Factors associated with frequent marijuana consumption in young people before admission to juvenile detention centers in Peru

Factores asociados al consumo frecuente de marihuana en jóvenes antes de su ingreso a centros juveniles de diagnóstico y rehabilitación en Perú

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Abstract

Marijuana is the most widely used illicit drug in the world, especially among young people. This study is relevant to policy makers because it expands the knowledge regarding drug use in vulnerable youth, allowing health authorities to reduce marijuana consumption via educational, family, and governmental strategies and policies. The objective of this study was to determine the prevalence of frequent marijuana consumption and its associated factors in young people before admission to juvenile detention centers in Peru. The data was taken from the 2016 National Population Census of the Youth Diagnostic and Rehabilitation Centers in Peru. The final sample was made up of 1,848 people with ages between 14 and 22 years old, with a median age of 17 (95.6% males). The variable *frequent marijuana consumption* was defined as the use of marijuana at least once a week, prior to entering the center. The main factors associated with frequent marijuana use were male sex, running away from home before the age of 15, physical abuse during childhood, having a family member who consumed alcohol or drugs frequently, and the presence of criminal gangs in the housing area. Additionally, it was found that living with parents up to a specific critical age decreases the probability of frequent use of marijuana in young people. These results could aid the development of strategies and public policies that help prevent the consumption of marijuana and other drugs from an early age.

Keywords: Cannabis; marijuana use; substance-related disorders; Peru; vulnerable populations.

Resumen

La marihuana es la droga ilícita más consumida en el mundo, especialmente entre jóvenes. El presente estudio es relevante para la toma de decisiones en salud porque expande el conocimiento sobre el uso de drogas en la juventud vulnerable y permite a las autoridades sanitarias reducir el consumo de marihuana mediante estrategias educativas, familiares y gubernamentales. El objetivo de este estudio fue determinar la prevalencia del consumo frecuente de marihuana y sus factores asociados en jóvenes antes de su ingreso a centros juveniles de diagnóstico y rehabilitación en Perú. Los datos fueron tomados del Censo Nacional de Población en los Centros Juveniles de Diagnóstico y Rehabilitación del año 2016 en Perú. La muestra final estuvo compuesta por 1848 personas entre 14 y 22 años, con una mediana de edad de 17 años (95,6 % hombres). La variable *consumo frecuente de marihuana* fue definida como el consumo de marihuana de al menos una vez por semana por parte de los jóvenes, previo a su ingreso al centro. Los principales factores asociados al consumo frecuente de marihuana fueron el sexo masculino, huir de casa antes de los 15 años, haber sufrido abuso físico durante la infancia, tener un miembro de la familia que consuma alcohol o drogas frecuentemente y la presencia de pandillas criminales en la zona residencial. Asimismo, se halló que vivir con los padres hasta cierta edad crítica disminuye la probabilidad de consumo frecuente de marihuana en jóvenes. Estos resultados podrían ayudar a desarrollar estrategias y políticas públicas que ayuden a prevenir el consumo de marihuana y otras drogas desde edades tempranas.

Palabras clave: Cannabis; uso de la marihuana; trastornos relacionados con sustancias; Perú; poblaciones vulnerables.

According to the United Nations Office on Drugs and Crime (UNODC) and the World Health Organization (WHO), cannabis is the most commonly used illicit drug in the world, with approximately 188 million people having used the drug in 2017 (United Nations Office on Drugs and Crime, 2019; World Health Organization, 2019). Globally, the prevalence of marijuana use ranges from 2.7-4.9%, with the highest rates of use reported in Australia and North America. In South America, the highest rates of cannabis consumption were found in Brazil and Chile (Degenhardt, Ferrari & Hall, 2017; Degenhardt et al., 2013; United Nations Office on Drugs and Crime, 2015; World Health Organization, 2016). In Peru, marijuana is also the most commonly used illicit drug. Overall rates of marijuana use in the past year are estimated between 2-3% (Inter-American Drug Abuse Control Comission, 2019). Furthermore, a national survey on the general population found that 47.1% of marijuana consumers in Peru have signs of dependency, which was similar to what was found for cocaine consumers (Comisión Nacional Para el Desarrollo y Vida sin Drogas, 2012).

Marijuana use has been associated with acute and long-term adverse effects. Acute effects are developed over a short period of time after consuming the drug and include psychiatric effects, such as impaired attention, dyschronometria, and psychosis; and physical signs such as conjunctival hyperemia, increased appetite, xerostomia, increased blood pressure and increased heart rate (Fonseca-Pedrero, Lucas-Molina, Pérez-Albéniz, Inchausti & Ortuño-Sierra, 2020; García Álvarez, Gomar, García-Portilla & Bobes, 2019; Karila et al., 2014; Levine,Clemenza, Rynn & Lieberman, 2017; National Institute on Drug Abuse, 2019; World Health Organization, 2019). Long term effects involve psychological impairment, cognitive deficits and respiratory consequences (Guxens, Nebot, Ariza & Ochoa, 2007; Karila et al., 2014; Martínez-Torres et al., 2016; World Health Organization, 2019). In addition, cannabis dependency is accountable for a decreased participation in academic activities and relationships, a lower income, unplanned pregnancies, mental diseases, increased rates of unemployment, and involvement in other risky behaviors (Khalsa & Baler, 2019; United Nations Office on Drugs and Crime, 2018). Nonetheless, cannabis has been associated with some beneficial effects, the most common conditions for which physicians recommend marijuana are pain, persistent nausea and vomiting, improvement of sleep and anxiety (Burggren, Shirazi, Ginder & London, 2019; Fiz , Durán, Capella, Carbonell & Farré, 2011).

Adolescence (~12 to 17 years old) is a period of critical risk for initiation of substance use (United Nations Office on Drugs and Crime, 2018). Its easy availability, coupled with perceptions of a low risk of harm, makes cannabis the drug of choice in this age group (Comisión Nacional para el Desarrollo y Vida sin Drogas, 2012; Comisión Nacional

para el Desarrollo y Vida sin Drogas, 2013; United Nations Office on Drugs and Crime, 2018). In Peru, the average age of onset of cannabis use is 14.4 years old, and the prevalence per year of marijuana use between the ages of 12 and 17 years is 2% (only surpassed by the age group between 19 and 25 years, with 2.1%) (Comisión Nacional para el Desarrollo y Vida sin Drogas, 2012). The regular use of marijuana during adolescence is of particular concern, since use by this age group is associated with an increased likelihood of experiencing the deleterious consequences described previously (Volkow, Baler, Compton & Weiss, 2014). Among adolescents in juvenile detention centers of Peru, the prevalence per year of marijuana consumption was found to be around 29.3%, which is more than ten times higher than what was found for the general Peruvian population (Comisión Nacional para el Desarrollo y Vida sin Drogas, 2013).

Factors that have been linked to cannabis use in adolescents in the scientific literature include a variety of social, interpersonal, and individual factors. Social factors include urbanization and availability of drugs in the environment; interpersonal factors include affiliation with marijuana-using peers and peer-pressure; and individual factors include gender, level of study, risk perception, perceived stress, self-esteem, impulsivity and emotional discomfort (Ameth et al., 2017; Casajuana et al., 2021; Rial et al., 2019; Zapata Roblyer, Betancourth & Grzywacz, 2015).

The present work aimed to find the prevalence, characteristics, and associated factors of marijuana use among young people in juvenile detention centers of Peru. Although international literature regarding factors associated to marijuana consumption in adolescents is available, our review did not find studies regarding marijuana use in young people from juvenile detention centers.

Materials and Methods

The present study has a cross sectional analytical design, based on secondary analysis of the data obtained from the National Population Census in the Diagnostic and Rehabilitation Youth Centers in Peru, carried out from March to April 2016 by the National Institute of Statistics and Informatics (INEI, from Spanish acronym), in coordination with the Ministry of Justice. The census included all men and women admitted in the country's 10 juvenile detention centers spread out across the nation (United Nations Office on Drugs and Crime, 2019). Considering a marijuana consumption prevalence of 2.5% (World Health Organization, 2019) and 95% of significance, we estimated the statistical power for two scenarios of comparison of proportions (depression and tobacco use) (Bahorik et al., 2018; Leatherdale, Ahmed & Kaiserman, 2006) in OpenEpi version 3.01. Thus, we obtained a statistical power higher than 90% in both scenarios.

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The information was collected through a face-to-face questionnaire by a printed census card, and the answers were registered by the pollster. The census card was composed of one cover and five chapters, which included 179 questions distributed in 16 pages. The chapters of the survey were: social and family conditions, the situation of the criminal offense, living conditions, role of the institutions, and expectations of the inmate. A pilot test was carried out to evaluate the operability, structure, phrasing and understanding of the questions, and answer alternatives stated in the census card. As a result, the number of questions was reduced from 213 to 179 to shorten the duration of the questionnaire. Coordinators of youth centers and census enumerators were trained to ensure the quality of the data obtained. They were also given a manual that served as a guide for an adequate collection of information by the enumerator (Instituto Nacional de Estadística e Informática, 2016).

The outcome variable "frequent marijuana consumption" (FMC) was constructed based on three questions from the health section of the questionnaire. The first question asked was: "Did you use drugs before entering the juvenile detention center?". If the answer was affirmative, the inmate would answer: "What type of drug did you use?". Thirdly, they were asked: "How often did you consume before entering the youth center?". Participants who answered "yes" to the first question; "marijuana" to the second one; and "daily", "2 to 6 times per week", or "weekly" to the third one, were considered as having the outcome. This way, the possible factors associated with frequent marijuana use in young people before entering the detention centers could be evaluated.

The variables were divided into sociodemographic and familial characteristics, morbidities, and harmful habits. The region variable was divided according to the place of origin of the inmate. They were classified as coming from Lima or other regions. The level of education was classified as uneducated, elementary (complete or incomplete) and secondary (complete or incomplete). Child labor was considered in those who reported having worked at age 14 or earlier. The age until which the inmate lived with the mother and father was classified as: he never lived, he lived until he was 14 and he lived beyond the age of 14. In addition, sex, age, ran away from home before the age of 15, physical abuse during childhood, having during childhood a family member who consumed alcohol or drugs frequently, presence of gangs in the area where he lived, discrimination or abuse before admission, has belonged to some criminal gang, and juvenile detention center readmission were considered in the independent variables. Depression, substance abuse disorder and asthma were evaluated using two questions. The first one asked the respondent to self-report whether he had the condition or not. The second one asked whether a health professional had diagnosed this

condition. Only those who responded affirmatively to both of these questions were considered as having the disease. Permanent limitations on learning and concentration were evaluated through self-report. Harmful habits prior to the admission (consumption of alcoholic beverages, tobacco, and their starting ages) were self-reported. The self-reporting of diseases has been used in previous studies carried out in vulnerable populations (Feinstein et al., 1998; Salazar-De La Cuba, Ardiles-Paredes, Araujo-Castillo & Maguiña, 2019). One study concluded that the prevalence of self-reported diseases was more sensitive and specific than the incidence (Oksanen et al., 2010).

The database was downloaded from https://observatorio.mininter.gob.pe/proyectos/censo-nacional-de-centros-juveniles in dbf format and was transferred to Stata 14.0 (Stata Corporation, College Station, TX, USA) for analysis. In the univariate analysis, the absolute and relative frequencies of each variable of interest were described. The numerical variables were described through the median and interquartile range (IQR), due to their abnormal distribution, previously tested by Shapiro-Wilk test. The bivariate analysis was performed using Pearson's chi-square test for categorical variables and Mann-Whitney U test for numerical variables. The magnitude of the association was calculated through crude prevalence ratios (cPR) and adjusted prevalence ratios (aPR), computed for each variable. The epidemiological and statistical criteria were taken into consideration to select the variables of the multivariable model. Both models were estimated employing generalized linear models, Poisson family, log link function, with robust variance. This statistical model allows us to study associations between exposures and binary outcomes, through point estimates and comparable standard errors (Chen, Qian, Shi & Franklin, 2018). This enables us to determine relative risks, that based on the design of the present study would be interpreted as prevalence ratios. The multivariable model was adjusted for all the previously selected variables, and it was adjusted by clusters conformed by juvenile detention centers. All statistical analyzes were conducted with a level of significance less than 0.05 and a 95% confidence interval (95% CI). This work was approved by the institutional ethics committee of the Universidad Peruana de Ciencias Aplicadas (registration code PI081-17).

Results

The population from the 10 juvenile detention centers was 2,203. Of these, 58 were excluded because they were absent during the survey or turned in blank forms. Out of the 1,965 remaining, 117 did not fill the variables of interest and therefore were excluded. 1,848 participants were included, which represents 91.3% of the total population (see Figure 1).
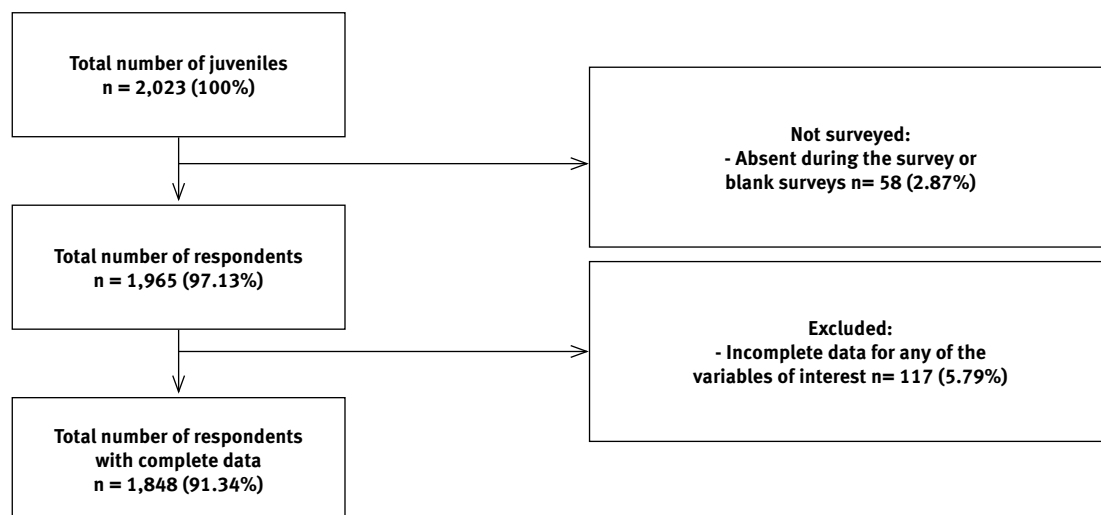
Figure 1. Flow chart.

The prevalence of FMC, as defined above, was 32.8% (n=606). The age range was 14 to 22 years old with a median age of 17 years old (IQR: 16-18). In addition, 95.29% (n=1,761) of the respondents were male and 67.26% (n=1,243) had secondary level education. Statistically significant (p value <0.05) association was found between FMC and being born in Lima, running away from home before the age of 15, presence of the father, physical abuse during childhood, having a family member who consumed alcohol or drugs frequently, presence of criminal gangs in the area where one lived, belonging to a criminal gang, and readmission to the juvenile detention center (see Table 1). Statistically significant associations were also found between FMC and a medical diagnosis of substance abuse disorder, consumption of alcoholic beverages, and tobacco use. An association between the age at which consumption of both alcohol and tobacco was started and FMC was also found (see Table 2).

When adjusted per all model variables and juvenile detention centers as clusters, we found that male sex (aPR: 1.31, 95%CI: 1.21-1.40), being born in Lima (aPR: 1.64, 95%CI: 1.36-1.95), running away from home before age 15 (aPR: 1.28, 95%CI: 1.11-1.47), physical abuse during childhood (aPR: 1.23, 95%CI: 1.07-1.40), having a family member who consumed alcohol frequently (aPR: 1.08, 95%CI: 1.01-1.15), having a family member who consumed drugs (aPR: 1.19, 95%CI: 1.05-1.34), presence of criminal gangs in the area where they lived (aPR: 1.63, 95%CI: 1.46-1.82), readmission to juvenile detention center (aPR: 1.18, 95%CI: 1.02-1.38), medical diagnosis of substance abuse disorder (aPR: 1.38, 95%CI: 1.13-1.67) and consumption of alcoholic beverages (aPR: 1.40, 95%CI: 1.18-1.66) increased the likelihood of FMC in a statistically significant way. We also found that when compared to never having lived with one's mother, living with her up to age 14 (aPR:

0.79, 95%CI: 0.64-0.95) or further (aPR: 0.83, 95%CI: 0.69-0.99) decreased the likelihood of FMC. In the case of the father, only living with him further than age 14 (aPR: 0.83, 95%CI: 0.73-0.93) decreased the likelihood of FMC (see Table 3).

Discussion

According to the World Drug Report of 2015, men are three times more likely than women to use marijuana (United Nationals Office on Drugs and Crime, 2015). In our country, marijuana use in men is three to ten times higher than in women (Comisión Nacional para el Desarrollo y Vida sin Drogas, 2012). This was also seen in our study, where male participants were 1.31 times more likely to use marijuana at least once a week than females. The prevalence of marijuana use among age groups vary among regions and socioeconomic level. According to the World Health Organization, in the United States marijuana use peaks at the early twenties and declines throughout the late twenties. In Brazil, the prevalence of use is highest among the adolescent population (World Health Organization, 2016). In the present study, subjects ranged from 14 to 22 years old, this age group is ideal for studying marijuana consumption because, as stated above, the highest prevalence is among adolescents and early adults.

Various studies have shown that interpersonal interactions influence the likelihood of marijuana utilization. In Peru, the most common initiation environment for marijuana use is among neighborhood groups, accounting for 57.9% of the consumption initiation environments (Comisión Nacional para el Desarrollo y Vida sin Drogas, 2012). Furthermore, a study conducted in North Carolina showed a positive correlation between gang membership

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Table 1. *Prevalence of frequent marijuana consumption (FMC) at Peruvian Juvenile Detention Centers according to sociodemographic and familiar characteristics.*

Characteristics	Study population (n=1,848) n (%)	FMC*† (n=606)	Prevalence (% row)	95% CI	p value
Age (IQR)	17 (16-18)	17 (16-18)			0.127
Sex					
Male	1,761 (95.29)	579	32.88	30.72-35.11	0.721
Female	87 (4.71)	27	31.03	22.17-41.54	
Region					
Lima	866 (46.86)	375	43.30	40.03-46.63	‹0.001
Other regions	983 (53.14)	231	23.52	20.97-26.28	
Education level					
No education	22 (1.19)	6	27.27	12.54-49.50	
Elementary	583 (31.55)	208	35.68	31.88-39.65	0.183
Secondary	1,243 (67.26)	392	31.54	29.00-34.17	
Child labour					
Yes	932 (50.43)	298	31.97	29.05-35.04	0.450
No	916 (49.57)	308	33.62	30.63-36.75	
Ran away from home before 15 years old					
Yes	717 (38.80)	307	42.82	39.23-46.47	‹0.001
No	1,131 (61.20)	299	26.44	23.94-29.08	
Age until he lived with the mother					
Never lived	58 (3.14)	26	44.83	32.51-57.80	
≤14 years	534 (28.90)	189	35.39	31.44-39.55	0.030
›14 years	1,256 (67.97)	391	31.13	28.62-33.74	
Age until he lived with the father					
Never lived	280 (15.15)	114	40.71	35.09-46.58	
≤14 years	724 (39.18)	251	34.67	31.28-38.21	‹0.001
›14 years	844 (45.67)	241	28.55	25.60-31.70	
Physical abuse during childhood					
Yes	866 (46.86)	329	37.99	34.81-41.27	‹0.001
No	982 (53.14)	277	28.21	25.47-31.10	
Having during childhood a family member who consumed alcohol frequently					
Yes	580 (31.39)	234	40.34	36.41-44.39	‹0.001
No	1,268 (68.61)	372	29.34	26.89-31.90	
Having during childhood a family member who consumed drugs					
Yes	81 (4.38)	49	60.49	49.43-70.57	‹0.001
No	1,767 (95.62)	557	31.52	29.39-33.72	
Presence of gangs in the area where he lived					
Yes	975 (52.76)	426	43.69	40.60-46.83	‹0.001
No	873 (47.24)	180	20.62	18.06-23.43	
Discrimination or abuse before admission					
Yes	166 (8.98)	66	39.76	32.57-47.41	0.045
No	1,682 (91.02)	540	32.10	29.91-34.37	
Belonged to some criminal gang					
Yes	337 (18.24)	154	45.70	40.43-51.05	‹0.001
No	1,511 (81.76)	452	29.91	27.65-32.27	
Juvenile detention center readmission					
Yes	253 (13.69)	112	44.27	38.24-50.46	‹0.001
No	1,595 (86.31)	494	30.97	28.74-33.28	

Note. * Chi-square test was used for categorical variables and Mann-Whitney's U for numerical variables.
† FMC: Frequent marijuana consumption, meaning at least once a week.

Table 2. *Prevalence of frequent marijuana consumption (FMC) at Peruvian Juvenile Detention Centers according to morbidities and harmful habits.*

Characteristics	Study population (n=1848) n (%)	FMC*† (n=606)	Prevalence (% row)	95% CI	P value
Morbidities‡					
Depression					
Yes	69 (3.73)	31	44.93	33.58-56.82	0.029
No	1,779 (96.27)	575	32.32	30.18-34.53	
Substance abuse disorder					
Yes	64 (3.46)	39	60.94	48.45-72.13	‹0.001
No	1,784 (96.54)	567	31.78	29.66-33.98	
Asthma					
Yes	105 (5.68)	42	40.00	31.04-49.67	0.105
No	1,743 (94.32)	564	32.36	30.19-34.59	
Permanent limitations to understand or learn					
Yes	289 (15.64)	106	36.68	31.30-42.40	0.126
No	1,559 (84.36)	500	32.07	29.79-34.43	
Harmful habits†					
Age of onset of marijuana use (IQR)		14 (13-15)			‹0.001
Consumption of alcoholic beverages					
Yes	1,507 (81.55)	535	35.50	33.12-37.95	‹0.001
No	341 (18.45)	71	20.82	16.83-25.46	
Age of onset of alcohol consumption (IQR)		14 (13-15)			‹0.001
Tobacco use					
Yes	925 (50.05)	344	37.19	34.12-40.35	‹0.001
No	923 (49.95)	262	28.39	25.56-31.38	
Age of onset of tobacco use (IQR)		14 (13-15)			‹0.001

Note. * Chi-square test was used for categorical variables and Mann-Whitney's U for numerical variables.
† FMC: Frequent marijuana consumption, meaning at least once a week.
‡ Autorreported diseases diagnosed by a healthcare professional.
† Use prior to admission at the juvenile detention center.

and frequency of marijuana consumption. The same study also showed a higher probability of consumption in early adolescence compared to those without gang membership (Wechsberg et al., 2015). These results are consistent with ours because we described an increase of 63% of probability of having FMC among those who live in a neighborhood with gang presence. Another study found that adolescents whose peers were involved in drug use, including marijuana, had almost six times higher chances of using cannabis, most likely because of peer pressure (Mehanović et al., 2020).

Family background has been reported to have an influence over marijuana use, and this is consistent with the results of our study. Having parents who consume alcohol and drugs increases the probability of FMC in 1.08 and 1.19 times, respectively. It has been described that closeness of young people to their parents reduces the consumption of marijuana and other substances (Kosterman, Hawkins, Guo, Catalano & Abbott, 2000; Velleman, Templeton & Copello, 2005). Furthermore, a

systematic review found that having a single-parent family, in addition to a problematic relationship with parents, are important risk factors to marijuana consumption in young people (Guxens et al., 2007). Physical abuse during childhood has also been shown to be a risk factor for marijuana consumption, as demonstrated by a study carried out in young adults from Mexico, using the Social Cohesion Survey for the Prevention of Violence and Crime. Similarly, other studies also reported the same association (Hornor, 2010; Hser, Longshore & Anglin, 2007; Huang et al., 2011; Vega-Cauich, Heredia & García, 2018). Our study found that running away from home before the age of 15 had 1.28 more probability of FMC, which is consistent with prior research carried on homeless and runaway adolescents, where it was found that the prevalence of marijuana use was much higher in this group compared to the general population, regardless of their reasons for running away (Rew, Taylor-Seehafer & Fitzgerald, 2001; Tyler, Gervais & Davidson, 2013; Wang, Chen, Lew-Ting, Chen & Chen, 2010). In a study in early adolescence a

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Table 3. *Associated factors to frequent marijuana consumption (FMC) at Peruvian Juvenile Detention Centers.*

	Crude analysis a			Adjusted model b		
	cPR*	P value	CI 95%	aPR‡	P value	CI 95%
Age	1.02	0.370	0.97-1.06	0.96	0.034	0.92-0.99
Sex						
Male	1.06	0.724	0.76-1.45	1.31	‹0.001	1.21-1.40
Female	Ref	Ref	Ref	Ref	Ref	Ref
Region						
Lima	1.84	‹0.001	1.60-2.10	1.64	‹0.001	1.36-1.95
Other regions	Ref	Ref	Ref	Ref	Ref	Ref
Ran away from home before 15 years old						
Yes	1.62	‹0.001	1.42-1.84	1.28	0.001	1.11-1.47
No	Ref	Ref	Ref	Ref	Ref	Ref
Age until he lived with the mother						
Never lived	Ref	Ref	Ref	Ref	Ref	Ref
≤14 years	0.79	0.132	0.58-1.07	0.79	0.014	0.64-0.95
›14 years	0.69	0.016	0.51-0.93	0.83	0.049	0.69-0.99
Age until he lived with the father						
Never lived	Ref	Ref	Ref	Ref	Ref	Ref
≤14 years	0.85	0.069	0.71-1.01	0.91	0.337	0.74-1.10
›14 years	0.70	0.000	0.58-0.83	0.83	0.002	0.73-0.93
Physical abuse during childhood						
Yes	1.35	‹0.001	1.18-1.53	1.23	0.002	1.07-1.40
No	Ref	Ref	Ref	Ref	Ref	Ref
Having during childhood a family member who consumed alcohol frequently						
Yes	1.38	‹0.001	1.20-1.56	1.08	0.016	1.01-1.15
No	Ref	Ref	Ref	Ref	Ref	Ref
Having during childhood a family member who consumed drugs						
Yes	1.92	‹0.001	1.58-2.31	1.19	0.005	1.05-1.34
No	Ref	Ref	Ref	Ref	Ref	Ref
Presence of gangs in the area where he lived						
Yes	2.12	‹0.001	1.82-2.45	1.63	‹0.001	1.46-1.82
No	Ref	Ref	Ref	Ref	Ref	Ref
Discrimination or abuse before admission						
Yes	1.24	0.036	1.01-1.51			
No	Ref	Ref	Ref			
Belonged to some criminal gang before admission						
Yes	1.53	‹0.001	1.32-1.75			
No	Ref	Ref	Ref			
Juvenile detention center readmission						
Yes	1.43	‹0.001	1.22-1.67	1.18	0.027	1.02-1.38
No	Ref	Ref	Ref	Ref	Ref	Ref
Depression						
Yes	1.22	0.019	1.03-1.44			
No	Ref	Ref	Ref			
Substance abuse disorder						
Yes	1.92	‹0.001	1.55-2.35	1.38	0.001	1.13-1.67
No	Ref	Ref	Ref	Ref	Ref	Ref
Consumption of alcoholic beverages						
Yes	1.71	‹0.001	1.37-2.12	1.40	‹0.001	1.18-1.66
No	Ref	Ref	Ref	Ref	Ref	Ref
Tobacco use						
Yes	1.31	‹0.001	1.14-1.49			
No	Ref	Ref	Ref			

Note. [a] Poisson regression with robust variance.
[b] Poisson Regression with robust variance adjusted per selected variables, and adjusting juvenile detention centers as clusters.
*cPR: Crude prevalence ratio.
‡ aPR: Adjusted prevalence ratio.

moderate association was found between having a sibling who consumed alcohol or who consumed marijuana during childhood and marijuana use in the last year (Heerde, Bailey, Toumbourou & Catalano, 2019; Terry-McElrath, O'Malley & Johnston, 2013). Having positive parental attitudes towards drug use increased 1.35 times the probability of substance use among young people (Heerde et al., 2019; Terry-McElrath et al., 2013). Furthermore, having parents with a positive attitude towards alcohol and tobacco use, increased the probability of marijuana consumption five-fold (Mehanović et al., 2020).

Our study described that alcohol consumption increases 1.40 times the probability of FMC. In addition, we found a great prevalence of tobacco use (50.05%) in our population, in contrast with the low prevalence of tobacco use in the general population in Peru (World Health Organization, 2016). A 2019 study found that consumption of either alcohol or cigarettes increased the probability of simultaneous use of marijuana. It is of note that this study found that marijuana use also increased the probability of alcohol and/or cigarette use (Roche et al., 2019). Furthermore, a population-based study in Canada found that teenagers who had used both alcohol and tobacco were 188 times more likely to have tried marijuana (Leatherdale, Hammond & Ahmed, 2008). These studies are consistent with ours, since we found that alcohol consumption increases the probability of FMC 1.40 times. A study in high school seniors found that simultaneous alcohol and marijuana use was strongly linked to perceived dependency (Mehanović et al., 2020), which supports our findings of an association between self-reported substance abuse disorder and marijuana consumption. Earlier age of onset of both alcohol and tobacco use has also been found to increase FMC prevalence, which is consistent with previous studies in incarcerated populations (Racz et al., 2016). Early onset of substance use has been associated with polysubstance use, higher risk of substance abuse and criminal behaviors later in life (Gordon, Kinlock & Battjes, 2004; Moss, Chen & Yi, 2014). This association is particularly strong in incarcerated young adults (Harrison, Ramo, Hall, Estrada-Gonzales & Tolou-Shams, 2019). Youth involved in the penal system are therefore at a higher risk for these disorders and should merit evaluation and further interventions.

We found that juvenile detention center readmission increases 1.18 times the probability of FMC compared to those who were not readmitted. This correlates well with studies that indicate that drug use overall is associated with faster recidivism (Aalsma et al., 2015). This indicates that drug use, in this case marijuana, could be an important factor for reentry to the youth detention center. A possible explanation for this could be that they were detained because of their illegal marijuana use, or because the drug use provoked them to commit an illegal act.

This study, due to the coverage of the entire population of juvenile detention centers, allows extrapolating the statistical data found on this population group at that of the level of Peru. The findings of this research should be interpreted in the light of its limitations. Since the variable FMC was generated using questions from the questionnaire, it represents only an approximation of the marijuana consumption pattern, since it has not been validated. It must be considered that some of the data obtained refers to events that occurred in childhood, so a memory bias may arise. The diseases analyzed were self-reports of diagnosis by health professionals, so they are subject to information bias. The use of a face-to-face interview to collect information about risky behaviors produces desirability bias. Because this is a cross-sectional study, there will be no temporality and it is impossible to determine causation. We encourage the development of longitudinal studies with the aim of evaluating marijuana consumption as a possible risk factor to juvenile detention centers admission. In addition, we suggest evaluating risk factors among this population through censuses in other countries.

The present study found important sociodemographic factors and life experiences associated with frequent marijuana consumption in Peruvian youths before their admission to detention centers. These results are relevant to policy makers because it expands the knowledge regarding drug use in vulnerable youth, such as those living in neighborhoods with gang presence and in single-parent families. Allowing health authorities to reduce the prevalence of factors associated with more frequent marijuana use via educational, family and governmental strategies and policies. At an educational level, programs could be made that promote healthier life styles, that shed a light on the dangers of marijuana and other drugs, or that allow testimonies from past drug users. In the family, the results could allow parents to be more watchful of their children and aware of which factors could lead their children to consume marijuana or other drugs. At a governmental level, the government could make television or radio commercials that educate the population on drug use, or they could also make policies that help reduce the frequency of use, like adding more security around the communities to help reduce marijuana use in vulnerable neighborhoods.

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Conflict of interests

The authors declare no conflicts of interest regarding the publication of this article.

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