



ORIGINAL

Association between HIV Perceived Risk and Intimate Partner Violence among Women

Asociación entre Percepción de Riesgo de VIH y Violencia de Pareja en Mujeres

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Recibido 19 octubre de 2022; aceptado 28 de julio de 2023

Abstract

HIV risk perception and Intimate partner violence (IPV) are related to HIV infection in women. However, there is a lack of information regarding on the association between risk perception and IPV in the Mexican population. This study aimed to identify and characterize subgroups based on their risk perception through the analysis of latent classes and to evaluate the variables associated with HIV risk perception. An online survey was conducted to assess sexual and preventive behavior, HIV risk perception, and intimate partner violence. Three hundred thirty-two women participated; the sampling was for convenience. Two latent classes were identified: a group with risk perception (85%) and one without risk perception (14.6%). The variables associated with the risk perception were a sexual attraction to men, not having a stable partner, perceiving oneself as at risk of acquiring HIV due to sexual behavior, and the presence of IPV. HIV prevention programs for women must address the stigmas related to HIV, such as the idea that the risk only occurs when they have multiple sexual partners, promote accurate HIV risk perception and prevent IPV in all its expressions and contexts.

Keywords: HIV Risk Perception; Intimate partner violence; Mexican women; Latent class analysis; Condom use

Resumen

En mujeres, la violencia de pareja está relacionada a una mayor probabilidad de adquirir la infección por VIH. De igual forma, una inadecuada percepción de riesgo de adquirir el virus coloca a las mujeres en una

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situación vulnerable. Existe una falta de información ente la asociación de la VPI y la percepción de riesgo es mujeres mexicanas. Este estudio persiguió dos objetivos: el primero fue identificar y caracterizar subgrupos en función de su percepción de riesgo a través del análisis de clases latentes; el segundo objetivo consistió en evaluar las variables asociadas con la percepción de riesgo de VIH. Se realizó una encuesta en línea para evaluar el comportamiento sexual y preventivo, la percepción del riesgo de VIH y la VP. Participaron 332 mujeres; el muestreo fue por conveniencia. Se identificaron dos clases latentes: un grupo con percepción de riesgo (85%) y otro sin percepción de riesgo (14,6%). Las variables asociadas a la percepción de riesgo fueron atracción sexual por hombres, no tener pareja estable, percibirse en riesgo de adquirir el VIH por la conducta sexual y haber sufrido de violencia de pareja en los últimos seis meses. Se concluye que los programas de prevención del VIH para mujeres deben abordar los estigmas relacionados con el VIH, como la idea de que el riesgo solo ocurre cuando tienen múltiples parejas sexuales, promover una percepción precisa del riesgo del VIH y principalmente, prevenir la VP en todas sus expresiones y contextos; así como también dar atención personalizada a mujeres que ya sufren de violencia de pareja.

Palabras clave: Percepción de riesgo; Violencia de pareja; Mujeres mexicanas; Análisis de clases latentes; Uso del condón

Data from 2021 indicate that in Mexico there are 328,791 people living with Human Immunodeficiency Virus (HIV), of which 18.57% are women (Ministry of Health, 2020). During the first three months of 2021, women represented 2.65% of new cases and pregnant women 1.36%, giving an estimate that in the national territory, one in five people with HIV is a woman (National Center for the Prevention and Control of HIV/AIDS [CENSIDA], 2021). During the 1990s, in Mexico, there was one woman with HIV for every seven men, which meant that women constituted 13% of the cases (CENSIDA, 2013). This information indicates an evident increase in HIV cases in women in Mexico, a phenomenon called the *feminization* of the HIV pandemic.

The feminization of the pandemic has particular characteristics that are explained through the social norms that determine gender. For example, among this population's most common HIV transmission route is via sex with a heterosexual partner, denominated as a stable (CENSIDA, 2014), and at least 35% of women living with HIV worldwide have experienced intimate partner violence (IPV) from their partner or partners. These data are relevant since it has been documented that IPV increases the risk of contracting the virus by up to 1.5 times (CENSIDA, 2021).

In addition to IPV, women experience a misperception of HIV acquisition perception (Schaefer et al., 2019). Risk perception is understood as the estimate or perceived susceptibility of a subject to a specific threat (Ferrer & Klein, 2015) in which various beliefs and attitudes intervene (Del Castillo, 2012). It is a fundamental component in many theories of health behavior change (Green, Murphy, & Gryboski, 2021)1958. The evidence suggests that interventions that involve change in risk perception translate into beneficial changes in health behaviors (Sheeran et al., 2014) and this idea has been supported in correlational studies. However, correlational data cannot answer the question, "Does heightening risk appraisals change people's intentions and behavior?" The present review meta-analyzed experimental evidence in order to address this issue. We identified 4 elements of risk appraisal-risk perception, anticipatory emotion, anticipated emotion, and perceived severity-and located experiments that (asince it is assumed that the higher the risk perception, the individual will carry out more behaviors to maintain their well-being (Ferrer & Klein, 2015).

Also, high HIV risk perception is associated with knowledge about routes of transmission and the preventive measures of HIV (Balán, Lopez-Rios, Dolezal, Rael, & Lentz, 2019; Tenkorang, 2013; Warren et al.,

2018), delay of sexual debut (Anderson et al., 2007), HIV testing (Evangelí, Pady, & Wroe, 2016), and condom use (Evangelí et al., 2016). Furthermore, low HIV risk perception is a barrier to seeking prevention services, specifically pre-exposure prophylaxis (PrEP), which is currently one of the most critical biomedical tools for HIV prevention (Blumenthal, Jain, et al., 2021).

In reference of the relationship between IPV and the perception of HIV risk, the presence of IPV is associated with an increase in HIV testing, which could be because women who experience IPV have a higher risk perception (Brown, Weitzen, & Lapane, 2013). However, women who experience IPV are more likely to report engaging condomless sex and contracting sexually transmitted infections (Li et al., 2014; Marshall et al., 2018). The presence of IPV also means that women have less opportunity to engage in self-care behaviors, such as negotiating condom use or being forced to have unprotected sex with an HIV-positive partner (Díaz-Sosa, Sánchez-Cervantes, Robles García, & Sánchez-Sosa, 2019).

Nevertheless, the literature review identified no studies addressing HIV risk perception and IPV among seronegative Mexican women. In addition, methodological approaches such as latent class analysis allow studying the variability of risk perception according to the cultural context (Cederbaum, Gilreath, & Barman-Adhikari, 2014). Knowing these variations will help health care providers design specific interventions to favor health behavior change.

Therefore, this research has two aims; the first was to identify and characterize subgroups of women based on their HIV risk perception through latent class analysis. The second objective was to evaluate the variables associated with HIV risk perception in this group of women. We hypothesize that IPV is associated with HIV risk perception; women in a dynamic of IPV are more likely to perceive themselves as at risk of acquiring HIV. The findings will have important implications for generating prevention strategies within a specific context that seek to promote adequate HIV risk perception and self-care behaviors in women.

Method

Participants

Women who met the following criteria: over 18 years of age, residents within the Mexican Republic, identify as cisgender woman, have started a sexual life, self-report not living with HIV, and accept informed consent. Refusal to participate was established as an exclusion criterion. The established elimination criterion was not completing the survey in its entirety.

Research design

It was an ex post facto cross-sectional study conducted between September and October 2021. The sample was obtained by non-probabilistic convenience sampling. The sample size was set at a minimum of 300 observations, considering the recommendations for carrying out latent class analysis (Weller, Bowen, & Faubert, 2020).

Instruments

Sociodemographic data sheet: Participants were asked about age (in years), marital status, schooling, family monthly income, and the Mexican state where they reside.

Sexual behavior and prevention: This section asks about sexual attraction (men, women, or both), sexual partners in the last six months (man, transgender man, woman, transsexual woman, or other), HIV screening test (response options: once in a life time and I have never done the test), age of sexual debut. Sexual behavior in the last six months was assessed with: the number of sexual partners, condomless vaginal sex (yes/no), and if they had sex with someone without knowing their serological status (yes/no), having had sex under the influence of any drug or substance (yes/no), having received money, gifts or lodging or some other material good in exchange for sex (yes/no), having a confirmed diagnosis by a doc-

tor of a sexually transmitted infection (yes/no). It was also asked if they had heard of Pre-Exposure Prophylaxis (PrEP) and Post Exposure Prophylaxis (PEP); both questions were answered dichotomously (yes/no). Finally, in this section, the question proposed by a survey designed by Torres et al. (2019), establishes: Considering your current sexual practices, in your opinion, what is your risk of acquiring HIV in the next 12 months? with the response options being: no risk, low risk, some risk, high risk and I'm sure I'll get HIV.

Intimate Partner Violence Thermometer (*Violentómetro*, in Spanish): Developed in Mexico for the Mexican population the content validity of the instrument was obtained through expert validation (Tronco & Ocaña, 2012). It is a visual analog scale that helps to identify different manifestations of IPV that occur in an everyday context. For the purposes of this research, it was adapted to a questionnaire format, where the participant had to answer dichotomously (yes/no) regarding having experienced a certain situation of violence in the last six months. Instrument reliability was obtained via the *Kuder-Richardson Formula 20* (KR-20) yielded a coefficient of .84. In this instrument, violent behaviors are divided by three colors: green (which calls for awareness since violence will increase; for example, having been the target of hurtful jokes, lies, silent treatment, among others), yellow (evident violent behaviors; for example, destruction of personal items, aggressive caresses, pinching, pushing, among others), and red (indicates the search for a professional urgently; for example, death threats, sexual abuse, and rape). For the purposes of this research and in order to name the categories of violence, the definitions the following tags were used: mild violence (green), moderate (yellow) violence and severe violence (red). There are two benefits of this instrument. First, it considers the violence that occurs on social media; and considers that violence is not necessarily linear but rather that the different violent situations can be experienced interwoven.

For the analysis of this study, it was considered that if the participant answered affirmatively to any of the behaviors in any of the sections, it meant that

the participant had experienced IPV in the last six months. If the participant did not mark any of the behaviors described, then it was considered that she had not been a victim of IPV. This same analysis and logic were done individually for each scale (mild violence, moderate violence, and severe violence).

HIV Risk Perception Scale (Lauby et al., 2006): translated into Spanish by (Herrera Gallardo & Jorquera Gutiérrez, 2020). The original version consists of 4 items; however, before the start of this research, the scale was validated. Through expert judges and a pilot with 10 users, it was decided to eliminate the item "What is the probability that you have done things to increase the risk of contracting HIV?". The reason for excluding it was due to the ambiguity of the item since it does not specify behaviors that lead to acquiring HIV. The Cronbach's coefficient of the scale in this investigation resulted in .81. Three questions formed the version used in this study: "How likely is it that I am currently infected with HIV?", "What is the probability of becoming infected with HIV in my life?" and, "What is the probability that my sexual partner will contract HIV?". The answers options are on a Likert scale (1= *very unlikely* to 4 = *very likely*). Since the cut-off point for the Mexican population has not been established, it was decided to use the latent class analysis to establish the comparison groups.

Procedure

Recruitment was carried out online by sharing a link that led to the survey hosted on the platform. To proceed with the survey, participants had to read and accept the informed consent by selecting the "accept" option and clicking to continue. The link was shared via email, Facebook, or WhatsApp, and participants were invited to share the survey with other women. At the end of the survey, the participants could download three different informative brochures: information on HIV prevention, mental health, and finally, information on IPV and care centers. An email address was also provided where the participants could reach the researchers if they needed more information.

Data analysis

The latent class analysis (LCA) was used to identify the classes (groups) derived from the variables related to the perception of HIV risk; for this reason, the three questions from the HIV Risk Perception Scale (Lauby et al., 2006) were used. It was decided to use this analysis since it is an approach that identifies the combinations or patterns of experiences that individuals may have in common (Weller et al., 2020).

Various models from two to four classes were tested. The model that had the best fit was selected based on the Bayesian Information Criterion (Bayesian Information Criterion, BIC) and the Akaike Information Criterion (Akaike Information Criterion, AIC). The probability for the bootstrap likelihood test and the Lo-Mendell - Rubin (LRT) fit test were also taken into account. The next step was to estimate the probabilities for each class, and participants were assigned to the class for which they had the highest probability of belonging. The LCA was carried out in the statistical program Mplus version 8 Demo.

Subsequently, we explored the distribution of sociodemographic data, sexual behavior, and IPV among the classes obtained. Statistical differences were evaluated using the Student's t-test for continuous variables and Chi-square for categorical variables. The likelihood ratio or Fisher's statistic was used for those variables where the assumption of expected values was not met.

For the binary regression analysis, which aimed to explore the factors associated with the perception of HIV risk, all those variables that were significant ($p < .05$) in the bivariate analyzes were included. Due to its theoretical relevance, it was previously established that the condomless vaginal sex in the last six months would form part of the model. Similarly, it was previously determined that the items on the risk perception scale would not be integrated into the model to avoid collinearity. The final model was created using a backward stepwise approximation with the likelihood method. All analyses were performed using SPSS version 25.

Results

A total of 429 people accessed the survey, of which 420 started the questionnaire, 391 met the inclusion requirements, and 322 (75%) completed the questionnaire and are included in the analysis.

Latent class analysis

Of the models tested, the two-class model was the one with the best fit (Table 1), and the labels given to each class were:

1. No risk perception: the attribute of this class was not perceiving the probability of having HIV, contracting the infection at some point in life, or that their partner becomes infected. Eighty-five percent ($n = 275$) of the sample was classified within this group.
2. Perceived risk: This class is characterized by perceiving with high probability the risk of HIV transmission at some point in their life or by their partner. 14.6% ($n = 47$) of the sample fell into this class.

Table 1
Latent Class Analysis Fit Index for Models of Two to Four Classes ($n=322$)

Models	AIC	BIC	p for MRLs	p for Likelihood test
2 classes	468 931	495 353	<.001	<.001
3 classes	476 931	518 451	0.128	1,000
4 classes	484 931	541 549	0.499	1,000

Note. AIC=Akaike Information Criterion, BIC=Bayesian Information Criterion, LMR=Lo-Mendell-Rubin Adjusted Test

Differences in risk perception

Table 2 describes the general characteristics of the sample; the mean age was 28.5 years (range 19-71 years). Most participants reported being single (71.4%), with low family income (53.8%), residents

Table 2*Sociodemographic data of the participants with differences between classes (n=322)*

Variable	No perceived risk 275 (85.4)		Perceived risk 47 (14.6)		Total		X^2 (df)	<i>p</i>
	n	%	n	%	n	%		
Age (years), <i>M</i> (<i>SD</i>)	28.9 (9.7)		25.9 (7.2)		28.5 (9.4)		2.1 (320)	.043
Marital status							1.5 (3)	.446
Single	193	70.2	37	78.7	230	71.4		
Married/Living with partner	69	25.1	8	17	77	23.9		
Divorced	13	4.7	2	4.3	15	4.7		
Family Income (n=277) ^a							1.6 (2)	.444
Low	127	53.8	22	53.7	149	53.8		
Medium	98	41.5	15	36.6	113	40.8		
High	11	4.7	4	1.4	15	5.4		
Lives in Mexico City (yes)	244	88.7	42	89.4	286	88.8		.899
Education ($\geq$ university)	117	42.5	22	46.8	139	43.2	0.3 (1)	.586
Sexual attraction (n=319)							4.5 (1)	.033
Men	215	78.2	30	63.8	265	76.1		
Women/Both	60	21.8	17	36.1	77	23.9		
Stable partner (yes)	170	61.8	12	25.5	182	56.5	21.5(1)	<.001

Note . ^a Taking as a reference what is established by the National Commission of Minimum Wages (Secretary of Labor and Social Prevention, 2021), income was categorized by the number of minimum wages per month per family as of 2021 (141.70 MXM= a minimum wage in the year 2021), so the categories were made up: low income (from no income to ≤ 3 minimum wages), medium income (from 3 to 9 wages) and high income (≥ 10 minimum wages).

of Mexico City or the State of Mexico (88.8%), and with less than university education (56.8%). Participants in the non-perceived risk group reported being older ($t = 2.1$, $df = 320$, $p = 0.43$), sexual attraction to men ($X^2 = 4.5$, $gl = 1$, $p = .03$) and have a stable partner ($X^2 = 21.5$, $df = 1$, $p < .001$).

Regarding sexual behaviors (Table 3) participants in the group of no risk perception reported an earlier age of sexual debut compared to those who perceived themselves to be at risk ($t = 2.5$, $df = 320$, $p = .001$). Women in the perceived risk class reported a more sexual partners ($X^2 = 11.7$, $df = 2$, $p = .008$), low and moderate risk of acquiring HIV through sexual behavior ($X^2 = 10.2$, $df = 1$, $p < .001$), probability of current HIV infection ($X^2 = 23.7$, $df = 1$, $p < .001$), probability of becoming infected with HIV at some point in their life ($X^2 = 125.1$, $df = 1$, $p < .001$), probability that their partner will contract HIV ($X^2 = 322$, $df = 1$, $p < .001$).

Regarding IPV, women in the perceived risk group showed a higher frequency of mild violence ($X^2 = 9.8$, $gl = 1$, $p < .001$), severe violence ($X^2 = 6.2$, $gl = 1$, $p = 0.28$), and presence of violence in general ($X^2 = 9.8$, $gl = 1$, $p = .002$).

Factors associated with HIV risk perception

In the final binary regression model (see Table 4) it was found that sexual attraction to men (aOR = 2.16, CI = 1.02-4.60, $p < .001$), not having a stable partner (aOR = 6.24, CI = 2.81 -13.85, $p < .001$), perceived risk of acquiring HIV due to sexual behavior (aOR = 3.44, CI = 1.54-7.68, $p = .003$) and the presence of IPV (aOR = 4.10, CI = 1.83- 9.18, $p < .001$) were associated with having a perceived risk of HIV (belonging to class 2).

Table 3
Sexual behavior, prevention, HIV risk perception, and intimate partner violence in women surveyed online (n=322)

Variable	No perceived risk 275 (85.4)		Perceived risk 47 (14.6)		Total		$X^2 (df)$	p
	n	%	n	%	n	%		
Beginning of sexual life (years), mean (range)	18.33 (3.3)		17.06 (2.03)		18.15 (3.18)		2.5(320)	.001
Have you ever been tested for HIV (yes)	122	44.4	22	46.8	144	44.7	0.1(1)	.755
Number of sexual partners							11.7(2)	.003
None	61	22.3	9	2.8	70	21.8		
1 sexual partner	186	67.9	25	53.2	211	65.7		
2 to 10 sexual partners	27	9.9	13	27.7	40	12.5		
Condomless vaginal sex in the last 6 months (yes)	173	62.9	30	63.8	203	63	0.1(1)	.904
Not knowing of the serological status of the sexual partner (yes)	62	22.5	21	44.7	83	25.8	10.2(1)	.001
Sex under the influence of any drug or substance (yes)	41	14.9	11	23.4	52	16.1	2.1(1)	.144
Sex in exchange for money, gifts, accommodation, and other material goods (yes)	3	1.1	1	2.1	4	1.2	0.3 (1)	.470
STI diagnosis (yes)	10	3.7	1	2.2	11	3.5	0.2 (1)	1,000
PrEP Awareness (yes)	70	25.5	13	27.7	83	25.8	0.1(1)	.749
PEP Awareness (yes)	69	25.1	15	31.9	84	26.1	0.9(1)	.325
Risk of acquiring HIV through sexual behavior							17.3(1)	<.001
No perceived risk	149	54.2	10	21.3	159	49.4		
Low and Moderate perceived risk	126	45.8	37	78.7	163	50.6		
Probability of current HIV infection (probable)	0	0	4	8.5	4	1.2	23.7(1)	<.001
Likelihood of HIV infection in your lifetime (likely)	12	4.4	30	63.8	42	13	125.1(1)	<.001
Likelihood that your partner will get HIV (likely)	0	0	47	14.6	47	14.6	322(1)	<.001
Intimate partner violence								
Violence (presence)	143	52	36	76.6	179	55.6	9.8 (1)	.002
Mild violence (yes)	128	46.5	3.4	72.3	162	50.3	10.6(1)	.001
Moderate violence (yes)	53	19.3	15	31.9	68	21.2	3.8 (1)	.050
Severe violence (yes)	8	2.9	5	10.6	13	4.0	6.2 (1)	.028

Discussion

Concerning the first objective, the identification and characterization of subgroups of women based on their perception of risk, this study identified two different classes associated with the HIV risk perception. The group of those who were classified as at risk were those who were identified as having a high probability that their partner would contract HIV at some point in their life. These findings show that women's health behavior seems to be determined by their partner or partners (Moreno Rodriguez et al., 2008). This

assumption can have significant consequences in developing HIV prevention programs since women do not prioritize their self-care and therefore do not go or do not ask for attention for prevention in sexual matters. HIV prevention programs for women need to focus and prioritize not only the biological aspects of HIV but promote empowerment and intern control locus.

In addition to the above and concerning the second aim of this study, the results obtained show that the HIV risk perception in women is associated with not having a stable partner, the presence of intimate partner violence in some type of manifestation, having

Table 4
Factors associated with the HIV risk perception in women (n=322)

Variable	Analysis Bivariate OR [95% CI]	<i>p</i>	Analysis multivariate aOR [95% CI]	<i>p</i>
Age (years)	0.95 [0.92, 0.99]	.046	-	
Age of sexual debut (years)	0.84 [0.84, 0.73]	.012	-	
Sexual attraction (men vs. other)				
Men	0.49 [0.25, 0.95]	.035	2.16 [1.02, 4.60]	.044
Women/Both	Ref.			
Stable partner				
No	0.12 [0.10, 0.43]	<.001	6.24 [2.81, 13.85]	<.001
Yes	Ref.			
Risk of acquiring HIV through sexual behavior				
Risk-free	Ref.			
Low and Moderate Risk	4.37 [2.10, 9.15]	<.001	3.44 [1.54, 7.69]	.003
Number of sexual partners			-	
< 2 couples	Ref.			
≥ 2 couples or more	3.50 [1.64, 7.42]	.001		
Vaginal sex without a condom			-	
Yes	1.04 [0.55, 1.98]	.904		
No	Ref.			
Ignorance of the serological status of the sexual partner			-	
Yes	2.77 [1.46, 5.26]	.002		
No	Ref.			
Intimate partner violence				
Presence	3.02 [1.48, 6.18]	.002	4.10 [1.83, 9.18]	<.001
Absence	Ref.			
Mild violence			-	
Yes	3.00 [1.52, 5.94]	.002		
No	Ref.			
Moderate violence			-	
Yes	1.96 [0.99, 3.87]	.053		
No	Ref.			
Severe violence			-	
Yes	3.97 [1.24, 12.7]	.020		
No	Ref.			

Note. CI= Confidence Intervals, Ref= reference value.

sexual attraction towards men, and perceiving themselves at risk due to sexual behavior. The idea that the absence of a stable partner continues to perpetuate the stigma that HIV is related to sexual promiscuity

and infidelity (De Aguiar & Camargo, 2014; Pranitha & John, 2005). For women, the idea of romantic love focuses on long-term or stable relationships, which in turn is associated with trust and safe sex (Carter et al.,

2019)we explored (1. Therefore, HIV prevention campaigns need to address the stigma that continues to be associated with stable partners, as well as to inform and address the concepts of romantic love that favor that nine out of 10 of the women with HIV have been infected by their partner that they consider being stable (CENSIDA, 2021).

The other two variables that associated with HIV risk perception were sexual behavior and sexual attraction. These results may denote that the participants are aware of the routes of HIV transmission; for prevention campaigns it will be necessary to complement with specific information, for example, that semen contains more viral load, the area to exposure to the virus in women is greater so that more micro-injuries can occur that facilitate the entry of the virus, among others (World Health Organization, 2021).

Intimate partner violence was a great predictor for high HIV risk perception, increasing the odds by 4.10 times compared to those who did not report intimate partner violence. These data have important implications for HIV prevention, for example, it has been widely documented that women who find themselves in dynamics of violence do not negotiate condom use, even when they suspect that their partner has multiple sexual partners, for fear of aggressive reactions from their partner (Psaros et al., 2014). A woman who has experienced psychological violence lose confidence in confronting her partner and avoid talk about sexuality; if the violence is sexual, women do not even have the opportunity to negotiate self-care behaviors and more serious, her life is in danger (Tirado-Muñoz, Gilchrist, Farré, Hegarty, & Torrens, 2014). In this sense, attention to IPV against women should be contemplated in the interventions (pre and post-HIV prevention counseling) to provide tools to face the dynamics of violence, and if the violence is treats their life, women should be provided other type of programs or interventions, where they are given legal support, safe houses, among others (Tirado-Muñoz et al., 2014).

Undoubtedly, addressing IPV is one of the pillars that must be considered regarding HIV prevention in women (Bond et al., 2021). The results here indicate

that women could recognize or perceive that being in situations where IPV is present makes them more vulnerable to HIV. Hence, interventions need to aim at solving their psychological needs and preventing the disease. In terms of care for women living with HIV, various proposals have been generated in the Mexican territory, such as training women in negotiating condom use (Díaz-Sosa et al., 2019); however, there is a lack of programs that address other elements of a cognitive-behavioral intervention for the treatment of symptoms of anxiety, depression, self-esteem and anger management (Crespo & Arinero, 2010) that ultimately contribute to the empowerment of women (Cruz-Alamanza et al., 2006).

As mentioned, IPV against women influences the possibility of self-care, including HIV prevention (Blumenthal, Landovitz, et al., 2021), as shown by recent research on biomedical prevention alternatives, such as PrEP, since it has been shown that IPV leads to dropout PrEP programs and low adherence treatment.

Another important related factor is that the inclusion criteria to be part of international PrEP programs contemplate: having a serodiscordant partner, participating in sex work, or having a sexual partner or partners whose serological status is unknown (Blumenthal et al., 2021) under these parameters within our sample, 26% did not know the status of their partner, which puts them at real risk of acquiring HIV. Although the objective of this research was not to account for the discrepancy between actual HIV risk and perceived risk, it is necessary to promote a correct assessment of risk and thus be able to promote behavioral change (Bennett et al., 2020).

This population's lack of knowledge of biomedical prevention strategies such as PrEP and PEP is essential. Currently, these biomedicine prevention options are crucial for the fight against the HIV epidemic; however, these options are less known and less offered to women within the spaces of health care in Mexico (Torres-Cruz & Suárez-Díaz, 2020). Currently, PrEP is not an option for cisgender women in the Mexican health system, but it is not ruled out that it will be in the future. Once PrEP can be implemented, the evaluation of intimate partner violence

should be implemented as a predictive aspect of HIV risk (Baldwin et al., 2021) and not only be based on risky sexual behavior to decide whether the user is accepted or accepted. not in PrEP programs (Blumenthal et al., 2021).

In the case of PEP, women are candidates to benefit, and it is offered to them in public health clinics, so it is necessary for women to be aware of the treatment and where it is provided (Torres-Cruz & Suárez-Díaz, 2020).

This research has several limitations that can represent an opportunity for future research. In the first place, the type of sampling was directed, and for convenience, the women who participated had access to the Internet and social networks, so it cannot be said that the data can be generalized. There was limited participation from other states of the Republic. Future research should pay special attention to the states with the highest rates of HIV cases, such as Chiapas, Guerrero, and Jalisco, which lead the cases of HIV. Second, the questions were based on the collection of past behaviors, which could have generated recall bias. Third, although the aspect of anonymity and confidentiality was taken care of, the questions refer to sexual behaviors, HIV, and IPV, topics that are surrounded by stigma, so it may be that the answers are biased by social desirability, with the purpose of not be judged. Fourth, the evaluation of IPV discriminates between passive, evident, and extreme violence, where sexual, physical, economic, and psychological violence converges but does not differentiate them. Therefore, it would be useful to strengthen the information that future research should include measurement by type of harm (sexual, physical, economic, or psychological) to know which type is more closely related to risk perception.

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