

# Stages of progression in drug abuse involvement across generations in Jeddah, Saudi Arabia

Medhat M. Bassiony, MSc, MD.

## ABSTRACT

**الهدف:** إن تعاطي المخدرات لدى المراهقين يتبع مراحل معينة قد تختلف من بيئة لأخرى. الهدف من هذا البحث هو دراسة مراحل التقدم في تعاطي المخدرات بين المراهقين والبالغين في جدة بالسعودية.

**الطريقة:** اشتملت الدراسة على ١٠١ مريض متتابعين يعانون من تعاطي أو إدمان المخدرات (٩١ من البالغين، ١٠ من المراهقين) حسب التصنيف الرابع للأمراض النفسية والإحصاء والذين تم دخولهم لمستشفى الأمل بجدة خلال شهري يوليه وأغسطس ٢٠٠٢ للعلاج. وقد أجاب كل المشاركين على استبيان احتوى على أسئلة لها علاقة بالأعمار ومراحل التقدم في تعاطي المخدرات.

**النتائج:** وجدت هذه الدراسة أن المراهقين يبدأون تعاطي المخدرات عند عمر أصغر من البالغين وكان الفرق بينهما ذو دلالة إحصائية في تعاطي المخدرات (١٤٦,٦ ± ٢٦,٦ مقابل ٢٢,٠ ± ٨,٣) بينما لم يكن كذلك بالنسبة للتدخين (١٤٧,٧ ± ١٨,٨ مقابل ١٦,٤ ± ٦,٥) كما كان هناك اختلاف ذو دلالة إحصائية في المرحلة الأولى والثانية في تعاطي المخدرات بين المراهقين والبالغين ولكنه لم يكن كذلك في المرحلة الثالثة من التعاطي.

**خاتمة:** وتخلص هذه الدراسة إلى أن المراهقين والبالغين مختلفون بالنسبة للعمر عند بداية التعاطي ومراحل التعاطي وأن هذا التتابع في مراحل التعاطي كان مختلفا في السعودية عنه في البلاد الأخرى مما قد يكون له انعكاس على برامج مكافحة المخدرات في السعودية.

**Objectives:** To investigate the stages of progression in drug involvement among adolescents and adults in Saudi Arabia.

**Methods:** One hundred and one consecutive male patients (91 adults and 10 adolescents), with substance abuse or dependence according to DSM-IV criteria, admitted to Al-Amal Hospital in Jeddah, Saudi Arabia, during July and August 2002 for treatment, were included in the study. All participants answered a questionnaire, which included questions pertaining to the ages and stages of progression in drug abuse.

**Results:** Adolescents started using tobacco and drugs at a younger age than adults. The difference is statistically

significant for drugs ( $14.6 \pm 2.6$  versus  $22.0 \pm 8.3$ ,  $t = 2.8$ ;  $p = 0.006$ ), but not for tobacco ( $14.7 \pm 1.8$  versus  $16.4 \pm 6.5$ ,  $t = -0.8$ ;  $p = 0.4$ ). Adolescents and adults were different in the first ( $\text{Chi } 2 (3) = 13$ ,  $p = 0.001$ ) and the second ( $\text{Chi } 2 (3) = 14.5$ ;  $p = 0.002$ ) stages of progression, but similar in the third stage ( $\text{Chi } 2 (3) = 0.1$ ;  $p = 1.0$ ).

**Conclusion:** Adolescents were different from adults regarding the age of onset and sequence of progression in drug involvement. This sequence was different in Saudi Arabia from that in other cultures and this could have an implication in prevention programs.

*Neurosciences 2008; Vol. 13 (1) 37-40:*

*From the Department of Neurosciences, King Faisal Specialist Hospital and Research Center, Jeddah, Kingdom of Saudi Arabia.*

*Received 18th April 2007. Accepted 11th August 2007.*

*Address correspondence and reprint request to: Dr. Medhat Bassiony, Department of Neuroscience, J-76, King Faisal Specialist Hospital & Research Center, PO Box 40047, Jeddah 21499, Kingdom of Saudi Arabia. Tel. +966 (2) 6677777. Ext. 5819. Fax. +966 (2) 6677777. Ext. 5813. E-mail: mbassiony@hotmail.com*

Much research has documented that adolescent substance use or abuse follows a sequence starting with the use of legitimate substances and potentially proceeding to the use of illicit drugs. Adolescents pass through 4 stages during their progression in substance abuse starting with use of tobacco or alcohol, then cannabis and illicit drugs and ending with prescribed medications. Based on this model, adolescents start using legal substances and then progress or not to illegal drugs.<sup>1</sup> In this sequence, cannabis acts as a gateway (a rite of passage) for the use of other serious drugs. Fergusson et al's<sup>2</sup> study findings support a causal model in which cannabis use causes other illicit drugs use. Investigation of a causal relationship in non experimental studies is difficult.<sup>3</sup> There are many factors that could explain the gateway hypothesis in drug abuse including: enhanced sensitivity or cross-sensitization,<sup>4,5</sup> age,<sup>6</sup> and developmental and neurobiological changes in the adolescent brain,<sup>7</sup> which could be illustrated

with animal studies.<sup>8-11</sup> The other model to explain the relationship between the use or abuse of cannabis and other illicit drugs is the correlated liabilities model, which stresses on the genetic and environmental influences.<sup>12-14</sup> Saudi Arabia is an Arabic country with strong Islamic traditions, which could affect the stages of drug involvement. Alcohol is forbidden in Islam, and the use of drugs, even for experimentation in adolescence, is socially unacceptable and stigmatizing. But tobacco is legal, even for adolescents (no age restrictions). In other cultures, tobacco and alcohol are legal, but available only for adults. Experimentation with drugs commonly occurs among adolescents in the western culture, and some researchers believe that it is an important stage during normal psychological development.<sup>15</sup> Although no epidemiological studies to estimate the prevalence of substance abuse or dependence in the community have been conducted, nevertheless, substance abuse has recently been acknowledged as a problem by the authorities in Saudi Arabia. However, there are studies that have investigated the sociodemographic and clinical characteristics, comorbidity, consequences, relapse, and treatment models of drug abuse among adults in clinical settings in Saudi Arabia.<sup>16-24</sup> Apart from sporadic campaigns in the media and schools, there have been no organized prevention programs for drug abuse in Saudi Arabia. To develop an effective prevention program, one needs to understand how people become involved with drugs. The aim of this study was to determine the age of onset of drug use (including tobacco and alcohol), the stages of progression in drug involvement and to determine whether there are any differences between adolescents and adults to identify any differences in the pattern of substance abuse that might exist across generations. This could help in implementing intervention programs to prevent transition from tobacco use to drug use and from drug use to abuse and dependence.

**Methods.** *Subjects.* One hundred and one consecutive male Saudi patients with substance abuse or dependence according to DSM-IV criteria, admitted to Al-Amal Hospital in Jeddah during July and August 2002 for treatment, were included in a retrospective cross-sectional study. This sample was composed of 91 adults (>20 years) and 10 adolescents (13-20 years). Al-Amal hospital in Jeddah is a 270-bed governmental hospital specialized in the treatment of substance use, abuse, and dependence. It is one of 3 hospitals carrying the same name, Al-Amal means "hope" in Arabic. Only males are treated in these centers while females are treated in mental or generalized hospitals. Patients were seen as self-referrals or were referred by families, the workplace, the Ministry of Health (MOH), or the Ministry of Interior (MOI).

*Measures.* Psychiatric, psychological, social, and medical assessments were carried out for all patients by a psychiatrist, psychologist, social worker, and an internist. Psychiatric diagnoses for substance use disorders and psychiatric disorders were made using the DSM-IV structured interview.<sup>25</sup> Urine screen for drugs and laboratory tests for liver function, kidney function, complete blood count, electrolytes, blood sugar, serology tests for infectious diseases (hepatitis, human immunodeficiency virus, syphilis) and chest x-ray were carried out routinely. Patients with substance use, abuse, and dependence were included in the study. The questionnaire was composed of sociodemographic items (age, sex, education, occupation, marital status, address, phone number) and clinical items (types of substances, age of onset for each substance, duration of use, sequence of substances used, frequency, quantity, social context, medical and psychiatric comorbidity, criminal history, number of admissions, types of treatment, causes for relapse, source of referral, family history of substance abuse). It was administered to all patients. The study was approved by the research and ethics committee of Al-Amal Hospital. The use of a new substance (including tobacco and alcohol) or more than one substance at the same time represents a new stage in progression in drug involvement.

*Statistical methods.* Sociodemographic and clinical data from the questionnaire were collected and tabulated. Chi-square and t-test analyses were used to compare multi-categorical and continuous variables respectively in adolescents and adults. All analyses were carried out using STATA software.<sup>26</sup> A *p*-value will be significant if less than 0.05.

**Results.** *Sociodemographic and clinical characteristics.* The mean age of the study participants was 29.6 years (SD = 9.2, range = 14-61) and the mean duration of education was 8.7 years (SD = 3.0, range 2-15). Almost two-thirds of the patients (63.5%) were single, while the remaining were either married (30.6%) or divorced (5.9%). Most of the patients were not working (70%) and were supported by their families. The patients were self-referrals (35%), or were referred by their families (33.7%), the MOI (22.9%), the MOH (4.8%), or the work place (3.6%). More than half of the patients (54.3%) were admitted for the first time, 23.4% for the second time, 20.2% for the third time, and 2.1% for the fourth time. Almost two-thirds of the patients (65.4%) had used 2 drugs or more in addition to tobacco (polydrugs). Ninety patients (89%) had used tobacco, 72 (71.3%) amphetamine, 61 (60.4%) cannabis, 25 (24.8%) heroin, 8 (7.8%) benzodiazepines, and 2 (2%) cocaine. Twenty-two (21.8%) patients had a positive family history for substance abuse. Twenty-eight (27.7%) patients had psychosis, 28 (27.7%) depression, 6 (5.9%) social phobia, 4 (4%) generalized anxiety

disorder (GAD), and 4 (4%) bipolar disorder. Sixteen (15.8%) patients had hepatitis B, 14 (13.9%) hepatitis C, 2 (2%) diabetes mellitus, 2 (2%) tuberculosis, and one (1%) human immunodeficiency.

**Age at onset of drug abuse.** Although adolescents smoked tobacco at an earlier age than adults (14.7±1.8 versus 16.4±6.5), the difference was not statistically significant ( $t = -0.8, p = 0.4$ ). Also, adolescents started using drugs at an earlier age than the adults (14.6±2.6 versus 22±8.3) and the difference in this case was statistically significant ( $t = 2.8, p = 0.006$ ).

**Stages of progression in drug abuse.** Adolescents were more likely than adults to use drugs in addition to tobacco in the first stage of progression. In the second stage, adolescents tended to use tobacco and cannabis, while adults tended to use alcohol. In this stage, amphetamine was commonly used by both adolescents and adults. In the third stage of drug involvement, adolescents and adults tended to be similar in the types of drugs they were using (Table 1). Although adolescents stopped progression for other drugs, at least for this age, adults continued to progress to the fourth drug (cannabis 37.2%, alcohol 20.9%, amphetamine 18.6%, heroin 14%, tobacco 2.3%, benzodiazepines 2.3%, cocaine 2.3%, and inhalants 2.3%), fifth drug (heroin 35%, cannabis 25%, benzodiazepines 20%, amphetamine 10%, and alcohol 10%), sixth drug (benzodiazepines 42.9%, heroin 28.6%, and amphetamine 14.3%) and 2 patients used cocaine as a seventh drug.

**Discussion. Age at onset of drug abuse.** This study found that adolescents tended to smoke tobacco and use drugs at the same age, while the adult group took almost 6 years to move from tobacco smoking to drug use. Adolescents started using drugs at an earlier age than adults in this study and than adults in previous studies.<sup>18,20</sup> In a sample of adults from the same hospital, 6 years earlier, Iqbal<sup>20</sup> found that most of the patients

smoked tobacco before the age of 20 years. Most had initiated tobacco smoking before using drugs, and two-thirds initiated drugs after the age of 20. In Riyadh, Al-Nahedh,<sup>18</sup> 4 years earlier, found that the mean age at first exposure was 19 years in adults.

Kandel et al<sup>27</sup> studied the 10-year outcome of adolescent substance use at age 15-16 years and found that the strongest predictor of drug use is prior drug use. Age at onset and frequency of use at the initial stages of drug use are strong predictors of progression into dependence or use of hard drugs.<sup>28,29</sup> The period of major risk for the initiation use of cigarettes, alcohol, and marijuana is primarily under the age of 20, for illicit drugs other than cocaine by the age of 21, and at later ages for prescribed drugs.<sup>30</sup> Adults, who do not use drugs before age 21, have a lower risk of using after that age.<sup>30</sup> Illicit drug use begun at an early age has also been found to increase the risk of drug problems during late adolescence. According to the results of a retrospective analysis of the Epidemiologic Catchment Area data,<sup>31</sup> prior drug use predicts future drug use. However, in a prospective study of adolescents,<sup>32</sup> the age at first use of illicit drugs did not emerge as an independent risk factor for either persistence or severity of drug use in adulthood. This change in the age of onset and pattern of tobacco smoking and drug use should be reflected on intervention programs for prevention of both tobacco smoking and drug use at the same time. Such programs should be started before adolescence.

**Stages of progression in drug involvement.** The fact that adolescents were different from adults at the first and second stages of progression in drug involvement could be due to the availability of drugs currently, or due to a change in drug abuse trends. Progression in drug involvement might depend on the availability of drugs, affiliation with substance-using peers, and greater opportunities for their use among other factors rather than the type of drug they started with in adolescence. Early access to, and use of, drugs may not only reduce perceived barriers against the use of other illicit drugs but may also provide access to these drugs.<sup>14</sup>

**Cultural aspects of drug abuse.** This study found that most of the patients smoked tobacco before using drugs, which is consistent with previous studies in other cultures. Contrariwise, amphetamine not alcohol or cannabis is the most commonly used drug in both adolescents and adults at the initiation of drug use. The findings of this study suggest that there may be intercultural differences in initiation stages and underscore the utility of targeting all substances to prevent escalation of drug involvement. The findings also underscore the importance of directing prevention programs not only toward the initial use, but also to the transition from use to dependence. Intervention programs aimed at the prevention of adolescent substance abuse certainly should be initiated. An educational approach is essential

**Table 1** - Comparison between adolescents and adults regarding stages of drug involvement.

Variable	Adolescents n (%)	Adults n (%)	Chi 2	P-value
<b>First drug</b>			13.0	0.001
Tobacco	6 (60)	74 (95)		
Amphetamine	2 (20)	2 (2.5)		
Inhalants	2 (20)	2 (2.5)		
<b>Second drug</b>			14.5	0.002
Tobacco	4 (40)	2 (2.5)		
Amphetamine	4 (40)	29 (36.3)		
Alcohol	2 (20)	28 (35)		
Cannabis	2 (20)	9 (11.3)		
<b>Third drug</b>			0.1	1.0
Cannabis	4 (57.5)	23 (37.1)		
Amphetamine	2 (28.6)	15 (24.2)		
Alcohol	2 (28.6)	13 (21.2)		
Heroin	1 (14.3)	7 (11.3)		

not only to increase awareness of substance abuse, but also to develop an effective program for health and social development.

Although this study has added some information to our knowledge about stages of progression in drug involvement in Saudi Arabia, it also has some limitations. First, it is a cross-sectional study, so the collected data are liable to recall bias. Second, it was drawn from a clinical setting and it has included a small number of adolescents and only male patients, which could limit the generalization of its findings.

In conclusion, this study found that there are some differences between adolescents and adults regarding age of initiation and stages of progression in drug involvement. There are also some differences between the Saudi culture and other cultures regarding the sequence of these stages. A prospective population-based study to fully investigate and understand the stages of progression in drug involvement in Saudi Arabia is recommended.

**Acknowledgment.** I would like to thank Dr. Girvin, Dr. Gascon, and Dr. Jan for reviewing this article.

## References

- Kandel DB, Yamaguchi K. Stages of drug involvement in the U.S. population. In: Kandel DB, editor. Stages and pathways of drug involvement: examining the gateway hypothesis. New York (NY): Cambridge University Press; 2002. p. 65-89.
- Fergusson DM, Boden JM, Horwood LJ. Cannabis use other illicit drug use: testing the cannabis gateway hypothesis. *Addiction* 2006; 101: 556-569.
- Heckman JJ. The scientific model of causality. In: Stolzenberg RM, editor. Sociological Methodology. Vol 35. Boston (MA): Blackwell Publishing; 2005. p. 1-97
- Schenk S. Sensitization as a process underlying the progression of drug use via gateway drugs. In: Kandel DB, editor. Stages and pathways of drug involvement: examining the gateway hypothesis. New York (NY): Cambridge University Press; 2002. p. 318-336.
- Cadoni C, Pisanu A, Solinas M, Acquas E, Di Chiara G. Behavioral sensitization after repeated exposure to Delta 9-tetrahydrocannabinol and cross-sensitization with morphine. *Psychopharmacology (Berl)* 2001; 158: 259-266.
- Kandel DB, Yamaguchi K, Klein LC. Testing the gateway hypothesis. *Addiction* 2006; 101: 470-472.
- Dahl RE, Spear LP, editors. Adolescent brain development vulnerabilities and opportunities. New York (NY): New York Academy of Sciences; 2004
- Smith RF. Animal models of periadolescent substance abuse. *Neurotoxicol Teratol* 2003; 25: 291-301.
- Levin ED, Rezvani AH, Montoya D, Rose JE, Swartzwelder HS. Adolescent-onset nicotine self-administration modeled in female rats. *Psychopharmacology (Berl)* 2003; 169: 141-149.
- Klein LC. Effects of adolescent nicotine exposure on opioid consumption and neuroendocrine responses in adult male and female rats. *Exp Clin Psychopharmacol* 2001; 9: 251-261.
- Agrawal A, Neale MC, Prescott CA, Kendler KS. Cannabis and other illicit drugs: comorbid use and abuse/dependence in males and females. *Behav Genet* 2004; 34: 217-228.
- Pagan JL, Rose RJ, Viken RJ, Pulkkinen L, Kaprio J, Dick DM. Genetic and environmental influences on stages of alcohol use across adolescence and into young adulthood. *Behav Genet* 2006; 36: 483-497.
- Agrawal A, Neale MC, Prescott CA, Kendler KS. A twin study of early cannabis use and subsequent use and abuse/dependence of other illicit drugs. *Psychol Med* 2004; 34: 1227-1237.
- Lynskey MT, Heath AC, Bucholz KK, Slutske WS, Madden PA, Nelson EC, et al. Escalation of drug use in early-onset cannabis users vs co-twin controls. *JAMA* 2003; 289: 427-433.
- Shedler J, Block J. Adolescent drug use and psychological health: a longitudinal inquiry. *Am Psychol* 1990; 45: 612-630.
- Abalkhail BA. Characteristics, nutritional and health status of addicts hospitalized for detoxification. *Saudi Med J* 1999; 20: 536-540.
- Abdel-Mawgoud M, Fateem L, Al-Sharif AI. Development of a comprehensive treatment program for chemical dependency at Al-Amal hospital, Dammam. *J Subst Abuse Treat* 1995; 12: 369-376.
- Al-Nahedh N. Relapse among substance-abuse patients in Riyadh, Saudi Arabia. *East Mediterr Health J* 1999; 5: 241-246.
- Hafeiz HB. Sociodemographic correlates and pattern of drug abuse in eastern Saudi Arabia. *Drug Alcohol Depend* 1995; 38: 255-259.
- Iqbal N. Substance dependence. A hospital-based survey. *Saudi Med J* 2000; 21: 51-57.
- Qureshi NA. Sociodemographic correlates, pattern and comorbidity of drug abuse among psychiatric patients. *Arab Journal of Psychiatry* 1992; 2: 98-106.
- Qureshi NA. Trihexyphenidyl (artane) abuse among Saudi psychiatric patients. *Ann Saudi Med* 1992; 12: 391-394.
- Qureshi NA, Al-Amri AH, Beyari TH, Abdelgadir MH. Trihexyphenidyl dependence: a controlled investigation between users and misusers. *Ann Saudi Med* 1997; 17: 185-190.
- Osman AA. Substance abuse among patients attending a psychiatric hospital in Jeddah: a descriptive study. *Ann Saudi Med* 1992; 12: 289-293.
- First MB, Spitzer RL, Gibbon M, Williams JBW. Structured Clinical Interview for DSM-IV Axis I Disorders (SCID-I). Washington (DC): American Psychiatric Press Inc; 1997.
- Stata Corporation. STATA 6. Texas: Stata Corporation; 1999
- Kandel DB, Davies M, Karus D, Yamaguchi K. The consequences in young adulthood of adolescent drug involvement. An overview. *Arch Gen Psychiatry* 1986; 43: 746-754.
- Kandel DB, Yamaguchi K, Chen K. Stages of progression in drug involvement from adolescence to adulthood: further evidence for the gateway theory. *J Stud Alcohol* 1992; 53: 447-457.
- Kandel DB, Yamaguchi K. From beer to crack. Developmental patterns of drug involvement. *Am J Public Health* 1993; 83: 851-855.
- Kandel DB, Logan JA. Patterns of drug use from adolescence to young adulthood: I. Periods of risk for initiation, continued use, and discontinuation. *Am J Public Health* 1984; 74: 660-666.
- Anthony JC, Petronis KR. Early-onset drug use and risk of later drug problems. *Drug Alcohol Depend* 1995; 40: 9-15
- Bates ME, Labouvie EW. Adolescent risk factors and the prediction of persistent alcohol and drug use into adulthood. *Alcohol Clin Exp Res* 1997; 21: 944-950.