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An exploratory study of internal migration and substance use among an indigenous community in Southern Mexico

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Abstract

The primary aim of this study was to explore the association between internal migration experience within Mexico and lifetime substance use among a sample of 442 indigenous persons from Yucatan, Mexico. Adjusting for potential confounding, correlates of lifetime substance use were assessed among participants with and without internal migration experience. Internal migration to a tourist destination was independently associated with higher odds (Adjusted Odds Ratio (AOR): 2.1; 95% Confidence Interval (CI): 1.3-3.4) of reporting lifetime substance use. Findings suggest that environmental contexts of internal migration may be of importance in shaping vulnerability to substance use.

Keywords

Internal migration; substance use; indigenous populations; Mexico; migrant health

Introduction

Migration has been linked to substance abuse and dependence in diverse settings.[1-3] Migration-related stressors, including poverty, social isolation, loss of social and familial support networks, substandard housing, exposure to more liberal norms regarding substance use, and increased drug availability may increase migrant's susceptibility to substance abuse.[1,4-6] In the context of Mexico, migration to the United States (US)—the primary migration destination for Mexican migrants—has been associated with substance abuse.[1,4-7] Mexican migrants in Mexico with prior migration histories to the US commonly report a higher prevalence of substance use and substance use disorders as compared to their non-migrating counterparts.[4-6] Though Mexico has had a long-standing history of high

emigration to the US, US-Mexico migration dynamics are quickly changing. Mexican migration to the US has dramatically declined in recent years, reaching a net immigration rate of zero.[8] Various factors have contributed to this decline, including stricter US immigration control policies, the 2007-2008 US economic crisis, increased number of deportations by the US, and the growing dangers of crossing the border through unauthorized means.[8] Consequently, internal migration within Mexico has increased.[9] Approximately 18% of the Mexican population (~2 million persons) are internal migrants (i.e., residing outside their birth state).[9] However, less is known about the health implications of internal migration and the health vulnerabilities of internal migrants as compared to those with US-migration histories.

The Southern Mexican state of Quintana Roo is among the most popular destinations for internal migrants, especially those from the Yucatan peninsula; more than half (52%) of Quintana Roo's population is comprised of internal migrants.[9] Economic opportunities stemming from large tourism cities (i.e., Cancun, Playa del Carmen) have attracted internal migrants from poorer and rural regions of Mexico, including surrounding indigenous communities from neighboring states.[10] Drug use in this region has also been increasing. The local drug use prevalence in Quintana Roo exceeds the national rate, especially cocaine and methamphetamine use.[11] Use of heroin in this region has also recently been detected.[11,12] Findings from our prior research in this region suggest that internal migration may influence the substance use behaviors of indigenous persons in Mexico.[7] Our research team found that among a sample of indigenous migrants (n=650) from Southern Mexico, those with only internal migration experiences (i.e., migrated internally but never to the US) had higher independent odds of being at-risk drinkers (i.e., alcohol abuse) with increased time spent in an internal migration destination.[7] This suggests that indigenous migrants may be at increased risk for substance abuse and dependence. There is a gap in research knowledge regarding the relationship between internal migration and illicit drug use among indigenous populations.

Indigenous populations in Mexico are highly marginalized and face significant social and structural disparities that impact their health.[13-15] Higher levels of poverty, low educational attainment, stigma and discrimination, language barriers, and barriers to health care access disproportionally impact indigenous populations in Mexico.[14-16] These factors place indigenous persons at higher risk for poor health outcomes when compared to the general Mexican population, including higher mortality rates, mental health disorders, chronic diseases, occupational hazards and barriers to health care.[15,17] Internal indigenous migrants may be at increased risk for substance use given their existing vulnerabilities, however, greater empirical research is needed. To the authors' knowledge neither the role of internal migration on substance use behaviors nor the health vulnerabilities of internal indigenous migrants have been systematically studied—representing a critical gap in the migration and substance use literature. We undertook the present study to explore the association between lifetime substance use and internal migration among a high emigrating and primarily indigenous community located in Yucatan, Mexico.

Methods

Study design and participants

This study was nested within a larger binational study that recruited 650 participants from the indigenous community of Tunkás, Yucatan, Mexico.[18] Given the dearth of information on the impact of internal migration within Mexico, this study excludes US-residing participants (n=67), yielding a sample of 583 participants residing in Mexico. In January of 2012 our field research study team traveled to the indigenous community of Tunkás. Our research team was comprised of faculty researchers and bilingual and bicultural students who served as interviewers at the undergraduate, master, and doctoral level from the University of California (UC), San Diego and the *Instituto Nacional de Antropología e Historia* (INAH). This research team operated under the leadership of the Mexican Migration Field Research and Training Program (MMFRP) based at UC San Diego.[18] Interviewers were extensively trained on research ethics and field research methods; program faculty researchers closely supervised interviewers.[18] MMFRP has a longstanding community-based research relationship with the town of Tunkás that dates back to 2006.[18-20] The strong rapport and continuous collaboration with our research team and local community leaders and members facilitated access to the Tunkás community. Our fieldwork visit coincided with the town's annual 'fiesta', a two-week timeframe when migrants return home to participate in local festivities and to visit family. This presented the optimal opportunity to collect data on migrants in their community of origin.

Detailed information regarding our methods and sampling strategy has been previously described.[7,18] In brief, a modified household sampling technique was used to recruit participants. Interviewers approached individual household dwellings and screened potential participants for eligibility; participants were also approached during public gatherings and activities such as sporting events and in the community plaza. Importantly, study activities (i.e., recruitment and interviews) did not take place during nighttime festivities, particularly in settings where alcohol was being consumed or sold. Eligible participants included individuals who were 1) 18 to 65 years of age; 2) born in or had at least one parent/ grandparent from Tunkás; 3) able to speak Spanish or English; and 4) able to provide informed consent. It should be noted that although Maya is still spoken in the community, very few indigenous persons in Tunkás are monolingual Maya speakers;[19] no participants were excluded on the basis of Spanish language deficiency. The refusal rate (i.e., being eligible and declining to participate in our study after three unique recruitment attempts) was 7%.[18] Those who were eligible and accepted to participate were enrolled into our study and completed a structured questionnaire in their preferred language and in a private setting using computer-assisted personal interviewing (CAPI). The questionnaire took approximately 45 minutes to complete and participants received no financial incentive. Questionnaire items included: socio-demographics, US and internal migration histories, health status, and lifetime and current substance use history. Regarding substance use items, interviewers were prepared to provide colloquial terminology as examples to ensure accuracy of data collection efforts. The study protocol was approved by the University of California, San Diego Human Research Protection Program and the State of Yucatán,

México's *Sistema para el Desarrollo Integral de la Familia (DIF) del Estado de Yucatán* (System for the Integrated Development of the Family of the State of Yucatán).

Dependent variable

Our dependent variable, lifetime substance use, was dichotomized based on affirmative responses to the following 7-items related to illicit drug use, having ever consumed (for non-medical use only): (1) cocaine (e.g., coke, crack), (2) methamphetamines (e.g., speed, ecstasy, crystal), (3) inhalants (e.g., nitrous, glue, petrol, paint thinner), (4) sedatives (e.g., Valium, Rohypnol), (5) hallucinogens (e.g., LSD, acid, mushrooms, PCP, special K), (6) opium (e.g., heroin, morphine, codeine), or (7) other illicit drugs. Our dependent variable excludes alcohol and cannabis (i.e., marijuana) usage, as such, participants who indicated only using alcohol or marijuana exclusively were characterized as having no prior history of lifetime substance use.

Variables of interest

We operationalized our internal migration variable by creating three mutually exclusive categories to account for types of migration: (1) ever migrating to a tourist destination (e.g., Cancun, Playa del Carmen), (2) migrating to another part of Mexico, and (3) no migration. Participants were asked if they had 'ever left Tunkás for more than 1 month with the purpose of living or working in another part of Mexico.' Those who answered affirmatively were asked to indicate the first and last place of migration destination and categorized accordingly.

Covariates

Covariates included age, gender, socioeconomic status (SES), and ability to speak English (good/average vs. no knowledge), born in Tunkás, and currently residing in Tunkás. Our SES variable was constructed by using participants' highest level of education (dichotomized as high school or greater vs. did not complete high school) and number of household appliances (e.g., TV, stereo, refrigerator, washing machine, car, drinking water, electricity, oven, bathroom, cable/satellite, computer, and internet connection) in their primary residence, which are strong indicators for SES.[18,21,22] A subgroup analysis was then employed to empirically assess participants based on three mutually exclusive SES categories:[23] low SES, lower-middle SES, and middle-high SES. We used Akaike's Information Criterion (AIC) and Bayesian Information Criterion (BIC) to assess the best model. These three SES categories showed the smallest values in AIC and BIC, which indicated a better fit for subsequent analyses.

Analytic plan

The main objective of our study was to explore the relationship between internal migration and lifetime substance use. Research in Mexico has linked prior US-migration experiences with increased substance use and dependence, and has been comparatively well-researched.[1,3-6,24-27] Given these two points, in order to ascertain that substance use status among internal migrants was not influenced by prior US migration experiences, we excluded participants who indicated ever migrating to the US (n=122) from our analyses. Participants

were asked to report the number of lifetime internal migration trips and the destination of their first and last internal migration experiences. Given how we operationalized our migration variable (i.e., internal migration history), those with more than 2 internal migration experiences (n=53) could potentially be misclassified as we are unable to determine the destination for internal migration trips that occurred in between their first and last trip. Subsequent analysis revealed that of the 53 participants, 34 had previously migrated to a tourist destination on their first or last internal migration trip. These 34 individuals were thus retained in the analysis as we could ensure proper classification of their internal migration history (i.e., ever migrated to a tourist destination). The remaining 19 participants who reported 2 or more internal migration experiences indicated that their first and last internal migration trip was to another part of Mexico. For these 19 participants we are unable to determine if the internal migration trips made in between their first and last were to tourist destinations, thus we excluded these 19 participants from our analyses to avoid any possible misclassification. Our final sample size included a total of 442 participants with prior internal or no internal migration histories.

In order to address potential selection bias in our sample (i.e., balance observed covariates between subjects) the authors considered the application of a propensity score process and matching.[28] However, because our migration variable has three levels (tourist cities, other states, and no migration), it presented analytical challenges to address the multinomial confounding issues through matching. To address these multinomial challenges, we used pairwise multivariate logistic regression, which runs logistic regression k-1 times, where k is number of levels (e.g. k=3; 2 logistic regressions), with one group as the constant reference group (i.e., no migration).[29] This pairwise multivariate logistic regression approach generates a propensity score by conducting a set of multivariate logistic regression controlling for the covariates: age, gender, SES, and ability to speak English.

Once the propensity score was computed, we applied a variable optimal matching algorithm,[30] which allows matching with multiple treatment units matched to one or more control cases and vice versa utilizing SAS Macro Vmatch developed by Mayo Clinic Division of Biomedical Statistics and Informatics. By doing this, we reduced potential selection bias in our samples by balancing observed covariates between participants. To examine the quality of matching, we compared non-parametric density estimates of the propensity score distribution in participants who migrated to a tourist destination and to other parts of Mexico. The distribution of the propensity score (available from author) is improved and demonstrates a more normal distribution, which indicates that our analytic approach to reduce potential selection bias was effective. This approach produced an average covariate patterns similar to those that would have occurred in a randomized study.

Descriptive statistics were generated for unadjusted samples, stratified by gender. Independent variables were tested for associated using Pearson's Chi-Square tests. A correlation matrix was produced to determine collinearity between variables (using a threshold of 0.5); no collinearity between variables was found. We used a conditional pairwise logistic regression model to determine the association between internal migration status and lifetime substance use. All statistical analyses were conducted using SAS (9.3; Cary, NC) and SPSS (19; Chicago, IIL).

Results

Sample characteristics

As shown in Table 1, more than one-third (36%) of our participants (n=442) were male with an average age of 39 years (SD 13.8); the majority were from a from a low-middle SES level (62%). The majority of participants were born in Tunkás (81%) and currently resided in Tunkás (94%). In terms of migration experiences, 38% of our participants had previously migrated internally; 20% (n=87) had ever migrated to a tourist destination, and 19% (n=82) had only migrated to other regions of Mexico. Compared to female participants, males were significantly more likely to have ever migrated internally (52% vs. 31%) and to have ever migrated to tourist destination (26% vs. 15%). More than half (62%) of participants had no prior migration history. Female particiapnts were more likely to have never migrated than males (69% vs. 48%). Overall, 5% (n=23) reported any lifetime substance use. Most commonly reported illicit substance use included cannabis (7%), cocaine (3%), sedatives (3%), and methamphetamine (2%). Male participants were more likely than female participants to self-report any lifetime substance use (11% vs. 2%).

Our conditional pairwise logistic regression model of pair-matched observations identified factors independently associated with lifetime substance use (Table 2). Participants who migrated internally to a tourist destination had significantly higher independent odds (Adjusted Odds Ratio (AOR): 2.1; 95% Confidence Interval (CI): 1.3, 3.4) of reporting lifetime substance use compared to non-migrants.

Discussion

This study found that internal migration to tourist destinations in Mexico is independently associated with lifetime substance use. Our study provides new data regarding the relationship between migration and substance use and suggests that internal migration may pose a risk factor for substance use among indigenous migrants. Quintana Roo's growing tourism industry and related employment opportunities has promoted migration from rural and indigenous communities from neighboring states, as is the case for our study population. The 2010 Mexican census estimated that approximately 62% of all internal migrants who leave the state of Yucatan migrate to the neighboring state of Quintana Roo.[10] Large urban tourism destinations, such as Cancun, are characterized as environments with increased exposure and access to drugs and alcohol and may influence health-damaging behaviors.[16,31,32] Increased availability of drugs and alcohol expands migrants' opportunity to engage in such behavior, as has been well documented in the US-Mexico migration context.[4,5] As such, this type of migration may pose unique risks as compared to broader rural-to-urban migration.

Indigenous populations, which primarily reside in Southern Mexico, are highly marginalized and at risk for poor health outcomes as compared to non-indigenous Mexicans.[15] Almost 90% of indigenous communities in this region live in extreme poverty.[33] Indigenous persons' vulnerable socio-demographic profile coupled with common migration-related stressors (e.g., family separation, social isolation) may further predispose indigenous internal migrants to substance use. There is a paucity of data regarding the relationship

between internal migration and health, including susceptibility to substance use and abuse, within the Mexican context. Our study highlights the need for further research aimed at better understanding the substance use risk and other vulnerabilities of internal migrants and health consequences of internal migration, especially among already vulnerable populations such as indigenous communities.

Our finding should be considered with certain limitations. The cross-sectional design does not allow us to determine precedence between internal migration and substance use. It could be that the characteristics of individuals who migrate to tourist destinations within Mexico may be more likely to use illicit drugs. However, our analytical approach attempted to reduce as much bias as possible to address potential confounding. The small sample size of our dependent variable may not have given us sufficient power to identify other factors independently associated with substance use. Subsequent studies of this topic will benefit from a larger sample size. Reporting bias may be present in our analyses given the sensitive and stigmatized nature of substance use among indigenous populations, resulting in possible underreporting of substance use. However, highly trained and culturally and linguistically appropriate interviewers were used to collect data to mitigate such biases. Our sample also excludes migrants who are currently living outside Tunkás, which may also contribute to undercounting of substance use in our study. Lastly, participants were recruited through non-random sampling techniques, and therefore finding cannot be generalized to all community members of Tunkás nor other indigenous populations or internal migrants in Mexico. Despite these important limitations, the association between internal migration and substance use among an indigenous population in Mexico suggests a new line of research to explore in the field of migration and substance use. Given the results of this study, notwithstanding the lack of variance in our dependent variable, there is the need for additional research with a larger sample of internal migrants to better understand drivers of substance use in relation to internal migration. Past studies linking substance use and migration have exclusively focused on US-Mexico migration;[1,3-6,24-27] we were unable to identify any studies to date that examine associations between internal migration and illicit substance use in Mexico.

Conclusion

The social and physical environmental contexts of migrant destinations may play an important role in shaping the drug using behaviors of migrants, including indigenous migrants. For instance, along the US-Mexico border where drugs are highly accessible, deported migrants commonly describe the pervasiveness of drug availability in their new environments, among other factors, as influencing their initiation into drug and injection drug use.[6] The increase of internal migration may have important public health implications in terms of the growing substance use problem in the southern region of Mexico.[9-12] Previous research suggests that Mexican family members of migrants with U.S. migration experience are more likely to engage in substance use, compared to persons who do not have a family member who has migrated.[5] In general, returned migrants in Mexico display a higher risk profile in terms of substance use and sexual practices compared to non-migrants.[5,6,24,25] Returned migrants may influence their family and other community member's substance using behaviors by impacting social norms regarding drug use and

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increasing access to illicit drugs. In the same context, indigenous persons who migrate to tourist destinations have the potential to introduce drugs and related substance use behaviors to their rural communities. Better understanding of the environmental contexts of tourism industries in Southern Mexico and its role in shaping substance-using behaviors is of critical importance to inform interventions aimed at curbing substance abuse in this region. Implications are sobering, particularly for those regions with limited resources to address substance abuse and addictions.

Acknowledgments

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Table 1

Unadjusted demographic, migration, and drug use characteristics of indigenous participants by gender (n =442)

Variables	Total sample N(%)	Male 161 (36%)	Female 281 (64%)
Socio-demographic characteristics			
Mean age (SD) [Range 18-65]	39 (13.8)	39 (14.5)	39 (13.4)
SES*			
Low	106 (24%)	44 (27%)	62 (22%)
Low-middle	275 (62%)	88 (55%)	187 (67%)
Middle	61 (14%)	29 (18%)	32 (11%)
Speak English*	62 (14%)	34 (21%)	28 (10%)
Born in Tunkás (vs. another region of Mexico)	359 (81%)	132 (82%)	227 (81%)
Currently lives in Tunkás (vs. another region of Mexico)	414 (94%)	147 (91%)	267 (95%)
Migration characteristics			
Ever migrated internally*	169 (38%)	83 (52%)	86 (31%)
Internal migration destination*			
Tourist destination	87 (20%)	42 (26%)	45 (16%)
Other part of Mexico	82 (19%)	41 (26%)	41 (15%)
No-migration	273 (62%)	78 (48%)	195 (69%)
Lifetime substance use history			
Any lifetime substance use[a]	23 (5%)	17 (11%)	6 (2%)
Types of illicit substances used			
Cannabis	30 (7%)	27 (17%)	3 (1%)
Cocaine	12 (3%)	12 (8%)	0 (0%)
Methamphetamine	7 (2%)	7 (4%)	0 (0%)
Inhalants	4 (1%)	4 (3%)	0 (0%)
Sedatives	12 (3%)	6 (4%)	6 (2%)
Hallucinogens	3 (1%)	3 (2%)	1 (0%)
Opium	2 (1%)	2 (1%)	0 (0%)
Other illicit drugs	1 (0%)	1 (1%)	0 (0%)

*p<0.05

[a]Excludes cannabis

Table 2

Conditional pairwise logistic regression: factors independently associated with lifetime substance use among indigenous participants (n=442)

Regression 1	Adjusted Odds ratio	95% Confidence interval	P-value
Tourist destination (ref=no-migration)	2.1	(1.3, 3.4)	<0.01
Regression 2			
Other part of Mexico (ref=no-migration)	1.5	(0.8, 2.9)	0.14

Adjusted for age, gender, SES, ability to speak English, born in Tunkás, and currently living in Tunkás.