

# International Journal of Alcohol and Drug Research

The Official Journal of the Kettil Bruun Society for Social and Epidemiological Research on Alcohol

# Prevalence and correlates of substance use by Egyptian school youth

Christopher A. Loffredo<sup>1</sup>, Yousri Edward Shaker<sup>2</sup>, Irene A. Jillson<sup>1</sup>, Dina N.K. Boulos<sup>3</sup>, Doa'a A. Saleh<sup>4</sup>, Magdy Garas<sup>2</sup>, Mar-Jan Ostrowski<sup>5</sup>, Xiaoyang Sun<sup>1</sup>, Xiaofei Chen<sup>1</sup>, Benjamin Shander<sup>6</sup>, and Sania Amr<sup>6</sup>

<sup>1</sup> Georgetown University, Washington, DC, United States

<sup>2</sup> Caritas-Egypt, Cairo, and Alexandria, Egypt

<sup>3</sup> Ain Shams University, Cairo, Egypt

<sup>4</sup> Cairo University, Cairo, Egypt

<sup>5</sup> Sustainable Sciences Institute, San Francisco, CA, United States

<sup>6</sup> University of Maryland School of Medicine, Baltimore, MD, United States

#### **Abstract**

**Aims:** Substance use among Egyptian youth is an emerging public health problem, yet there is a paucity of information on the prevalence and correlates of these behaviors. To address this gap, we conducted surveys at 25 schools in Egypt in 2013 and 2014.

**Design:** We calculated associations between substance use prevalence and age, gender, residence area, living arrangement, and employment status, along with adjusted odds ratio (OR) and 95% confidence intervals (CI).

Setting: Cairo region and southern Egypt.

**Participants:** School youth ages 12-18 (*N*=1,415).

**Measures:** Self-administered survey on the use of cigarettes, waterpipes, alcohol, hashish, bango, heroin, Tramadol, other oral medications, injected substances, and glue/petrol sniffing; together with the amount and frequency of each substance used and age at initiation, in addition to demographic characteristics.

**Findings:** Seventy-two percent of participants were male. Tobacco and cannabinoids were the most commonly used substances by both genders. Males reported smoking cigarettes (25%), waterpipes (15%), and hashish (6%), drinking alcohol (16%), and taking Tramadol (3%). Younger age (12–14 years) and residence outside of Cairo were somewhat protective. Among males, but not females, having a job increased the odds of smoking cigarettes (OR = 1.8, 95% CI [1.3, 2.6]), waterpipes (OR = 1.9, 95% CI [1.2, 2.9]), or hashish (OR = 2.0, 95% CI [1.1, 3.7]).

**Conclusions:** These findings, consistent with reports from other countries, can inform the design and direct the resources of future public health programs targeting adolescents to prevent the onset of substance use and ultimately addiction in Egypt and elsewhere.

## Introduction

The public health threat from tobacco and other drugs, especially among youth, is a major concern throughout the world. A recent report from the United Nations Office on Drugs and Crime (UNODC) highlighted "the wide-ranging impact of drugs not only on the health and well-being of individuals, but also on the people around them—families and communities . . . in particular women and children" (UNODC, 2016). Substance use in Egypt has been emerging as a public health problem with increasingly high prevalence among youth (UNODC, 2012). It is more commonly reported by boys than girls, often involves the

use of cannabis, and is characterized by an increasingly permissive attitude towards waterpipe tobacco smoking (Abou Eleinen, Mostafa, Ghanem, Elnaggar, & Elbayomy, 2008; Al-Youm, 2012; Hamdi et al., 2012; Labib et al., 2007; Viney, 2012).

Most of the previous research on substance use in Egypt has focused on the transition from tobacco to other drugs, and many reports have combined cigarette and waterpipe smoking and have grouped street drugs together, making it difficult to discern prevalence and risk factors for individual substances. Several recent reports are press releases as opposed to peer-reviewed research articles, and

Correspondence: Dr. Christopher Loffredo, Department of Oncology, Department of Biotstatistics, Bioinformatics, and Biomathematics, Lombardi Comprehensive Cancer Center, Georgetown University Research Building, Room W503, 3970 Reservoir Rd, NW, Washington DC 20057. Telephone: 202-687-3758; E-mail: cal9@georgetown.edu

Financial support: The work was supported by grant number 1RO1DA025205 from the National Institute on Drug Abuse, U.S. National Institutes of Health. Declaration of interest: The authors report no conflicts of interest.

many studies focused on youth in treatment programs. Thus, there is a paucity of data from the more general population of youth in Egypt, and there is a need for rigorously conducted research to capture the prevalence and correlates of their substance use.

A focus groups study was previously conducted among 40 Egyptian youth, ages 12 to 18, in Cairo and Alexandria. It investigated their knowledge and awareness of substance use, the types of substances used, their sources, and promoting and protecting factors (Loffredo et al., 2015). The results suggested high levels of awareness of the availability and adverse health effects of substances (including tobacco, alcohol, illicit drugs, glue sniffing, and pharmaceutical agents). Peer pressure from friends and adverse life events were cited as the most common reasons contributing to substance use. On the other hand, strict parenting, religiosity, and having non-user friends were among the factors perceived by youth to prevent substance use or help them quit it. The results of that study informed the present study, which was conducted to identify the prevalence and correlates of substance use among the general population of youth in Egypt.

### Methods

The Institutional Review Boards of Georgetown University and Caritas-Egypt approved the study protocol. Caritas-Egypt, a non-governmental organization that provides diverse programs to serve youth and adults, including education, housing, and detoxification and rehabilitation services to drug addicts, conducted the surveys.

#### **Ouestionnaire Development**

A survey was developed for youth attending schools in several regions of Egypt, using information collected from a previous focus groups study (Loffredo et al., 2015). Briefly, focus groups were conducted with a total of 40 male and female youth participants, aged 12-14 and 15-18, recruited from two different areas (Cairo and Alexandria). Their knowledge and perceptions regarding current substance use, its sources, and promoting and protecting factors were investigated. The topics that were broadly addressed were the use of tobacco products, illicit and prescription drugs, inhaled substances such as glue and solvents, and alcohol. The survey for the current study was informed by the results of the focus group study and was designed to capture use of alcohol, tobacco products (cigarettes and waterpipes separately), specific types of illicit and prescription drugs revealed during focus groups, and inhaled substances such as glue and petrol, together with information about living arrangements, area of residence, and working status. The survey was also supported by input from Caritas-affiliated investigators, who have worked directly with youth, providing education, vocational training, and detoxification and rehabilitation services to drug addicts. As such they were very knowledgeable about the targeted youth population. These investigators examined pre-existing questionnaires on substance use that had been used in prior studies to identify

culturally appropriate material for Egyptian youth. These previously validated surveys were the Global Youth Tobacco Survey (Warren et al., 2008), the Nafis Salaam survey conducted among Muslims in New York City (Carroll, 2009), and the middle school and high school versions of the U.S. Youth Risk Behavior Surveillance System survey (Centers for Disease Control and Prevention, 2013). Questions were selected from those prior surveys that addressed the following substances: cigarettes, waterpipes, alcohol, hashish (a compressed and purified form of cannabis), bango (an Egyptian Arabic term for the unrefined leaves and stems of the cannabis plant), heroin, Tramadol (a highly addictive synthetic opioid-like pain medication sold under various trade names), other oral medications, injected substances, and glue/petrol sniffing. The surveys also captured the amount used for each substance, frequency of use, and age at initiation. Additional questions included 1) living arrangements (living with one, both, or neither parent), 2) motivating factors for substance use, 3) sources of substances, 4) reasons for not trying substances, 5) beliefs about harm, and 6) working after school. The preliminary questionnaire was pilot tested in one middle school and one high school (121 participants total) before it was finalized (Appendix 1).

The final survey was conducted at preparatory (middle) and secondary (high) public schools in Egypt between November 26, 2013, and March 24, 2014. Schools were sampled in the city of Cairo, the two suburban governorates (provinces) bordering it (Giza and Qalyubia), two governorates immediately to the south (Minya and Asyut), and two governorates in the far south (Sohag and Qena). The latter four jurisdictions are characterized as rural but having large, centrally located capital cities. One of the authors made multiple visits to the central Ministry of Education Office at each governorate and worked with staff members to identify and select schools that were accessible via public transportation and were not located in areas of civil unrest. Ministry officials then contacted the school to arrange for the author to visit. The school informed parents that a survey was going to be conducted and a permission slip was sent home to be signed by a parent/guardian and returned to the school. On the day of the visit, the author visited each homeroom classroom, obtained verbal assent from the student, and distributed the surveys to the students who were present. Each student completed the questionnaire according to the directions provided verbally by the author. Completed questionnaires were returned to the study office in Cairo where they underwent double data entry in Microsoft Access.

## **Data Analysis**

Group comparisons were initially made using chi-square tests, and subsequently logistic regression was used to model the odds of each type of substance being used in relation to age group, gender, living arrangement, area of residence, and employment status. The adjusted odds ratios (OR) and 95% confidence intervals (CI) from models that contained all of the above factors as covariates are reported.

Table 1
$Socio-demographic\ characteristics\ of\ a\ population-based\ sample\ of\ school\ youth\ in\ Egypt$

Characteristic	Total N = 1,415	Males n = 1,012 n (%)	Females n = 403 n (%)	Gender p value*
Age group	· · · · · · · · · · · · · · · · · · ·	· · · · · · · · · · · · · · · · · · ·		•
> 16	618 (43.7)	481 (47.6)	137 (34.0)	
$12 \leq \leq 14$	321 (22.7)	231 (22.8)	90 (22.3)	< .0001
14 < ≤16	475 (33.6)	299 (29.5)	176 (43.7)	
Missing	1	1		
Residence				
Cairo	219 (15.5)	118 (11.7)	101 (25.1)	
Cairo suburbs	489 (34.6)	285 (28.1)	204 (50.6)	
Minya & Asyut	255 (18.0)	189 (18.7)	66 (16.4)	
Sohag & Qena	452 (31.9)	20 (41.5)	32 (7.9)	< .0001
Living with:				
Both parents	929 (65.9)	673 (66.9)	256 (63.5)	.02
One parent	384 (27.3)	276 (27.4)	108 (26.8)	
Others	96 (6.8)	57 (5.7)	39 (9.7)	
Missing	6	6		
Working				
Yes	403 (28.8)	316 (31.7)	87 (21.7)	.0002
No	995 (71.2)	680 (68.3)	315 (78.3)	
Missing	17	16	1	

<sup>\*</sup>Chi-square test

Comparisons on gender were stratified, based on the previously reported youth focus group results, which showed differences in substance use between males and females (Loffredo et al., 2015). SAS 9.3 was used for all the analyses.

#### Results

A total of 1,415 youth from 25 schools participated. Table 1 provides the overall distribution of the subjects by age group, area of residence, living arrangement, and employment status, separately for males and females. Of the total respondents, approximately one fifth were 12 to 14 vears old, and one third were 14 to 16. Males represented 72% of the study sample. Age (p < .0001), residence (p < .0001).0001), and employment status (p = .0002) all differed between male and female youth

#### Types of Drugs Used by Egyptian Youth, Age at Initiation, and Frequency of Use

Table 2 shows the prevalence of substance use, separately for males and females. In both groups, the most commonly reported substance was cigarettes (one quarter of males and less than one fifth of females). Among males, the next most reported substances were alcohol (15.8%), waterpipes (14.7%), hashish (6.2%), bango (5.0%), and Tramadol (3.0%). Among females the most commonly reported substances, next to cigarettes, were waterpipes (11.3%), hashish (4.3%), and alcohol (2.3%); females rarely or never reported other substances. Overall, the age at initiation for using each substance was similar among males and females (ranging from 13 to 16 years old in both groups), as was the number of days of use during the past month. In addition to being the most reported substance, cigarettes were used on 18 of the past 30 days, on average, by males and on nearly 22 days by females.

Associations between contributing factors and substance use for the four most commonly reported substances (cigarettes, waterpipes, hashish, and alcohol) are shown in Table 3, with males and females combined. The two younger age groups showed reduced odds of cigarette, waterpipe, and hashish use, but not alcohol, relative to the group of youth > 16 years old. Relative to living with both parents, living with just one parent or living with nonparents increased the odds of using cigarettes, waterpipes, and hashish, but not alcohol. Reduced odds for most of these four substances were observed for youth residing in the Cairo suburbs or in southern areas of Egypt, relative to Cairo. Working youth were at significantly increased risk for using cigarettes (adjusted OR = 1.79), waterpipes (adjusted OR = 1.75), and hashish (adjusted OR = 1.96). Male gender was associated with greatly increased odds for using each of these four substances, with the greatest disparity observed for alcohol drinking (males were 9.36 times more likely than females to report drinking).

Table 2 Prevalence, age at initiation, and frequency of substance use among a sample of school youth in Egypt

			Males ( $n = 1,01$	2)		Females $(n = 403)$				
Substance		n (%)	Age* Mean ± (SD)	Days/month** Mean ± (SD)	n (%)	Age* Mean ± (SD)	Days/month** Mean ± (SD)			
Cigarette										
	Yes	243 (24.5)	13.8 (2.6)	18.0 (12.3)	73 (18.2)	13.8 (1.6)	21.7 (10.0)			
	No	749 (75.5)			328 (81.8)					
Mis	sing	20			2					
Waterpipe										
	Yes	134 (14.7)	14.5 (2.6)	9.9 (10.5)	45 (11.3)	14.9 (1.2)	10.9 (7.6)			
	No	780 (85.3)			353 (88.7)					
Mis	sing	98			5					
Hashish										
	Yes	56 (6.2)	15.1 (1.6)							
	No	846 (93.8)		8.5 (9.4)	7 (4.3)	15.8 (1.1)	6.5 (4.0)			
Mis	sing	110			381 (95.7)					
Bango					16					
	Yes	45 (5.0)	15.5 (2.0)	6.1 (8.2)	0					
	No	857 (95.0)			398 (100)	-	-			
Miss	sing	110			5					
Tramadol										
	Yes	26 (3.0)	16.2 (1.5)	12.2 (13.2)	1 (0.2)	17.0				
	No	826 (97.0)			393 (99.8)		-			
Miss	sing	160			9					
Alcohol										
	Yes	134 (15.8)	13.6 (3.2)	6.1 (7.7)	9 (2.3)	14.4 (0.9)	3.0 (1.4)			
	No	717 (84.2)			381 (97.7)					
Mis	sing	161			13					

Table 3 Adjusted Odds Ratios and 95% Confidence Intervals of the associations between substance use and contributing factors among Egyptian school youth (males and females combined)

Variable	Cigarettes	Waterpipes	Hashish	Alcohol
Age group				
> 16	Reference	Reference	Reference	Reference
$12 \leq \leq 14$	0.29 (0.20-0.44)	0.36 (0.21-0.64)	0.14 (0.04-0.41)	0.81 (0.46-1.43)
14 < ≤ 16	0.29 (0.20-0.41)	0.46 (0.30-0.70)	0.31 (0.17-0.59)	1.17 (0.73-1.87)
Living with				
Both parents	Reference	Reference	Reference	Reference
One parent	1.86 (1.30-2.66)	1.56 (1.01-2.42)	1.34 (0.71-2.56)	0.77 (0.44-1.35)
Others	2.15 (1.25-3.70)	1.81 (0.99-3.31)	2.93 (1.35-6.35)	1.05 (0.50-2.20)
Residence				
Cairo	Reference	Reference	Reference	Reference
Cairo suburbs	0.02 (0.01-0.04)	0.02 (0.01-0.05)	0.07 (0.02-1.86)	-
Minya & Asyut	0.93 (0.60-1.45)	0.84 (0.51-1.38)	1.75 (0.85-3.58)	0.67 (0.38-1.17)
Sohag & Qena	0.50 (0.32-0.77)	0.25 (0.15-0.42)	0.37 (0.17-0.79)	0.35 (0.21-0.59)
Working	1.79 (1.29v2.49)	1.75 (1.18–2.59)	1.96 (1.14-3.38)	0.84 (0.52-1.38)
Male gender	1.43 (0.95-2.13)	1.93 (1.20-3.09)	2.08 (1.04-4.18)	9.36 (4.46-19.63)

The multivariable model included all the variables listed in the first column. Statistically significant associations are shown in bold font.

<sup>\*</sup> Mean age at which they started using the substance \*\* Mean number of days of substance use in the past month

Table 4 Adjusted Odds Ratios and 95% Confidence Intervals of the Associations between Substance Use and Socio-demographic Factors among Egyptian Youth in School Stratified by Gender

		Male	Youths		Female	Youths
Variable	Cigarettes	Waterpipes	Hashish	Alcohol	Cigarettes	Waterpipes
Age group						
> 16	Reference	Reference	Reference	Reference	Reference	Reference
$12 \le \le 14$	0.29 (0.19-0.46)	0.40 (0.22-0.73)	0.16 (0.05-0.47)	0.79 (0.44-1.43)	0.30 (0.08-1.14)	0.38 (0.05-2.60)
14 < ≤16	0.45 (0.30-0.67)	0.78 (0.48–1.27)	0.52 (0.25-1.05)	0.95 (0.57-1.57)	0.04 (0.01-0.14)	0.09 (0.02-0.35)
Living with						
Both parents	Reference	Reference	Reference	Reference	Reference	Reference
One parent	1.45 (0.94–2.22)	1.43 (0.84–2.42)	1.08 (0.50-2.35)	0.93 (0.52-1.67)	4.08 (1.67–9.95)	1.51 (0.60–3.75)
Others	1.61 (0.82–3.16)	1.23 (0.55–2.77)	1.95 (0.68–5.59)	1.34 (0.61–2.94)	5.62 (1.70–18.61)	2.97 (0.95-9.31)
Residence						
Cairo	Reference	Reference	Reference	Reference	Reference	Reference
Cairo suburbs	0.03 (0.01-0.08)	0.03 (0.01-0.09)	0.11 (0.03-0.41)	_	0.04 (0.01-0.12)	0.05 (0.01-0.19)
Minya & Asyut	2.13 (1.22–3.71)	1.75 (0.94–3.26)	3.75 (1.49–9.41)	0.43 (0.23-0.81)	0.08 (0.02-0.35)	0.13 (0.02-0.66)
Sohag & Qena	0.92 (0.55-1.55)	0.42 (0.23-0.75)	0.69 (0.27-1.74)	0.23 (0.13-0.40)	0.24 (0.04-1.33)	0.10 (0.01-1.32)
Working						
No	Reference	Reference	Reference	Reference	Reference	Reference
Yes	1.80 (1.26-2.57)	1.88 (1.20-2.94)	1.99 (1.06-3.72)	0.93 (0.56-1.55)	0.40 (0.13-1.18)	0.65 (0.24–1.79)

The multivariable model included all the variables listed in the first column. Statistically significant associations are shown in bold font.

# **Gender-Specific Associations**

Table 4 shows the associations between various factors and youth substance use, stratified by gender. Among females, the sample size was relatively small, and therefore was only adequate for the evaluation of cigarettes and waterpipes. The younger age groups were generally at reduced odds for using cigarettes and waterpipes, compared to those who were > 16 years old, regardless of gender. Not living with both parents was associated with increased odds of smoking cigarettes; this association was statistically significant among girls (4.08 [1.67-9.95] and 5.62 [1.70-18.61]) but not among boys (1.45 [0.94-2.22] and 1.61 [0.82-3.16]). Working was significantly associated with increased odds of smoking cigarettes (adjusted OR = 1.80), waterpipes (adjusted OR = 1.88), and hashish (adjusted OR= 1.99) among boys but not among girls. Relative to Cairo residents, those who lived in the suburbs of Cairo and in southern Egypt were less likely to report use of cigarettes, waterpipes, hashish, and alcohol. Alcohol drinking was not associated with age, parental living arrangements, or working among males.

#### Discussion

The most commonly reported substance used by school youth from diverse regions of Egypt was tobacco, regardless of gender. These results support earlier findings from focus groups that tobacco smoking, including cigarettes and waterpipes, was the most commonly

mentioned substance used by Egyptian youth (Loffredo et al. 2015). Substance use in general was reported in earlier studies to be more prevalent among males than females worldwide (Amin, Amr, Zaza, & Kaliyadan, 2012; UNODC, 2016; Welte, Barnes, Tidwell, & Hoffman, 2011).

The various substances used by Egyptian youth have been reported to be prevalent worldwide, including cannabis (UNODC, 2012, 2016), tobacco, alcohol, illegal drugs (Akl et al., 2011; Barnett, Curbow, Weitz, Johnson, & Smith-Simone, 2009; Bejjani, El Bcheraoui, & Adib, 2012; Degenhardt et al., 2008), and prescription drugs (Al-Afifi, Sakka, & Al-Afifi, 2011; 2012; Albsoul-Younes, Wazaify, Al-Motassem, & Tahaineh, 2010; Fawzi, 2011). Tobacco and cannabinoids such as hashish, which were frequently reported among youth focus groups (Loffredo et al. 2015), are the most commonly used substances by youth in many countries (Momtazi & Rawson, 2010; Mzayek et al., 2012; Omage & Omage, 2012), including Egypt and Palestine (Afifi, Kariri, & El Susis, 2007; Hamdi et al., 2012). Inhalant misuse, such as sniffing glue, paint thinner, or gasoline, has also been found to be prevalent among young adolescents (Kurtzman, Otsuka, & Wahl, 2001; Lubman, Yücel, & Lawrence, 2008), including in Egypt (Elkoussi & Bakheet, 2011). Indeed, glue sniffing was frequently mentioned by Egyptian youth in focus groups (Loffredo et al., 2015); however, it was seldom reported by the school youth surveyed. The focus groups included not only school youth but also street and homeless youth.

In the focus group study, youth reported the importance of having a home and the fear of their parents and family members as deterrents for substance use (Loffredo et al., 2015). The present study found that living with two parents, compared to other living arrangements, was protective, which is consistent with studies in Sweden (Jablonska & Lindberg, 2007) and the United States (Eitle, 2005; Wang, Simons-Morton, Farhat, & Luk, 2009). The current study also found that the prevalence of substance use was higher among youth who worked, relative to those who did not. This association has been described nearly universally in prior studies across the world (Kaestner, Sasso, Callison, & Yarnoff, 2013; Leeman, Hoff, Krishnan-Sarin, Patock-Peckham, & Potenza, 2014; Osilla et al., 2013; Ramchand, Ialongo, & Chilcoat, 2007; Staff & Uggen, 2003; Valois, Dunham, Jackson, & Waller, 1999; Wakai, Miura, & Umenai, 2005; Wu, Schlenger, & Galvin, 2003). Several of these investigators have postulated that this is because working youth have the financial means to buy substances (Ramchand et al., 2007; Staff & Uggen, 2003; Wu et al., 2003), and they are more likely to be exposed to people in the workplace who use substances (Wu et al., 2003). Indeed, younger age groups in the current study had reduced odds of ever using cigarettes, waterpipes, and hashish, relative to youth > 16 years old. Nonetheless the youngest school youth group (age 12-14 vears) reported use of alcohol and other substance, an observation that is not unique to Egypt (see, for example, the report of the National Institute on Drug Abuse, 2014).

The strengths of this study include the inclusion of older and younger age groups and both girls and boys, facilitating comparisons of substance use between different age groups Schools were sampled across a wide and gender. geographical area within Egypt, in contrast to previous studies that were conducted mainly in Cairo and Alexandria. In addition, the use of trusted survey administrators from a well-regarded, non-governmental organization (Caritas-Egypt) encouraged participation. However, the study was limited to more accessible urban and suburban areas in Egypt, limiting the generalizability of the results to rural areas and more remote regions of the country. Additionally, the study only included students enrolled in and attending school. Children under the age of 12 were excluded, and therefore it was not possible to directly assess the onset of substance use, which could have started at younger ages. The crosssectional nature of the study also limited the observations to a single time point. Future research employing a prospective design could study the trajectories and changing patterns of substance use by youth.

The information gained from this survey-based study can be used to design evidence-based prevention interventions, using strategies that target children and early adolescents. The earlier youth start using substances, the higher their odds are of becoming an addict (Lynskey et al., 2003), and adolescent behavior concerning substance use is somewhat universal (Yabiku et al., 2010; Zeinali, Sharifi, Enayati, Asgari, & Pasha, 2011). Keeping children off the streets and in a good environment is paramount for primary prevention of substance use, which can lead to abuse and

addiction (National Institute on Drug Abuse, 2014). This requires collaborative efforts from families, schools, communities, and policy makers. Modeling behaviors, parental supervision, education, and limiting access to prescription and non-prescription drugs and other substances are approaches that can be implemented to prevent the onset of substance use in Egypt and elsewhere.

# **Acknowledgments**

The authors thank Dr. Nabiel Mikhail for data management services for this project. Administrative support was provided by Ms. Nandhini Natarajan, Ms. Hayam Abdel-Azimand, and Mr. Philip Samuel.

#### References

- Abou Eleinen, R., Mostafa, M., Ghanem, A-E., Elnaggar, E., & Elbayomy, A. (2008). Psychoactive drug use in toxicology unit patients in Mansoura Emergency Hospital, Egypt. Abstract retrieved from National Institute on Drug Abuse Abstracts Database: https://www.drugabuse.gov/international/abstracts/psy choactive-drug-use-in-toxicology-unit-patientsmansoura-emergency-hospital-egypt
- Afifi, M., Kariri, M., & El Susis, S. (2007). Smoking patterns and problems among male and female youth in Palestine. Abstract retrieved from National Institute Abstracts Database: Drug Abuse https://www.drugabuse.gov/international/abstracts/sm oking-patterns-problems-among-male-female-youthin-palestine
- Akl, E. A., Gunukula, S. K., Aleem, S., Obeid, R., Abou Jaoude, P., Honeine, R., & Irani, J. (2011). The prevalence of waterpipe tobacco smoking among the general and specific populations: A systematic review. BMC Public Health, 11, 244.
- Al-Afifi, M. F., Sakka, M., & Al-Afifi, R. (2011). Prescription drug abuse trends among school and university students in Gaza (Palestinian Territories). Abstract retrieved from National Institute on Drug Abuse Abstracts Database: https://www.drugabuse. gov/international/abstracts/prescription-drug-abusetrends-among-school-university-students-in-gazapalestinian-territories
- Al-Afifi, M. F., Sakka, M., & Al-Afifi, R. (2012). Trends of use of tramadol and Ecstasy among prescription drug users in Gaza (Palestinian Territories). Abstract retrieved from National Institute on Drug Abuse Database: https://www.drugabuse.gov/ international/abstracts/trends-use-tramadol-ecstasyamong-prescription-drug-users-in-gaza-palestinianterritories
- Al-Youm, A. (2012). Cairo at forefront of growing drug abuse problem in Egypt, research shows. Egypt Retrieved Independent. from http://www.egyptindependent.com/news/cairoforefront-growing-drug-abuse-problem-egyptresearch-shows

- Albsoul-Younes, A., Wazaify, M., Al-Motassem, Y., & Tahaineh, L. (2010). Abuse and misuse of prescription and nonprescription drugs sold in community pharmacies in Jordan. Substance Use & Misuse, 45, 1319-1329.
- Amin, T. T., Amr, M. A., Zaza, B. O., & Kaliyadan, F. (2012). Predictors of waterpipe smoking among secondary school adolescents in Al Hassa, Saudi Arabia. International Journal of Behavioral Medicine, 19, 324-335.
- Barnett, T. E., Curbow, B. A., Weitz, J. R., Johnson, T. M., & Smith-Simone, S. Y. (2009). Water pipe tobacco smoking among middle and high school students. American Journal of Public Health, 99, 2014–2019.
- Bejjani, N., El Bcheraoui, C., & Adib, S. M. (2012). The social context of tobacco products use among adolescents in Lebanon. Journal of Epidemiology & Global Health, 2, 15-22.
- Carroll, A. (2009). Imams, service providers and other community leaders: Nafis Salaam baseline survey of 21 stakeholders. Report submitted to Legacy Foundation. Retrieved from http://nafissalaamreports. blogspot.com/2009/04/nafis-salaam-baseline-surveyof-21.html
- Centers for Disease Control and Prevention. (2013). Youth Risk Behavior Surveillance System (YRBSS). Retrieved http://www.cdc.gov/HealthyYouth/data/yrbs/ index.htm
- Degenhardt, L., Chiu, W-T., Sampson, N., Kessler, R. C., Anthony, J. C., Angermeyer, M., . . . Wells, J. E. (2008). Toward a global view of alcohol, tobacco, cannabis, and cocaine use: Findings from the WHO World Mental Health Surveys. PLoS Medicine, 5, 141.
- Eitle, D. (2005). The moderating effects of peer substance use on the family structure-adolescent substance use association: Quantity versus quality of parenting. Addictive Behaviors, 30, 963-980.
- Elkoussi, A., & Bakheet, S. (2011). Volatile substance misuse among street children in Upper Egypt. Substance Use & Misuse, 46, 35–39.
- Fawzi, M. M. (2011). Some medicolegal aspects concerning Tramadol abuse: The new Middle East youth plague 2010. Egyptian Journal of Forensic Science, 1, 99-102.
- Hamdi, E., Gawad, T., Khoweiled, A., Sidrak, A. E., Amer, D., Mamdouh, R., . . . Loza, N. (2012). Lifetime prevalence of alcohol and substance use in Egypt: A community survey. Substance Abuse, 34, 97-104.
- Jablonska, B., & Lindberg, L. (2007). Risk behaviours, victimisation and mental distress among adolescents in different family structures. Social Psychiatry and Psychiatric Epidemiology, 42, 656-663.
- Kaestner, R., Sasso, A. L., Callison, K., & Yarnoff, B. (2013). Youth employment and substance use. Social Science Research, 42, 169-185.
- Kurtzman, T. L., Otsuka, K. N., & Wahl, R. A. (2001). Inhalant abuse by adolescents. Journal of Adolescent Health, 28, 170–180.
- Labib, N., Radwan, G., Mikhail, N., Mohamed, M. K., Setouhy, M. E., Loffredo, C., & Israel, E. (2007). Comparison of cigarette and water pipe smoking

- among female university students in Egypt. Nicotine & Tobacco Research, 9, 591-596.
- Leeman, R. F., Hoff, R. A., Krishnan-Sarin, S., Patock-Peckham, J. A., & Potenza, M. N. (2014). Impulsivity, sensation-seeking, and part-time job status in relation to substance use and gambling in adolescents. Journal of Adolescent Health, 54, 460-466.
- Loffredo, C. A., Boulos, D. N., Saleh, D. A., Jillson, I. A., Garas, M., Loza, N., . . . Amr, S. (2015). Substance use by Egyptian youth: Current patterns and potential avenues for prevention. Substance Use & Misuse, 50, 609-618.
- Lubman, D. I., Yücel, M., & Lawrence, A. J. (2008). Inhalant abuse among adolescents: Neurobiological considerations. British Journal of Pharmacology, 154, 316-326.
- Lynskey, M. T., Heath, A. C., Bucholz, K. K., Slutske, W. S., Madden, P. A. F., Nelson, E. C., . . . Martin, N. G. (2003). Escalation of drug use in early-onset cannabis users vs co-twin controls. JAMA: The Journal of the American Medical Association, 289, 427–433.
- Momtazi, S., & Rawson, R. (2010). Substance abuse among Iranian high school students. Current Opinion in Psychiatry, 23, 221-226.
- Mzayek, F., Khader, Y., Eissenberg, T., Al-Ali, R., Ward, K. D., & Maziak, W. (2012). Patterns of water-pipe and cigarette smoking initiation in schoolchildren: Irbid Longitudinal Smoking Study. Nicotine & Tobacco Research, 14, 448-454.
- National Institute on Drug Abuse. (2014). Drugs, brains, and behavior: The science of addiction. Retrieved from https://www.drugabuse.gov/publications/drugsbrains-behavior-science-addiction
- Omage, E. I., & Omage, M. I. (2012). Illicit drugs use and dependency among teenagers and young in Oredo Local Government Area, Benin City, Nigeria. European Scientific Journal, 8, 187-210.
- Osilla, K. C., Hunter, S. B., Ewing, B. A., Ramchand, R., Miles, J. N., & D'Amico, E. J. (2013). The effects of employment among adolescents at-risk for future substance use. Addictive Behaviors. 38, 1616–1619.
- Ramchand, R., Ialongo, N. S., & Chilcoat, H. D. (2007). The effect of working for pay on adolescent tobacco use. American Journal of Public Health, 97, 2056-2062.
- Staff, J., & Uggen, C. (2003). Fruits of good work: Early work experiences and adolescent deviance. Journal of Research in Crime and Delinquency, 40, 263-290.
- United Nations Office on Drugs and Crime (UNODC). (2012). World Drug Report 2012. Retrieved from http://www.unodc.org/unodc/en/data-and-analysis/ WDR-2012.html
- United Nations Office on Drugs and Crime (UNODC). (2016). World Drug Report 2016. Retrieved from http://www.eurad.net/en/World+Drug+Report+2016.9 UFRHYXF.ips
- Valois, R. F., Dunham, A. C., Jackson, K. L., & Waller, J. (1999). Association between employment and substance abuse behaviors among public high school adolescents. Journal of Adolescent Health, 25, 256-263.

- Viney, S. (2012). As drug addiction rises in Cairo, experts offer recommendations. Egypt Independent. Retrieved from http://www.egyptindependent.com/news/drugaddiction-rises-cairo-experts-offer-recommendations
- Wakai, K., Miura, H., & Umenai, T. (2005). Effect of working status on tobacco, alcohol, and drug use among adolescents in urban area of Thailand. Addictive Behavior, 30, 457–464.
- Wang, J., Simons-Morton, B. G., Farhat, T., & Luk, J. W. (2009). Socio-demographic variability in adolescent substance use: Mediation by parents and peers. Prevention Science, 10, 387-396.
- Warren, C. W., Jones, N. R., Peruga, A., Chauvin, J., Baptiste, J. P., Costa de Silva V., . . . Asma, S. (2008). Global youth tobacco surveillance, 2000-2007. Morbidity and Mortality Weekly Report, 25, 1–28.
- Welte, J. W., Barnes, G. M., Tidwell, M. C., & Hoffman, J. H. (2011). Tobacco use, heavy use, and dependence among adolescents and young adults in the United States. Substance Use & Misuse, 46, 1090-1098.
- Wu, L. T., Schlenger, W. E., & Galvin, D. M. (2003). The relationship between employment and substance use among students aged 12 to 17. Journal of Adolescent Health, 32, 5–15.
- Yabiku, S. T., Marsiglia, F. F., Kulis, S., Parsai, M. B., Becerra, D., & Del-Colle, M. (2010). Parental monitoring and changes in substance use among Latino/a and Non-Latino/a preadolescents in the Southwest. Substance Use & Misuse, 45, 2524–2550.
- Zeinali, A., Sharifi, H., Enayati, M., Asgari, P., & Pasha, G. (2011). The mediational pathway among parenting styles, attachment styles and self-regulation with addiction susceptibility of adolescents. Journal of Research in Medical Sciences, 16, 1105–1121.

Appendix 1 School Survey Form

					Governo	orate ID	School ID
Date	of School Survey	<u>/</u> Day	<u>/</u> Month	Year	-		
						1 – Rural	2 Urban
Nam	ne of School		Na	me of Governorat	e	Distr	rict (Circle only one)
1	Year of your birth?	Year	Yo	ur Age Now?			
2	Your gender?	1-Male	2-	Female	(Circle on	ly one)	
3	Do you work ?	1-Yes		No			
4	You live with whom now?	1- Mother and Father	2-Mother Only	3-Father Only	4-Grandparents	5- Other Relativ	es 6-Other
5	Number of brothers and sis	ters you have?	Nu	mber of Brothers		Number of Sisters	3

		1 Have you ever	2	3			0 1	5 On the days when	6	
	Substance	experimented with this, even once?	How old were you?	If you ever tried it before, why? (check all that apply)			month (30 days), you used this, on how many days how much did you did you use it? use?		From where did you get this substance? (Check all that apply)	
1	Cigarettes				Yes	No				
		1- Yes	Years	1-Curiosity	1	2	Days	Cigarettes	Bought it myself	
				2-Family used/offered it	1	2			Someone bought it for me	
		2- No		3-Friend used/offered it	1	2			Was given to me	
				4-To feel better	1	2			Other	
				5-Family problems	1	2				
				6-To make me feel older	1	2				
				7-To relieve traumatic experience	1	2				

	Substance	1 Have you ever experimented with this, even once?	2  How old were you?	During the pas month (30 days w old If you ever tried it before, why? on how many do		-	5 On the days when you used this, how much did you use?	6 From where did you get this substance? (Check all that apply)	
2	Shisha		•		Yes	No	•		
		1- Yes	Years	1-Curiosity	1	2	Days	Hagars	Bought it myself
				2-Family used/offered it	1	2			Someone bought it for me
		2- No		3-Friend used/offered it	1	2			Was given to me
				4-To feel better	1	2			Other
				5-Family problems	1	2			
				6-To make me feel older	1	2			
				7-To relieve traumatic experience	1	2			
3	Hashish				Yes	No			
3		1- Yes	Years	1-Curiosity			Days	Joints	Bought it myself
				2-Family used/offered it	1	2			Someone bought it for me
		2- No		3-Friend used/offered it	1	2			Was given to me
				4-To feel better	1	2			Other
				5-Family problems	1	2			
				6-To make me feel older	1	2			
				7-To relieve traumatic experience	1	2			
							1	2	
4	Bungo				Yes	No			
		1- Yes	Years	1-Curiosity	1	2	Days	number	Bought it myself
				2-Family used/offered it	1	2			Someone bought it for me
		2- No		3-Friend used/offered it	1	2			Was given to me
				4-To feel better	1	2			Other
				5-Family problems	1	2			
				6-To make me feel older	1	2			
				7-To relieve traumatic experience	1	2			

Substance	1 Have you ever experimented with this, even once?	2  How old  were you?	3  If you ever tried it before, (check all that apply)	)		4 During the past month (30 days), on how many days did you use it?	5 On the days when you used this, how much did you use?	6 From where did you get this substance? (Check all that apply)
5 Heroine	1 37	<b>3</b> 7	1.0.1.1	Yes	No	Б	,	D 1.11 16
	1- Yes	Years	1-Curiosity	1	2	Days	number	Bought it myself
			2-Family used/offered it	1	2			Someone bought it for me
	2- No		3-Friend used/offered it	1	2			Was given to me
			4-To feel better	1	2			Other
			5-Family problems	1	2			
			6-To make me feel older	1	2			
			7-To relieve traumatic experience	1	2			
6 Tramadol				Yes	No			
Tumuuoi	1- Yes	Years	1-Curiosity	1	2	Days	Pills	Bought it myself
			2-Family used/offered it	1	2			Someone bought it for me
	2- No		3-Friend used/offered it	1	2			Was given to me
			4-To feel better	1	2			Other
			5-Family problems	1	2			
			6-To make me feel older	1	2			
			7-To relieve traumatic experience	1	2			
Other				Yes	No			
medications for non-	1- Yes	Years	1-Curiosity	1	2	Days		
medical			2-Family used/offered it	1	2		pills	Bought it myself
purposes, like Apetryl	2- No		3-Friend used/offered it	1	2			Someone bought it for me
(strawberry)			4-To feel better	1	2			Was given to me
medications			5-Family problems	1	2			Other
for non			6-To make me feel older	1	2			
medical purposes like apetril stawberry			7-To relieve traumatic experience	1	2			

	Substance	1 Have you ever experimented with this, even once?	How old were you?	3  If you ever tried it before, (check all that apply			month (30 days), on how many days did you use it?	5 On the days when you used this, how much did you use?	6 From where did you get this substance? (Check all that apply)
8	Injected substances	1 37	V	1.0 : :	1	2	Yes	No	
	substances	1- Yes	Years	1-Curiosity	1	2	Days		
				2-Family used/offered it	1	2		Injection	Bought it myself
		2- No		3-Friend used/offered it	1	2			Someone bought it for me
				4-To feel better	1	2			Was given to me
				5-Family problems	1	2			Other
				6-To make me feel older	1	2			
				7-To relieve traumatic experience	1	2			
							Yes	No	
9	Gkue, petrol other	1- Yes	Years	1-Curiosity	1	2	Days		
				2-Family used/offered it	1	2		Inhalation	Bought it myself
		2- No		3-Friend used/offered it	1	2			Someone bought it for me
				4-To feel better	1	2			Was given to me
				5-Family problems	1	2			Other
				6-To make me feel older	1	2			
				7-To relieve traumatic experience	1	2			
10	Alcohol						Yes	No	
		1- Yes	Years	1-Curiosity	1	2	Days		
				2-Family used/offered it	1	2		Glass	Bought it myself
		2- No		3-Friend used/offered it	1	2		Cup	Someone bought it for me
				4-To feel better	1	2			Was given to me
				5-Family problems	1	2			Other
				6-To make me feel older	1	2			
				7-To relieve traumatic experience	1	2			

	Substan	7 Do you think if you want to quit you will	8 Have you tried to stop using this	9 Do any of your friends use this	Do you think it is harmful to	If you never tried it, why?		
1	Substance Cigarettes	be able to do so	substance?	substance?	your health?	(check all that apply)	Yes	No
	- <b>g</b>	1 V	1- Yes	1- Yes	1- Yes	1 I	1	
		1- Yes	1- Yes	1- Yes	1- Yes	1-I worried about health problems from it		2
						2-I saw the negative experience of others	1	2
		2- No	2- No	2- No	2- No	3-Just not interested	1	2
						4-Religious/moral reasons	1	2
						5-Didn't want to become addicted	1	2
						6-Advertising Warnings (TV and elsewhere)	1	2
						7-Didn't want family to find out	1	2
2	Shisha						Yes	No
		1- Yes	1- Yes	1- Yes	1- Yes	1-I worried about health problems from it	1	2
						2-I saw the negative experience of others	1	2
		2- No	2- No	2- No	2- No	3-Just not interested	1	2
						4-Religious/moral reasons	1	2
						5-Didn't want to become addicted	1	2
						6-Advertising Warnings (TV and elsewhere)	1	2
						7-Didn't want family to find out	1	2
3	Hashish						Yes	No
3	Hasinsii	1- Yes	1- Yes	1- Yes	1- Yes	1-I worried about health problems from it	1	2
						2-I saw the negative experience of others	1	2
		2- No	2- No	2- No	2- No	3-Just not interested	1	2
						4-Religious/moral reasons	1	2
						5-Didn't want to become addicted	1	2
						6-Advertising Warnings (TV and elsewhere)	1	2
						7-Didn't want family to find out	1	2
4	Bungo						Yes	No
7	8	1- Yes	1- Yes	1- Yes	1- Yes	1-I worried about health problems from it	1	2
						2-I saw the negative experience of others	1	2
		2- No	2- No	2- No	2- No	3-Just not interested	1	2

		7 Do you think if you	8 Have you tried to	9 Do any of your	10 Do you think it	11		
	Substance	want to quit you will be able to do so	stop using this substance?	friends use this substance?	is harmful to your health?	If you never tried it, why? (check all that apply)		
						4-Religious/moral reasons	1	2
						5-Didn't want to become addicted	1	2
						6-Advertising Warnings (TV and elsewhere)	1	2
						7-Didn't want family to find out	1	2
5	Heroine						Yes	No
		1- Yes	1- Yes	1- Yes	1- Yes	1-I worried about health problems from it	1	2
						2-I saw the negative experience of others	1	2
		2- No	2- No	2- No	2- No	3-Just not interested	1	2
						4-Religious/moral reasons	1	2
						5-Didn't want to become addicted	1	2
						6-Advertising Warnings (TV and elsewhere)	1	2
						7-Didn't want family to find out	1	2
6	Tramadol						Yes	No
v	114114401	1- Yes	1- Yes	1- Yes	1- Yes	1-I worried about health problems from it	1	2
						2-I saw the negative experience of others	1	2
		2- No	2- No	2- No	2- No	3-Just not interested	1	2
						4-Religious/moral reasons	1	2
						5-Didn't want to become addicted	1	2
						6-Advertising Warnings (TV and elsewhere)	1	2
						7-Didn't want family to find out	1	2
7	Other						Yes	No
	medications for	1- Yes	1- Yes	1- Yes	1- Yes	1-I worried about health problems from it	1	2
	non-medical					2-I saw the negative experience of others	1	2
	purposes, like Apetryl	2- No	2- No	2- No	2- No	3-Just not interested	1	2
	(strawberry)					4-Religious/moral reasons	1	2
	•					5-Didn't want to become addicted	1	2
						6-Advertising Warnings (TV and elsewhere)	1	2
						7-Didn't want family to find out	1	2

		7	8	9	10	11  If you never tried it, why? (check all that apply)		
	Substance	Do you think if you want to quit you will be able to do so	Have you tried to stop using this substance?	Do any of your friends use this substance?	Do you think it is harmful to your health?			
8	Injected						Yes	No
	substances	1- Yes	1- Yes	1- Yes	1- Yes	1-I worried about health problems from it	1	2
						2-I saw the negative experience of others	1	2
		2- No	2- No	2- No	2- No	3-Just not interested	1	2
						4-Religious/moral reasons	1	2
						5-Didn't want to become addicted	1	2
						6-Advertising Warnings (TV and elsewhere)	1	2
						7-Didn't want family to find out	1	2
9	Glue, petrol,						Yes	No
	other	1- Yes	1- Yes	1- Yes	1- Yes	1-I worried about health problems from it	1	2
						2-I saw the negative experience of others	1	2
		2- No	2- No	2- No	2- No	3-Just not interested	1	2
						4-Religious/moral reasons	1	2
						5-Didn't want to become addicted	1	2
						6-Advertising Warnings (TV and elsewhere)	1	2
						7-Didn't want family to find out	1	2
10	Alcohol						Yes	No
		1- Yes	1- Yes	1- Yes	1- Yes	1-I worried about health problems from it	1	2
						2-I saw the negative experience of others	1	2
		2- No	2- No	2- No	2- No	3-Just not interested	1	2
						4-Religious/moral reasons	1	2
						5-Didn't want to become addicted	1	2
						6-Advertising Warnings (TV and elsewhere)	1	2
						7-Didn't want family to find out	1	2