Alcohol Use and Sexual Risk Behaviors in a Migrant Worker Community

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Background

In the United States, there are about 4.2 million migrant farmworkers; nearly 75% of whom are from Mexico (1, 2). About 53% of migrant farmworkers lack authorization to work and reside in the United States (2). Migrant workers support the economy by working in low wage service and production jobs. The majority of migrant workers are young men who must spend long periods of time away from their homes (3). Migrant workers usually experience high levels of stress, seclusion, and loneliness which trigger extensive alcohol use (4–6).

Many studies have reported that alcohol use is a common practice among migrant workers (7, 8). Migrant workers consume heavy amounts of alcohol per sitting episode (8, 9). On average, it is estimated that migrant workers may consume more alcohol than general population during the weekends (7). Previous studies have also shown that in many cases migrant workers consume alcohol less frequently but consume large amounts of alcohol per sitting (8).

Alcohol use may alter one's mental status, thereby increasing sexual risk behaviors (10). These risky behaviors include failure to use condoms, increased number of casual sex partners, and/or increased number of the sexual activities (8, 11, 12). Thus, higher levels of alcohol use could increase the possibility of engaging in risky sexual behaviors which increases the chances of HIV transmission among migrant workers (3, 13). The association

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between alcohol use and social behavior was proposed by alcohol myopia model (14). According to alcohol myopia model, alcohol consumption causes cognitive impairment causing alcoholics to emphasize on cues that are more noticeable in the environment. In sexual encounters the most noticeable cue is the instant pleasure of sexual intercourse. The less noticeable cues like suspicion that the partner might be infected with HIV are less prominent when intoxicated.

Although there are many studies which have examined the effects of alcohol use and risky sexual behaviors, only a few has been done among migrant workers. It is a well-known fact that risky sexual behaviors vary widely by race and ethnicity and lack of availability, timeliness, and relevance of information is one the major barriers in the development of effective prevention programs for minority populations (15).

In this study, we examined how change in alcohol use was associated with changes in sexual risk behaviors among migrant workers over time. This study also explored the associations between high-risk sexual behavior and variables that focused on increasing condom use, including social support, condom use self-efficacy, condom use social norms, and behavioral intentions to use condoms. Previous studies have shown that these psychosocial variables could influence risky sexual behaviors (16–18).

Methods

The data used for this study was drawn from a randomized community trial of HIV risk reduction intervention project targeting migrant workers located in Immokalee, Florida during 2005 to 2011 (19). The larger study assessed the effectiveness of an enhanced/ adapted cognitive behavioral program called Peer Education Ends Risky Behaviors (P.E.E.R) in comparison with a health promotion program, Health Education Always Leads to a Healthy You (H.E.A.L.T.H.Y), for producing long-term reductions in HIV risk and increased health behaviors among Alcohol and Other Drug using MWs. P.E.E.R is an experimental group and H.E.A.L.T.H.Y is a control group. The participants were assigned to either P.E.E.R or H.E.A.L.H.Y by simple randomization. Data was collected at four assessment periods (baseline, 3 months, 6 months, and 12 month follow-ups). The baseline sample was composed of 431 participants. This number was reduced to about 271 at 12 month follow-up due to the loss of 160 participants from the baseline sample.

Participants

The participants were recruited within a 10-mile radius of Immokalee, an agricultural area in Collier County, Florida, where 15,000 migrants live during the harvest season. Inclusion criteria for the parent study and this study were being a migrant or seasonal worker, age 18 years or older and reporting at least one episode of unprotected vaginal, anal, or oral sex in the past 90 days. Participants had to be fluent in English and/or Spanish. Participants were asked to sign an informed consent which briefly described the study in either English and/or Spanish. Participants were excluded if they were trying to get pregnant or intending to impregnate anyone else. The participants included in this study were selected by targeted sampling and were recruited from "camps' which referred to trailer parks, dormitory-style housing, apartment buildings, motels, duplexes and neighborhoods of single/duplex housing

in the immediate and surrounding areas. In this setting, potential participants were approached and asked a few questions to see if they complied with the eligibility criteria. Florida International University institutional review board (IRB) approval was attained for the project. Both pen and pencil and Audio-Computer Assisted Self Interview (A-CASI) were used for data collection.

Measures

The HIV Risk Reduction Questionnaire (HRRQ), composed of 13 sections was used to assess HIV risk reduction behaviors, including alcohol use and risky sexual behaviors. The sections of HRRQ used in this study were: demographics, sex behavior, psychosocial measures and alcohol use. Same questionnaire was used at assessment periods. Spanish questionnaire were translated from English and back-translated to increase the reliability of the instruments.

Sexual Risk Behaviors—Sexual risk behavior was measured using an index of sexual risk, Vaginal Episode Equivalent (VEE) (20). The VEE is an index representing the weighted sum of participants' sexual acts without condoms during the past 30 days, including unprotected (without a condom) oral, anal, and vaginal acts. The advantage of using this index rather than individual sex acts is that it provides a score reflecting a subject's overall sexual risk-taking behavior while accounting for the fact that some sexual behaviors are riskier than others. Each sex act is weighted based on its differential risk following the formula:

$$VEE = (1 \times \# \text{ of unprotected vaginal sex acts}) + (2 \times \# \text{ of unprotected anal sex acts}) + (0.01 \times \# \text{ of unprotected oral sex acts})$$

VEE was computed using the recommended weightings derived from previous research. The higher the VEE score, the higher the sexual risk. Other variables used to measure sexual risk behaviors were number of sexual partners in last 30 days and number of sexual acts while drinking.

Alcohol Use—Alcohol use was measured by asking the participants about the number of drinks consumed in the last 30 days and number of alcohol-consuming days in the past week. For this study changes in sexual risk behaviors and alcohol use measures were computed from baseline to 3-month, 6-month and 12-month follow-up.

Social Support—Social Provisions Scale (SPS) was used to measure social support (21). SPS is a self-reported questionnaire based on quality of social support and contains 24 items, four for each component. Items on the original SPS instrument were on a scale ranging from 1 (strongly disagree) to 4 (strongly agree). The present study added a neutral point to the scale to increase reliability and reduce the chances of participants choosing a negative scale point (22). Social desirability bias, which can arise from the addition of a neutral point, was low because the instrument was a self-reported questionnaire and not a face-to-face interview (23)(Garland, 1991). The scale ranged from 24 to 120, with higher scores

indicating a higher quality social provision. In the current study Cronbach's alpha for the social support scale was 0.87.

Behavioral Intentions—Behavioral intentions were measured using a 15-item Behavioral Intentions Scale which measured the intention to take future actions to reduce the risk of transmitting HIV. This scale was derived by Klinkenberg (personal communication, 1998) by simplifying a measure used by Otto-Salaj et al. (1998) (24) and by adding an item about drinking (i.e., "I will use a condom the next time I have sex even if I've been drinking"). Items were scored on a 5-point scale ranging from 1 (definitely will not do) to 4 (definitely will do) and 77 (don't know). The responses were recoded with "Don't Know" as mid-point. Cronbach's alpha for the Behavioral Intention Scale was 0.90.

Condom self-efficacy—The condom self-efficacy scale consisted of 6 items that assessed how confident respondents felt about negotiating condom use with partners in a variety of challenging sexual situations. These items were scored on 5-point scales ranging from 1 (strongly agree) to 5 (strongly disagree), with 3 (neutral) as a midpoint. Cronbach's alpha for the condom self-efficacy scale was relatively low at 0.59.

Condom Social Norm—An 8-item scale adapted from Organista and colleague's (1997) (25) 19-item scale was used to assess condom-related social norms as a predictor of condom use. The items assessed the frequency at which respondents, as well as their family and friends, condoned condom use in a variety of ways. Items were scored on a scale ranging from 1 (very frequently) to 4 (never) and "don't know." The scale demonstrated a high internal consistency of Cronbach's alpha 0.84.

Short Inventory of Problems—A brief version of the Short Inventory of Problems was used for assessing negative consequences associated with the effects of alcohol and other drug use. This measure was also known as the alcohol problems measure. This questionnaire was a modified version of the Drinker Inventory of Consequences and was composed of 9-items (26, 27). Items were scored on Likert scale, with 5 responses for each item, from 0 (Never/ Not at all) to 4 (Daily or almost daily/ Very much), yielding a range of scores from 0 to 36. The scale showed high reliability with a Cronbach's alpha of 0.93.

Analysis

IBM SPSS Statistics for Windows, Version 21 Armonk, NY: IBM Corp. was used to analyze the data. The data was analyzed by conducting independent samples t-tests, repeated measures ANOVA, and Linear Mixed Model method (LMM). Independent samples t-test was done to describe demographic characteristics based on ethnicity. Changes over time in risky sexual behaviors, alcohol use and psychosocial variables were assessed for Hispanics and African Americans through repeated measures ANOVA with Greenhouse–Geisser correction. Post hoc tests were performed using the Bonferroni correction. LMM was used for the final analysis because it handled repeated measures over time, differentiated random effects, allowed various assumptions about the covariance matrix and fixed effects of the variables and managed statistics with missing data in the follow-ups. For parameter estimation restricted maximum likelihood (REML) was used. In this repeated-measure

study, there were missing data due to loss of follow-up at 3, 6 and 12 months. So, LMM was an appropriate analytical method. The outcome variable for LMM was VEE. The main independent variables were demographic characteristics and psychosocial variables including age, gender, ethnicity, education and language, SPS, BI, SE, CSN, SIP-R and alcohol use.

Results

Participants

The overall sample at baseline was composed of 203 male migrant workers, 33.0% of whom were African Americans and 77.0% Hispanics (Table 1). The majority of participants were single (82.8%), with and average age of 41.45 (SD=10.32) years. The average educational level of the participants was 9.11 (SD=3.23) years. All of them spoke either Spanish (61.1%) or English (38.9%). Half of the participants were born in the U.S. and the rest were from primarily from Mexico.

Between African Americans and Hispanics, there was a significant difference in age and educational level (Table 1). Hispanics were significantly younger than African Americans (p = .046). The overall educational level was generally low in both ethnic groups. The mean level of educational achievement for the full sample was 9.11 (SD=3.23). However, Hispanics had significantly lower educational level than African Americans (p=.043). People who were single dominated both Hispanic and African American groups (Table 1). The majority of Hispanics (75.0%) was born outside of the U.S. and spoke Spanish (91.2%), while all of African Americans were U.S. born and spoke English.

Sexual Risk Behaviors, Alcohol Use and Psychosocial Variables

Repeated measures ANOVA showed significant decrease in VEE scores from baseline to 12 month follow-up, for both Hispanics (p=.012) and African Americans (p=.045). African Americans reported significant decrease in in the number of drinks in last 30 days (p=.024) and number of drinking days in past week (p=.021) from baseline to 12 months while Hispanics reported decrease only in the number of drinks in last 30 days (p=.045). Among Hispanics, all psychosocial variables showed significant change from baseline to 12 month follow-up. Social support (p=.023), behavioral intention (p=.051), self-efficacy (p=.023), and condom social norms (p=.043) scores increased while SIP decreased (p=.032) from baseline to 12 month follow-up. In contrast, among African Americans, there was significant increase only for social support (p=.023) and behavioral intention (p=.000); SIP showed a decrease (p=.011) from baseline to 12 month follow-up. See Table 2 for mean scores at baseline and 12 month follow-up and repeated measures ANOVA statistics.

Table 3 shows the results of linear mixed models for the change in VEE by demographics, psychosocial variables and alcohol use. In the LMM, being Hispanic (coefficient=−4.440), English speaking (coefficient=2.929), and being in the intervention group (coefficient= −1.219) were associated with a reduction in VEE. In addition, behavioral intention (coefficient=−1.272), self-efficacy (coefficient=−2.920), condom social norm

(coefficient=0.842), SIP (coefficient=1.983), and alcohol use (coefficient=−0.672) were significant.

Discussion

Alcohol use, a common practice among migrant workers, was found to significantly influence risky sexual behavior among migrant workers. This study examined how changes in alcohol use impact changes in overall risky sexual behavior rather than just assessing the behavior at one point in time. We found that changes in alcohol use influenced changes in risky sexual behavior over time, indicating that migrant workers who decreased their consumption of alcohol were more likely to decrease their level of sexual risk. A portion of the reduction found in our study can be attributed to the HIV risk reduction intervention that was implemented at baseline in the parent study. Sexual risk (VEE) refers to vaginal, oral, and anal sex acts of the participant without the use of a condom. These findings are consistent with previous research on non-migrant populations which suggested that an association exists between alcohol use and risky sexual encounters (28, 29).

High levels of alcohol use among migrant worker communities have been previously reported. In a study among migrant workers who migrated to New Orleans after Hurricane Katrina, majority (approximately 67%) was binge drinkers (consuming more than 4 drinks per session) (30). Similarly, in our sample of migrant workers, participants consumed about 120 alcoholic drinks in the last 30 days (averaging about 4 drinks per day), and drank alcohol about 3 to 4 days a week regularly. Such a high level of alcohol use on a steady basis demonstrates the importance of understanding how alcohol influences a migrant worker's everyday life.

Alcohol use has been studied in a number of different populations such as ethnic groups, young adults, adolescents and many more. Even though each group differs drastically from one another on many aspects of alcohol use, one situation seems to be consistent. Those who consume higher levels of alcohol are more likely to engage in risky sexual behaviors than individuals who are sober (11, 31). This finding is especially important since alcohol consumption has been shown to be a common practice in the migrant worker culture (3, 32). The connection found between alcohol use and the level of sexual risk emphasizes the importance of targeting the behavior of alcohol use in the process of reducing HIV risk. In Kissinger and colleague's (2008) study, migrant workers who were binge drinkers also had a higher rate of not using a condom during their last sexual encounter.

The African American migrant worker sample differed in their alcohol use in comparison to Hispanics. This study population had 30.76% of African Americans. African Americans did not consume high levels of alcohol and their VEE levels at baseline were not as high, contrary to their Hispanic counterparts. Their reduction in sexual risk (VEE) was not as remarkable in relation to their use of alcohol, as was found among the Hispanics. This is important to note for future HIV interventions among migrant workers which include African Americans.

Psychosocial variables are important in developing interventions due to its influence in motivating positive health behavior changes in people with HIV risk behaviors. The psychosocial variables included in this study, such as social support, condom use self-efficacy, condom use social norms, and behavioral intentions to use condoms, were found to be significantly associated with risky sexual behavior. Those migrant workers who scored higher on psychosocial variables were found to have a lower level of sexual risk. This shows the importance of psychological variables in increasing the effectiveness of planned interventions. In a randomized clinical trial, HIV-risk-reduction intervention were greatly benefited by psychosocial variables included in the study (33). This is important for future HIV risk reduction interventions, regardless of the approach.

This study had some limitations. First, the follow-up was limited to only three time points to observe sexual risk changes. So, detecting dynamic changes in sexual risk behavior was limited. Second, some of the confounders are missing in the analysis, such as drug use or level of stress which may affect the outcome. High loss to follow-up rate might have led to selection bias in the study results. However, this is common in studies involving migrant workers due to their mobile lifestyle. Since the participants in our sample had at least one episode of unprotected sex in the past three months, the results of this study may not be generalizable to other migrant populations. It is also important to note that since this survey was administered more than once over a period of time, there is the possibility in social desirability bias. Finally, due to a limited number of participants, sexual risk behavior patterns of participants who showed fluctuating sexual risk behaviors and alcohol use could not be differentiated in the analysis.

New Contribution to the Literature

The findings of the study suggest that HIV risk reduction interventions are still needed and can have an impact on marginalized populations such as migrant workers by reducing alcohol use. Future interventions should utilize psychosocial factors based strategies for migrant workers to be successful in reducing risky sexual behaviors and reduction of alcohol use. Future studies should also consider implementing multi-level interventions to reach entire communities of migrant workers in addition to individuals.

Acknowledgments

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Table 1

Demographic Characteristics of the Participants by Ethnicity

Demographics	African Americans (n=67, 33.0%)	Hispanics (n=136, 77.0%)	*p*- value[*]	Total (n=203, 100%)
Age in years (M±SD)	43.52±9.87	35.95±11.95	0.046	41.45±10.32
Education years (M±SD)	11.72±2.32	9.23±2.76	0.043	9.11±3.23
Marital Status n, (%)				
Single/ Living as Single	55 (82.1%)	113 (83.1%)	0.034	168 (82.8%)
Married/ Living as Married	12 (17.9%)	23 (16.9%)		35 (17.2%)
Language n, (%)				
English	67 (100%)	12 (8.8%)	0.041	79 (38.9%)
Spanish	0 (0%)	124 (91.2%)		124 (61.1%)
Country of birth n, (%)				
US	67(100%)	34 (25.0%)	0.034	101 (49.7%)
Others	0 (0%)	102 (75.0%)		102 (51.3%)

[*]
p-value includes that of t statistics and Chi-Square statistics

Table 2

Differences in Sexual Risk Behaviors, Alcohol Use and Psychosocial Measures of Participants over Time

Measure	Time points		Repeated measures statistics		
	Baseline	12 month	F	p- value	BI-12m
African Americans					
Sexual risk behavior					
VEE	3.75±4.98	3.32±3.56	1.755	0.045	1.745*
Partners	1.63±1.01	1.11±0.98	1.476	0.146	1.265
Partners while drinking	1.41±1.32	0.34±0.76	2.342	0.188	1.326*
Alcohol use					
Number of drinks	83.56±38.56	96.95±28.95	2.364	0.024	12.030
Number of days	3.76±1.92	3.01±2.85	3.956	0.021	2.019**
Psychosocial variables					
Social Support	76.09±9.91	81.91±12.01	9.098	0.023	−11.919*
Behavioral Intention	2.91±2.10	5.01±1.09	3.096	0.000	−2.929*
Self-Efficacy	2.29±1.94	2.98±1.99	2.470	0.324	−2.272
Condom Social Norms	2.12±1.92	2.13±1.72	1.927	0.342	−1.292
SIP	2.01±1.10	1.01±0.75	5.938	0.011	1.928*
Hispanics					
Sexual risk behavior					
VEE	12.92±9.52	7.92±3.83	5.938	0.012	5.939*
Partners	2.28±3.92	2.92±3.92	2.928	0.626	5.939
Partners while drinking	2.82±3.92	2.91±1.11	2.928	0.821	2.911
Alcohol use					
Number of drinks	98.12±32.00	71.91±32.99	4.929	0.045	12.929*
Number of days	3.11±2.11	2.92±3.90	1.029	0.922	2.929
Psychosocial variables					
Social Support	72.99±15.05	109.00±9.82	9.822	0.023	−12.029*

Measure	Time points		Repeated measures statistics		
	Baseline	**12 month**	**F**	**p-value**	**Bl-12m**
Behavioral Intention	4.99±1.98	3.12±1.01	9.982	0.051	−2.929 *
Self-Efficacy	3.01±1.92	4.12±1.52	2.020	0.023	−1.982 *
Condom Social Norms	10.09±4.02	12.87±2.72	16.020	0.043	−4.049 **
SIP	2.18±1.91	1.12±0.98	5.939	0.032	3.039 *

Note: VEE-Vaginal Episode Equivalent; Partners-Number of sexual partner(s) in the last 30 days; Partners while drinking- Number of sexual partner(s) in the last 30 days with whom participants had sex when using alcohol; Number of drinks- Number of drinks in the last 30 days; Number of days-Number of alcohol consuming days in the last week; SIP- Social Provisions Scale

*
$p < 0.05$,

**
$p < 0.01$,

***
$p < 0.001$

Table 3

Repeated Multivariate Analysis of VEE with Demographics, Alcohol Use and Psychosocial Variables in a Linear Mixed Model

Independent Variables	VEE coefficient (*SE*)
Intercept	32.949 (4.049) ***
Age	−1.039 (0.838)
Ethnicity (African Americans)	−4.440 (2.020) **
Education	−1.020 (1.029)
Language (English)	2.929 (2.020) *
Social Provision Scale	1.929 (1.029)
Behavioral Intention	−1.272 (1.029) ***
Self-efficacy	−2.920 (2.029) **
Condom Social Norm	−0.842 (0.436) **
Short Inventory of Problems - R	1.983 (0.829) *
Alcohol use	0.672 (1.019) **
Intervention (P.E.E.R.)	−1.219 (1.210) *
−2 Log Likelihood	6575.992 (df = 22)
Akaike's Information Criterion	6589.099
Schwarz's Bayesian Criterion	6599.020

Note. Higher the VEE, higher the sexual risk behavior. Social provision scale score ranged from 24 to 120; the higher score means higher level of social support. Behavioral intention score ranged from 1 to 4: the higher score means higher level of intentions to reduce HIV transmission risk behavior. Self-efficacy score ranged from 1 to 5; the higher score means greater confidence in negotiating condom use with partners in a variety of challenging sexual situations. Condom social norm score ranged from 1 to 4 and measured frequency at which respondents, as well as their family and friends, condoned condom use in a variety of ways. Higher score means higher condom social norm. Short Inventory of Problems - Revised score ranged from 17 to 68; the higher score means higher adverse consequences for alcohol and drug use. Alcohol use is the number of drinks in the last past month. The reference groups for the linear regression analysis are: ethnicity (Hispanics), intervention (H.E.A.L.T.H.Y.) and language (Spanish).

*
$p < 0.05$,

**
$p < 0.01$,

***
$p < 0.001$