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RESEARCH ARTICLE

Prevalence of Strox Smoking Among University Students in Cairo, Egypt

Ahmed M. M. Hashim¹ , Ahmed M. Hassan¹ , Ghada Essam El-Din Amin¹  and Mohamed Farouk Allam^{1,2,*} 

¹Department of Community, Environmental and Occupational Medicine, Faculty of Medicine, Ain Shams University, Cairo, Egypt

²Department of Preventive Medicine and Public Health, Faculty of Medicine, University of Cordoba, Córdoba, Spain

Abstract:

Background:

In Egypt, the prevalence rate of New Psychoactive Substances (NPSs) use is severely underestimated. In the last 5 years, several non-scientific reports have demonstrated the presence of an emergent, cheap NPSs that has taken the name of “Strox” or “Egyptian Spice”. The objective of this study was to estimate the prevalence rate of Strox smoking among undergraduate students attending Ain Shams University (ASU), Cairo (Egypt).

Methods:

A cross-sectional study was conducted in five non-medical colleges of ASU, namely, Law, Commerce, Computer Science, Engineering, and Literature. Participants were recruited using a convenient sampling method and were asked about NPSs use. Data were collected using the Marijuana Smoking History Questionnaire (MSHQ) developed by Bonn-Miller and Zvolensky (2009). The questionnaire was translated and modified to reflect Egyptian slang and culture.

Results:

This study included 558 students, 422 (75.6%) males and 136 (24.4%) females. The results showed that 189 (33.9%) were current tobacco smokers, 51 (9.1%) were smokers of substances other than tobacco, 45 (8.1%) were cannabis smokers, 38 (6.8%) were Strox smokers, and 3 (0.5%) were Voodoo smokers. When students were asked about their reasons for smoking Strox, they cited the following motivations: to achieve a feeling of euphoria(28.9%), depression (23.7%), experimentation (23.7%), peer pressure (21.1%), and having excess money (2.6%). The results showed a clear association between tobacco and cannabis smoking and consumption of Strox.

Conclusion:

Although the prevalence rates of NPSs usage as observed in this study were not high, higher rates could be expected in other communities outside of the university. Community-based studies are needed to estimate the magnitude of NPSs use in Egypt and the associated risk factors.

Keywords: Smoking, Cannabis, Strox, Voodoo, Drug use, Prevalence.

Article History

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1. INTRODUCTION

Substance Abuse (SA) is considered one of the major health problems that has been faced by humanity in the last few decades [1]. A globally applicable definition of SA is a matter of much debate; however, according to the WHO, SA is defined as the harmful or hazardous use of psychoactive substances, including alcohol and illicit drugs. Abuse of different substances, legalized or not, is noted as an important cause of morbidity and premature deaths [2 - 4]. In 2016, an

estimated 6.8% of the Egyptian population over the age of 15 years regularly engaged in substance abuse [5].

As a result of authorities' and communities' restriction of legalized drug use together with the criminalization of many substances previously abused freely [6 - 8], a new beast has reared its ugly head: New Psychoactive Substances (NPSs) [9]. According to the UNODC (United Nations Office on Drugs and Crime), NPSs are defined as substances of abuse, either in a pure form or a preparation, that are not controlled by the 1961 Single Convention on Narcotic Drugs or the 1971 Convention on Psychotropic Substances but which may pose a public health threat. Despite global efforts to control NPSs, approximately 739 different NPSs were reported between 2009

* Address correspondence to this author at the Department of Community, Environmental and Occupational Medicine, Faculty of Medicine, Ain Shams University, 11566 Abbasia, Cairo, Egypt; Tel: + (2) 011 43559946; Fax: +(202) 24346888; E-mail: farouk.allam@med.asu.edu.eg

and 2016. In 2015 alone, 500 different NPSs were in the market [10]. The explosion of NPS abuse has been attributed to the internet revolution, together with the attractive, colorful designs of the packaging, which make NPSs appealing to young people [11].

In Egypt, the prevalence rate of NPSs use is seriously underestimated. In the last 5 years, several non-scientific reports have demonstrated the presence of emergent, cheap NPSs called “Strox” or “Egyptian Spice”. Other NPSs, like Voodoo, were also reported but to a lesser extent. In 2017, the hotline of addiction treatment under the Ministry of Social Solidarity (MOSS) reported that 4.3% of the 10,400 cases seeking medical support were Strox-related [12]. In April 2018, the frequency of hotline contacts who were Strox addicts increased by more than five-fold, reaching 22% of the total 6948 who contacted the hotline [13]. No comprehensive studies were conducted in Egypt about to what degree it causes dependence.

The objective of the present cross-sectional study is to estimate the prevalence rate of Strox smoking among undergraduate students in 5 non-medical colleges of Ain Shams University (ASU), Cairo (Egypt).

2. METHODOLOGY

2.1. Study Setting

5 non-medical colleges of ASU were randomly selected: Law, Commerce, Computer Science, Engineering, and Literature. ASU, the third Egyptian university, was founded in July 1950, and it is located in the center of Cairo.

2.2. Study Period

March 2018.

2.3. Study Population

Undergraduate students attending the five colleges mentioned above were included in the study.

2.3.1. Inclusion Criteria

Undergraduate students, male or female, attending one of five non-medical colleges (Law, Commerce, Computer science, Engineering, and Literature) of ASU.

2.3.2. Exclusion Criteria

Graduate students, undergraduate students in colleges other than the abovementioned colleges, or graduate or undergraduate students at any university other than ASU. Students who refused to participate in the study.

2.4. Sampling Method

Participants were recruited using a convenient sampling method on which the interviewers visited each college and invited the students randomly to share in the study after clarifying the aim of the study, on the campus outdoor setting in front of the targeted college.

2.5. Sample Size

The sample size was calculated according to the results of the Egyptian Fund to Fight and Treat Drug Addiction and Abuse study, which was conducted in 2018 [13].

- Total number of students in the 5 non-medical colleges of ASU: Approximately 65,000.
- Expected prevalence rate: 22%
- Level of confidence (1 - Alpha Error): 95%
- Accuracy: 5%
- Provisional sample size: 263

Sample size was calculated using EPIDAT software version 4.1.

Because no previous study was conducted about the prevalence of strox smoking among university students in Egypt, the researchers decided to double the number of the estimated sample size (total 526). The final sample size was augmented to 558 students.

2.6. Ethical Considerations

Oral verbal informed consent was obtained from every participant, and confidentiality was ensured. Confidentiality measures that were applied in this research included the following: 1) Name, phone number or any type of personal identification were not required or even existed in the form; 2) the interviewers were instructed not to attend the process of filling of the form by the participants (in the nearby, but not closely attending); 3) All the participants were instructed to deliver their response directly into a box full of other participant responses; 4) The interviewers were trained by the corresponding author (MFA) about the common pitfalls that can breach the participant confidentiality.

This study was approved by the Ethical Committee of Ain Shams Medical School.

2.7. Study Procedures

The questionnaire was administered by 28 interviewers (medical fellow students) who had been previously trained for 1 day regarding how to complete the questionnaire for the participants. Students who agreed to participate in the study filled the form on their own with the interviewer in the nearby (but not closely attending) to resolve any query of the participant. The number of students that refused to participate in the study was 16.

2.8. Study Tools

Data were collected using the Marijuana Smoking History Questionnaire (MSHQ) developed by Bonn-Miller and Zvolensky (2009) [14]. This questionnaire was previously used and validated in previous studies [15 - 17]. The questionnaire was translated with back-to-back translation and modified to reflect Egyptian slang and culture. A section for MSHQ was added to include the sociodemographic data of the interviewed students.

2.9. Statistical Analysis

A data entry screen was created using Microsoft Excel. Data were checked, coded, and entered into the computer. Double data checking was performed. First, the following descriptive statistics were calculated: frequency, percent, mean and standard deviation. Thereafter, comparisons were performed using Student’s t-test for continuous variables and Pearson’s Chi square test/Fisher’s exact test for categorical variables. The level of significance was set at $p \leq 0.05$.

2.10. Statistical Package

Statistical analyses were performed using the Statistical Package for the Social Sciences (SPSS) version 23.0.

3. RESULTS

This study included 558 students, 422 (75.6%) males and 136 (24.4%) females. This opportunistic sample of undergraduate students was recruited from 5 colleges: Computer science, 87 students (64 males and 23 females); Business, 94 students (69 males and 25 females); Law, 146 students (126 males and 20 females); Literature, 167 students (111 males and 56 females); and Engineering, 64 students (52 males and 12 females).

Participants were students in the following years: first year, 233 students; second year, 139 students; third year, 100 students; and fourth year, 86 students. No statistically significant difference was found between academic year and gender (p -value 0.38).

The obtained results showed that 189 students (33.9%) were current tobacco smokers, 51 (9.1%) were smokers of substances other than tobacco like marijuana, 45 (8.1%) were cannabis smokers, 3 (0.5%) were Voodoo smokers, and 38 (6.8%) were Strox smokers. Table 1 shows the gender distribution of smokers of tobacco, substances other than tobacco, cannabis, Voodoo, and Strox. This table clearly shows the higher prevalence rate of smoking different substances among males than females.

Table 1. Comparison between males and females with regard to smoking of tobacco, substances other than tobacco, cannabis, Voodoo and Strox.

| Current smoker of/Gender | Male (%) | Female (%) | P value |
|--|-----------|------------|---------|
| Tobacco | 181(42.9) | 8(5.9) | 0.000 |
| Substance other than tobacco, like marijuana | 48(11.4) | 3(2.2) | 0.001 |
| Cannabis | 43(10.2) | 2(1.5) | 0.001 |
| Voodoo | 3(0.7) | 0(0) | 0.324 |
| Strox | 36(8.5) | 2(1.5) | 0.004 |

Upon asking the 38 students smoking Strox their reasons for engaging in that unhealthy practice, they stated the following motivations: to feel euphoria [11 (28.9% Strox smokers], depression [9 (23.7% Strox smokers], experimentation [9 (23.7% Strox smokers], peer pressure [8 (21.1% Strox smokers], and having excess money [1 (2.6% Strox smoker].

Table 2 shows a clear association between tobacco

smoking and the consumption of Strox. The same clear association was observed between cannabis smoking and consumption of Strox.

4. DISCUSSION

The main aim of the present study was to shed light on the prevalence rate of NPSs like Strox use among undergraduate students attending five non-medical colleges in Cairo, Egypt. Undergraduate university students were selected because it is expected that their educational level could be protective against NPSs use.

Before reaching conclusions based on the present results, it is necessary to consider a number of potential objections to the methodology. This study included a specific population, undergraduate university students from non-medical colleges, thus, the results could not be generalized. Furthermore, in a cross-sectional study about NPSs consumption, the possibility of an artefact, like selection bias (university students have high educational level) or systematic bias (university students consuming NPSs may not attend lectures in their colleges), could not be excluded. The stigma of using NPSs among undergraduate university students could underestimate the prevalence rates of cannabis, Voodoo, and Strox smoking.

Table 2. Association between Strox, gender, tobacco, cannabis and voodoo smoking among the participating students.

| Variable/Strox Smoking | Strox Positive (N=38) | Strox Negative (N=520) | P value |
|------------------------|-----------------------|------------------------|---------|
| Female, N (%) | 2 (5.3) | 134 (25.8) | 0.003 |
| Tobacco, N (%) | 34 (89.5) | 155 (29.8) | <0.001 |
| Cannabis, N (%) | 21 (55.3) | 24 (4.6) | <0.001 |
| Voodoo, N (%) | 3 (7.9) | 0 (0) | <0.001 |

It is unlikely that stigma would have impeded the credibility of the response, however, all responses were collected anonymously, with answers placed in a box full of other responses. Similarly, other factors, like incentives to encourage false positive responses or fear of legal consequences, were eliminated, given the methods of data collection.

The use of NPSs, also called legal Spice, is an alarming global problem that has become more marked in the last few decades [18]. Despite the great efforts that have been made to diminish their skyrocketing use, the number of NPSs is still increasing together with the number of users [19].

In Egypt, very few studies, if any, have been carried out to estimate the magnitude of NPSs like Strox or Voodoo use at the community level.

The present study showed that the prevalence rate of Strox usage among undergraduate students at Ain Shams University was less than 7%, while Voodoo usage did not reach 1%. A study investigating the prevalence rate of other NPSs(Spice, K2) among US college students from two different universities reported a higher prevalence rate of 17% [20]. Although the prevalence rates of NPSs usage in this study were not high, higher rates could be expected in other communities beyond

the university, as denoted by a recent report of the Egyptian Fund to Fight and Treat Drug Addiction and Abuse [13].

Indeed, these large differences in NPSs use between Egypt and the USA should be considered with caution, as fear of social stigma is considered a barrier to reporting substance use and seeking treatment [21], especially in eastern countries known for strict social control [22].

The prevalence rate of substance use was significantly higher among males than females, with significant differences for tobacco, cannabis, and Strox. In general, males are known for their greater tendency to engage in drug and substance abuse [23, 24]. The gender-based difference may be even more pronounced in the case of NPSs use. In this study, males represented 94.7% of Strox smokers while females were 5.3%. These results are consistent with a previous study reporting a high prevalence of NPSs use among males (68%) compared to that among females [20]. These results are also in line with other Egyptian community-based reports of substance use, demonstrating a higher prevalence among males [25].

Of note, about one-fourth (23.7%) of Strox smokers reported depression as the main cause for its consumption, this could imply a need for better mental health services in the Egyptian colleges.

Tobacco, the most prevalent hazardous substance used worldwide [26], is known not only for its adverse cardiopulmonary effects [27] but also for its ability to increase the risk of other substance use disorders, such as use of gateway substances [28 - 30]. It was found that 89.5% of Strox smokers were also tobacco smokers (p value <0.001). These results are identical to previously published data, indicating that all NPSs addicts were tobacco smokers [31].

In addition to tobacco, cannabis is considered another major gateway substance [32]. The percentage of dual smokers of both cannabis and NPSs was 55.3%, with a highly significant association (p value <0.001). It has been previously reported that more than 86% of NPSs users smoke cannabis on 5 or more days per week [31].

These results call for health education programs for college students and establishing college policies against drug consumption, especially NPSs.

In general, Egypt lacks studies about drug use, especially the use of cannabis and NPSs. New community-based studies are needed to estimate the magnitude of NPSs use in Egypt and the associated risk factors.

CONCLUSION

1. The prevalence of Strox use among college students was almost as high as the prevalence of cannabis use.

2. Strox use was more prevalent among males.

3. Strox users were likely to be smokers of tobacco and cannabis.

4. The most prevalent reason for smoking Strox was to feel euphoria, but that this was closely followed by depression, experimentation, and peer-pressure.

ETHICS APPROVAL AND CONSENT TO PARTICIPATE

This study was approved by the Ethical Committee of Ain Shams Medical School, Egypt.

HUMAN AND ANIMAL RIGHTS

Not applicable.

CONSENT FOR PUBLICATION

Oral verbal informed consent was obtained from every participant, and confidentiality was ensured.

AVAILABILITY OF DATA AND MATERIALS

The authors confirm that the data supporting the findings of this study are available within the article.

FUNDING

None.

CONFLICT OF INTEREST

The authors declare no conflict of interest, financial or otherwise.

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