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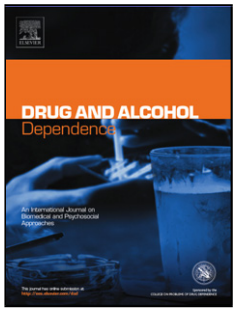

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Relationship of media exposure to substance use among adolescents in Saudi Arabia: results from a national study

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Highlights

- Adolescents in Saudi Arabia spend a considerable amount of time viewing media.
- Tobacco/substance use is associated with excessive use of media.
- Gender differences exist between amount of certain media exposure and risk behaviors.

Abstract

Background: With limited social options, young Saudis are increasingly relying on media for entertainment. The media impact has been greatest among the younger generation, which constitutes half of the population of the Kingdom of Saudi Arabia (KSA). Therefore, this study aims to examine the association between exposure to varied types of media and substance use among adolescents in the KSA and explores whether these associations differ by gender. **Methods**: Data were obtained from a national cross-sectional survey of school students aged ten to 19 years (N=12121). A self-administered questionnaire was used to assess exposure to three types of media: television, the Internet and video games with the use of legal substances such as cigarette/shisha smoking, solvents sniffing and misuse of medications, and illegal substances, such as alcohol, marijuana and other illicit drugs.

Results: Logistic regression analyses revealed that the odds of using tobacco, legal and illegal substances were higher for students who were watching television, surfing the Internet, or playing video games for more than two hours compared with their peers who watched less than two hours ($P<0.05$). For males, results showed the heavy and light use of the Internet were both significantly associated with smoking. Whereas for females, only excessive use of the Internet was associated with smoking.

Conclusion: Despite the conservative nature of the Saudi society, findings showed a significant association between tobacco or substance use and media exposure among adolescents. This suggests increased attention to the growing role media might play in shaping adolescents health risk behaviors in the KSA.

Keywords: Media; Adolescents; Tobacco; Substance use; Saudi Arabia

1. Introduction

Adolescents today are living and growing up in a media-rich environment. The use of diverse technological platforms has become an everyday routine for many children and adolescents around the world. A typical adolescent in the Kingdom of Saudi Arabia (KSA) frequently spends a substantial amount of time daily watching television, surfing the Internet or playing video games (AlBuhairan, 2016), where they are provided with a constant flow of messages on a wide range of different subjects, including tobacco and substance use. Concerns have grown over the last several years of frequent media portrayals of substance use and their possible impact on young viewers' behaviors around tobacco, common household products, alcohol and other illegal substances.

In the last decade, the population of Saudi Arabia has grown to over 32 million. This is an increase of almost 40% compared with the previous decade (KSAGASTAT, 2004). As a consequence of the high growth rate, the majority of the population is young with more than 14% of the population of the KSA being adolescents aged 10-19 (KSAGASTAT, 2017). This represents a distinct bulge in the youth population. At the same time, availability and access to cable television and the Internet had become widespread in the KSA, compared to the recent past

when the only sources of media available were traditional television, with only two channels, monitored radio, and newspapers.

The vast majority of published studies that examined media content found an association between certain media exposure and negative outcomes (Villani, 2001). Many studies have linked media to smoking (DiFranza et al., 2006), drinking (Van den Bulck and Beullens, K., 2005), and marijuana use (Primack et al., 2009). This media effect seems to apply to adolescents from other countries and not to be confined to the United States (US) only (Brunborg et al., 2017; Dahal et al., 2015; Hanewinkel and Sargent, 2009; McCool et al., 2014). However, little research has looked beyond tobacco, alcohol, and marijuana to examine the association between media exposure and other substances. The only study that addressed the relationship between media exposure and solvents found an association between excessive viewing of television and video games and increased use of solvents and alcohol (Armstrong et al., 2010).

Media plays a critical role and less understood influence on adolescents' health and behavior in the KSA. Evidence comes primarily from studies conducted within Western nations rather than Middle Eastern countries, where tobacco and substance consumption among youth has been rising for the past few decades (Sweileh et al., 2014). A review study showed that cigarette smoking among school and university students in the KSA ranges between 12% and 37% in different regions around the country, reaching more than 50% among adults in some studies, with most of them reporting initiation of cigarette smoking at a young age (Bassiony, 2009). Annually, more than 70,000 Saudis die from smoking-related diseases only (KSAMOH, 2017). Furthermore, another report found that alcohol was used by 9% of male secondary school students at Abha, in the South of the KSA, and more than 8% of students were other substance abusers (Al-Musa and Al-Montashri, 2016). In the area of media research, only a few studies

have come from the Arab world and looked at tobacco only. In 2005, a study on adolescents aged 11 to 18 years and living in Tabouk, in the north of the KSA, linked smoking with watching and reading pro-tobacco advertisements; particularly in movies and at sports events (Abdalla et al., 2012). This correlates with a recent study from another Northern city that reported a similar association between media and smoking behavior among Saudi females (Kilase et al., 2013). An Egyptian study also found that exposure to Western media was positively associated with smoking in both Egyptian males and females (Islam and Johnson, 2007).

In many Middle Eastern countries, including KSA, the prevalence of smoking among female adolescents is consistently reported to be lower than male adolescents, where females are traditionally more stigmatized for using tobacco and substance (Abdalla et al., 2007; Mandil et al., 2010). However, females are just as likely as male to become addicted (Anthony et al., 1994). Several studies have examined gender differences among adolescents in media influence. To date, the results have been mixed. For example, a number of studies have shown that video games increase male aggression but not female (Shibuya et al., 2008). While other studies have found no link between aggression and video games (Ferguson, 2007). Similarly, media has been found to affect levels of dieting and body dissatisfaction among females (Groesz et al., 2002), whereas other research suggests that there is no clear association between media exposure and body dissatisfaction (Calado et al., 2011).

The search for an explanation for the association between media exposure and tobacco or substance use among youth is complicated. There are myriad influences on adolescents' attitudes toward health risk behaviors. The social-ecological theory provides a framework for understanding these forces, in that it suggests that adolescents develop in multilayered contexts. These contexts include individual, community, and environmental factors such as media

(Twombly et al., 2008). According to Kilbourne, adolescents are particularly vulnerable to the messages and images conveyed through different kinds of media because they are young and inexperienced and are the prime target of many programs (Kilbourne, 2011). In 1995, Strasburger contended that display of risk behaviors on media could function as a super-peer (Strasburger, 1995). The super-peer theory suggests that media is a powerful factor in defining social norms for adolescents. Therefore, the consumption of cigarettes, alcohol, and drugs in movies and music videos may increase acceptance of smoking and use of substances as normative and encourage initiation (Brown et al., 2005).

The public health approach emphasizes prevention, early detection of those at risk, and effective programs. Therefore, it is important to understand why adolescents initiate tobacco or substance use, and why they sometimes escalate in abusing them and subsequently develop abuse related problems. Such an understanding is a key in preventing morbidity and mortality associated with tobacco and substance abuse (Wang et al., 2014). Faced with the considerations presented, this study aims to explore the association between exposure to various types of media and tobacco/substance use among adolescents in the KSA. Two main questions are investigated: 1) Is there a relationship between three types of media exposure; television, the Internet and video games with the use of legal substances such as cigarette/shisha smoking, solvent sniffing and misuse of medications, and illegal substances, such as alcohol, marijuana and other illicit drugs? 2) Do these associations differ by gender?

2. Methods

2.1. Subjects

Data for this study were obtained from Jeeluna®, a national cross-sectional study conducted in 2011/2012 in all 13 regions of the KSA to produce a nationally representative

sample. A total of 12,121 adolescents from a representative sample of 278 middle and secondary schools were selected by a multi-stage, stratified, cluster random sampling technique based on the school grade (middle or secondary) and gender of students, as schools in the KSA are gender segregated.

2.2. Measures

A self-administered survey was used to collect data on a range of demographic variables, tobacco/substance use behaviors, media exposure and risk factors associated with adolescents' tobacco/substance use. Data were weighted to produce national estimates. A detailed methodology of *Jeeluna*® was published earlier (AlBuhairan et al., 2015). This study was reviewed and approved by the Institutional Review Board (IRB) at the King Abdullah International Medical Research Center (KAIMRC).

2.2.1. Covariates. Analyses controlled for age (≤15 and >15 years old); gender; geographical region (regions grouped based on geographical location: Central, Western, Eastern, Northern, and Southern); relationship with the father/mother (good, average, and poor); father's/mother's education (illiterate/primary, intermediate/secondary, and graduate/post-graduate); family total monthly income (low= Saudi Arabian Riyal (SAR) <10,000, average= SAR 10,000 to 14,999, and high= SAR >14,999 {based on USD 1.00 = SAR 3.75}); and adolescents' perception of family financial status compared to other students (poorer than others, like others, and richer than others). Additional risk/protective factors included whether students are engaged in physical activity during the school day or not; the number of days per week they engaged in exercise for at least 30 minutes (none, 1-2 days, 3-5 days, 6-7 days); and whether they had experienced symptoms reflective of depression during the past 12 months ''hereafter referred to as depression''; or have a chronic illness that require health care follow-up.

2.2.2. Tobacco/Substance Use. Smoking was defined as having tried a cigarette or shisha (water pipe/hookah) at least once in a lifetime. Use of legal substances considered sniffing home solvent products such as glue, gasoline, and aerosols or taking medications for non-medicinal reasons at least once over the last 30 days. Illegal substance use included using alcohol, which is illegal in the KSA, marijuana, or other illicit drugs at least once in a lifetime. Respondents answered yes or no; a positive response classified the student as a user or a smoker.

2.2.3. Media Exposure. Separate items used to assess adolescents' exposure to television, the Internet, and video games. The students were asked the following questions, 'How much time do you usually spend watching the television daily?', 'How much time do you usually spend on the Internet (not related to school work) daily?'' and ''How much time do you usually spend playing video games (not on the Internet-offline) daily?'' to which they could answer {none, less than 1 hour, 1-2 hours, 2.1-4 hours, 4.1-5 hours, and > 5 hours}. Based on the earlier American Academy of Pediatrics **(**AAP) recommendations of two-hour daily limit of screen time (Strasburger and Hogan, 2013), responses were grouped into (Never, ≤ 2-hours, and > 2-hours).

2.3. Data Analysis

Data were analyzed using statistical procedures contained in STATA 14 for Windows. Descriptive statistics conducted included frequencies and proportions. Chi-squared tests were used to examine gender differences in substance use (smoking and use of legal and illegal substances) and three types of media exposure (television, the Internet, and video games). A multivariate logistic regression model was used to assess the independent association between each independent variable of media exposure, and each dependent variable of the substances used. Age (≤15 and >15), gender, chronic illness, depression, relationship with father/mother,

fathers' and mothers' highest educational level, household income, adolescents' perception of family financial status, physical activity at school and exercises frequency per week were used as covariates to investigate if the relationship between each type of media and substance use were independent of all the above-mentioned factors. In addition, multivariate logistic regression models were run separately for males and females to examine gender-specific differences. We used a significance level of $P < 0.05$ for all statistical tests. Figure 1 shows the conceptual framework of the research.

3. Results

3.1. Socio-Demographics

A total of 12,121 adolescents, divided almost equally between males and females and with a mean age of 15.6 years (SD= 1.8), participated in this study. Socio-demographics and covariates for the sample are described in Table 1.

3.2. Substance Use

Based on the results, 19.6% of students had experienced smoking at least once in their lifetime, 3.1% had ever tried illegal drugs, and 23% used legal substance at least once in the last month (solvents accounted for 16% and medications for 9.5%). There were significant differences in the use per gender. Male students were more likely to smoke ($\chi^2 = 67.63$, df = 203, $P = 0.000$) and use illegal substances ($\chi^2 = 56.33$, df = 203, $P = 0.000$), while female students were more likely to use legal substances ($\chi^2 = 14.21$, df = 203, $P = 0.000$) (Table 2).

3.3. Media Exposure Effects

The prevalence of the various types of media exposure is reported in Table 1. Logistic regression was first conducted for the total sample for ever-use of smoking, illegal substances and 30-day use of legal substances, to examine which of the media exposure types might be

associated with use. Results showed that viewing >2-hours of television were significantly associated with tobacco, legal and illegal substances ($P< 0.01$, $P< 0.01$ and $P<0.05$ respectively). There were 35%, 18% and 38% (presented in table 3) increased likelihoods of using tobacco, legal and illegal substances for students who watch >2-hours of television compared with students who watch ≤2-hours. Likewise, students who used the Internet for >2-hours were significantly more likely to smoke or use legal or illegal substance than those who used the Internet for ≤2-hours ($P< 0.01$, $P< 0.01$ and $P<0.01$ respectively). Furthermore, playing video games for >2-hours was also associated with a significant increase in odds of legal and illegal substance use compared with those who play for ≤2-hours ($P< 0.01$ and $P<0.05$ respectively). A similar effect was seen for students who play video games ≤2-hours compared with students who never play video games ($P< 0.05$ and $P<0.05$ respectively).

Thereafter, two separate multivariate logistic regressions were conducted for males and females. For males, results showed that heavy and light Internet users were significantly more likely to smoke tobacco when compared with non-Internet users ($P < 0.01$ and $P < 0.05$ respectively). For females, only heavy Internet users were significantly more likely to smoke tobacco compared to peers who have never used the Internet ($P < 0.05$). In addition, females who play video games for more than 2-hours were more likely to use legal and illegal substances than did their counterparts who have never played video games ($P < 0.01$, $P < 0.01$ respectively). A similar effect was seen for females with light use of video games (≤ 2-hours) compared with females who have never played video games ($P < 0.05$ and $P < 0.05$ respectively) (Table 3).

4. Discussion

In this cross-sectional analysis, we found that the odds of using tobacco, legal and illegal substances were higher for students who were watching television, surfing the Internet or playing

video games for more than the earlier AAP recommendations of two hours of screen time per day compared with their peers who complied with the limits. These findings are consistent with the results of previous studies (Fischer et al., 2011; Tucker et al., 2013) and provide future direction for research about media and health behaviors.

In spite of the growing literature on media, studies into the effect of media use on adolescents' substance use behaviors are almost nonexistent in the Kingdom. To the best of our knowledge, this study is the first to examine the association between three types of media; television, the Internet, and video games, with smoking and the use of legal and illegal substances among adolescents in the KSA. Therefore, a major contribution of this study is providing evidence for an independent association between various types of media and tobacco, legal and illegal substances use among adolescents.

The study revealed that after controlling for multiple demographic and risk factors, there is a strong multivariate association between heavy use of the Internet with smoking and the use of legal and illegal substances. Other studies from Greece (Fisoun et al., 2012) and China (Gong et al., 2009) showed similar results. With limited entertainment and extracurricular activities, young Saudis are increasingly relying on media and technology for entertainment. In the latest report published by the Saudi Communication and Information Technology Committee in 2015, the majority of more than 21 million users of the Internet in the KSA spend at least 120 minutes daily on social media websites only (KSACITC, 2015). This widespread adoption of the Internet by Saudi adolescents is mainly linked to the digital media's ability to offer wide-ranging materials. Today, the Internet provides a new platform for advertisement with the potential to reach millions of adolescents around the world and the Kingdom. Furthermore, the Internet

allows adolescents to buy drugs easily; a previous study by Columbia University found that over 85% of online pharmacies do not require a prescription or proof of age (USNCASA, 2006).

In addition, we found that there is a strong association between television viewing for > 2-hours and the use of tobacco and other legal and illegal substances. Similar results were found in an American study between movies and alcohol, and between music and marijuana (Primack et al., 2009). It is possible that television which contains references to tobacco, solvents and illegal drugs such as alcohol and marijuana through music videos, television series, and films, are more likely to make this type of activity seems to be cool and fun. According to the policy statement published in 2010 by Pediatrics, the official journal of the AAP, media usually tends to popularize and glamorize substance abuse and encourage younger viewers to engage in risky behaviors (Strasburger, 2010).

Although tobacco products are not advertised directly on local television in the KSA, the passive promotion still occurs in movie scenes and television programs in local and international channels. In 2015, the National Tobacco Control Committee in KSA issued an anti-smoking law prohibiting promotion of tobacco and its derivatives by any means of advertising in any official media (KSAMOH, 2015). However, the rise of cable television has made advertising more liberal and harder to monitor and control. With this new media environment, Saudis found a window of entertainment that is imbued with Western social and cultural values, which competes with traditional social structures and religion. According to Professor Miller, international television productions accounted for 50% of total programming in KSA (Miller, 2003). As a result of that, Saudi adolescents often watch different cultures and lifestyles from their own and receive mixed messages about various topics, which might be considered to be socially

acceptable in other parts of the world yet are taboo in the local culture. In this sense, media influences adolescents by producing characters that adolescents get attracted to and perceived to be peers and who they long to be. Such foreign examples and their media activities provide templates for youths' behaviors (Escabar-Chaves et al., 2005).

Recent studies continued to focus on television in spite of all the new forms of media, largely because adolescents are heavy users of television and they spend the most time with this medium. Moreover, there are no cinemas in the Kingdom. Without movie theaters; the popularity of television, whether it is cable TV, Netflix, or Apple TV is still growing as Saudis perceive television to be the main source of entertainment and information. Based on our sample, more than 95% of students watch television daily; almost half of them (42.5%) watch it for >2-hours, compared to 30% using the Internet, and only 13.3% playing video games for more than two hours. This finding is consistent with previous literature on the number of hours' adolescents spend watching television in the KSA. A study by King Abdulaziz Medical City (2013) showed that 40% of adolescents aged between nine and 14 years watch television for more than three hours a day during weekends (Al-Ghamdi, 2013).

Similar to other studies, we found a link between excessive video gaming (>2-hours) and substance use (Denniston et al., 2011; Ream et al., 2011). Armstrong et al. examined video games in a sample of 4,691 elementary school students and found that drinking alcohol and sniffing solvents were significantly higher for those playing ≥3 hours compared with those who played for ≤2 hours only (Armstrong et al., 2010). However, other studies failed to find a relation between duration of playing video games and certain substances (Walther et al., 2012). Interestingly, the current study found that the light use of video games (≤2-hours) was also significantly associated with legal and illegal substances. There are several potential explanations

for this finding; one possibility is that substance use is either more prevalent or more glamorously portrayed in video games. Secondly, it may be that those who use illegal substances like to play video games. Greenberg et al., showed that participants who reported being addicted to a substance such as alcohol, are most vulnerable to be dependent on another activity such as video games (Greenberg et al., 1999). Thirdly, adolescents are more likely to play video games at home, whether in their bedrooms, playrooms, or molhak (a common outdoor room, located in the outdoor premises of many homes in the KSA; usually built for sons/daughters to give them privacy to entertain their friends), hence having more unsupervised time though at home. Based on an American study on elementary school students, it was found that students spend 24% of their time at home alone, mostly unsupervised (Morrongiello et al., 2011).

4.1. Gender Differences

The analyses by gender found that media exposure associated with substance use was different for males and females. For males, light and heavy exposure to the Internet was linked with smoking, which may be because males typically prefer to use the Internet to play online games, where they might be encouraged to smoke while playing with their friends or online peers (Huang et al., 2014). Although not statistically significant, we found that male students who reported limited television use (≤2 hours) were less likely to use legal and illegal substances compared with those who never watch television. Maybe adolescents, who never watch television, tend to be more sociable and active than those who watch television. Therefore, they might be more likely to engage in risky behaviors around peers than alone. Previous research has suggested that peer presence increases risk-taking behaviors in adolescents (Smith et al., 2014). This increase in adolescents' risk-taking behavior has been attributed to the brain's reward

circuitry, which makes adolescent more sensitive to the rewards of peer relationships (Albert and Steinberg, 2011). This association merits further study.

For females, the study found that light and heavy exposures to video games were significantly associated with the use of legal and illegal substances. It might be that a male-dominated activity like video games have an image of masculinity, or such culture with a negative influence on the health behaviors seem more appealing to adolescents females who use the substance (Desai et al., 2010).

The gender difference in tobacco and substance use observed in our study may be attributed to cultural differences and social behaviors associated with traditional patriarchal society. Although tobacco and substance use, in general, are stigmatized in KSA, female experience more social disapproval of tobacco or substance use. Consequently, consistent with other Middle Eastern research (Sweileh et al., 2014), the prevalence of illegal drugs use may have been underestimated in our study. Alcohol, marijuana, and illicit drugs are not legally, religiously or socially accepted in the KSA; therefore, though the survey was confidential and anonymous, we cannot deny that some students may have underreported any substance use even if it was on a single occasion.

While there are a lot of concerns regarding illegal substances, the greatest danger comes from using legal products like glue, paints, nail polish remover and over the counter medicines. More than 28% of the female sample, compared to 18.52% of the male sample reported that they used legal substances at least once in the last month. These numbers should be a warning sign as more powerful and harmful substances are introduced on to the market. The U.S. Substance Abuse and Mental Health Services Administration Report in 2009 found that more than 17% of adolescents who use drugs started by sniffing common household products (USDHHS, 2009).

This difference in prevalence may be due to the nature of the position of females in the social structure of Saudi culture, including the fact that females are highly protected and sheltered, hence limiting their mobility on their own. Household products are cheap and easily accessible to females who may not have the same access to illegal substances or tobacco products as males.

4.2. Limitations

The limitations of this study must be acknowledged. The data in this study used a cross-sectional self-reported survey, which is subject to recall bias and are less sensitive measures of exposure than other techniques, such as longitudinal studies (USNRC, 1985). With cross-sectional designs, it is difficult to determine whether the outcome followed exposure in time or exposure resulted from the outcome. In addition, we only measured student perception at the one-time point and captured exposure to media in one questionnaire item; limiting exploration of the differential effects of each media type. More importantly, we did not directly measure exposure to tobacco/substance use depictions. Rather, we relied only on measures of overall exposure; i.e., we addressed the quantitative exposure to media, however, did not examine the quality of the content of exposure, which may be even more important. The problem with such measures is that students viewing equal amounts of television, Internet or video games may be differentially exposed to tobacco/substance depictions, depending on their preferences and attention levels. However, the consistency of our findings with the existing literature demonstrates the utility of self-reported measures (DiFranza et al., 2006; Primack et al., 2009). Despite these limitations, the study has several strengths, including the large sample, use of well-validated measures of media exposure, tobacco/substance use and other demographic characteristics and social influences. The present study controlled for covariates that were

missing from other studies, such as depression, chronic illness, daily exercises and relationship with father/mother, adding confidence to the independence of the associations.

4.3. Implications

These findings have numerous implications for theory and practice. First, the study is a step towards the development of a theoretical framework for understanding the relationship of media exposure with tobacco and substance use behaviors among adolescents living in the KSA. Further work in media use is necessary to focus our future interventions efforts on the most relevant media type and content related to risky behaviors to reduce its impact on population health. Second, such findings can be used by a child, adolescent, and public health advocates to reduce portrayals of substances and promote positive health behaviors. Third, this study indirectly reflects the importance of media literacy, a subject which needs to be integrated into school curriculums and in conversations at home. Fourth, our findings are important for beginning to inform future media-related policy initiatives.

5. Conclusion

Despite the conservative nature of the Saudi society, this study showed a significant association between different types of media and adolescents' tobacco and substance use behaviors. Though media exposure without a doubt comes with numerous potential benefits and opportunities for growth and learning, certain drawbacks must be kept in mind. This suggests increased attention to the growing role media might play in shaping adolescents health behaviors in the KSA.

Author Disclosure

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Contributors

AA participated in analytic plan, data analysis and interpretation, and drafting of manuscript. FA conceived of the study, acquired the funding, participated in its design, analytic plan, interpretation of results, and critical revision of manuscript. All authors reviewed and approved the final version of manuscript

Conflicts of Interest

No conflict declared.

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Figure Legend

Figure 1. The conceptual framework of the research.

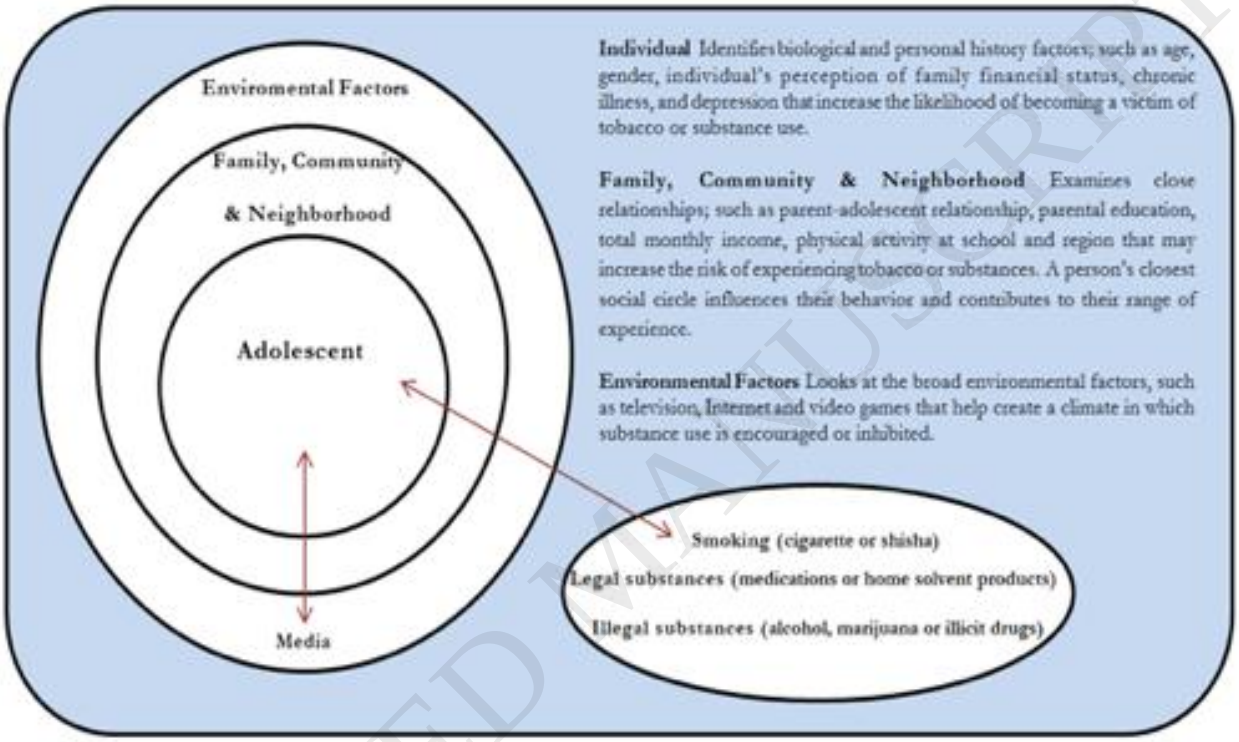

Table 1: Participant's characteristics (N = 12,121)

Covariate	Total number of responses	%
Gender		
Male	6290	52.97
Female	5831	47.03
Age		
=<15	5275	46.83
>15	6846	53.17
Geographical region		
Central	3306	25.9
Western	3737	32.36
Eastern	1841	14
Northern	1277	10.42
Southern	1960	17.32
Relationship with mother[a]		
Poor	194	1.66
Average	621	5.2
Good	10916	93.14
Relationship with father[a]		
Poor	476	4.05
Average	1312	11.2
Good	9859	84.75
Father's highest level of education[a]		
Illiterate/primary	2531	23.73
Intermediate/secondary	4345	42.16
University/Post	3570	34.11
Mother's highest level of education[a]		
Illiterate/primary	4173	38.25
Intermediate/secondary	3977	37.14
University/Post	2684	24.61
Income[a]		
Low	3127	49.61
Average	1393	22.05
High	1792	28.34
Perception of family financial status[a]		
Poorer	847	7.49
Like others	8410	71.58
Richer	2474	20.92
30 minutes' exercises in the last 7 days[a]		
None	5354	44.28
1 to 2 days	3190	27.04
3 to 5 days	1520	13.13
6 to 7 days	1868	15.55
Engaged in physical activity at school[a]	4362	37.25
Depression[a]		

Never Sometimes Always	5375 4816 1707	45.65 40.1 14.25
Chronic Illness	995	8.39
Watching TV[a] - (per day) None =< 2hours > 2hours	 547 6296 5092	 4.46 52.96 42.58
Using Internet (non-related to schoolwork)[a] - (per day) None =< 2hours > 2hours	 2309 5961 3621	 19.29 50.62 30.09
Playing video games[a] - (per day) None =< 2hours > 2hours	 5368 5028 1599	 44.3 42.33 13.37
Smoking ''Cigarette or Shisha''[a] - (ever use)	2365	19.68
Legal substance[a] **''Sniffing home solvent products or misusing Medications'' - (last 30 days use)**	2748	23.02
Illegal Substance[a] **''Alcohol, marijuana, or illicit drugs'' - (ever use)**	385	3.14

[a] Values do not always sum to 12,121 due to missing data

Table 2: Media exposure, using tobacco, legal, and illegal substances by gender

Measures	Gender %		
	Males (n=6290)	Female (n=5831)	*P*-value
Smoking ''Cigarette or Shisha'' – (ever use)	26.12%	12.46%	<0.001[a]
Legal Substance use ''Sniffing home solvent products or Medications'' - (last 30 days use)	18.52%	28.07%	<0.001[a]
Illegal Substance use ''Marijuana, alcohol or illicit drugs'' - (ever use)	3.95%	2.22%	<0.001[a]
Watching TV - (per day)			
None	4.02%	4.95%	0.001[a]
=< 2hours	55.38%	50.25%	
>2hours	40.59%	44.8%	
Using Internet (non-related to schoolwork) - (per day)			
None	21.37%	16.97%	<0.001[a]
=< 2hours	52.68%	48.33%	
>2hours	25.95%	34.7%	
Playing video games - (per day)			
None	31.81%	58.35%	<0.001[a]
=< 2hours	48.65%	35.22%	
>2hours	19.54%	6.43%	

[a]Chi-2 test

Table 3: Logistic regression analysis of tobacco, legal and illegal substances with media exposure (N=12,121).

	Smoking[b,d]		Legal substance[c,d]		Illegal substance[b,d]	
	OR	**95%CI**	**OR**	**95%CI**	**OR**	**95%CI**
Total Sample						
TV						
> 2-hours vs never	1.40	0.99 - 1.99	1.16	0.85 - 1.58	0.93	0.50 - 1.72
=< 2-hours vs never	1.04	0.73 - 1.46	0.98	0.71 - 1.35	0.67	0.37 – 1.24
> 2-hours vs =< 2-hours	1.35	1.17 - 1.55[a]	1.18	1.05 - 1.31[a]	1.38	1.02 – 1.86[a]
Internet						
> 2-hours vs never	1.63	1.30 - 2.04[a]	1.26	1.07 - 1.47[a]	1.36	0.91 - 2.04
=< 2-hours vs never	1.20	0.98 - 1.46	0.99	0.84 - 1.17	0.87	0.59 - 1.26
> 2-hours vs =< 2-hours	1.35	1.15 - 1.59[a]	1.26	1.11 - 1.44[a]	1.56	1.13 - 2.16[a]
Video games						
> 2-hours vs never	1.31	1.04 - 1.65[a]	1.60	1.29 - 1.98[a]	2.15	1.38 - 3.37[a]
=< 2-hours vs never	1.11	0.96 - 1.28	1.17	1.03 - 1.33[a]	1.43	1.01 - 2.00[a]
> 2-hours vs =< 2-hours	1.17	0.95 - 1.45	1.36	1.11 - 1.66[a]	1.50	1.04 – 2.17[a]
Males Only						
TV						
> 2-hours vs never	1.24	0.83 -1.85	0.90	0.57 - 1.44	0.71	0.36 - 1.40
=< 2-hours vs never	0.91	0.61 - 1.34	0.85	0.53 - 1.38	0.58	0.28 - 1.18
> 2-hours vs =< 2-hours	1. 36	1.15 - 1.62[a]	1.05	0.89 - 1.25	1.23	0.84 - 1.80
Internet						
> 2-hours vs never	1.75	1.31 - 2.35[a]	1.23	0.99 - 1.53	1.17	0.71 - 1.93
=< 2-hours vs never	1.33	1.04 - 1.70[a]	1.03	0.84 - 1.25	0.74	0.49 - 1.14
> 2-hours vs =< 2-hours	1.31	1.07 - 1.61[a]	1.19	0.96 - 1.48	1.56	1.00 - 2.42[a]
Video games						
> 2-hours vs never	1.08	0.84 - 1.40	1.47	1.15 - 1.88[a]	1.90	1.14 - 3.17[a]
=< 2-hours vs never	1.06	0.88 - 1.27	1.05	0.87 - 1.26	1.30	0.84 - 1.99
> 2-hours vs =< 2-hours	1.02	0.81 - 1.28	1.40	1.11 - 1.75[a]	1.46	0.99 - 2.14
Females Only						
TV						
> 2-hours vs never	1.58	0.82 -3.01	1.45	0.97 - 2.18	1.68	0.53 - 5.35
=< 2-hours vs never	1.26	0.64 - 2.49	1.15	0.76 - 1.74	0.94	0.32 - 2.73
> 2-hours vs =< 2-hours	1.24	0.97 - 1.59	1.26	1.09 - 1.44[a]	1.78	0.98 - 3.21
Internet						
> 2-hours vs never	1.51	1.05 - 2.18[a]	1.23	0.96 -1.56	1.70	0.80 - 3.62
=< 2-hours vs never	1.06	0.76 - 1.48	0.94	0.72 - 1.23	1.20	0.59 -2.45
> 2-hours vs =< 2-hours	1.42	1.06 - 1.90[a]	1.29	1.09 - 1.54[a]	1.41	0.90 - 2.22
Video games						
> 2-hours vs never	2.38	1.60 - 3.55[a]	1.75	1.19 - 2.56[a]	4.09	1.67 - 10.04[a]
=< 2-hours vs never	1.10	0.90 -1.35	1.23	1.03 - 1.47[a]	1.99	1.16 - 3.41[a]
> 2-hours vs =< 2-hours	2.15	1.46 - 3.19[a]	1.42	0.96 - 2.09	2.05	0.82 – 5.10

[a] OR/CI significant $p < 0.05$
[b] Ever-use.
[c] During the past 30 days.
[d] Analysis adjusted for the following covariates; age, gender, region, relationship with the father/mother, father's/mother's education, family total monthly income, perceived family's financial status, physical activity at school, the frequency of exercises per week, depression and chronic illness.