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Australian university students' attitudes towards the use of prescription stimulants as cognitive enhancers: perceived patterns of use, efficacy and safety

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Abstract

Introduction and Aims

Recent, high profile articles in leading science journals have claimed that the enhancement use of prescription stimulants is a common practice among students worldwide. This study provides empirical data on Australian university students' perceptions of: (i) the prevalence of prescription stimulant use by their peers for cognitive enhancement; (ii) motivations for such use; (iii) efficacy; and (iv) its safety.

Design and Methods

Participants were 19 Australian university students with an average age of 24 who were recruited through emails lists, notice board posters and snowball sampling. Semi-structured interviews were conducted during 2010 and 2011, recordings transcribed and responses coded using thematic analysis.

Results

Participants typically did not believe the use of stimulants for cognitive enhancement was common in Australia. Perceived motivations for use included: (i) 'getting ahead' to perform at high levels; (ii) 'keeping up' as a method of coping; and (iii) 'going out' so that an active social life could be maintained in the face of study demands. Australian students were generally sceptical about the potential benefits of stimulants for cognitive enhancement and they identified psychological dependence as a potential negative consequence.

Discussion and Conclusions

This study is an important first step in understanding the use of stimulants for cognitive enhancement in Australia, amid calls for more widespread use of cognitive enhancing drugs. It is important to conduct further studies of the extent of cognitive enhancement in Australia if we are to develop appropriate policy responses.

Introduction

National surveys of US college students have found that the annual prevalence of non-medical prescription stimulant use is between 3% and 6% [1-4]. Users are more likely to report higher rates of other drug use (including alcohol), report lower grades and live in a fraternity [2, 3]. Although many surveys do not explicate the reasons for this non-medical use, a number of studies have shown that prescription stimulants are used non-medically for recreation or to 'get high' [5, 6] or perhaps as self-treatment [7]. Qualitative interviews and other large-scale surveys have also shown that some healthy US university students use stimulants (such as Ritalin and Adderall) without a prescription with the intention of improving their alertness or concentration when studying, or improving their grades (termed 'cognitive enhancement', or CE) [4, 6, 8-10]. Recent, high profile articles in leading science journals have claimed that the enhancement use of prescription stimulants is a common practice among students worldwide [11]; however, media portrayals of the benefits and prevalence of neuroenhancement appear to be overstated [12].

A recent survey with members of the Australian general public found that only 2.4% had ever used a prescription drug to enhance their concentration or alertness, despite not having a diagnosed disorder—a further 8% knew someone who had done so [13]. Prevalence among those aged 18–34 was higher (6.2%); however, there are currently no data on the prevalence of enhancement psychostimulant use among Australian students or on their attitudes towards such use. This is an important gap in knowledge because the rate of stimulant prescribing in Australia has increased dramatically over the last decade [14], increasing the potential for these drugs to be diverted. It is important to examine the attitudes of Australian students if we are to have a comprehensive understanding of CE and develop appropriate policy responses.

Franke et al. found low levels of non-medical stimulant use for CE among German students and pupils, and although 80% said they would consider using drugs for CE, it was on the condition that it was safe and non-addictive—tellingly, 95% of students thought that currently available drugs for CE could lead to addiction [15]. US and Canadian studies indicate that many students are aware of the use of prescription stimulants for CE or as a 'study aid' [16]. For example, a qualitative study of Canadian students, parents and health-care providers found that over 75% were familiar with the practice of using methylphenidate (Ritalin) for CE and US students who had used prescription stimulants for CE viewed the practice as widespread and normal [9, 16]. Perceptions of why students engage in the use of stimulants for CE vary [17]. Canadian students paradoxically viewed the practice as a matter of personal choice, but also the result of social pressure to succeed [16]. A US study found that first-time users of stimulants for non-medical reasons reported academic stress and anxiety as their primary motivator, supported by reports from friends that these drugs were highly effective as a study aid [9]. Focus groups with parents, health workers and students have highlighted the concerns that some stakeholders have about the side-effects of drugs, such as methylphenidate, including the effects of long-term use and the risks of use without medical supervision [18]. However, users may perceive the risks to be low, as one survey of fraternity members in the USA found that 89% believed stimulants were either 'not dangerous at all' or only 'slightly dangerous' [10].

This paper is an exploratory qualitative study of the extent to which Australian university students are familiar with the use of prescription stimulants for CE. It also examines the perceived motives for students to use prescription stimulants for CE, as well as the safety and effectiveness of such behaviour. Using individual interviews, we explored perceptions about:

The prevalence of use of prescription stimulants, such as Ritalin, for CE among Australian students.

Patterns of use of prescription stimulants, and reasons for use.

Efficacy of prescription stimulants for CE.

Safety of using prescription stimulants for CE.

Methods

Sample and recruitment

Participants were 19 Australian university students (15 female and 4 male) with an average age of 24 (ranging from 18 to 31). The study was advertised via emails lists within a large metropolitan Australian university, notice board posters and snowball sampling. Recruitment ceased once data saturation occurred. Data saturation occurs when there are no new themes emerging from the interviews. No incentives were given for participation in the study. Ethics approval was granted by the University of Queensland ethical review committee and all participants gave informed consent to participate in the study.

Procedure

Semi-structured interviews with participants were conducted between 2010 and 2011 by one member of the research team. Interviews lasted between 30 and 45min. Prior to commencement of the interview, participants were given an information sheet describing the aims of the study. To prompt discussion, participants were read a short newspaper article about the use of Ritalin as a study aid and were provided with a vignette describing the use of Ritalin as a study aid (participants in a study by Forlini and Racine [16] also read media articles to aid their discussion of the topic) (see Box 1). Ritalin was used as an example because it is a well-known prescription medicine in Australia which commonly features in media reports.

Box 1. Box 1.Cognitive enhancement scenario discussed in interviews

Sam is studying for final exams but is having difficulty concentrating on the work. Sam complains to a friend about feeling under pressure and finding it difficult to study. The friend suggests that taking some Ritalin might be helpful and offers Sam some from their own supply. Sam takes the Ritalin and finds that it is easier to concentrate for longer. It feels as though the study is more efficient and Sam doesn't feel as anxious about the exams. Sam takes the exams and gets an overall 'Distinction/7' grade which is slightly better than Sam's usual 'Credit/5'.

The interview schedule focused on attitudes towards the non-medical use of prescription stimulants by healthy students for the purposes of aiding study. Questions were open-ended so that participants were not constrained in their responses and, where appropriate, the interviewer prompted interviewees for more information about their attitudes. Topics included attitudes towards the practice of CE and its prevalence, who was likely to use prescription stimulants in this way and why, and attitudes about efficacy and safety. After reading the article and vignette, participants were asked questions such as: What is your reaction to this story? Have you heard of similar reports? Do you think the use of Ritalin or other drugs for study is common among students at university in Australia? Do you think it is ok? Are you aware of any other substances that students take to help them study? Has Sam (student in vignette) done the right thing? Why/why not? Do you think students who take

Ritalin to help them study will do better in their exams than students who do not? Do you think there are any risks? Do you think it is fair that some students might take drugs like Ritalin?

Participants were not asked to disclose their own use of prescription stimulants in order to encourage free discussion of the non-medical use of prescription stimulants without being concerned about how their own behaviour may be viewed.

Coding and analysis

All interviews were transcribed verbatim and analysed using QSR NVivo software (Doncaster, Australia) version 9. Each participant's responses were first coded by one member of the research team according to four domains: (i) prevalence of stimulant use for CE; (ii) patterns of use—who engages in CE, when and why; (iii) efficacy of using of Ritalin for CE; and (iv) safety of using of Ritalin for CE. Coded segments of data ranged from single sentences to whole paragraphs. A second member of the research team then read through the interview transcripts and domain codes in order to check that data had been coded in its most suitable domain—any proposed changes were discussed and agreed upon.

Two members of the research team then independently and collectively examined the data within each domain to highlight the common subdomains. At this point we separated the 'Patterns of use' domain into three new subdomains titled 'When are prescription stimulants used', 'Motivations for use' and 'Other factors affecting use'. In order to come to the best understanding of the data, this data was then discussed by three members of the research team and underwent several revisions as the research team reached a consensus. This process was repeated for additional core themes, including prevalence, efficacy and safety.

Results

The themes that emerged from the interviews are presented in Table 1. Based on the recommendations of Hill et al. [19, 20], we have used the following labels to describe the frequency of each theme emerging from each domain: (i) 'General' applies to a theme expressed by all participants, or all except one (in this study, 18 or 19 participants); (ii) 'Typical' refers to more than half the participants up to the cut-off for 'general' (10–17 participants); and (iii) A 'variant' theme applies to a minimum of three participants and up to half of the sample (three to nine participants). Themes that were expressed by two participants or less are not reported in this paper.

Table 1. Domains, themes and frequencies emerging from analysis of attitudes towards CE
 Domain and subdomains Theme Frequency
 Nineteen cases total. General, 18–19 cases; Typical, 10–17 cases; Variant, 3–9 cases. CE, cognitive enhancement.

1. Prevalence of prescription stimulants for CE	Prescription stimulants for CE is uncommon	Typical
	May increase in the future	Variant
	Prescription stimulants for CE is common	Variant
	Perception of prevalence depends on circle of friends	Variant
2. Patterns of use		
2a. When are prescription stimulants used for CE	Exam time	Typical
	Before assignments	Variant

2b. Factors affecting use of stimulants for CE Common in circle of friends Variant

High achiever Variant

Low achiever Variant

Use other drugs Variant

2c. Motivation for using stimulants for CE Cram General

Keeping up/coping Typical

Getting ahead Variant

Going out Variant

3. Efficacy of Ritalin for CE Improves alertness/concentration Variant

Efficacy depends on the individual Variant

Unlikely to change overall grade Variant

Good grades the result of hard work Variant

4. Safety Some side-effects General

Risk of psychological dependence or addiction Typical

Mental health issues Variant

Sleep disturbance Variant

Prevalence of use

The use of prescription stimulants (such as Ritalin) by healthy students in Australia for CE was typically thought to be uncommon, if it occurred at all:

I wouldn't say it's common, but it still happens.

I definitely think it's rare at the moment.

One participant said that they had not heard of anyone using Ritalin to help them study, but they were aware of its use as a recreational drug:

No, I haven't heard of it here. Not for studying purposes anyway. I know people take it at parties but I've never heard of it being used in the study arena.

In comparison, most participants reported that caffeine and energy drinks were commonly used by healthy students to enhance alertness while studying. A variant theme was that the prevalence of prescription stimulant use for CE may increase in the future. One participant specifically pointed to the increased prescribing rate of stimulants for attention deficit-hyperactivity disorder (ADHD) as a potential cause of future increases in use, as this could create more potential for these drugs to be diverted:

I think it's a possibility that it may become more common, because I think ADHD is becoming over-diagnosed so Ritalin is being prescribed more and as they get older they have greater access to it ... in 10 years it could be a problem.

In contrast to this typical view, a variant theme expressed by some participants was that the use of stimulants for CE was a common practice among students in Australia. One participant stated:

I can't believe they are picking up about it in 2010. I've known about it for many years. And it is quite common.

However, another variant theme was that a person's perception of the prevalence of CE is likely to be influenced by how common the practice is among their own group of friends. For example, one student who perceived CE to be uncommon said:

I haven't really been exposed to that many people that have taken it for study ... it really depends on the circle of friends.

Another claimed that stimulant use for CE was likely to be highly prevalent only in 'certain pockets' of friendship groups where it is regarded as acceptable.
Who uses stimulants for CE, and when?

Participants typically thought that those who use prescription stimulants for CE do so during exam periods to help study. A variant of this view was that the CE use of prescription stimulants occurred intermittently throughout the semester when students had an assignment due. Several variant themes emerged about factors affecting one's likelihood of using prescription stimulants for CE. Participants thought that a student's normal level of achievement may influence the attractiveness of stimulants as a study aid. Some thought that students who already have low grades are the most likely to engage in or try CE, while others perceived CE as a practice defining 'high achievers'.

Motivations for using stimulants for CE

A general theme was that prescription stimulants are used to 'cram'—that is, complete a large amount of work before a deadline. Our participants perceived three other broad motivations for using stimulants in this way:

1. Cognitive enhancement to 'get ahead': high performance and pressure to succeed
Maintaining a high level of academic achievement was highlighted as a potential reason for stimulant use for CE. A variant theme was that CE is an assertive action that some already high achieving students take to succeed, or as one participant said, 'It's the people staying ahead that seem to have the advantage and that's the mentality that everyone's got'. In this way, motivation to engage in CE was couched in the language of competition. This was further evidenced by participants who said that job market competition was a strong motivator for getting good grades and this in turn motivated the use of study aids:

There is the element of competition. There are only a limited number of jobs at the end and the high achievers get the best spots.

2. Cognitive enhancement to 'keep up': a method of coping

There was also a typical view that university study is highly stressful and that the use of prescription stimulants may be an attractive mechanism for coping with stressful tasks, such as exams. As one participant said:

Exams are stressful. When people get stressed, they will do anything in order to achieve the marks they need to achieve.

Some of these participants thought that using a drug facilitating long periods of work would be highly attractive when 'cramming' at the last minute. However, cramming was often seen as the sign of a disorganised student who was in danger of falling behind. In this sense, rather than being something to 'get ahead', taking stimulants was perceived to be a practice more

likely to be engaged in by students who needed to 'keep up'—use of stimulants to help study was thought to be the domain of students who wanted to do well but were having trouble coping with the stresses of their degree.

3. Cognitive enhancement to 'go out': a way to maintain an active social life

Another variant theme was that prescription stimulants may be a tool used by individuals who are socially active and want to get more work done in less time, to (in the words of one participant) 'have more of a social life during the semester'. Some of our participants said that prescription stimulants may be used to help rush through academic work so that social/recreational engagements are not impinged upon. This is not the same as using prescription stimulants 'recreationally' to get high. Some participants discussed the difficulty that some students had in balancing an active social life with study and work requirements. For example, one participant said students typically 'curtail their social lives to help them concentrate, rather than trying to have everything'. However, some people simply placed greater importance on an active social life while wanting to fulfil the requirements of their study. In this way, stimulants were seen as a potential way of cutting down the time needed to devote to study:

If you are really battling, or you want to keep your social life and get through or work and everything then [Ritalin] would help you be superhuman, well not super human but you would need less sleep, in which case you could get a lot more done.

Efficacy of using stimulants as a study aid

Four variant themes emerged about the efficacy of using Ritalin as a study aid. The first was the perception that Ritalin increased alertness or concentration while studying. The second variant theme was that the effects of Ritalin were highly dependent on the situation and the student. For example, one participant said:

Just because you are staying awake when you otherwise might feel a bit tired, it's not necessarily [that you] just take the drug and fantastic things will happen. It's different from person to person and it's different depending on what your study requirements are.

Some students said that inflated confidence from taking the drug may be the real cause of any improvements, the size of which depended on a person's baseline level of intelligence, aptitude, alertness or memory. A third variant theme was that even if some students experienced increased alertness or concentration, Ritalin was unlikely to produce large improvements in a student's overall grade. For example, one participant said 'It's not going to take a pass student to an HD [high distinction] over night. I think it takes more than that'. A fourth, related, variant theme was that good grades were primarily the result of hard work, good time management and organisational skills. These participants suggested that a healthy, balanced approach to study may be of more help than taking stimulants. Many doubted that using stimulants would significantly improve the grades of a student who had not been organised or not worked hard in preparation for an exam. For example:

Being disorganised is a huge hurdle to overcome and I don't know how much Ritalin would actually help you, it's not going to solve the problem, so I don't really think it's going to help that much.

Safety and side-effects

Participants recognised that there are times when students may need a boost in their alertness, but they were generally hesitant to support long-term use of Ritalin as a study strategy to achieve this goal. A general theme was that using stimulants as cognitive enhancers would have at least some side-effects that many participants thought would vary from person to person. For example, one student said ‘medicines affect different people in different ways, you can't just say, take this pill and this will happen, because everyone's body is different’. The most severe side-effects believed to be more of an issue for long-term users included mental health issues and sleep disturbances. A typical theme was that frequent use carried the risk of addiction or psychological dependence on the drug, for example:

... your body wasn't necessarily craving it but I think always in the back of your mind when you went to do a test you'd be thinking maybe I should take some Ritalin, it worked well last time.

Discussion

We found that participants typically thought the use of prescription stimulants for CE was not a common practice among university students in Australia. These perceptions would fit with recent data from members of the Australian general public indicating the lifetime prevalence of using prescription stimulants for CE is fairly low, even among those aged 18–34 [13]. In addition, although our participants thought some people may use these drugs to increase their alertness or concentration, these benefits were thought to be highly variable. Many doubted that healthy students could significantly improve their overall grade by using prescription stimulants as a study aid. They generally thought that prescription stimulants had side-effects that may vary from person to person, but could include sleep disturbances, mental health issues and addiction/dependence. Although this was a preliminary study that explored perceptions of prevalence, attitudes and perceived motivations (rather than actual behaviour and motivations of users themselves), it is an important first step in gauging the nature of the phenomenon in Australia, where there has been no evidence base for approaching the topic, and to build a comprehensive investigation of this form of illegal drug use.

The overall perceptions of our participants differ from some US and Canadian studies in which students believed that stimulant use for CE was more common [10, 16] and some of whom described stimulants as ‘a miracle study drug’ that helps you to get ‘better grades’ and do ‘well on tests’ [7, 9]. Our study highlights the importance of conducting culture-specific research in this area. Much of the discussion surrounding the non-medical use of prescription stimulants has been based on studies of US college students, and these findings may not be applicable to other countries. There has been a considerable amount of recent enthusiasm for CE among neuroscientists and bioethicists—this includes proposals to relax the laws that prohibit use of stimulants without a prescription in order to facilitate more widespread CE [11], as well as professional guidelines that condone the prescription of ADHD or Alzheimer's medications to healthy people for CE [21]. However, this enthusiasm typically assumes that the benefits of CE are clear and substantial, that the risks can be easily managed, and that the practice is already widespread. It is not appropriate to make global recommendations about the use of prescription drugs for CE based primarily on the US experience. Our participants were uncertain of the benefits of using prescription stimulants for CE, and envisioned some risks. The media, academics and clinicians should be careful not to inflate the potential benefits of CE, exaggerate its prevalence or gloss over the risks [12, 22].

We did find a small number of participants who claimed that the enhancement use of stimulants was widespread among Australian university students, and others suggested that the practice of CE might become more common in the future in Australia. It would be worthwhile conducting large-scale surveys with representative samples of students in Australia to explore the extent of use; whether some groups of students do indeed have higher rates of usage; and whether there are misperceptions about prevalence. A small number of our participants suggested that use may be higher in certain ‘pockets’ of friendship groups where the practice is seen as normal and acceptable. It would be worth following up this perception. McCabe [1] found that among US students, perceptions of prevalence were typically higher among those who had engaged in CE. Personally knowing someone who has engaged in the practice may have a similar effect; however, larger surveys are needed to explore this. Among members of the Australian general public, those who had engaged in CE or personally knew someone who had were more likely to find the practice acceptable [13]. Larger studies would assist in monitoring patterns of use, and build a more comprehensive understanding of all types of non-medical use of stimulants, including enhancement use, and attitudes towards it.

Our participants believed that CE would most likely occur during peak assessment times to ‘cram’ (final exams and when assignments are due). This perception fits with previous studies of US students who had used stimulants for CE, who identified stress and anxiety as key motivators for their stimulant use, and exam times as the most common period of use [9]. Our qualitative study also uncovered a range of beliefs about the characteristics of those most likely to engage in CE, and potential factors that may motivate the use of stimulants as a study aid.

Simply saying that stimulants are used to ‘enhance cognition’ may not entirely capture what this means for all users. It would be interesting and useful to compare the perceptions of our participants with the self-reported motivations of actual users of prescription stimulants for CE in Australia. Our participants believed that students who are already high achievers may use stimulants as a study aid if they believe this can help to maintain their good grades, ‘get ahead’ of their peers and get a good job after graduation. This supports an important finding of Forlini and Racine's qualitative study of Canadian students' views about the use of methylphenidate for CE [16]. As in our study, Forlini and Racine found that students believed the pressure to succeed was a contributor to CE; they also emphasised job placement as contributing to the pressure to use prescription stimulants.

Conversely, some of our participants suggested that lower performing students may be more likely to engage in non-medical use of stimulants for CE. Degrees with a higher time commitment and higher level of required achievement may place greater stress on students. Stresses, and difficulty coping with the high demands of study, were identified by our participants as potential motivators of stimulant use to maintain alertness while ‘cramming’—in this way the motivation to simply try to ‘keep up’ was clearly distinct from the motivation of those students who were trying to ‘get ahead’.

There is often an assumption in discussions of enhancement stimulant use that any extra time that students are supposedly afforded by enhancing alertness will invariably be used for study. However, our participants suggested that another motivation for using study aids may be to maintain an active social life. This novel finding has not been discussed during interviews with non-medical users of stimulants in the USA [9, 10], perhaps because students

who engage in non-medical use of prescription medicines may be more likely to offer socially desirable responses to justify their own behaviour.

Limitations

Given the exploratory nature of this study our findings should not be taken to represent the views of the general community as a whole, nor the university population in Australia. Readers should interpret the results with the following limitations in mind. Given our recruitment method, we were not able to ensure a subsample of participants who had actually engaged in CE—it is possible that substance users were not inclined to participate. Given that this was the first attempt to explore Australian student attitudes towards CE, we were unsure about whether participants would have a frame of reference with which to discuss the topic—for this reason we made use of the newspaper article and vignette. It is possible that the stimulus material may have influenced the responses of some participants; however, this a well established technique in the social sciences for exploring public attitudes towards new technologies and participants were encouraged to talk through each issue presented and offer their own opinions. One limitation of this study is the low proportion of male participants in our sample (four out of 19 participants). Some US surveys have found that male college students have a higher rate of non-medical stimulant use compared with women (e.g. [3]), and this may reflect a more favourable attitude towards efficacy and safety among men. However, other large surveys have found no gender differences in past-year use (e.g. [1, 4]), and McCabe found that undergraduate women actually perceived a higher rate of prevalence compared with men [1].

This was an exploratory qualitative study, and more representative quantitative studies are required to examine the prevalence of non-medical stimulants, patterns of use, and attitudes among Australian students. Establishing accurate and reliable prevalence data is also necessary to establish appropriate policy responses to CE that are context- and culture-specific. Future studies in the area are important to explore attitudes towards the non-medical use of stimulants for CE among different groups of students, especially those who engage in the practice.

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