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Original Article

Stages of change, knowledge and self-efficacy for condom use in migrants.

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Abstract: Introduction: Migrants experience different circumstances that define sexual behavior, increasing their vulnerability to acquiring STIs and HIV. For the prevention of STIs, including HIV, adopting condom use as a protective practice is essential, according to the National Health and Nutrition Survey. The objective of this study is to describe the relationship between condom knowledge and self-efficacy in condom use with the stages of change for condom use in migrants in transit. **Method:** The design is correlational and cross-sectional in a sample of migrant men and women in transit in the city of Tijuana, Baja California. Data were processed using the Statistical Package for the Social Sciences (SPSS) 25. Descriptives were determined using means ± standard deviation (SD) and frequencies. Spearman's correlation coefficient (Spearman's Rho) was used with a 95% error margin, $p<0.05$. **Results:** In the stages of change for condom use, 31.1% were in precontemplation, meaning they had no intention of using condoms in their vaginal, oral, and/or anal sexual relations within the next six months. On the other hand, 26.6% were in preparation, indicating they intended to always use condoms during vaginal, anal, or oral sex within the next thirty days. 19.8% of the migrants had been using condoms for more than six months in every sexual encounter, classifying them in the maintenance stage for condom use. Migrants in the initial stages like precontemplation and contemplation had lower scores than those in the maintenance stage. **Conclusion:** Knowledge of condoms and self-efficacy in condom use have a significant positive relationship with the stages of change for condom use. It is suggested to replicate the study with a larger sample and incorporate variables such as motivation, decisional balance, and processes of change, as well as others indicated by the literature as important in condom use behavior among migrants in transit.

Keywords: Transtheoretical Model; Condoms; Self-efficacy; Migrants.

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1. Introduction

Sexually Transmitted Infections (STIs), including the Human Immunodeficiency Virus (HIV), remain a public health issue due to their high incidence, despite being preventable through behaviors like condom use1. Currently, more than 30 viruses, bacteria, or parasites are known to be sexually transmitted, eight of which are linked to a high incidence of STIs. Among these, four are curable: syphilis, gonorrhea, chlamydia, and trichomoniasis. The other four are incurable viral infections but can be managed with treatments that mitigate their symptoms or the disease: Hepatitis B, herpes simplex, Human Papillomavirus (HPV), and HIV[1]. According to the WHO, more than a million people contract an STI daily. In 2020, it was estimated that 374 million people acquired chlamydia, gonorrhea, syphilis, and trichomoniasis (129, 82, 7.1, and 156 million respectively), and more than 500 million people are estimated to be carriers of HPV[2].

In the Americas, the situation regarding STIs is similar, with around 64 million cases annually, making it the second most affected region after Africa with 23.2% of cases of trichomoniasis, chlamydia, gonorrhea, and active syphilis[3]. In Mexico, according to the 2021 epidemiological report by the Ministry of Health, there was a 75.3% increase in STI cases compared to 2020. Over the last 15 years, the incidence rate of STIs has increased by 124%, from 2.1 cases per 100,000 inhabitants to the current 4.7[4].

For the prevention of STIs, including HIV, adopting condom use as a protective practice is essential. According to the National Health and Nutrition Survey, condom use is more common among adolescents during their first sexual encounter, reaching 82.7% among males and 69.2% among females. However, this decreases in subsequent encounters to 79.2% among males and 54.9% among females. As age increases, condom use becomes less common: among people aged 20 to 29 years, 72.1% of males and 59.3% of females use condoms, while in the 30 to 39 age group, only 53.4% of males and 41.5% of females do. For the 40 to 49 age group, condom use drops to 38.5% among males and 21.4% among females[5].

Migrants are a vulnerable population with a higher sexual risk due to their displacement experiences[6]. According to Guerra, this group has been associated with a high prevalence of STIs/HIV since the beginning of the pandemic[7]. Migrants are three times more likely to get infected than non-migrants[8]. Mobile populations, such as migrants, accounted for 3.6% of the global population in 2020[9]. The International Organization for Migration (IOM) estimated that approximately 281 million people lived in a country other than their birth country, with 21% residing in North American countries[10]. Migrants suffer from a range of communicable and non-communicable diseases requiring urgent recognition and attention[11].

In recent years, Mexico has seen a significant increase in the number of irregular migrants due to migratory flows from Central America heading to the USA. According to the Migration Policy Unit, Registration, and Identity of Persons, the first quarter of 2022 saw a 148.7% increase in the arrival of both national and foreign migrants, increasing the number of people in this situation at the

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country's borders[12,13]. By 2019, Baja California had 10,000 Central American migrants from Honduras, El Salvador, Guatemala, and Belize, with 70% in Tijuana. Most of them are in 32 migrant shelters, with 25% in hotels and apartments[14].

Migrants experience various circumstances that shape sexual behavior, increasing their vulnerability to acquiring STIs and HIV. The risk is heightened due to Risky Sexual Behaviors (RSB)[7]. Several factors influence migrants' RSB, such as their knowledge of condom use. Public health studies have shown that poor knowledge about condom use hinders the adoption of preventive measures[7,8]. Another crucial predictor of condom use is self-efficacy, which is defined as the confidence individuals have in their ability to handle different situations, thus reducing sexual risk among migrants[15].

Prochaska and Di Clemente explain these relationships in their Transtheoretical Model of Change, which describes how, when, and why people change[16]. To understand the phenomenon of change, the model describes stages that individuals go through to achieve change and the relationship between knowledge and self-efficacy with progress in these stages. Therefore, the objective of this study is to describe the relationship between condom knowledge and self-efficacy in condom use with the stages of change for condom use among migrants in transit.

2. Method

A baseline study was conducted on a pilot feasibility trial of an intervention using Motivational Interviewing with migrants in transit located in shelters, approved by the research, ethics, and biosafety committees with authorization number FAEN-D-1915.17 The data presented in this document are from the cross-sectional correlational analysis done with the sample of migrant men and women in transit in the city of Tijuana, Baja California. The sample size was calculated using the nQuery Advisor statistical package, through a test for multiple linear regression considering a sample size of 177 participants. A proportion of variance explained for two covariables of 0.06, considered between small and medium, with a power of 80 and a significance level of 0.05, was established. The 177 data collected in the baseline tests of the study were used.

2.1 Stages of Change for Condom Use

To collect the data, a personal data form was used to understand the characteristics of the participants. To measure the stages of change, an algorithm for the stages of change in condom use was used, which classifies participants based on questions about the frequency of condom use and/or the intention each time they have vaginal, oral, or anal sex. This is a translation of the proposal by Grimley et al.[18].

2.2 Condom Knowledge

The validated scale by Robles et al.[19] was used for the test of knowledge on the correct use of condoms. This instrument includes six statements about aspects related to the packaging and the correct way to put on and remove a condom, with response options of true, false, and don't know. Correct answers are coded with one (1) and incorrect answers (including don't know) with a value of zero (0), where a higher score indicates a higher

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level of knowledge. An example item is "It is necessary to place the condom to the base of the penis because if not, it will slip during sexual intercourse." The scale was subjected to an analysis to obtain the discriminative power of each item through factor analysis, including those items with a factor load greater than 0.40. The test reports a difficulty index of 0.37 and a Cronbach's alpha of 0.75.

2.3 Condom Use Self-Efficacy

The subscale related to condom use from the self-efficacy scale to prevent AIDS validated by López & Moral[20] was used. This is a 27-item self-efficacy scale to prevent AIDS (SEA-27) with Likert-type and dichotomous questions. The subscale comprises only the second factor, composed of eight items related to condom use, with Likert-type responses where 1 = not at all sure, 2 = somewhat sure, 3 = moderately sure, 4 = very sure, and 5 = completely sure. Higher scores indicate greater self-efficacy for condom use. An example question is, "How sure are you that you can use a condom every time you have sex?" The complete scale presents an internal consistency of $\alpha = 0.89$, and the subscale of self-efficacy for condom use reports an alpha of 0.75.

2.4 Statistical Analysis

The data were processed using IBM Social Package for the Social Sciences (SPSS) 25. Descriptives were determined using means ± standard deviation (SD) and frequencies. To initiate the analysis, the Kolmogorov-Smirnov test was performed to determine the distribution of the data, and Spearman's correlation coefficient (Spearman's Rho) was used with a 95% error margin, $p < 0.05$.

3. Results and discussion

The initial characteristics of the 177 migrants indicate that 61% are men, with the predominant educational level being high school (similar across different countries) at 45.2%. Regarding marital status, 60% reported being single. Foreign migrants make up 68.4% of the sample, with Venezuela being the most common country of origin at 39%. Only 15.3% have temporary migration status, with the majority (48%) being in an irregular situation. At the time of the study, 55.4% had been away from their place of origin for less than three months.

The characteristics of the 177 migrants further indicate that 5.6% engaged in transactional sex during their journey, only 11.9% consumed alcoholic beverages, 96% reported not using drugs during the journey, and none of the participants were diagnosed with HIV (Table 1). The average age is 32.09 years (SD = 8.99), the number of times they crossed into the USA is 0.42 (SD = 0.94), and the age at which they first crossed is 28.82 (SD = 8.54). In relation to sexual behavior, the average number of sexual partners during the journey is 2.01 (SD = 4.71) (Table 2).

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Table 1. Sociodemographic characteristics of the sample (Frequencies)

Sociodemographic data	Total (n=177)	
	f	%
Gender		
Female	69	39
Male	108	61
Education		
None	8	4.5
Elementary	24	13.6
Middle School	48	27.1
High School	80	45.2
Bachelor's Degree	16	9
Postgraduate	1	.6
Marital status		
Single	79	44.6
Married	53	29.9
Divorced	6	3.4
Widower	4	2.3
Cohabiting	35	19.8
Nationality		
Mexican	56	31.6
Foreign	121	68.4
Place of origin		
Mexico	56	31.6
Cuba	6	3.4
Nicaragua	3	1.7
Honduras	18	10.2
Venezuela	69	39.0
El Salvador	11	6.2
Haiti	4	2.3
Guatemala	8	4.5
Peru	2	1.1
Migratory status		
Regular	65	36.7
Irregular	85	48
Temporary	27	15.3
Time elapsed since leaving place of origin		
Less than 3 months	98	55.4
Over three months	47	26.6
Over 6 months	20	11.3
Over 12 months	12	6.8
Living in the USA		
Yes	24	13.6
No	153	86.4
Transactional sex		
Yes	10	5.6
No	157	88.7
Rather not answer	10	5.6
Alcohol consumption		
Yes	21	11.9
No	154	87
Rather not answer	2	1.1
Drug use		
Yes	4	2.3
No	170	96
Rather not answer	3	1.7
HIV diagnosis		
Yes	0	0
No	177	100

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Nota: n= 177 *f* = frecuencia %= Porcentaje

Table 2. Sample sociodemographic characteristics

Sociodemographic data	Total (n=177)			
	M	**SD**	***Min***	***Max***
Age	32.09	8.99	18	54
Number of sexual partners during transit	2.01	4.71	0	50
Number of times you have crossed to USA	0.42	0.94	0	6
Age of first time crossing to the U.S.	28.82	8.54	9	54

Note: *n=Sample*; M=*Mean*; *SD=Standard deviation*; *Min=Minimum*; *Max=Maximum*

In the stages of change for condom use, 31.1% were in precontemplation, meaning they had no intention of using condoms in their vaginal, oral, and/or anal sexual relations within the next six months. On the other hand, 26.6% were in preparation, indicating they intended to always use condoms during vaginal, anal, or oral sex within the next thirty days. 19.8% of the migrants had been using condoms for more than six months in every sexual encounter, classifying them in the maintenance stage for condom use (Figure 1).

Migrants in the initial stages, such as precontemplation and contemplation, had lower scores than those in the maintenance stage (Table 3).

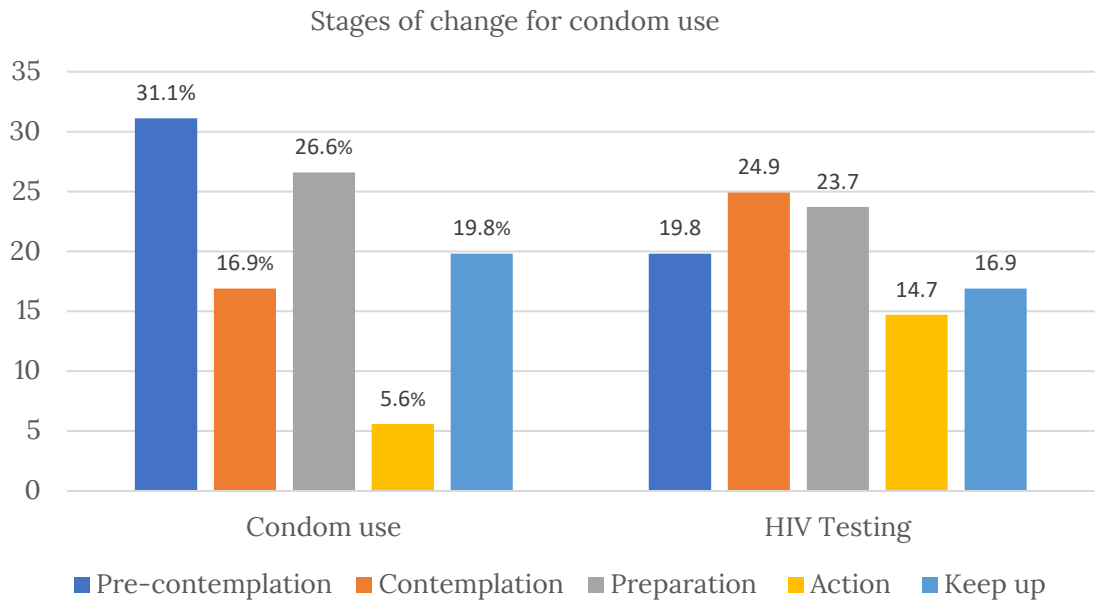

Figure 1. Classification of stages of change for condom use among migrants in transit.

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Table 3. Knowledge and self-efficacy scores for condom use according to each stage of change.

Stage of change	Variable	M	Min	Max	SD
Pre-contemplation (n = 55)	Knowledge	40.90	0.00	100.00	29.71
	Self-efficacy	56.25	0.00	100.00	26.98
Contemplation (n= 30)	Knowledge	51.66	0.00	100.00	22.88
	Self-efficacy	59.68	15.63	100.00	25.20
Preparation (n= 47)	Knowledge	60.63	0.00	100.00	28.32
	Self-efficacy	67.81	12.50	100.00	22.62
Action (n= 10)	Knowledge	53.33	16.67	83.33	21.94
	Self-efficacy	69.06	50.00	93.75	14.98
Keep up (n=35)	Knowledge	64.28	0.00	100.00	23.27
	Self-efficacy	79.82	25.00	100.00	23.04

Note: n=Sample; M=Mean; SD=Standard deviation; Min=Minimum; Max=Maximum

The increase in knowledge and self-efficacy along with the progression in the stages of change is to be expected, since according to Prochaska and DiClemente's transtheoretical model of change, the greater the knowledge of the phenomenon and the greater the self-efficacy, the more advanced in the stages of change the person is in adopting the behavior[21]. On the other hand, there are studies that agree with these results such as Tung et al.[22] where they evaluated the association between gender and TTM constructs, and knowledge of HIV/AIDS, it was found that participants in the contemplation stage were 4.10 times more likely to have high self-efficacy (CI=95%: 2.10-8.04, p<0.001) than those in precontemplation. Tung et al.[23] in a study developed with the aim of assessing sexual and condom use behaviors, shows that action-placed participants presented significantly higher self-efficacy scores than precontemplation participants in specific situations such as: when receiving peer pressure (M=3. 55 SD=1.20 vs. M=2.88, SD=1.06, p=0.008; when there is not much risk (M=3.91, SD=1.10 vs. M=3.16, SD=1.06, p=0.004); and when the risk seems low (M=4.02, SD=0.97 vs. M=3.04, SD=1.14, p=0.0001).

As can be seen, both variables showed higher scores in the more advanced stages of change, this is due to the fact that according to Ramirez et al.[24] in a study with 232 immigrant Latina farmworkers with the purpose of knowing the egalitarian attitudes towards women in relation to knowledge of HIV, self-efficacy for HIV and intentions to negotiate safe sex. The results show that the greater the knowledge of HIV (β=0.197, p<0.005), the greater the self-efficacy for HIV (β=0.210, p=0.004), and the greater the intentions for safe sex (β=0.172, p=0.022), which suggests a relationship between the variables with an impact on behavior to reduce sexual risk, including condom use. The results show that there is a low significant correlation between the stages of change for condom use with condom knowledge (Rho(175)=0.304,

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p<0.001) and condom use self-efficacy (Rho(175)=0.317, p<0.001) (Table 4).

Table 4. Correlations of stages of change for condom use with condom use knowledge and self-efficacy.

Variables	Knowledge about the Condom	Condom use self-efficacy
Stages of Change for Condom Use	0.304**	0.317**

Note: * p <0.05; ** p <0.001

Additionally, a multiple linear regression model was calculated to predict the effect of condom knowledge (β=0.205, SE=0.004, p<0.05) and condom use self-efficacy (β=0.260, SE=0.004, p=0.001) on the stages of change for condom use. The regression equation was statistically significant (F(2-174)=15.27, p<0.001). R2=0.149, indicating that the predictor variables only explain 14.9% of the stages of change for condom use (Figure 2).
This model allows predicting a low percentage of the stages of change; however, there are other studies such as the one by Gullette & Turner, which was carried out with the objective of describing the relationship between the stages of change and condom use, showing that individuals who were in a higher stage of change were more confident in the efficacy of condom use (β=0.31, p<0.05)[25].

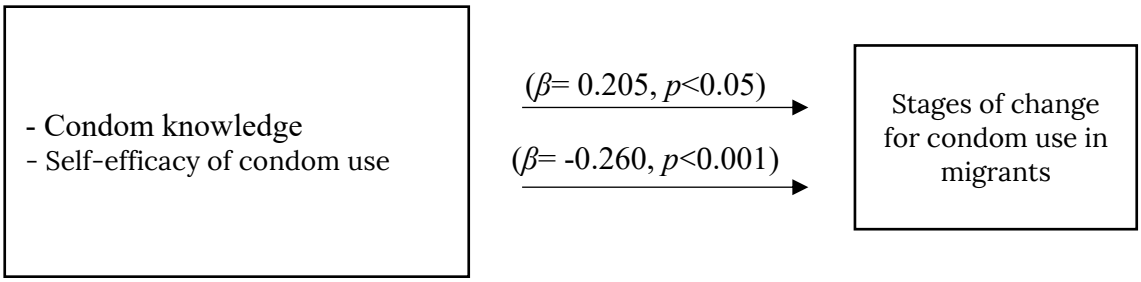

Figure 2. Schematic of the stages of change model for condom use in migrants.

4. Conclusions

In the present study, it was possible to respond to the objective of describing the relationship between knowledge of condom use and self-efficacy of condom use with the stages of change for condom use in migrants in transit. Knowledge of condoms and self-efficacy for condom use have a significant positive

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relationship with the stages of change for condom use; this could indicate that the greater the knowledge and self-efficacy of the migrant about condoms, the better positioned he/she is in the stages of change; this statement can be confirmed by the model that shows the predictive effect of the variable.

The study demonstrates the relationship between the variables. It is worth mentioning that, although the correlation between the variables is low, it is an important finding that encourages us to increase the sample size to confirm the results. Additionally, the further analysis of the regression model calculation shows that the study variables significantly predict the stages of change for condom use among migrants. However, it also highlights the need to explore other variables that might enhance the model's explanatory power, such as processes of change, decisional balance, and motivation, which are factors influencing the stages of change for adopting a behavior, as indicated by Prochaska and DiClemente's Transtheoretical Model of Change.

Therefore, it is suggested to replicate the study with a larger sample and incorporate variables such as motivation, decisional balance, and processes of change, as well as other factors indicated by the literature as important in condom use behavior among migrants in transit.

5. Declarations

5.1 Author Contributions

Conceptualization: JRAI; Methodology: JRAI; Validation: JRAI, RABT; Formal Analysis: JRAI, RABT; Investigation: JRAI; Resources: JRAI; Data Curation: JRAI, RABT; Writing - Original Draft: JRAI; Writing - Review & Editing: JRAI, RABT; Visualization: JRAI; Supervision: JRAI, RABT; Project Administration: JRAI, RABT.

5.2 Conflict of Interest

The authors declare that there is no conflict of interest regarding the development of this study.

5.3 Funding

This study was conducted during the doctoral studies of the first author, who is recognized with a scholarship for postgraduate studies from the National Council of Humanities, Sciences, and Technologies (CONAHCYT) of Mexico.

5.4 Acknowledgements

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