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Abstract

Background: Addictive behaviours are a major public health problem, especially among adolescents, who are susceptible to experiencing multiple co-occurring addictions.

Aim: To assess the prevalence of addiction problems and co-occurrences of addictive behaviours (substance abuse, problematic video gaming and social media addiction) and disorders among high school students in Sousse, Tunisia.

Methodology: A cross-sectional study was conducted in 2018 in public high schools, in the urban area of Sousse, Tunisia. A structured self-administered questionnaire was used to obtain relevant information from the students. Statistical analysis was performed using SPSS version 10 and confidence intervals of 95% were calculated. Chi-square test was used to compare qualitative variables and multinomial regression was conducted to determine independent factors related to the number of addictive behaviour co-occurrences.

Results: Of the 1399 high school students, 60.5% were girls and mean age was 17 ± 2.28 years. Analysis of single addiction problems revealed 20.9% prevalence for all tobacco products, 10.1% for alcohol, 7.0% for all drugs, 36.1% for Facebook, and 35.3% for video games. Analysis of co-occurring addiction problems showed that 46.0% of the study population had 1 addiction problem, 12.2% had 2 addiction problems, 4.5% had 3, and 2.7% had the maximum number of 4 addiction problems. Multinomial regression showed an increase in

co-occurrence of addiction problems among boys (aOR = 217.004; P

Conclusion: The rate of co-occurrent addictions among adolescents in Sousse, Tunisia, is alarming. Problematic use of Facebook, gaming and tobacco use were the most frequent addictive behaviours. There is an urgent need for effective and multisectoral programmes to prevent addictions among children in Tunisia and other countries in the Middle East and North Africa Region.

Keywords: Addiction, addictive behaviour, co-occurrence, video gaming, substance abuse, social media, Tunisia, MENA

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Introduction

Adolescence is a transitory period characterised by physiological, physical, and emotional changes. It is a stage of maturation and complex psychological evolution (1,2). During this phase, adolescents grow gradually, seek to be independent from their parents, join a circle of peers, and try to affirm their own desires by experimenting with new ways to explore their existence (3). Teenagers also seek new experiences (4) and may engage in a range of risky behaviours (5). WHO estimates that 70% of premature deaths among adults worldwide are the result of potentially addictive behaviours that began during adolescence (6), such as the consumption of psychoactive substances and a gaming disorder (7). Generally, people with a gaming disorder are more exposed to sedentary behaviour and insomnia, and other addictive behaviours like smoking, drinking, and cannabis use, which increases the risk of premature death.

Addictive behaviours are chronic relapsing health conditions and have harmful effects on individuals and populations (8). These behaviours have been associated with higher morbidity and mortality rates, financial damages, and an increase in economic and social costs (9). Addiction is a major public health challenge, especially among adolescents (3,10). Adolescents aged 18 to 25 years are the most vulnerable, exhibiting a higher prevalence of addictive behaviours (11,12). The morbidity and mortality associated with disorders due to substance abuse among teenagers has become a global pandemic (12,13). Persons living with problems due to substance abuse generally tend to have other addictive behaviours (14). This co-occurrence is increasingly more frequent among teenagers (4) and can generate a panoply of negative consequences (15).

Substance abuse has physical consequences, and a key role role in the occurrence of serious diseases such as cancer, heart disease, cerebrovascular diseases, chronic bronchopulmonary diseases, HIV, and mental health disorders (5,7,14). Video game and Facebook addiction can result in decreases in academic performance, self-esteem and self-confidence, and interfere with a student's engagement with real life (15–18).

Studies have shown that the prevalence of addictive behaviours in the Eastern Mediterranean Region (EMR) and in Tunisia is a public health concern and is increasing (19,20). The Survey Project on the Consumption of Alcohol and Other Drugs in Mediterranean Schools (MedSPAD) showed that the prevalence of tobacco use among adolescents in Tunisia increased from 22.6% in 2013 to 25.1% in 2017 (19). The national study also confirmed the upward trend of different types of psychoactive substance abuse among pupils aged 15 to 17 years, and the excessive use of the internet, gambling, and violence (19). The same survey showed a 17% prevalence of tobacco use in Morocco in 2013 (19).

Addictive behaviours result from a variety of interactions between an individual, their environment, and an object of dependence (21,22). Different personality traits such as individual risk factors, such as low self-esteem, lack of self-confidence, shyness, excessive emotional reactions, difficulties facing problems, and anxiety or depressive disorders, can also lead to addictive behaviour (23).

Many studies have reported the prevalence of addictive substance abuse or behaviours in Tunisia (24–26). In the Sfax Region, the prevalence of alcohol consumption was 8.8% among students aged 13 to 21 years in 2016 (24). Among nursing students in Sousse, this prevalence was 50% among men and 4.5% among women (25). A 2013 cross-sectional study conducted

among nursing students in private and state institutions in Sousse showed a prevalence of current alcohol consumption of 7.6% (25). The prevalence of addictive substance abuse and tobacco use among those consuming alcohol was 90.3% and 55.3%, respectively (26).

Studies that concurrently examined the co-occurrence of addictive behaviours during adolescence are lacking, especially in low- and middle-income countries (LMICs). In this context, our study aimed to assess the prevalence of addiction problems and to determine the prevalence of co-occurrences of addictions among high school students, and their association with socio-demographic characteristics and mental health problems.

Methods

Study design and setting

In 2018, we conducted a cross-sectional study in public high schools in the urban area of Sousse, Tunisia.

Sousse is the third largest city in Tunisia. It is the capital of the Sousse Governorate and the Tunisian Sahel. The city has 271 428 inhabitants, according to the last national census (2014) (27). It is a coastal city in the central-east of the country and is part of the Mediterranean.

Study population

The target population for the study was high school students.

In order to estimate the required sample size, we used Epi Info v. 6 software while assuming a prevalence of 26% for smoking (28) as it gave the largest needed sample compared with other factors, a 95% confidence interval, and a 4.5% precision level. Assuming a 20% possibility of subjects declining to participate, the estimated sample size was 1314 adolescent students.

From a list of 10 eligible high schools (number of students > 500) in Sousse, the Department of Epidemiology research team, from the University Hospital Farhat Hached, randomly selected 4 schools for the calculated sample size. Based on the number of students in each school and in each grade within the selected school, we calculated the sample needed for recruitment in each school and in each grade. A total of 59 classes, out of 114, were randomly selected from the 4 schools. All the students in those selected classes were invited to participate in the study by the research team.

The distribution of students in the selected schools is presented in Table 1 .

Data collection

Before starting data collection, we obtained permission from the regional directorate of education and the directors of the selected schools. Classes were randomly selected within the schools. Two weeks before data collection, we informed the teachers and students of the study's objectives and distributed an informed written consent to be signed by parents and returned to the school's administration. We also provided the contact details for the Department of Epidemiology at the University Hospital Farhat Hached for anyone wanting further information. Students refusing to participate or whose parents did not consent were excluded from the study.

In order to minimise the disruption of regular class schedules, we coordinated with the school supervisor and the teachers to determine the schedule for data collection.

Data collection was conducted from 5 February to 14 March 2018. Students completed self-administered questionnaires in their classrooms during regular class sessions.

Prior to data collection, the questionnaire was tested on a group of students from the selected high schools. Responses from this group was not included in the data analysis.

At the start of the survey, trained research staff introduced the study's purposes and assured students about data confidentiality and anonymity.

The pre-tested questionnaire was self-administered in classrooms in the presence of a trained investigator. A student needed about 30 minutes to complete the questionnaire. After filling the questionnaire, a physical examination (including measuring height, weight, and blood pressure) was performed by the medical team. The medical team consisted of family doctors, residency trainees of preventive and community medicine, and a nurse, and was supervised by a specialist doctor in preventive and community medicine.

The questionnaire allowed us to collect data on the socio-demographic characteristics of the

students and their parents (occupation, level of education etc.), psychoactive substance use, video game addiction, Facebook addiction, and mental health disorders (depression, anxiety, alexithymia, and low self-esteem).

The game addiction scale (29) was translated into Arabic (30); validated by experts (epidemiologists, psychiatrics, English teachers); and pretested.

We used a 21-item questionnaire representing 7 Diagnostic and Statistical Manual of Mental Disorders (DSM)-based criteria for game addiction: salience, tolerance, mood modification, withdrawal, relapse, conflict, and problems. The addiction scale investigates behaviours over the course of 6 months and rates them on a 5-point Likert scale (1=never, 2=very rarely, 3=sometimes, 4=often, 5=very often) (29).

The overall score can range from 21 to 105 with a cutoff score ≥ 4 on 7 items. The scale showed high reliabilities with a Cronbach's alpha of 0.94 in the first sample and 0.92 in the second sample (31). The Cronbach's alpha in our sample was 0.95.

A Facebook addiction disorder was assessed using the brief version of the Bergen Facebook Addiction Scale (BFAS), which was developed by Andreassen et al. (32). It includes 6 items reflecting the basic elements of addiction and rates them on a 5-point Likert scale (1=very rarely, 2=rarely, 3=sometimes, 4=often, 5=very often). The total score ranges from 6 to 30. Subjects who score 3 points or more in at least 4 of the 6 items are considered as having a Facebook addiction. The internal scale reliability of the brief version was found to have a Cronbach's alpha of 0.83/0.86 (33). The original short version of BFAS was translated into Arabic and validated among adolescents in a previous study, with a Cronbach's alpha of 0.87. It showed good psychometric proprieties as the long version (34). This Arabic version was adopted for our study.

We measured self-esteem and self-concept using the Rosenberg Self-Esteem Scale (RSES) and studied 2 aspects: 'positive self-esteem' and 'negative self-esteem' (35). The RSES is a widely used scale to measure self-esteem with a Cronbach's alpha of 0.7 in our study. Items 1, 2, 4, 6, and 7 (feeling valuable, belief of having good qualities, being able to excel in things like others, having a positive view regarding myself, satisfied with myself) belonged to the 'positive self-esteem' aspect. Items 3, 5, 8, 9 and 10 (feeling like a loser, not proud of myself, feeling useless, lacking respect for myself, and feeling a failure) belonged to the 'negative self-esteem' aspect (35).

Each item in this questionnaire has 4 response options (1=strongly agree, 2=agree, 3=disagree, 4=strongly disagree), offering a score range of 10 to 40. Lower negative self-esteem scores indicate higher self-esteem, while lower positive self-esteem scores indicate higher negative self-esteem.

We considered adolescents with a score:

from 35 to 40: having high self-esteem

from 31 to 34: having median self-esteem

less than 30: having low self-esteem

Depression was measured using an Arabic version of the Beck Depression Inventory-Second Edition, which contains 42 items rated on a 4-point Likert scale (0=did not apply to me at all, 3=applied to me very much or most of the time) (36). The scale score ranges from 0 to 39 and higher scores indicate a higher level of depression. The scale has solid psychometric characteristics and a good capacity to distinguish depressed people from non-depressed people (37). The Cronbach's alpha in our study was 0.84.

We considered students with a score:

of 16 and more: having a severe depression

from 8 to 15: having a moderate depression

from 4 to 7: having a mild depression

from 0 to 3: having a depression

Emotional self-awareness was measured using the 20-item Toronto Alexithymia Scale (TAS-20) (37). The TAS-20 is the most used instrument for assessing alexithymia. The scale showed good reliability and factorial validity (38). In our sample, the Cronbach's alpha was 0.8.

Alexithymia is a term used to describe emotional self-awareness. It is defined as the ability of someone to identify and describe their own feelings. This scale yields 3 factors (the difficulty of identifying feelings, the difficulty of describing feelings, and externally oriented thinking).

The scale includes 21 items rated on a 5-point Likert scale (1=strongly agree, 2=agree, 3=neither agree nor disagree, 4=disagree, 5=strongly disagree). A score between 52 and 60 indicates possible alexithymia, and a score ≥ 61 indicates alexithymia.

Anxiety was measured using the Screen for Child Anxiety Related Disorders (SCARED-C) (39).

The SCARED-C was used to assess different types of anxiety disorders among adolescents (39). Based on criteria in the DSM-IV, the SCARED-C consists of 5 subscales: generalised anxiety disorder, separation anxiety disorder, panic disorder, social phobia, and school phobia. It is a 41-item, self-report scale. Each item is rated on a 3-point Likert scale (0 =not true, 1 =sometimes true, 2 =very true or often true). The total score was calculated by summing the responses to the 41 items, and it ranges from 0 to 82 (39).

A total score ranging between 25 and 30 indicates the possibility of an anxiety disorder, while a total score of at least 31 indicates an anxiety disorder.

A score ≥ 7 for items 1, 6, 9, 12, 15, 18, 19, 22, 24, 27, 30, 34, 38: having a panic disorder.

A score ≥ 9 for items 5, 7, 14, 21, 23, 28, 33, 35, 37: having a generalised anxiety disorder.

A score ≥ 5 for items 4, 8, 13, 16, 20, 25, 29, 31: having separation anxiety.

A score ≥8 for items 3, 10, 26, 32, 39, 40, 41: having a social phobia.

A score ≥3 for items 2, 11, 17, 36: having school avoidance.

An Arabic version of the SCARED-C was used in our study, as it showed good psychometric properties when applied to a Lebanese clinical sample (40). In our study, the Cronbach's alpha was 0.913.

Variable definitions

A "cigarette user" was defined as a person who consumed ≥ 1 cigarette per day in the past 30 days.

A "waterpipe user" was defined as a person who used a waterpipe at least once in the past 30 days.

An "e-cigarette user" was defined as a person who used an e-cigarette on ≥1 day in the past 30 days.

"Tobacco use" was defined as the sum of cigarette, waterpipe, and e-cigarette usage.

Alcohol use" was defined as drinking alcoholic beverages (beer, wine, whiskey, or other alcohol liquids) in the past 30 days.

"Drug abuse" was defined as the sum of diluent, glue, paint, cannabis, Artane, Subutex, and other drugs usage.

"Other drugs" was defined as the sum of cocaine, heroin, ecstasy, ketamine, fentanyl, or other addictive substance usage.

“Poly-tobacco use” was defined as the use of 2 or more tobacco products (41), consumed at the same time or sequentially, in the past 30 days.

“Poly-drug use” was defined as the use of more than 1 drug or type of drug by an individual, consumed at the same time or sequentially (42), in the past 30 days.

“Co-occurring addiction problem” as defined as the presence of more than 1 type of addictive substance use and addictive behaviour, in the past 30 days.

The employment categories were defined as follows:

Worker: labourer or a person working in a factory.

Liberal profession: any professional activity conducted independently by a single person,

without control from a hierarchy.

State officer or employee: any person, other than a special State officer or employee, holding an office or employment in a State agency.

Senior staff: a manager or an administrative executive.

Statistical analysis

Statistical analysis was conducted using SPSS version 10.

The absolute and relative frequencies were provided for the qualitative variables. Confidence intervals of 95% were calculated. Comparisons between independent groups were conducted using chi-square tests.

To evaluate the most frequent tobacco product combinations and drug combinations, the ratio between the observed and expected prevalence was calculated for each possible combination, as described by Schuit et al. (43). The observed prevalence was identified in our sample. The expected prevalence was calculated by multiplying the individual probabilities of each problem addiction based on their occurrence in the studied population.

We added the addictions (tobacco, illicit addictive substances, alcohol, Facebook, and gaming) 1 at a time and created 5 aggregations of addiction problems from 0 to 4. Given the low number of simultaneous occurrences of 4 addictions, the last 2 categories have been associated.

Multinomial regression was conducted to determine the independent factors related to the number of co-occurring addictive behaviours (coded: none [0], 1 [1], 2 [2], 3 or more [3]). The results of factors associated to the number of co-occurring addictions were expressed by their adjusted odds ratio (aOR) and its 95% confidence interval. All variables with a P value ≤ 0.2 were included in the model.

Significance level P was set at P ≤ 5%.

Ethical considerations

The study protocol was approved by the Ethics Committee of the University Hospital Farhat Hached in Sousse, Tunisia.

Informed consent was obtained from parents before data collection. Students were also asked for their consent.

Results

The study population comprised 1399 high school students of whom 61.5% were girls. The mean age was 17 ± 2.28 years. Participants aged 16 to 18 years represented 47.2% and those older than 18 years represented 14.5%. The response rate of our population was 86.68%.

Regarding the distribution of participants based on study level, 26.7% were in their fourth year of secondary school and 26.3% in their first year (Table 2).

In terms of parents' education levels, 41.6% of the participants' fathers and 36.5% of the participants' mothers held university degrees. With regards to their occupations, 30.8% of the students' fathers were State officers, while 50.8% of the students' mothers were housewives.

The socio-demographic characteristics of the study population are presented in Table 2 .

Prevalence of addictive behaviours among high school student

Regarding the prevalence of substance abuse, tobacco accounted for 20.9%. Cigarettes were the most commonly used tobacco product among high school students, with a prevalence of 14.1%. Boys were more likely to smoke than girls (38.4% vs 9.2%; P Table 3).

Among all the participants, 10.1% reported that they had used alcohol. Boys were more likely to drink alcohol than girls (22.1% vs. 2.2%, P Table 3).

Of the sample, 35.3% of the high school students were addicted to video games. The prevalence of Facebook addiction was 36.1%. Boys were more likely to be addicted to video games than girls

(54.4% vs. 22.8%, P Table3).

Co-occurrence of addiction problems among high school students and associated factors

Among adolescents, 34.6% had 0 addiction problems, while 2.7% had the maximum number of 4 addiction problems. The most prevalent group was 1 addiction problem, accounting for 46% of the total (Table 4).

The observed and expected prevalence of addiction problems are presented in Table 4. The proportion of subjects with 3 and 4 addictions was higher than expected, based on the individual frequencies (observed and expected ratio =2.0 and observed and expected ratio =24.5, respectively) (Table 4).

The greatest degree of clustering was observed in 2 addiction problems, represented by tobacco use and alcohol use (observed and expected ratio: 2.6), followed by a combination of alcohol and drugs use (observed and expected ratio: 1.0) (Table 4).

As for the co-occurrence of 3 addiction problems, the combination of tobacco, alcohol, and drug use showed the highest degree of clustering with a ratio of 10, followed by the combination of video games and Facebook addiction, tobacco use, and drug use, with a ratio of 2.1 (Table 4).

In Table 5, we added the addictions 1 at a time and created 5 aggregations of addiction problems rated from 0 to 4.

Statistically significant associations (P

The prevalence of 2 and more than 3 addiction problems was higher among boys than girls, 20.2% vs. 6.9% and 17% vs. 0.6% (P Table 5).

Fourth-grade students had the highest percentage (37.2%) of aggregated ≥3 addiction problems. The association of ≥3 addiction problems was higher among participants who had repeated a grade than among those who had not repeated a grade; 53.2% vs. 46.8%, respectively (Table 5).

The high school students who had 3 or more addictions were more likely to have lower scores on the self-esteem scale; 45.7% compared to students with no addiction problem (30.6%). Students who had ≥3 addiction problems presented symptoms of a moderate or severe depression more frequently (61.7%) than the other addiction groups. The students who had an aggregation of 3 or more addictions were more likely to be anxious (Table 5).

Multiple logistic regression

The results of multinomial regression are presented in Table 6 .

In our population, boys were 3.3 times more likely to have 1 addiction than girls (aOR = 3.37; CI95%[2.42;4.70]; P

Students who had not repeated a grade had less risk of being addicted to 1 or more behaviours.

Non-depressive adolescents had a lower risk of experiencing the co-occurrence of 2 or more addictions. Compared to anxious students, having no anxiety was associated with less risk of any type of addiction. The same observation was seen with alexithymia (Table 6).

Discussion

Our study included a random sample of 1399 high school students of whom 61.5% were girls. The response rate of our population was 86.68%. The prevalence of tobacco use among adolescents was 20.9%. Cigarettes were the most commonly used tobacco product (14.1%). Boys were more likely to smoke than girls (38.4% vs 9.2%; P

Of the sample, 35.3% had problematic gaming and 36.1% problematic use of Facebook. Boys were more likely to have problematic gaming than girls, while girls were more likely to be addicted to Facebook than boys

(P

We created aggregation groups by adding each addiction problem 1 at a time, and we found that 34.6% of the studied population had 0 addiction problems, while 2.7% had the maximum number of 4 addiction problems. Furthermore, 12.2% and 4.5% had 2 and 3 addiction problems, respectively. We found that the main group, comprising 46% of the population, had 1 addiction problem.

To assess factors independently associated with the number of addictions, we performed a multinomial regression which showed that boys were 3.3 times more likely to have 1 addiction than girls (aOR=3.37; CI95%[2.42;4.7]; P

A Quebec survey of tobacco, alcohol, drugs, and gambling among secondary school students in 2014 reported that 37% had 0 addiction problems, more than a quarter (28%) had 1 addiction, 21% had 2, 11% had 3, and about 4.3% had all of the addiction problems (15). A study conducted in a private nursing institute in Sousse, Tunisia showed that the consumption of at least 1 psychoactive substance was reported by 60% (mainly tobacco with 53.8%) of participants and that the consumption of 3 substances was reported for 16.4% of respondents (44). In middle schools of the same governorate, the prevalence of tobacco use was 5.2% (45).

Another study conducted in 2009 among 587 high school students in the urban area of Sfax in Tunisia showed a high prevalence of problematic internet use (18.05%) (46). In Sousse, the prevalence of poor control of internet use was 54% among college students in 2012–2013, which was significantly associated with illicit substances abuse (47).

A study conducted in Egypt among university students to determine the prevalence and associates of substance abuse reported poly-drug use among 35.1% of the participants, of which 1.4% used 3 substances (48). This difference in results can be explained by the variability of populations included in those studies and methodology differences, including the number and type of addictions examined.

Among USA high school youth, the prevalence of 1 or more addictions was 61.5% in the last 30 days, and the lifetime prevalence was 29.2%. The co-occurrence of 2 or more of these addictions in the past 30 days and over a lifetime was 37.7% and 61.5%, respectively (49).

Another study in Türkiye showed that among high school students, the prevalence of the use of any 2 of 9 illicit substances was 2.6%, which was lower than our prevalence (7%) (50). Compared to another study in Lebanon, 76.87% of the participants had a low addiction profile

and only 9.21% were found to have high addiction to licit or illicit substances (51). The observed differences may be due to the different number of addictions examined or to socio-cultural differences.

Our results showed that the greatest degree of clustering was in 2 addiction problems comprising tobacco and alcohol use, which were similar to results found in the literature.

A study in Ireland asserted that most adolescents begin with the use of alcohol and tobacco as gateway substances, which increases the probability of progression to other drugs (52). Similarly, a national study in the USA reported that the 2 most common addictive substances used together are nicotine and alcohol. Smokers are more likely to consume alcohol and develop an alcohol use disorder than non-smokers (53). Regarding the co-occurrence of 3 addiction problems, the combination of tobacco, alcohol, and drug use showed the highest degree of clustering, which was similar to the results of the Global Youth Tobacco Survey (GYTS). The survey reported that tobacco, alcohol, and cannabis use was common and clustered among adolescents of rapidly developing countries, such as Seychelles, South Africa, England, and Switzerland (54). Studies investigating temporal relationships of substance abuse suggest that tobacco use often precedes alcohol and cannabis use, and that it may represent a "gateway" to other substance abuse (52).

The co-occurrence of 2 or more addiction problems was higher among boys [aOR=3.37; CI95%(2.42;4.7); P

In Canada, a study showed that the number of addiction problems varied significantly between boys and girls. The proportion of students with 3 or 4 addiction problems was higher for boys than for girls; for 3 addiction problems, the prevalence was 12% vs. 9%, and 5% vs. 3.3% for 4 addiction problems (15).

The proportion of students who did not report any addiction problems was higher for girls than for boys (39% vs. 35%). The results also showed that students who reported more than 1 addiction problem were more likely to rate their school performance below their class average (2 addiction problems: 23% vs. 19%, 3 addiction problems: 13% vs. 9%, 4 addiction problems 6% vs. 3.9%) (15).

Another study in Canada reported that the co-occurrence of 3 or more addiction problems was higher among boys than girls, and that the co-occurrences of 2 and 3 or more addiction

problems increased with age (P

A study in Switzerland revealed that the aggregation of addiction problems was associated with higher proportions of mental health problems, which means that there was a steep increase in the proportions of mental health problems with the number of co-occurring addictions [aOR=7.23 (5.48, 9.54)] (55). A similar study in Sweden revealed that depressive symptoms were associated with the use of 2 substances [aOR=1.10 (1.02–1.19)] (56).

In our study, we observed that the prevalence of addictive behaviours was relatively high among high school students. The results showed the urgent need to implement comprehensive preventive strategies and to target children at an early age. Monitoring psychoactive substance use and addiction behaviours among school students is essential for monitoring potential future trends (20,57). According to the recommendations of the 2016 United Nations General Assembly Special Session, countries in the MENA region should enhance their efforts to prevent drug trafficking and consumption, with long-term strategies that consider current practice and policy gaps in the fight against substance abuse, with reinforced rehabilitation programmes (55).

The study also showed that being anxious or depressive may increase the co-occurrence of addictive behaviours. Due to the COVID-19 pandemic and general lockdown, many studies showed increased levels of anxiety and depressive disorders (56,57). Identifying the profile of different clusters may help give special attention to those groups at high risk and particularly vulnerable to video game and internet addiction. It is also necessary to integrate strong self-esteem and soft-skills training into students' curriculums as early as possible. Further studies are needed to understand the underlying mechanisms of co-occurring addictive behaviours and to explore effective preventive strategies in the context of developing countries.

Our study was conducted using probability sampling methods in a large representative sample of high school students. However, some limitations do exist. Since the study was cross-sectional, it limited the extent of reporting causal relationships and only reported associations. The use of a self-administered questionnaire as a data collection tool may have caused reporting bias that could lead to subjectivity risks; either the over or underestimation of the data. To mitigate these risks, we used validated tools with good psychometric characteristics and data collection was made anonymously.

Conclusion

The prevalence of addictive behaviours among high school students in Tunisia, especially gaming and Facebook addiction, is very alarming. The co-occurrence of 2 or more addictions

was very frequent. There is a need to develop comprehensive prevention strategies that target children at an early age, their parents, school staff, and the general population to address this public health problem, especially in developing countries and in the MENA Region.

Étude transversale des problèmes d'addiction concomitants chez les lycéens en Tunisie

Résumé

Contexte : Les comportements addictifs constituent un problème majeur de santé publique, surtout chez les adolescents, qui sont susceptibles de souffrir de plusieurs addictions concomitantes.

Objectif : Évaluer la prévalence des problèmes d'addiction et les comportements addictifs concomitants, tels que la consommation de substances psychoactives, l'addiction aux jeux vidéo ou aux médias sociaux, et d'autres troubles chez les lycéens à Sousse (Tunisie).

Méthodologie : Une étude transversale a été menée en 2018 dans des lycées secondaires publics de la zone urbaine de Sousse. Un questionnaire structuré auto-administré a été utilisé pour obtenir des informations pertinentes auprès des étudiants. L'analyse statistique a été effectuée a l'aide du logiciel SPSS version 10 et des intervalles de confiance de 95 % ont été calculés. Le test du khi-carré a été utilisé pour comparer les variables qualitatives et une régression multinomiale a été menée pour déterminer des facteurs indépendants liés au nombre de comportements addictifs concomitants.

Résultats : Sur les 1399 lycéens, 60,5 % étaient des filles et l'âge moyen était de 17 ans (±2,28). L'analyse des problèmes d'addiction individuels a révélé une prévalence de 20,9 % pour la consommation de produits du tabac, de 10,1 % pour celle d'alcool, de 7,0 % pour l'usage de l'ensemble de drogues, de 36,1 % pour l'utilisation de Facebook et de 35,3 % pour celle des jeux vidéo. L'analyse des problèmes d'addiction concomitants a montré que 46,0 % de la population étudiée présentait un seul problème de ce type, 12,2 % en avait deux, 4,5 % en comptait trois et 2,7 % souffrait d'un maximum de quatre addictions. La régression multinomiale a révélé une augmentation des cas d'addictions concomitantes chez les garçons (ORa = 217,004 ; p

Conclusion : Le taux d'addictions concomitantes chez les adolescents à Sousse est alarmant. L'utilisation problématique de Facebook, des jeux vidéo et la consommation de produits du tabac étaient les comportements addictifs les plus fréquents. Il est urgent de mettre en place des programmes efficaces et multisectoriels pour prévenir les addictions chez les enfants en

Tunisie et dans d'autres pays de la Région du Moyen-Orient et de l'Afrique du Nord.

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