

Psychoactive Drug Use by Medical Students: a review of the national and international literature.

Introduction

In recent years, the problem of non-medical use of psychoactive drugs by medical students and doctors, has become an area of growing interest and concern to researchers, educational institutions and medical associations (6; 22; 23; 27; 32; 34; 42; 44). Doctors themselves can be seen as occupying diametrically opposite, and at times conflicting, positions in relation to substance misuse: on the one hand they have a higher prevalence of drug misuse, but on the other have a pivotal role to play in the early detection of drug misuse among colleagues and the referral of these colleagues to appropriate services (13; 14; 19; 28).

The aims of this review are three-fold. Firstly to evaluate the published data on drug misuse among Brazilian medical students; secondly to compare these findings with studies from other countries; and finally to look at how interventions

aimed at identifying and treating this problem might be developed.

Brazilian studies

To date there have been four published studies looking at the prevalence of drug misuse among Brazilian medical students (3; 4; 35; 44). The work of Silva *et al.* has various methodological problems which limit the interpretation of the results and make it difficult to compare them with those of other studies. In particular, the questionnaire that Silva *et al.* used to collect information on drug misuse does not seem to have been validated, there is no mention as to how the sample of students was obtained and the criteria used to define drug misuse are extremely unclear. Consequently this study will not be considered further. The studies by Mesquita *et al.* and Andrade *et al.* (3, 35) were based on the same population, namely the Faculty of Medicine of the University of São Paulo, whilst that of Andrade, 1995 (4) was undertaken at nine medical schools in the state of São Paulo.

There are no similar studies of the general population that could be used for comparison, therefore, we reviewed several studies of drug use among university

students in general (8;11;17;21;29;37;41;48). Unfortunately these too suffer from serious methodological problems, as was pointed out by Almeida-Filho in a review of drug misuse in Brazil in 1991. These problems include: unrepresentative samples, non-standardized definitions of drug misuse, use of non-validated questionnaires of unknown reliability, unclear methods of data collection and inadequate data analysis. Consequently, only the more methodologically rigorous study by Magalhães *et al.*, 1991 will be used for comparison.

The studies by Magalhães *et al.*, 1991, Mesquita *et al.*, 1995 and Andrade, 1995 will be examined in more detail in the following section.

Magalhães *et al.*, 1991. This study was undertaken using a representative sample (n=1069) of university students from various faculties in the city of São Paulo, using an instrument based on that recommended for student surveys by the World Health Organization (45). The authors examined the prevalence of non-medical use of 11 psychoactive substances over two time periods: lifetime use and use in the last three months. The prevalence of use of the various substances is

shown in Table 1 (**why does table 2 come before table 1!!**).

Among the illicit drugs, cannabis was the most commonly used with 26% reporting lifetime use , of whom 4% described themselves as heavy users (using once or more times per day). Factors that were associated with more frequent drug use were: holidays, travelling, friends, ease of obtaining the drug and personal crises. Factors which seemed to be protect against drug use were: living with family, having a girlfriend or boyfriend, health problems and work problems.

Mesquita *et al.*, 1995. This study was undertaken in 1991 amongst all students at the Faculty of Medicine of the University of São Paulo (FMUSP) and had a response rate of 74% (n=796). A modified version of the questionnaire used by Magalhães *et al.* was employed and further qualitative information was obtained using focus groups. Questions covered the non-medical use of 11 substances, with use being classified into: lifetime use, use in the last 12 months and use during the last 30 days. Information was also collected on age at first use, reasons for using, attitudes towards drugs and attitudes towards drug dependent patients.

The prevalence figures are shown in **Tables 1** and **2**. Apart from alcohol and tobacco, the most commonly used substances were cannabis and tranquillizers, both of which were more commonly used by students in the final years of medical school.

Qualitative data from the focus groups suggested that competitiveness, heavy work loads, contact with patients and the proximity of the residency examination were seen as contributory factors for drug use. At the same time students reported that their scientific knowledge of the effects of these substances protected them from developing drug related problems.

A logistic regression analysis revealed that three factors were associated with a greater probability of drug use: being towards the end of the medical course, approving of experimentation of drugs by others and frequenting bars as a leisure activity. One factor was associated with a reduced risk of drug taking: not having someone to confide in about personal problems.

Andrade, 1995. This study was undertaken in 1994 and involved all students

at 9 medical schools in the State of São Paulo and had a response rate of 71% (n=3725). The author used the same instrument that had been used by Mesquita *et al.* (1995) (which itself had been adapted from that used by Magalhães *et al.*). Questions were asked about the use of the same 11 substances over the same three time periods described in the previous study. The full statistical analysis of these results has yet to be published and the prevalence figures presented here are derived from the final report that was sent to the study's research funding body.

Comparisons between the three studies

One of the problems in comparing the studies of Mesquita *et al.* (1995) and Andrade (1995) is that some of the students interviewed in the former were also interviewed in the latter. However, as there was a three year time gap between the studies, we calculate that this overlap represents no more than 10% of Andrade's total sample.

Various authors have suggested that in studies of student populations, those students who are absent on the day of the survey are more likely to be drug users

(6; 32). All three of the above studies suffer from this defect. Since the questionnaires were anonymously completed there was no way of approaching those students who did not appear on the day of the survey. Therefore, the true prevalence of drug misuse may have been underestimated.

Comparing the studies of Mesquita and Andrade (see Table 2) the following similarities can be seen: the prevalence of drug use tends to increase from the first to sixth year for most substances and over most time intervals; the sequence of lifetime drug use from highest to lowest prevalence figures follows the same order: alcohol, tobacco, solvents, cannabis, tranquillizers, amphetamines to cocaine; and there tends to be a prominent increase in the prevalence of tranquillizer use in the fifth and sixth years.

In Table 2, statistical comparisons, using the χ^2 -test, between university students in general and medical students show that medical students have a higher lifetime prevalence of alcohol use (89% vs 82%, $p < 0.01$) and a lower lifetime prevalence of cocaine use (5% vs 10%, $p < 0.01$). University students show the same

declining order of prevalence of substance misuse from alcohol to cocaine, seen in the other two studies. Although several authors have observed that use of prescription drugs is more common among medical students (6, 28, 32), we were unable to investigate this, as Magalhães *et al.*, did not ask a separate question about tranquilizer use, but combined it with amphetamine use. Both Mesquita *et al.* and Andrade demonstrated the relatively high prevalence of tranquilizer use among medical students (11% and 8% in the last 30 days, respectively).

General considerations about Brazilian studies

The early studies of drug use in Brazil tended to be fairly simple prevalence studies, often with unclear objectives and little thought given to methodological design. These studies rarely did more than attempt to correlate drug use with such variables as social class and used statistical analyses no more complicated than the χ^2 test.

Magalhaes *et al.*'s study in 1991 marks a turning point in this respect. They were concerned about such factors as sampling, the use of validated questionnaires

and the formulation of more precise objectives. More recent studies, such as Mesquita *et al*., have adopted a mixture of quantitative and qualitative methods to more fully investigate the problem.

The studies of Mesquita *et al* and Andrade have made further advances, including the following: (i) sampling methods that allow data to be collected on representative samples of the target population, thus permitting a greater degree of generalizability; (ii) the use of more specific hypotheses; (iii) more robust and diverse statistical methods, e.g. factor analysis, that allow more complex analyses than simple bi-variate correlations; and (iv) standardized methodologies that allow reproduction and comparison of results with those of other studies.

International studies of drug use among medical students

Using the data banks Medline and Lilacs (...), 22 articles about drug use among non-Brazilian medical students were found between 1970 and 1995(?). Most of the more recent studies were conducted in the United States (6;22;27;28;32), with the exception of one study undertaken in Cuba (34) and another that used a sample

obtained from 42 different countries (16).

Samples. In the studies by Baldwin *et al.* (6) and McAuliffe *et al.* (32) stratified random samples were used, based on criteria such as: geographic region, medical school size, type of school (private or public) and the proportion of female students. In other studies, sample selection was simply based on specific medical schools and specific years. In the study by Crofton *et al.* (16), no information is provided as to how the sample was selected.

Data collection. In all the studies, with the exception of that of Crofton *et al.* (16), self-completed, anonymous questionnaires were used, which were posted to the students. In some cases the students were paid to participate in the study. Students who did not return the questionnaire were posted a further two copies before being considered non-responders. The response rates varied from 37% to 100%. The questionnaires had generally been adapted from those used in previous student surveys, thus facilitating comparison between studies.

In Crofton *et al*'s multi-centre and multi-country study, the method of data collection used was left to the discretion of the local study co-ordinators. Further details are not given beyond the information that the questionnaires were completed in the student's class rooms.

Variables studied. The majority of studies, with the exception of Crofton *et al.* (16) and Menendez and Calabuch (34), asked questions about the use of licit drugs, illicit drugs and non-prescribed medications. Lifetime use and use during the last year and the last 30 days were the most commonly used time intervals. Some studies also asked about lifetime abuse and dependence. This was assessed either by means of self-report or by use of the CAGE questionnaire for alcohol dependence.

Socio-demographic data were collected in all the surveys. Other aspects that were studied included: access to drugs, reasons for use, attitudes towards drug use by doctors, knowledge of prevention and treatment programmes, personality factors associated with abuse/dependency, knowledge of drug related harm and the

type of drug abuse training offered by the medical school.

Principal findings. As can be seen in Table 3, with the exception of amphetamines, there is a remarkable degree of variation in the use of all reported substances, be it lifetime use or recent use. Because of the differences in the way the studies were undertaken, it is difficult to interpret how much of this variation is real and how much is a methodological artefact. Maddux *et al.* (28) found a prevalence of substance abuse of 11%, which in conjunction with illicit substance use were associated with depressive affect. McAuliffe *et al.* (32) found that 16.5% of students had met criteria for drug abuse at some time during their lives. The same authors also found that 5.2% of students reported having experienced drug dependency, which compares to the 2.8% of students who were found to be CAGE positive in Menendez and Calabuch's study (34).

Comparing two North American cohorts, Baldwin *et al.* (6) confirmed that medical students had a higher probability of using alcohol, tranquillizers and psychedelic drugs (but not LSD).

According to McAuliffe *et al*'s study (32), "experimentation" was the most commonly reported reason for using drugs, and recreational use was found to be twice as common as self-medication. Kory and Crandall (1986)(27) found that recreational use of an individual drug was a positive predictor of the use of other substances.

Maddux *et al.* (1986)(28) showed that first use of cocaine and benzodiazepines occurred more commonly at medical school than at high school. The authors suggested that first use of benzodiazepines at medical school was probably due to ease of access to these drugs, whilst first use of cocaine was an age effect also seen in the cohort of non-medical students.

McAuliffe *et al.* (32) discovered that the prevalence of drug use was even higher in the clinical years at medical school, whilst Kory and Crandall (27) found that drug use was associated with age, sex and a greater number of absences.

Comparison of the Brazilian and North American Studies

To facilitate comparison between the Brazilian and North American studies,

Baldwin *et al's* study will be focused on; for although it only provides data on final year students, it has a large representative sample and uses the same criteria for drug use.

Baldwin *et al.*, 1991 - this study was undertaken in 1987 and used a large national sample of medical students (n=2046) from 23 North American medical schools. Selection criteria included the geographical region in which the school was located, size and whether the institution was private or public. The sampling procedure also took into account the sex ratio of students at the schools. Data were collected using an anonymous self-completed questionnaire, which were returned by post.

Table 4 compares the results of Baldwin *et al's* study with the data on final year students from Andrade's study. In terms of lifetime use, North American students showed significantly higher prevalences for use of alcohol, tobacco, cannabis, amphetamines and cocaine ($p < 0.001$). Brazilian students showed a higher 12-month prevalence for tobacco, tranquillizer and amphetamine use and a higher 30-day prevalence for tranquillizers and amphetamines use.

Although there are some notable differences in the lifetime prevalence of drug use between the two populations (in particular cannabis and cocaine), there are remarkable few differences in the figures for recent drug use, which may suggest a greater tendency towards drug experimentation among North American students .

Methodological considerations of the international studies

A common factor to virtually all the studies is the use of anonymous, self-completed questionnaires. Although, this method is believed to be associated with a higher response rate, more honest replies and is without doubt cheaper, the reliability of some of the responses may be questionable. Other studies have shown that medical students have a general lack of knowledge in relation to drugs and drug misuse (7,18,31,40,46), including difficulty in making substance abuse related diagnoses (9,25,40,46). Therefore, self reports of abuse and dependency probably lack validity and reliability and should really be only made using validated diagnostic scales.

Likewise, most studies can be criticized for being unimaginative in the investigation of factors associated with drug use, rarely going much beyond sociodemographic factors and time spent at medical school.

Precise questioning of the reasons for drug use is often lacking. Such reasons may be diverse, including: curiosity, pleasure, self-medication and attempts to increase performance. Better information on the reasons for use is necessary if prevention programmes are to be developed.

Several of the studies show that initiation into drug use occurs at medical school, but because comparison data from aged/social class matched non-medical students is rarely presented, it is difficult to know how much experiences particular to medical school are responsible for this.

Discussion

The results from both Brazilian and international studies are remarkably consistent, although there are some notable differences in the prevalence of cannabis and cocaine use by North American and Brazilian students. By and large,

alcohol is the drug with the highest lifetime prevalence and stimulants the lowest. Of particular concern among the Brazilian studies is the relatively high prevalence of tranquillizer use, which increases with time spent at medical school. Indeed, there is a general trend for the reporting of drug use to increase for all categories as the students passes from the first to the final year.

As has already been remarked there is a conspicuous lack of information about the reasons for drug use, the context in which it occurs, the personality traits of those involved and how these relate to other risk factors. Furthermore, once drug use has been initiated, little is known as what maintains this behaviour. These questions point to areas where further research is needed and also to the need to combine quantative methodologies with qualitative ones to obtain a fuller picture of drug use. In the study by Mesquita *et al.* , students believed that stess was an important factor in drug use, in particular stress associated with competetiveness, the large number of hours worked, certain aspects of clinical work and the pending residency exam. However, even here students may be over simplifying and

rationalizing the situation. For example, are the reasons for using cannabis the same as those for using cocaine or misusing alcohol? As yet we are unable to answer these questions.

That medical students experience considerable stress is without question, as has been shown by other studies (33, 30). McCue, 1982 (33) described a variety of stresses that students experience, for example: intimate and frequent contact with pain and suffering, physical and emotional contact with patients, death and the uncertainty of much of medical science in contrast to the desires that patient have for certainty and guarantees. In a study of Brazilian medical students at the Escola Paulista de Medicina, São Paulo, Martins (1994)(30) found three main areas in which residents expressed difficulties: breaking bad news, treating patients with terminal disease and the fear of contracting infectious diseases. The residents also pointed to two particular stresses: fear of making a mistake and lack of time to spend with family, friends etc.

Drug use by medical students can cause a variety of problems depending on

the degree of involvement that the student has with the drug. The effects of occasional use largely depend on the circumstances in which he uses the drug, but may range from no discernible effect to a serious impairment in academic performance and concentration difficulties. There is also an increased risk of abuse or even dependence later on in life, with the associated personal and social complications that ensue. Early detection of drug problems, ideally whilst the student is still at medical school should be a priority of any drug prevention/intervention programme.

To better facilitate such early detection, there is an urgent need for research investigating the risk factors associated with initiation into drug use. Such studies need to go beyond the confines of merely examining factors related to the pressures of medical training and look at factors that pre-date entry into medical school, such as family problems, personality traits and prior experimentation with other drugs.

Most medical schools in Brazil lack a structural framework that would allow

students with drug problems to be identified. One possibility would be to have a type of tutorial system, in which a designated professional, with a pastoral/counselling function, met with a small group of students on a regular basis from the start of the course until the end. This type of approach would permit the development of a more trusting and confidential relationship than is usually possible with academic staff. Such a professional would be ideally placed to identify students with drug or other psychological problems and offer treatment where appropriate. Treatment would have to be completely confidential, so that students were not identified as "drug addicts" by their colleagues.

When the person who identifies drug misuse in a student is a doctor, his or her own attitudes toward, and personal experience of, drug use come into play. Doctors with more liberal attitudes to drug use and those who have experimented with drugs in the past, may be more disposed to play down the importance of drug misuse by colleagues and consequently less likely to intervene at an early stage and offer treatment.

There is an extensive literature showing that medical students have negative attitudes towards patients with drug dependency problems (10, 12, 15, 20, 36, 39, 46). It is likely that these attitudes are formed or at least re-inforced at medical school. If medical schools are to have a role in preventing drug and alcohol problems among students, then these attitudes need to be more effectively challenged. Research suggests that the most effective way of changing clinicians attitudes towards patients with drug and alcohol problems is for them to have properly supervised clinical experience of managing such patients (**ref**). However, the amount of drug and alcohol training that most medical students have is minimal (Glass, ****1,15,24,39,42,46) and fragmented (10,15,23,26,42,46). Nocks (1980 - 39) states that negative attitudes towards these patients increase during the medical course, because students feel inadequately prepared to manage these them. In particular they may lack the necessary skills of how to identify drug problems and deal with denial (10,23,46). According to Negrete (****), such difficulties are aggravated by the unhelpful attitudes that many clinicians have

towards this group of patients, including a distaste for illness that are characterized by frequent relapses, moralistic attitudes towards patients who drink too much, beliefs that drug and alcohol misuse are social rather than medical problems and the difficulty many doctors have in comprehending why patients misuse drugs at all. Consequently, when faced with a drug or alcohol misusing colleague, the student may be paralysed into inaction due to a combination of fear of confronting the person and inappropriate therapeutic nihilism. Often the little contact that students have with drug and alcohol dependent patients is fairly short-term and is likely to be with those patients who have more chronic problems associated with psychiatric and physical complications (5,15,23,39,46). They are unlikely to see patients who have achieved stable abstinence and social re-integration, firstly because these patients often drop out of treatment and secondly because such an outcome may take several years to achieve. Consequently, students may not believe that these patients can be successfully rehabilitated and therefore, become unduly pessimistic in their outlook.

Whilst doctors allegedly make bad patients, they may also make bad physicians when the patient they are treating is another doctor. There may be an unwillingness for colleagues to take control of the situation, allowing the doctor-patient to take liberties that would not be allowed with ordinary patients. Thus corridor consultations, inadequate supervision and allowing self-prescribing are common, behaviours that are rationalized on the grounds that busy schedules and on-call commitments make it difficult to find time to make proper consultations. These lessons are learned early on at medical school, particularly in relation to the use of benzodiazepine to relieve symptoms of stress or induce sleep after a period of on-call duty. Whilst such behaviour may not lead to drug dependency, it is undesirable (48). Indeed consideration should be given to prohibiting self-prescribing among doctors and only allowing doctors to prescribe to colleagues who have registered with them as patients. Specialized services for students and doctors need to be developed to counteract this tendency and give the medical profession the treatment service it deserves.

In Brazil it is common practice for final year medical students to have unrestricted access to prescription drugs. Drugs are often donated by pharmaceutical companies for use with impoverished patients who cannot afford to pay for a prescription and in some institutions medical students themselves these small pharmacies. Such easy access only encourages students to self-prescribe when they become ill. This may later lead to the inappropriate or improper prescribing of psychotropic drugs by one doctor to a colleague or even to himself. In Brazil consideration should be given to ending the relatively unlimited and unsupervised access that many students and doctors have to pharmacies.

To really tackle the problem of drug and alcohol misuse by medical students and doctors, particularly in terms of prevention, early identification and treatment, we must do much more than simply tinker with the medical school curriculum. The following five recommendations offer a suggested framework of where to go from here:

- 1) To increase the knowledge base that medical students have about drug

and alcohol misuse, in particular information about misuse by the medical profession and how to identify such problems.

2) Better and more appropriate clinical experience of patients with drug and alcohol problems, based on directly supervised case management.

3) Medical school authorities need to develop a system where by students who are having problems during the medical school course can be identified and counselled, such as the modified tutorial system mentioned above. A similar system needs to be developed for residents and other doctors.

4) In conjunction with bodies representing the medical profession, such as the regional medical councils, hospitals need to develop a system whereby students and doctors who have been identified as having drug and alcohol problems can be assessed and treated confidentially. In resistant cases there may need to be an element of compulsion.

5) Further research needs to be undertaken to investigate risk factors for drug and alcohol misuse and whether these can be minimized.