Original Article

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Factors Associated with the Use of Psychotropic Substances During the Migration Process to the United States

Factores asociados al consumo de sustancias psicotrópicas durante el proceso migratorio a Estados Unidos

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Summary

Objective: To determine the factors associated with substance use during the migration process to the United States. **Methods:** A total of 212 migrants were surveyed at the border of Tijuana, Mexico. Three stages of the migration process were explored for substance use: 1) before leaving home; 2) transit and stay at the border; and 3) living in the United States. Multivariate analysis was performed. **Results:** When leaving home, the substances used were alcohol and tobacco 45.3%; marijuana 3.8% and no substance 50.9%. Upon returning to Mexico, alcohol and tobacco use was 59.2%; illicit substances 26.6% and 14% did not use drugs. **Conclusions:** Consumption increased in the United States, reaching 86% upon return to Mexico. Family support was a protective factor against drug use at all stages.

Key words: Emigration and Immigration; Alcoholism; Substance-Related Disorders; Family Structure; Hispanic or Latino.

Resumen

Objetivo: determinar los factores asociados con el uso de sustancias durante el proceso migratorio a Estados Unidos. **Métodos:** se encuestaron 212 migrantes en la frontera de Tijuana, México. Se exploraron tres etapas del proceso migratorio para el consumo de sustancias: 1) antes de salir del hogar; 2) tránsito y estancia en la frontera y 3) vivir en Estados Unidos. Se realizó análisis multivariado. **Resultados:** al salir del hogar, las sustancias utilizadas fueron alcohol y tabaco 45.3%; marihuana 3.8% y ninguna sustancia 50.9%. Al retornar a México, el consumo de alcohol y tabaco 59.2%; sustancias ilícitas 26.6% y 14% no consumía drogas. **Conclusión:** el consumo se incrementó en los Estados Unidos, alcanzando 86% al retornar a México. Asimismo, la familia fue un factor protector para el consumo de drogas en todas las etapas.

Palabras clave: emigración e inmigración, alcoholismo, trastornos relacionados con sustancias, estructura familiar, hispano o latino.

Introduction

Drug addiction or addiction to psychotropic substances is defined as the frequent consumption of narcotic drugs, even when users are aware of the harmful consequences they may have.[1] It is also defined as a compulsive urge to seek and use drugs, the loss of control over drug use and the manifestation of a negative emotional state when access to the drug is denied.[2] Drug addiction is developed through the following four stages: occasional use, recreational use, regular use, and addiction.[2]

Clinically, substance use disorder is described in the fifth edition of the Diagnostic and Statistical Manual of Mental Disorders (DSM-5), based on the following criteria: at least twelve months of use; use associated with social or interpersonal problems; failure to fulfill responsibilities; withdrawal syndrome; drug tolerance; unsuccessful attempts to stop using drugs; physical or psychological problems resulting from the drug use. Severity of drug abuse can be mild (2-3 criteria), moderate (4-5 criteria) or severe (6 or more criteria).[3]

According to the latest World Drug Report 2022, about 284 million people aged 15 to 64 years old consumed some type of substance worldwide during 2020; men had a higher consumption, compared with the previous decade, representing an increase of 26%. According to the World Health Organization (WHO), the prevalence of drug use in North America changes according to the type of narcotic drug: cannabis 16%; amphetamines and other stimulants 4.28%; opioids 3.62%; cocaine 2.03% and ecstasy 0.94%; these percentages may vary depending on age, gender, and other ethnic groups.[4]

In Mexico, the National Survey on Drug, Alcohol and Tobacco Consumption 2016- 2017, reported 2.2 million drug users.[5,6] According to the Mexican National Survey of Addictions (2011), prevalence in the use of any drug at some point in individuals' lives increased from 5.0% in 2002 to 7.8% in 2011, while the use of any illegal substance increased from 4.1% to 7.2%, mainly affecting the northern region of Mexico (2.8%); prevalence in Central Mexico was 1.7% and in the southern region was 1.2%.[7]

From a legal perspective, drugs are classified as legal and illegal. Legal drugs include tobacco, alcohol and inhalants, and illegal drugs include those of natural origin, such as marijuana and cocaine; synthetic drugs such as crystal meth and other amphetamines; and finally, those of pharmacological origin such as fentanyl, ketamine, and benzodiazepines. The use of these drugs has been associated with mood disorders, especially anxiety and depression, as well as impaired perception of interpersonal relationships.[8]

Substance use, both licit and illicit, is a multifactorial problem that affects vulnerable groups, such as migrants, who are exposed to various risk factors during transit to the United States (U.S.). Some of these factors may be stress generated by structural, environmental, cultural, or economic aspects, as well as personal factors such as family separation, loss of support networks, loss of identity, guilt, longing, among others. Such factors may induce symptoms of anxiety and/or depression, leading individuals to increase their emotional fragility and favor the onset or aggravation of addictions.[9-11] On the other hand, it has also been documented that many of the deported migrants consume new and more dangerous illegal drugs upon their return to Mexico, the most common of which are heroin and methamphetamines.[12-13]

This study analyzes the behavior of Latin American migrants with respect to drug addictions in a multivariate context. The objective was to determine the variables associated with the use of psychotropic substances during the migratory process to the United States.

Methods

Analytical Cross-sectional study. Latin American migrants over 16 years of age and of both sexes who had lived for at least six months in the United States were sur-

veyed. A questionnaire with 73 variables was developed covering: sociodemographic data; family members; health risks; violence; addictions; means of transportation and access to health care services.

In this report, both legal (alcohol and tobacco) and illegal (marijuana, cocaine, heroin, crystal meth, ecstasy, among others) substances were considered. Three stages of the migratory process were considered: 1) before leaving home; 2) transiting toward and stay at the border of Tijuana, Mexico, and 3) living in the United States and returning to Mexico (repatriated or deported migrants).

A pilot test was conducted with 20 migrants similar to those included in the final sample. Adjustments were made to the semantics and wording of questions. Content validation was performed and neither criterion nor construct validity was considered, since this was an exploratory study by means of personal interviews. The questionnaire was carried out by a previously standardized family physician in a personal interview with people repatriated or deported to Mexico. These interviews were conducted at the "Garita del Chaparral", in Tijuana, Baja California, and at five migrant shelters (Casa del Migrante; Ejército de Salvación A.C.; Desayunador Salesiano Padre Chava; Casa de los Pobres A.C. and Instituto Madre Asunta A.C.).

The information was stored in Excel and analyzed using SPSS v26. A multivariate discriminant analysis was performed in each of the three stages to identify the variables associated with addictions in migrants. The study was conducted in accordance with national and international regulations, norms, and guidelines on ethics; in addition, migrants included in the study agreed to participate voluntarily and anonymously, with prior written informed consent. The project was registered and approved by the Research Commissions and the Ethics and Research Committee of the School of Medicine of the National Autonomous University of Mexico, with Registration code: FM/DI/113/2019.

Results

Data collection was carried out from November 2019 to March 2020. Information was obtained from 612 migrants, of which only 212 individuals met the inclusion criteria (have emigrated, lived in the United States for at least six months, and then returned to their country of origin). A previous paper[14] described the general information on the sociodemographic and family profile and specific aspects of the variables in the stage of transiting to and staying at the border, with emphasis on aspects of violence.

In this report, respondents answered that the main reasons for starting to use illegal drugs were: because their friends used them (31.3%); to know how it felt (22.2%); just for pleasure (17.2%); and because they felt sad, depressed and/or lonely (16.2%). Table 1 shows drug use in each of the three stages of the migratory process, indicating a gradual increase in the use of illegal substances after leaving home (3.8%) transiting (8.4%) and living in the United States (26.6%). The difference in this trend was significant (p<0.00001).

Upon leaving home, the most used substances were alcohol and tobacco (45.3%) and among the illegal drugs, marijuana (6.1%). During transit, the new drugs used were mainly illegal drugs, such as cocaine (2.3%) and crystal meth (2.3%). In the United States, the main new drugs used were cocaine (9.3%), crystal meth (8.8%) and marijuana (8.3%) as shown in Table 2.

By nationality, the study sample was divided into Mexican and non-Mexican Latin American migrants; this variable was correlated with any type of addictions (legal and illegal). No significant differences were found in the proportions of migrants

Table 1. Percentages of Migrants by Drug Use in the Stages of the Migratory Process

Migratory process stage	Did not use drugs		Use of legal drugs		Use of illegal drugs	
	n	%	n	%	n	%
1. Before leaving home in their country of origin	108	50.9	96	45.3	8	3.8
2. Transiting toward the Mexico – U.S. border	96	45.2	98	46.4	18	8.4
3. Living in the United States and returning to Mexico (repatriated or deported migrants)	30	14.2	126	59.2	56	26.6

χ^2= 47.058, p < 0.00001 (N= 212)

for the four subgroups:

χ^2= 0.078, p= 0.781.

Multivariate analysis

A multivariate discriminant analysis was performed to identify the variables associated with addictions among migrants in each of the three stages of the migratory process. Sixty-three independent variables were included, divided according to their contextual belonging: 13 for the first stage; 24 for the second stage and 26 for the third stage. The dependent variable was drug use; group 1 was defined as migrants who declared themselves to be non-drug users and group 2 as migrants who were addicted to legal or illegal drugs. By its methodological relevance, the technical specifications of the calculated discriminant analysis model were:

- Variable entry method: stepwise method (entry one at a time)
- Analysis method: Wilks' Lambda F criterion of predictor variables: entered= 3.84 and removed= 2.71
- Prior probabilities: all groups equal
- Centroids of discriminant scores
- Belonging probabilities of cases
- Concordance percentages of discriminant model classification
- Discriminant scores

Interpretation of the discriminant models was based on the coefficients of the discriminant function obtained at each stage and the response values of the significant discriminant variables.

Stage 1: If the migrant was female and her family of origin with whom she lived in her country of origin consisted of children and/or siblings, it was significantly associated with no addictions. On the other hand, if the migrant was male and the family with whom he lived was his spouse, or if he was living alone or with other non-family members, it was significantly associated with drug addictions. This model obtained a value of 89.1% of correctly classified cases based on the significant discriminant variables (Table 3).

Stage 2: In this model, there was no clear and precise pattern in the behavior of the responses of the significant discriminating variables. The fact that the migrant traveled accompanied by acquaintances, strangers, in a migrant caravan or alone to the border was significantly associated with drug use. In contrast, if the migrant traveled accompanied by a spouse, children, other relatives, or friends, it was significantly associated with no drug use. This model

was regular since it obtained a moderate value (58.5 %) of correctly predicted cases (Table 4). Note that the main significant discriminating variable in this model, determined by the Wilks' Lambda value, was a polytomous variable with eight different response options and that the values were not coded on an ordinal scale.

Stage 3: This model had a mixed pattern (one section was clear, but there was some uncertainty in the other). The migrant did not increase drug consumption during his/her stay in the United States if the reasons for using substances were: just for pleasure; to know how it felt; to improve his/her job performance, to get rid of hunger and/or to sleep peacefully. By contrast, if the migrant used drugs, it was significantly associated with being sad, depressed, lonely, guilty and/or having friends who used drugs. This model obtained a very acceptable value (74%) of correctly predicted cases (Table 5). It is also relevant to note that the discriminant predictor variable was also polytomous with eleven different response options and that the values were not coded on an ordinal scale.

Regarding the statistical power of the study, the stage-1 discriminant model

Table 2. Most Used Drugs by Stage of the Migratory Process

Migratory process stage	Use of legal drugs			Use of illegal drugs			Illegal drugs χ^2 p
	Type	%	n	Type	%	n	
1. Before leaving home in their country of origin	Alcohol Tobacco	28.8 20.3	61 43	Marijuana Cocaine Crystal meth	6.1 2.8 1.9	13 6 4	[6.143] 0.046
2. Transiting toward and stay at the Mexico – U.S. border	Alcohol	1	2	Cocaine Crystal meth	2.4 2.4	5 5	[7.538] 0.023
3. Living in the United States and returning to Mexico (repatriated or deported migrants)	Alcohol Tobacco	9.9 2.8	21 6	Cocaine Crystal meth Marijuana	9.4 9.0 8.4	20 19 18	[0.286] 0.593

N= 212

Table 3. Summary of Discriminant Model. Stage 1: Before Leaving Home in Their Country of Origin

Step	Entered variable	Entered/removed variables[a,b,c] of the discriminant model							
		Wilks' Lambda							
		Statistic	gl1	gl2	gl3	Exact F			
						Statistic	gl1	gl2	Sig.
1	Migrant's gender	0.467	1	1	140	160.009	1	140	< 0.00001
2	Relatives with whom he/she lived who remained in the country of origin	0.437	2	1	140	89.643	2	139	< 0.00001

	Summary of canonical discriminant functions				
	Function	Eigenvalue	% of variance	Cumulative %	Canonical correlation
	1	1.290	100.0	100.0	0.751

	Wilks' Lambda				
	Functions test	Wilks' Lambda	χ^2	gl	Sig.
	1	0.437	115.158	2	p < 0.00001

	Canonical Discriminant Function Coefficients
Discriminant Function 1	FD_1 = -3.055 + migrant's gender (3.508) + Relatives with whom he/she lived (-0.445) [note: the -3.055 value corresponds to the Function constant]

	Centroids of discriminant function		
Dependent variable Drug use	Group	Centroids	Covariances
	Non-addicted	1.683	2.318
	Addicted	-.756	0.416

Classification results (original vs. predicted classification)		
Group	Correctly classified cases	Discriminant scores averages ± standard deviation
Non-addicted migrants	71.1 %	1.72* ± 1.527; n= 45
Addicted migrants	97.1 %	-0.76* ± 0.633; n= 102
Overall classification	89.1 %	Unclassified cases	0.41 ± 1.773; n= 65
Overall evaluation of the discriminant model		Very good

The variable that minimizes the overall Wilks' lambda is entered at each step. (N= 212)
a. The maximum number of steps is 28
b. The minimum partial F to enter is 3.84
c. The maximum partial F to remove is 2.71
*The distribution was not normal. Comparison of averages: Mann-Whitney U Test p < 0.00001

was the most statistically robust, since the total value of the Wilks' Lambda test significantly decreased. The stage-3 and stage-2 (regular) models were the second and third most robust models, respectively. It is worth noting important to mention that the three models were predictive, although the sample size was not very large.

Discussion

Data found in this study revealed a gradual increase in the use of illicit substances as people traveled to the border; it increased from 3.8% of users (mainly marijuana) upon leaving home to 8.4% (cocaine and crystal meth) during transit to the border and to 26.6% during their stay in the United States, derived from the use of substances such as cocaine, crystal meth and marijuana. It is noteworthy that, upon leaving home, 50% of the migrants did not use any drugs; however, upon returning to Mexico, only 14.2% of the migrants remained free of substance use. Likewise, alcohol and tobacco users increased from 45.3% to almost 60%.

Table 4. Summary of Discriminant Model. Stage 2: Transit and Stay at the Border

		Entered/removed variables[a,b,c] of the discriminant model							
		Wilks' Lambda							
Step	**Entered variable**	**Statistic**	**gl1**	**gl2**	**gl3**	**Exact F**			
						Statistic	**gl1**	**gl2**	**Sig.**
1	With whom he/she traveled to the border	0.957	1	1	135	6.083	1	135	0.015
2	Substance use during transit	0.925	2	1	135	5.408	2	134	0.006

Summary of canonical discriminant functions				
Function	Eigenvalue	% of variance	Cumulative %	Canonical correlation
1	0.081	100.0	100.0	0.273

Wilks' Lambda

Functions test	Wilks' Lambda	χ^2	gl	Sig.
1	0.925	10.401	2	0.006

Canonical Discriminant Function Coefficients

Discriminant Function 1 — FD_1 = -1.918+ With whom he/she traveled to the border (0.318) + Substance use during transit (2.582) [note: the -1.918 value corresponds to the Function constant]

Centroids of discriminant function

Dependent variable	Group	Centroids	Covariances
	Non-addicted	-0.424	0.645
Drug use	Addicted	0.188	1.155

Classification results (original vs. predicted classification)

Group	Correctly classified cases	Discriminant scores averages ± standard deviation	
Non-addicted migrants	66.7	-0.40 ± 0.791; n= 45	
Addicted migrants	54.9	0.17 ± 1.077; n= 102	
Overall classification	58.5	Unclassified cases	-0.48 ± 0.977; n= 65
Overall evaluation of the discriminant model		Regular	

The variable that minimizes the overall Wilks' lambda is entered at each step. (N = 212)
a. The maximum number of steps is 48
b. The minimum partial F to enter is 3.84.
c. The maximum partial F to remove is 2.71.
*The distribution was not normal. Comparison of averages: Mann-Whitney U Test p < 0.00001

This information is consistent with that reported by various authors, who associate substance use in migrants with various risk factors to which they are exposed, such as fatigue, hunger, stress and travel companions during transit toward and crossing at the border.[5,13,15-16] Zhang et al.,[17] found prevalence rates that were completely opposite to those reported herein. For instance, they reported that 20% of the Mexican migrants in transit consumed illicit drugs one year before their departure. In addition, only 8.9% of the migrants who returned to Mexico were reported to use any substance. In this research, a sample was compiled with seven different groups of migrants who were at different stages of the migration process. Also, surveys were conducted in the city of Tijuana (Baja California), at the Tijuana International Airport, at the Tijuana central bus station, and at the San Ysidro port of entry/deportation station. As a result, a highly heterogeneous sample of regular and irregular migrants was obtained.

The above data are also consistent with what was reported in the National Survey on Drug, Alcohol and Tobacco Consumption 2016-2017, regarding the

Table 5. Summary of Discriminant Model. Stage 3: Arrival and Stay in the United States and Return to Mexico (Repatriated or Deported Migrants)

		Entered/removed variables[a,b,c,] of the discriminant model							
		Wilks' Lambda							
Step	Entered variable	Statistic	gl1	gl2	gl3	Exact F			
						Statistic	gl1	gl2	Sig.
1	Increase in drug use in the United States	0.751	1	1	132	43.875	1	132	< 0.00001
2	Main reason for initiating the use of illegal drugs	0.698	2	1	132	28.321	2	131	< 0.00001

Summary of canonical discriminant functions				
Function	Eigenvalue	% of variance	Cumulative %	Canonical correlation
1	0.432	100	100	0.549

Wilks' Lambda

Functions test	Wilks' Lambda	χ^2	gl	Sig.
1	0.698	47.074	2	< 0.00001

Canonical Discriminant Function Coefficients

Discriminant Function 1

FD_1 = -3.569 + Increase in drug use in the United States (0.163) + Main reason for initiating the use of illegal drugs (0.903) [note: the -3.569 value corresponds to the Function constant]

Centroids of discriminant function

Dependent variable	Group	Centroids	Covariances
	Non-addicted	0.966	0.102
Drug use	Addicted	-0.441	1.404

Classification results (original vs. predicted classification)

Group	Correctly classified cases	Discriminant scores averages ± standard deviation
Non-addicted migrants	86.7	0.97 ± 0.311; n= 45
Addicted migrants	68.3	-0.40 ± 1.207; n= 101
Overall classification	74.0	Unclassified cases: -0.27 ± 1.480; n=11
Overall evaluation of the discriminant model		Good

The variable that minimizes the overall Wilks' lambda is entered at each step. (N= 212)
a. The maximum number of steps is 52
b. The minimum partial F to enter is 3.84.
c. The maximum partial F to remove is 2.71.
 *. The distribution was not normal. Comparison of averages: Mann-Whitney U Test p < 0.00001

burden of disease due to substance use, which was approximately 3,075.44 years of healthy life lost (YHLL) per 100,000 inhabitants. Alcohol was identified as the substance with the greatest impact on the Mexican population with 1,622.03 YHLL and tobacco was ranked second with 1,220.36 YHLL. Illicit drugs were the third leading cause, mainly due to marijuana use (2.7%, equivalent to 2.2 million people), which accounted for 233.05 YHLL. The same survey also reported an increase in cannabis use (2.6%) among adolescents aged 12 to 17 years old between 2002 and 2016, which was higher than the figure reported for the entire population (2.1%).[5]

In contrast to Mexico, the greater availability of drugs in the United States, as reported by deported migrants,[13] can be evidenced in the prevalence of drug use (19.4%) reported in 2018; this was primarily due to marijuana, which was illicit at the time.[5] Moreover, the U.S. National Center for Health Statistics re-

ported a total of 107.622 drug overdose deaths in 2021, which was an increase compared to 2020, when 93.655 deaths were reported. The main substances related to the deaths were synthetic opioids such as heroin and fentanyl, with an estimated increase from 57.834 to 71.238 in 2021.[18]

In this respect, studies have also reported that U.S.-born children of Mexicans are more than five times more likely to have health problems related to the use of psychoactive substances. This was related to their type of friends and their curiosity, as well as to social pressure and to improve their job performance.[19-21] It has also been mentioned that the degree of acculturation of migrants and entertainment centers significantly influence the consumption of methamphetamine, marijuana, and cocaine,[22-23] which is consistent with the findings reported in this study.

In the stage 1 of this study, it was found that the variables associated with drug use were being male migrant and living with a partner, alone or with friends. Furthermore, the family of origin, consisting of children and/or siblings, was significantly associated with not being addicted. These findings are consistent with what was reported by CONADIC in 2016, which indicated that 1.8 million of the 2.2 million illicit drug users were male.[5] Similarly, the World Drug Report 2022 by the United Nations Office on Drugs and Crime (UNODC) reported that most of the 284 million drug users in 2020 worldwide were men.[4]

In this regard, Sánchez-Huesca[21] reported the existence of protective factors for the development of addictions, such as values and advice provided by parents within the family. In women, facts such as being a mother, a pregnant woman or even having children, avoided, suspended, or did not increase the use of substances.[20, 24-26]

In stage 2 of the migratory process, people traveling accompanied by strangers, in a migrant caravan or alone to the border were found to be significantly associated with drug use. Thus, the use of illegal drugs has been associated with the initial use of alcohol and having travel companions who consume alcohol.[27-30] Other authors have pointed out the increase in the consumption of alcohol, tobacco, and illicit substances when migrants were separated, divorced or single during their migratory transit, or when the migrant's partner consumed alcohol or when he/she had a low level of education.[16,21,23,31,32]

As mentioned in stage three of the migratory process, the stress experienced by migrants, reflected in emotional states such as nostalgia, fear, pain and uncertainty during the mobility stage, can lead to substance use.[33-35]

According to this study, in stage three of the migratory process, the people most exposed to drug use were those who felt sad, depressed, lonely, guilty and/or who had friends who used drugs. This is explained by the fact that substance use is associated with the fulfillment of psychosocial needs such as pain, sadness, stress, anger, or guilt. By doing so, the pharmacological effect is an increased release of dopamine, noradrenaline, adrenaline, and serotonin generated by drugs, producing the sensation of pleasure, euphoria, relaxation, decreased appetite, absence of fatigue and even hallucinations that free individuals from reality.[13,36]

The drug use associated with drug-using friends found in this study was also reported by other authors who related it mostly to the use of marijuana and greater alcohol intake, justified by "leaving problems aside", being included in groups of friends, greater availability, as well as having a greater economic capacity to obtain drugs.[14,28,33,37]

The limitations of this study included the small sample of migrants who completed the three stages of the migratory process studied, due to the fact that the border was closed because of the COVID-19 pandemic. In addition, it was not possible to survey many other migrants who apparently met the inclusion criteria, but who were under the influence of drugs or with possible mental disorders.

Conclusions

Exposure to psychoactive substances during the three stages of the migratory process revealed greater vulnerability of individuals during their stay in the United States, reaching 86% of users upon their return to Mexico. Likewise, the importance of the family as a protective factor was decisive for the associated variables in each stage. Both when leaving home and during transit and while living in the destination country, the variables associated with drug use were related to living away from family, traveling alone, traveling with strangers, or living with friends or partners who were drug users, as well as to feeling sadness, loneliness, guilt, and stress.

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