limited to enhancing academic performance, but is also

being taken for recreational purposes, and at times, in combination with other substances to produce euphoria.⁷ However, it often also has adverse effects such as hallucinations, anxiety, xerostomia and visual disturbances.¹⁸ More alarming is that if incorrect doses of the drug are taken or if it is suddenly withdrawn, it can result in severe depression, altered sleep patterns and a risk of cardiac failure or seizures.¹ Another cited danger of Ritalin use is hindered brain development.¹⁹ The study by Mc Neil et al. reported that 87% of students who used stimulant medication like Adderall for non-medical reasons sourced it from friends and 80% reported having adverse reactions when taking the medication.²⁰ For this reason it is imperative that students are made aware of the consequences of the use of MPH and similar substances as well as the added dangers of drug interactions if taken in conjunction with other medication or performance enhancing substances.

To date there are few studies that examined the level of use of performance or mood enhancing substances, also referred to as "smart drugs" amongst dental students. As far as the authors could ascertain no study of this nature has ever been carried out at their home institution, and only few others had been conducted in the other South African dental schools. The aim of the study was to assess substance use by dental and oral hygiene students at this dental school in Gauteng. Specifically, to identify which substances were used, where they were obtained, frequency and reasons for use, as well as the self-perceived benefits and side effects experienced by the students after taking them.

METHODOLOGY

Ethical approval was obtained from the University, Faculty of Health Sciences Ethics committee (Ref 722/2019). Respondents were assured that all information was to be kept strictly confidential, and anonymity was guaranteed. Due to the nature of the study, contact information for the university counsellors was also given to the students in the event that they identified a need to seek professional help.

A cross-sectional study using a modified, validated, self-administered questionnaire was conducted on all consenting dental and oral hygiene students at a university in South Africa.^{1,7}

The questionnaire inquired about substances or stimulants use, number and names of the products being taken, frequency of use, amounts taken, history of use, where the products were obtained, reasons for use, benefits as well as side effects experienced, and whether they had tried or wanted to stop using them. All dental and oral hygiene students from the first to the final year of study who were registered in 2019 were invited to participate in the study.

There were 302 dental students and 41 oral hygiene students registered (total of 343 students). Based on the population of 343 students, a confidence interval of 95%, and an error margin of 5%, a minimum sample size of 170 was deemed a representative sample. Data was analysed with SPSS Version 27 using

descriptive and analytical statistical tests. The level of confidence was set at 95% with the level of significance of $p < 0.05$.

RESULTS

Of the 343 registered students, 303 (88%) agreed to participate. The ages ranged from 17 to 36 years (mean 22.3 years; $SD \pm 3.2$) and two thirds (66%) were between 20 and 24 years old.

Out of the 303 students who participated, less than a third 97 (32%) reported to not using any substances, while over two thirds 206 (67.9%) were taking at least one. Almost half of the group (44.6%) only took one product, 16.5% took two, and 7% consumed between 3 and 5 (Table 1).

Almost half of the students who used substances 100 (49%) were daily users, followed by occasional users at 69 (33%), with no students reporting a once off use (Table 2). The sources cited for acquiring the substances were from "other sources / suppliers" 33 (37%), friends, peers and acquaintances 20 (8.5%), from pharmacies with a prescription 64 (31%), from pharmacies and supermarket dispensaries over the counter 36 (17.5%) and from family members 5.3% (Table 2).

Substances used were then categorised into classes

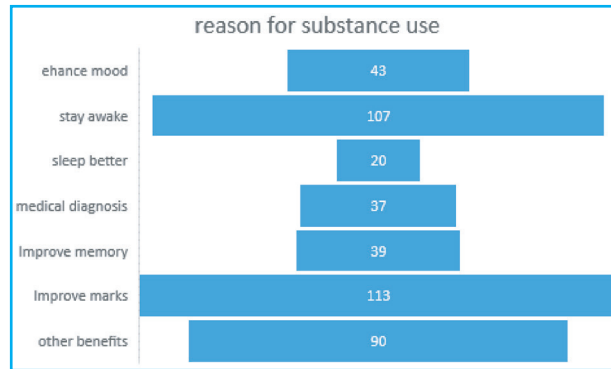


Figure 1. Reasons for use of substances / perceived benefits n=206

according to the various names the students gave to identify each product taken. Some of the students gave the class of the substance used without naming them, and hence those were classified as unspecified (Table 3).

The substances used ranged from alcohol, anti-anxiety pills, antidepressants, natural boosters (mainly vitamins), and caffeine products including tea and coffee, tobacco products and tranquillisers. Nearly twenty percent of the students used caffeine products, energy drinks, and methylphenidate. Almost 10% used anti-anxiety pills and anti-depressants whilst just above 11% used natural boosters and multivitamins. Almost 4% specifically mentioned using marijuana, Ritalin or Concerta as examples.

More than half of the students using substances used them to stay awake and improve marks 107(51.9% and 113(54.9%) respectively. About forty percent used them for other unexplained benefits 90(43.7%). Just above 18 % of students, used them for medically diagnosed conditions and to improve memory. Some of the students used them as mood enhancers 43(20.9%), and nearly 10% of the students used them to sleep better (Figure 1).

The majority of respondents experienced headaches

Number of substances	Number of students	%
0	97	32
1	135	44.6
2	50	16.5
3	12	4
4	8	2.6
5	1	0.3
Total	303	100

Variable	Frequency	n (%)	Variable	Sources	n (%)
Frequency N=206	Once off	0 (0)	Sources of substances n=206	Other sources	77(37)
	Occasionally	69(33)		Acquaintances	8(3)
	Daily	100(49)		Friends	9(4)
	Weekly	26(13)		Peers	3(1.5)
	Monthly	2(1)		Prescription	64 (31%)
	Monthly	2(1)		Over the counter	36(17.5)
			Family	11(5.3)	

Substances	n/(%)	Substances	n/(%)	Substances	n/(%)
Alcohol	11(5.3)	Caffeine	38(18.4)	Weight loss products	1(0.5)
Analgesics	3(1.5)	Energy drinks	36(17.5)	Tranquillisers	5(2.4)
Anti-anxiety medication	16(7.8)	Methylphenidate	34(16.5)		
Anti-depressants	20(9.7)	Natural de-stressors	3(1.5)		
Anti-psychotics	2(1)	Tobacco products	13(6.3)		
Boosters/ vitamins	24(11.7)	Unspecified	81(39.3)		

51(25%) followed by loss of appetite 49 (24%), anxiety 44 (22%) and xerostomia 43(21%). Close to a third had either experienced palpitations, weight loss or drowsiness [29 (14) %, 27 (13) % and 26 (13) % respectively], others reported to have suffered from depression 25(12%), nausea and vomiting 21(10%), chest pains 14(7%), memory loss 13 (6%) and abdominal pain 6 (3%). Forty-five (22%) of the users confessed that they had tried, but struggled to stop using the substances (Figure 2).

DISCUSSION

The high response rate of 88% was welcomed in terms of strengthening the validity and relevance of the data obtained. This could have been attributed to the fact that the questionnaires were handed out during lecture periods, which were compulsory at the time of the study. It is a concern that over two thirds of the students are using at least one memory or performance enhancing substance, with 31% obtaining their supplies with prescriptions.

This number was much higher than the findings of Mc Neil et al. who found only 12% of the dental students using prescription medication.²⁰ However their study did not consider non-prescription substance use which accounts for the disconcerting finding of 67.9% of the current study's cohort, and is perhaps a more worrying phenomenon. At the same time, their investigation was carried out almost 10 years ago. Bhayat and Madiba in 2017 investigated stress levels amongst dental students at the same institution as the current study and reported that 45% of the respondents felt moderately stressed and 42% were severely stressed.⁶

The present study also found that almost half of the respondents used substances on a daily basis and most did so in order to improve their marks, stay awake and to gain other personal benefits. They also used these substances despite the fact that they are students in the health care sector and as such should be aware of the associated risks. Furthermore, more than half of them experienced many adverse side effects, most notably headache, loss of appetite, xerostomia and depression. Yet despite this, they chose to continue with their habits with less than one fifth of them having reportedly tried to quit.

There are also a number of additional unsubstantiated issues to consider. It is also possible that students under-reported their consumption patterns of substances due to them knowing about the harmful health effects and / or their illegal acquisition. Response acquiescence is common among questionnaires that investigate habits that are considered taboo or have negative connotations. This study also did not consider substances used in other "non-oral" forms, such as nasal inhalation or intravenous injections. Neither did it elicit the actual dosages or volumes of the substances used, which could vary widely between different products and students.

Subsequent to undertaking this investigation the world met with the year 2020 and Covid-19. This pandemic, along with the ensuing social isolation, class size and number restrictions, limited university access, and reliance on distance learning has had dire negative

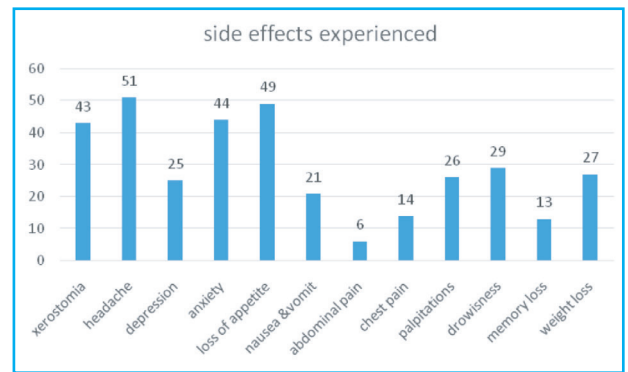


Figure 2. Side effects experienced by students from substance use. n=206

consequences on education in general, and dentistry in particular. While it has been possible for educators to adjust and tailor their didactic input to suit the "new normal" situation, it was virtually impossible to teach the manual skills associated with this profession. Many students also struggled to access the digital platform due to personal limitations with technology, finances or internal abilities. They also experienced extreme anxiety and fear that they would not be able to develop the necessary skills and confidence needed to enter the clinics, nor to have the time and capabilities to achieve the requisite clinical quotas. The added social isolation left many without peer or academic staff support, and no doubt could have added to their feelings of being alone in their plight.

CONCLUSION

This study revealed high levels and frequency of substance use amongst dental and oral hygiene students, which must be seen as a concern for dental educators. It may now be the opportune time to reflect on the current curriculum and see where the "old school shibboleths" can be removed to accommodate replacement with the new and ever-increasing technological advances. It is also crucial to introduce more structured life-orientation courses to equip students with the necessary emotional and mental aptitude needed to deal with stressors associated with their studies as well as those they may anticipate in their future careers.

The findings of this study, along with the background of the last 2 years, almost make it obligatory for educators to conduct a similar study with the present cohort of dental and oral hygiene students. It will then be interesting to compare the results of substance use and acquisition, as well as elicit if the students have developed other positive or negative stress management and coping strategies.

Limitations

This study is limited by the cross-sectional study design, and causality cannot be inferred. The study did not collect information on gender, race, residence, or socio-economic demographics. A further limitation was that the results were pooled and not analysed separately for each course or level of study. The latter may have been useful in order to compare substances use between the classes. Despite these restraints, the study provided useful information that may inform future health

promotion approaches, and introduction of more courses offering life-orientation and coping skills at the institution.

Conflicts of interest

The authors declare that there are no conflicts of interest.

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