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Kelly Reyna

An Examination of Social Determinants of Health among Women Living with HIV in Chiapas, Mexico

By

Kelly Reyna
Master of Public Health

Hubert Department of Global Health

Dr. Sophia Hussen
Committee Chair

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Kelly Reyna

B.A.
Emory University
2019

Sophia Hussen, MD, MPH
Committee Chair

A thesis submitted to the Faculty of the

Rollins School of Public Health of Emory University

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Abstract

An Examination of Social Determinants of Health among Women Living with HIV in Chiapas, Mexico

By: Kelly Reyna

Objective: To examine associations between social determinants of health, such as food insecurity, gender-based violence, and socioeconomic conditions, and virologic failure, among HIV-positive women between the ages of 18-44 living in Chiapas, Mexico.

Methods: Data were derived from the Proyecto Mujeres study in Chiapas, Mexico. Participants in the study were 215 cis-gender women living with HIV, who completed staff-assisted interviews and STI laboratory testing. Food insecurity was measured using the Latin American and Caribbean Food Security Scale. Gender-based violence was assessed by a survey influenced by the 2016 National Survey of Relationship Dynamics in Households. We employed logistic regression to explore the relationships between food insecurity, gender-based violence, and history of virologic failure.

Results: Food insecurity was associated with increased odds of virologic failure, when controlling for days worked per week, the number of children, time spent to get to appointments, transportation method used to get to appointments, and money spent on appointments (OR=1.073, 95%CI = 1.007-1.145).

Conclusions*:* Findings suggest that food insecurity may play a role in medication nonadherence as evidenced by higher risk for virologic failure. Future interventions could consider food assistance as a strategy for improving HIV care engagement.

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Acknowledgments

"Because it is a world event—that is, because it affects the West—it is regarded as not just a natural disaster. It is filled with historical meaning."

— Susan Sontag, *Illness as Metaphor and AIDS and Its Metaphors*

***

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Chapter I: Introduction

Introduction and Rationale

On a global scale, HIV remains a major health issue and challenge, with approximately 38 million people living with HIV worldwide and 39 million deaths since the beginning of the HIV/AIDS epidemic in the 1980s (Kaiser Family Foundation, 2021). In Mexico, estimates from 2020 show 20,000 new cases, with a prevalence of 0.27 per 1000 population of adults ages 15-49 (UNAIDS, 2021a). According to the Mexican Secretariat of Health's 2021 World HIV Day Report, between the first accounts of HIV in Mexico in 1983 and the latest records in 2021, there have been a total of 328,791 documented HIV diagnoses in the country. Traditionally, data from Latin America and the Caribbean highlights the disproportionate impacts of HIV on various key populations, such as men who have sex with men (MSM), transgender women, sex workers, and people who inject drugs (PWID) (Avert, 2020).

Since the start of the epidemic, women have been heavily impacted by HIV across different countries and contexts. In fact, current HIV estimates from UNAIDS data (2021b) predict that about 5,000 young women aged 15-24 become infected with HIV weekly. This burden of HIV among women is likely to be an underestimate, due to the low reporting of HIV in women since the beginning of the epidemic in the 1980s (Hoyos-Hernandez and Duarte-Alarcón, 2016; Garibi Gonzalez, 2009). Over the last four decades, cases of HIV have increasingly become more prevalent among women around the world (Avert, 2021; Secretaria de Salud, 2021; Garibi Gonzalez, 2009). In Mexico, 60,000 women are living with the virus as of 2020. For women aged 15 to 49 in Mexico, the prevalence rate of HIV is 0.1 percent (UNAIDS, 2021a). Though lower than many other countries in Sub-Saharan Africa, the rate in Mexico is still concerning given the rise in incident cases in recent years from 1,733 cases in 2009 to 4,112

cases in 2019 (Secretaria de Salud, 2021). The rise in HIV incident cases among women indicates a potential shift in the Mexican epidemic toward one that is heavily affected by heterosexual transmission (Garibi Gonzalez, 2009).

Problem Statement

Considering the alarming increase of HIV cases in Mexican women over the last ten years, it is vital to understand the social conditions that impact care engagement among cis-gender women living with HIV. There are persistent and intertwined epidemics of food insecurity, gender-based violence, and HIV in Chiapas, Mexico, but little is known about the impacts of food insecurity and gender-based violence, respectively, on virologic failure.

Purpose Statement

This thesis aims to examine associations between food insecurity, gender-based violence, and virologic failure as an HIV-related clinical outcome for women living with HIV in Chiapas, Mexico. As such, the secondary objectives of this analysis are to identify the prevalence of food insecurity among households of women living with HIV, in addition to identifying how many women living with HIV experienced any type of violence, including physical violence, sexual violence, emotional or psychological violence, and patrimonial or economic violence, in 2020.

Significance Statement

Identifying the prevalence of women living with HIV who are exposed to gender-based violence, food insecurity, and other adverse situations will allow health care teams to identify which patients need additional support to remain engaged in HIV-related care. Similarly, understanding the relationships between these social determinants of health and virologic failure are vital informants to teams developing interventions for women living with HIV to promote optimal HIV care engagement and overall health and well-being.

Chapter II: Literature Review

Gender-Based Violence and HIV

The intersection of intimate partner violence and HIV is long documented, with preliminary reports from the 1990s and early 2000s stemming from India, Rwanda, South Africa, and Tanzania (Dunkle et al., 2004; Maman et al., 2002; Silverman et al., 2008; van der Straten et al., 1995; van der Straten et al., 1998). Despite advances in women's rights and gender equality, today, between 30-60% of women experience gender-based violence across their lifetime (Dunkle and Decker, 2013; World Health Organization, 2021). The prevalence of gender-based violence (GBV) varies greatly by age, geographic region, and the state of a country's economic development. Notably, the range of intimate partner violence is reportedly lower in high-income countries, whereas low-and-middle-income countries have a slightly higher range, with high-income countries averaging a prevalence of 22% while the latter group of countries has a 37% prevalence of intimate partner violence (Nabila El-Bassel et al., 2022). However, despite these differences, several studies have shown that women who reported experiencing any physical or sexual violence from an intimate partner were more likely to test positive for HIV compared to those who did not experience violence. To illustrate, in a 2004 study conducted in South Africa among women attending antenatal clinics, survivors of intimate partner violence were up to 53% times more likely to have a positive HIV diagnosis (Dunkle et al., 2004). More recently, an article examining the prevalence of intimate partner violence among women living with HIV in Kazakhstan found similar rates of prevalence, with nearly 52% out of 249 women sharing an account where they experienced an incident of intimate partner violence (Jiwatram-Negrón et al., 2018). In short, literature shows that women who experience GBV have a greater risk of

acquiring HIV compared to women who do not report accounts of violence from an intimate partner.

Over time, literature has emerged explaining some of the pathways from gender-based violence to HIV. One of the more seminal pieces describes two main pathways from GBV to HIV, where the first pathway consists of direct transmission of HIV through a sexual encounter, regardless of whether the encounter was consensual or forced (Dunkle and Decker, 2013). It is important to note here that intimate partner violence as it relates to HIV transmission is not exclusively sexual violence. In fact, the risk for HIV acquisition also increased among women who solely reported experiences of physical violence (Decker et al., 2005; Dunkle et al., 2004; Jewkes et al., 2010; Jewkes et al., 2006). Equally important is the second pathway, which states that the perpetrators of violence against women are men who are more likely to be living with HIV and other sexually transmitted infections (Jewkes et al., 2011; Dunkle and Decker, 2013).

When both pathways are considered respective to GBV and HIV, gender inequality and gender norms are social conditions that permit the perpetration of violent acts against women. Namely, men engaging in violent acts are considered permissible due to historically existing power hierarchies between men and women. Specifically, norms about masculinity allow men to engage in risky sexual behaviors, such as having unprotected sex with multiple partners, and substance use without accountability or repercussions (Dunkle and Decker, 2013). On the other hand, norms about femininity and the role of women in relationships demand that women trust their partners. Unfortunately, in some cases, the trust granted to men by women in heterosexual relationships comes at the expense of a reduced ability to influence the conditions of sex. To illustrate, research shows that women who experience violence are less likely to be able to negotiate the use of condoms during sex with their partners (Hirsch et al., 2007; Dunkle and

Decker, 2013). Further, women are often denied control over contraceptive use, thus making GBV and HIV care reproductive health issues in addition to sexual health issues. Lack of autonomy over health poses a risk for women who are living with HIV, as their retention and engagement in care may be affected. Consequently, also impacting their ability to reach viral suppression and more likely to experience virologic failure. (El-Bassel et al., 2018; Leddy et al., 2019).

This section presents the various, less indirect mechanisms that link gender-based violence and HIV among women; more specifically, the socioecological multilevel factors that have an effect on the dynamic between GBV and HIV. On an individual level, previous studies have mounted evidence for some of the ways in which GBV leads to substandard health outcomes, including poor mental health and sexual health. Stated explicitly, a large number of existing literature report that survivors of intimate partner violence suffer from depression, post-traumatic stress disorder, anxiety, and commonly engage in substance use to cope with these adverse effects of experiencing violence (Dunkle and Decker, 2013; Jiwatram-Negrón et al., 2018; Ellsberg et al., 2008; Li et al., 2014; Kouyoumdjian et al., 2013; Abramsky et al., 2011). Furthermore, physical and sexual acts of violence against women by an intimate partner are also associated with adverse physical health outcomes, such as irritable bowel syndrome and adverse pregnancy outcomes (Plitchta and Falik, 2001; Romito et al., 2005; Fischbach et al., 1997; Bonomi et al., 2006; Loxton et al., 2006).

Undoubtedly, among women living with HIV, GBV is also proven to be an important, detrimental influence on HIV clinical outcomes. Jewkes et al. (2015) demonstrated that among participants followed over an average of 1.3 years, a decline in CD4 T-cell and CD8 T-cell count was associated with emotional violence. Similarly, other studies report there is an association

between poor health outcomes, such as PTSD, and non-adherence to medication. Moreover, this association is further complicated if women also have mental health problems and use substances (Machtinger et al., 2012; Leddy et al., 2019). Although many studies reveal the relationship between intimate partner violence and HIV, few studies have examined the relationship between the two in the context of women living with HIV in Mexico.

Gender Inequality and Employment among Women in Mexico

The HIV epidemic among women in Mexico is associated with social and cultural conditions that perpetuate gender inequality. In fact, Evangelista Garcia et al. (2020) propose that the effect of gender inequality on women is reflected in an unequal division of labor, more specifically as the struggle pertains to childcare and housework. These unequal conditions persist despite advances in and participation of women in the workforce over the last few decades. To illustrate the vast differences in labor across men and women in Mexico, Guzman (2007) shares that in a report conducted by INMUJERES in 2002, there was an average difference of nine hours in the time allocated to labor between men and women of 12 years of age and older. This 9-hour difference is attributed to the unofficial double standards of caretaking and housework. On top of 34 hours of weekly employer-based or informally-paid work, women and young girls are expected to contribute additional hours to unpaid domestic household chores and caretaking. The impact of unpaid work on a woman's participation not only impacts access to job opportunities and income salary, and consequently in the case of women living with HIV, the impact of unpaid work extends into HIV care.

Food Insecurity and HIV

Nationally, food insecurity affects nearly 70% of all Mexican households. When food insecurity is considered under the standards of the Latin American and Caribbean Food Security Scale (ELCSA), about 28.2% of all households experience moderate to severe forms of food insecurity. When food insecurity was assessed by states in Mexico, the state of Chiapas was among the top three states with the most severe levels of food insecurity with a prevalence of 38.9% of moderate to severe food insecurity (Mundo-Rosas et al., 2013). Literature shows that Chiapas actually exceeds the national rates of food insecurity, with about 83% of households in Chiapas struggling with food insecurity (Instituto Nacional de Salud Pública, 2012; Martinez-Rodriguez et al., 2015). Furthermore, among those who reported experiencing food insecurity, it was found that almost 90% of them belong to the lowest socioeconomic class in the region. The aforementioned finding from Martinez-Rodriguez et al. (2015) supports research from Shamah-Levy et al. (2014), which states that food insecurity is often associated with poverty, low levels of educational attainment, and households where the head of the household is a woman. Despite decades of research on food insecurity, there remains room to explore the relationship between food insecurity and HIV.

Food insecurity and HIV have a relationship that mirrors the inextricable link between GBV and HIV outcomes. There exists a considerable body of literature highlighting how food insecurity impacts HIV care outcomes, more specifically how it effects antiretroviral treatment adherence, viral load outcomes, CD4 counts, and risk of transmission (Anema et al., 2009; Aibibula et al., 2016). The understanding of this literature is vital, especially as reports on food insecurity prevalence among people living with HIV become increasingly accessible. Of the studies that have measured prevalence of food insecurity among people living with HIV, the

results have ranged from 48% in Canada to 63% in the United States (Normén et al., 2005; McMahon et al., 2011). Upon comparison to people living without HIV, the prevalence of food insecurity among people living with HIV is found to be higher (Aibibula et al., 2016). To illustrate, people living with HIV in Canada experienced food insecurity at five folds higher than the general Canadian population (Normén et al., 2005).

When HIV outcomes were assessed in relation to food insecurity, findings remained consistent across outcomes. To elaborate, among people who reported experiencing food insecurity, the odds for lower CD4 counts increased by 32% compared to food secure counterparts (Aibibula et al., 2016)). Among houseless individuals living with HIV, experiences with severe levels of food insecurity were associated with lower odds of achieving viral suppression compared to those with mild to moderate levels of food insecurity (Weiser et al., 2008). The aforementioned assessments of HIV clinical outcomes as they relate to food insecurity highlight the need to consider food as being connected to adherence and care outcomes. More importantly, food supplementation should be considered as part of a comprehensive HIV care package since research has shown that treatment intake without proper food consumption levels can result in reduced treatment effectiveness (Anema et al., 2009).

Chapter III: Methods

Introduction

This analysis utilized data from Proyecto Mujeres, a cross-sectional mixed-methods study designed to assess the relationships between different social determinants of health and access to health care services among women who live with HIV in Chiapas, Mexico. The study was designed to collect information on social determinants of health, including food insecurity, gender-based violence, socioeconomic conditions, and employment inequality, to explore how specific determinants of health are associated with clinical HIV outcomes including CD4 count, viral load, gaps in care engagement, and virologic failure. The current analysis is focused on virologic failure as the HIV outcome of interest.

Population and Sample

A total of 216 participants were enrolled across thirteen Prevention and Care of AIDS and Sexually Transmitted Infections Outpatient Centers (CAPASITS) and Comprehensive Care Centers (SAIH) throughout Chiapas. CAPASITS are health units distributed throughout Mexico that provide comprehensive health care to people living with HIV and to people with symptoms of other sexually transmitted infections. These outpatient centers offer services spanning from the distribution of antiretroviral therapy to routine laboratory visits. They also provide psychiatric and social work services and workshops focused on medication adherence. SAIH sites exist within hospitals across the state and offer the same benefits as CAPASITS.

The following eligibility criteria were used for participants (1) female sex assigned at birth, (2) ages of 18-44 years old, (3) living with HIV, (4) being an enrolled patient and receiving care for HIV across one of the 13 health centers in the state of Chiapas, (5) having received ART

for at least six months and attended at least one appointment in the last six months and picked up ART at least once in the last three months, (6) consented to participate in the study voluntarily. On the other hand, participants were excluded from the study if they did not sign the informed consent form, later decided to withdraw from the study, or if they were unable to find a relative who could serve as a translator if their primary language was not Spanish (i.e., the participant was from an indigenous community) throughout the course of the study.

Research Design and Procedures

Participants for the study were recruited in Chiapas, Mexico from a list of patients registered on SALVAR, an electronic database system containing clinical information and medical records on people living with HIV within Mexico. The patients registered on the SALVAR system are patients from CAPASITS and SAIHS sites from all across the country. For the purposes of the study, only women receiving care in Chiapas who were registered in SALVAR were eligible to participate.

Using a stratified random sampling approach at each health center and accounting for the proportion of women seen at each center, it was estimated that it would be necessary to survey at least 200 women between the ages of 18-44. Women were recruited and enrolled for the study from September 2020 to November 2020 if they met the eligibility criteria. Some women were recruited if they had an appointment scheduled during the study period, while others were invited via phone call if they met inclusion criteria but did not have an appointment scheduled during the span of the study period. On the day of their appointment, participants were given a form outlining the purpose of the study, the study procedures, risks, and benefits, as well as information on confidentiality and an informed consent form. The participants were asked to

provide informed consent before moving forward with the official surveys, urine sample, and rapid test for syphilis.

Once informed consent was provided by participants, they proceeded to complete a survey including the following domains: sociodemographic characteristics, division of caregiving, food insecurity, maternal breastfeeding, and history of violence.

Instruments

Demographic Variables

Demographics. Demographic data captured information about the participant's residence, relationship status, HIV diagnosis, employment status, monthly income, number of household members, number of children, and contraception method. All information was self-reported by participants.

Residence was self-reported in terms of each participant's city and district/neighborhood. Residence type was classified as waste material, metal sheet, wood, mud, clay, cement, or brick). The number of rooms within each residence was also collected. Relationship status was recorded as married, domestic partnership, separated, or divorced, widow, and single. If a participant reported being a widow, information regarding their partner's HIV status was collected. Employment was reported by type of labor, such as employee, retail worker, farm/field worker, housekeeper, or other. Information about how many hours and days worked per week by each participant was also recorded. Annual income was recorded in pesos by four categories: Less than or equal to $999, $1,000-1,999, $2,000-2,999, $3,000-3999, and more than or equal to $4,000. A count of the total number of people living in the participant's household was documented. Each participant's total number of children was also registered, and information about each child's age and HIV status. Contraception methods were classified by type, including

the pull-out method, insertive condom, receptive condom, copper IUD, hormonal IUD, minipill, combined injectable, implant, combined pill, bilateral tubal occlusion, DMPA, or other.

Outcome Variable

Virological Failure. This variable indicates if the participant has experienced virological failure at any point throughout the course of their diagnosis. A value of '1' was used to indicate a history of virologic failure, whereas a value of '0' was used to indicate no experience of virological failure. Virologic failure is defined as having a viral load of greater than 200 copies/mL.

Exposure Variables

Food Insecurity. The Latin American and Caribbean Food Security Scale (ELCSA) was utilized to measure experiences surrounding food insecurity. The ELCSA contains 15 questions focused on experiences with food insecurity within the last three months. Each question can be answered with a yes/no response. For each question that receives a response of "yes," a weight of '1' is attached to the response. Households are then classified into one of four categories depending on the raw score: a score of 0 points = 'food secure', 1-3 points = 'mild food insecurity', 4-6 = 'moderate food insecurity', and 7-8 points is 'severe food insecurity' (INDDEX Project, 2018).

History of Violence. Indicators for violence were based on items in the 2016 National Survey of Relationship Dynamics in Households (ENDIREH). The ENDIREH measures four types of violence: emotional/psychological damage, physical violence, sexual violence, and economic and patrimonial violence (Instituto Nacional de Estadistica y Geografia, 2016). For the purposes of this survey, emotional and psychological damage is defined as forms of aggression that have an impact on the emotional and psychological well-being of a woman. Physical

damage is conceptualized as a form of aggression with the objective to cause physical injury or damage to a woman's body. Sexual violence includes acts of sexual coercion to abuse, degrade, and/or damage a woman's body. Furthermore, sexual violence also includes acts of sexual coercion that may affect a woman's sexual liberty and dignity, or physical integrity. Economic and patrimonial violence includes any actions by a perpetrator of harm that affect the economic well-being of someone. The aforementioned form of violence refers to actions such as controlling how income is used or taking ownership of a property that does not belong to the perpetrator of harm.

Data Analysis

The dataset was cleaned and analyzed using SAS version 9.4 (SAS Institute, Cary, North Carolina, USA), as well as R version 3.6.2 (R Foundation for Statistical Computing, Vienna, Austria). The primary outcome was virologic failure. Chi-square tests and t-tests were used to analyze bivariate relationships between virologic failure and age, marital status, occupation, days spent working per week, monthly income, number of children, children under 3 years, travel time to CAPASITS appointment, number of transportation units, travel costs to CAPASITS appointment, food insecurity, and exposure to violence. $P < 0.05$ was considered to be statistically significant for the purposes of this analysis. Unadjusted and adjusted logistic regression models were produced to examine differences between women with a history of virologic failure and women without a history of virologic failure.

Ethical Considerations

This analysis was determined to be IRB-exempt since it is a secondary analysis of data that were de-identified prior to analysis. Appropriate measures were taken to ensure participant participation and confidentiality throughout the study. Ethics approval was obtained from the

Ethics in Research Committee at ECOSUR - The South Border College in Campeche, Mexico. All participants signed an informed consent form, were made aware of the risks and benefits associated with the study, and were provided with contacts for information on participant rights or questions regarding the study. Each participant was compensated with 800 pesos for transportation and for the time invested in the study (equivalent to USD 38.91).

To ensure participant confidentiality, the research team enacted several protective measures. The database containing protected health information and participant names was protected with a password. However, only two members of the research team had access to this database. Once all data was integrated into one database, all copies of data containing personal information (i.e., participant names, date of birth, patient ID) were destroyed.

Given the nature of the study, the research team also developed a plan for navigating reports of violence, food insecurity, and sexually transmitted infections among participants. Any participant that reported being a victim/survivor (V/S) of violence or abuse was provided with psychiatric services. Additionally, they were also equipped with information about resources in the state of Chiapas focused on the prevention and treatment of physical, sexual, or emotional violence. Women who reported experiencing moderate or severe cases of violence were referred to community organizations that provide specialized services to V/S of violence. If any form of violence was reported, the participants were also offered a self-help manual for guidance. If participants were found to be struggling with food insecurity, the research team provided the respective participants with a referral to state-sponsored legal and social services. Lastly, women who tested positive for syphilis, chlamydia, or gonorrhea were offered pharmacological treatment.

Chapter IV: Results

Characteristics of participants and children

A total of 216 women living with HIV were surveyed for the purposes of the study. The average age of participants was 27.6 years old (SD = 7.3 years). The majority of the participants were either married or widowed. More specifically, about 132 (61.4%) of the participants were married, while 42 women (19.53%) were widowed. Nearly 88 percent of the women in the widowed group reported that their partner's death was associated with complications related to HIV.

The women in the study worked a variety of jobs. Approximately 115 women reported they were homemakers, while 28.37% of the women shared they were more broadly employed in some capacity. Over half of the women reported working seven days per week, while 28.37% of women worked between 5-6 days. The average number of hours spent working in a day is 8.9 (SD = 4.0) hours, irrespective of the number of days spent working in a week. The monthly earnings of most participants (53.40%) fall within the range of $0-2000 Mexican pesos, which equates roughly to $0-100.50 Mexican pesos. A smaller majority (26.21%) of women earn a little more than 2000 Mexican pesos, but no more than 3000 Mexican pesos. Despite the hours contributed to jobs by the participants, many (42.3%) of the women share they do not contribute to the household income. To illustrate, less than 30% of women (n=59) contribute all of their monthly earnings to the household income.

Other characteristics that are important to understand are the characteristics of the participant's children. Approximately sixty-three percent of the participants had 1-2 children, with about 22% of the remaining participants having between 3-4 children. Children were typically younger than 18 years old, with only 15.81% of women reporting their children were over 18 years old. Similarly, most study participants did not have children under three years old.

In fact, only 21.86% of the women in the study had children under three years of age. When study participants are not home, family members traditionally take over the role of caregiver, with 152 women reporting support from family. Despite the HIV status of study participants, only 47 participants have at least one child who is currently living with HIV. Of these women with at least one child living with HIV, 76.6% of participants have only one child living with HIV. Children living with HIV were on average older than 15 years old. All characteristics of women and their children are summarized in Table 1.

Social Determinants of Health

Information regarding participants and the social determinants of health is summarized in Table 2. History of violence was collected for only 114 participants out of the total sample of 215. In general, when all forms of violence were combined into one measure, 85 participants (60.3%) reported an experience with violence. When broken down by type, over half (58.9%) of women had experienced emotional or psychological violence, 30.5% of participants had experienced physical violence, 11.3% had experience economic or patrimonial violence, and 20.6% had experienced sexual violence.

A total of 191 participants (88.8%) experienced food insecurity. More specifically, when the breakdown of food insecurity was measured as proposed by The Latin American and Caribbean Food Security Scale, only 24 participants were ‘food secure’. Out of the remaining 191 women, 52.6% participants experienced ‘severe food insecurity, 16.3% participants experienced ‘moderate food insecurity’, and 20% participants experienced ‘mild food insecurity’.

Bivariate Associations of Socio-Demographic Factors, Social Determinants of Health, and History of Virological Failure

In our bivariate analysis using history of virologic failure as our outcome, socio-demographic factors, exposure to different types of violence, food insecurity, and relevant travel time and money spent on CAPASITS appointments were analyzed to explore relationships. The results of this bivariate analysis are reported on Table 3. At the 95% confidence limit, it was found there is a positive association between participants who have experienced food insecurity and history of virological failure (p=0.0444). The negative relationship between having children under 3 years of age and history of virologic failure is trending significance, with a p-value of 0.0687.

Adjusted Associations of Socio-Demographic Factors, Social Determinants of Health, and History of Virological Failure

In our multivariable logistic regression model using history of virologic failure as our outcome, socio-demographic factors, food insecurity, and relevant travel time and money spent on CAPASITS appointments were analyzed to explore relationships. The results of this model are on Table 4. At the 95% confidence limit, it was found there is a positive association between all food-insecure participants and history of virological failure (p=0.0449). That said, there is a higher likelihood of someone experiencing food insecurity to experience virologic failure compared to someone who is food secure (OR:1.073, 95% CI: 1.01-1.14). Likewise, there was a negative association between women who are single (OR: 0.223, 95% CI: 0.054-0.743, p=0.0263), women who are homemakers (OR: 0.331, 95% CI: 0.133-0.802 p=0.0250), and women who have children (OR: 0.591, 95% CI=0.352-0.960, p=0.0398) and history of virological failure.

Table 1. Characteristics of participants and children

Age, mean (SD)	27.6 (7.3)
Age, median (IQR)	27.5 (22-32)
Marital Status, n(%)	
Married	132 (61.40)
Separated/Divorced	18 (8.37)
Widow	42 (19.53)
Single	23 (10.70)
Partner died from an HIV-related complication, n (%)[a]	
Yes	37 (88.10)
No	5 (11.90)
Number of children, n(%)	
0	15 (6.98)
1-2	136 (63.26)
3-4	49 (22.79)
5+	15 (6.98)
Children older than 18 years old, n (%)	
Yes	34 (15.81)
No	181 (84.19)
Children under 3 years old, n (%)	
Yes	47 (21.86)
No	168 (78.14)
Caretaker of children when participant is not home, n (%)[b]	
Family	152 (76.0)
Neighbors	4 (2.0)
Childcare center	1 (0.50)
Other	43 (21.50)
Participant has at least one child currently living with HIV, n (%)	
Yes	47 (21.9)
No	168 (78.1)
Number of children living with HIV that a participant has, n (%)[c]	
1 child	36 (76.60)
2 children	7 (14.89)

3 children	1 (2.13)
4 children	3 (6.38)
Age of children living with HIV, n (%)[d]	
0-5	17 (19.10)
6-10	22 (24.72)
11-15	16 (17.98)
15+	34 (38.20)

Note: Data from Sociodemographic Questionnaire

[a] n=42, of those who indicated widow as marital status

[b] The survey included "Friends" as an option for this question, no participants indicated this option.

[c] n= 47

[d] n = 89; from 47 different participants.

Table 2. Prevalence of Social Determinants of Health among Participants

Household food insecurity, n(%)[a]	
Food secure	24 (11.2)
Mild food insecurity	43 (20.0)
Moderate food insecurity	35 (16.3)
Severe food insecurity	113 (52.6)
Any insecurity	191 (88.8)
Exposure to violence, n(%)[b]	
Physical violence	43 (30.5)
Sexual violence	29 (20.6)
Emotional violence	83 (58.9)
Economic violence	74 (11.3)
Any violence	85 (60.3)

Note:

[a] n=215, data from the The Latin American and Caribbean Food Security Scale (ELCSA) Questionnaire.

[b]n=114, data from the Violence Questionnaire.

Table 3. Crude Associations of Socio-Demographic Factors, Social Determinants of Health, and History of Virological Failure

Variable	No History n = 151	History n = 64	Test	P value
Age, mean (SD)[a]	29.41 (7.32)	23.52 (5.29)	5.82	<.0001
Marital status, n (%)				
Married	96 (63.58)	36 (56.25)		
Separated/divorced	10 (6.62)	8 (12.50)		
Widow	26 (17.22)	16 (25.00)		
Single	19 (12.58)	4 (6.25)	5.326	0.1494
Occupation, n (%)				
Employed	36 (23.84)	25 (39.06)		
Homemaker	92 (60.93)	23 (35.94)		
Informal sector	12 (7.95)	12 (18.75)		
Farmworker	5 (3.31)	1 (1.56)		
Other	6 (3.97)	3 (4.69)	14.165	0.0068
Days spent working per week, n (%)				
7 days	94 (62.25)	34 (53.13)		
5-6 days	40 (26.49)	21 (32.81)		
1-4 days	17 (11.26)	9 (14.06)	1.554	0.4597
Monthly income, n (%) [b]				
0 - 2000 MXN ($0-100.5 USD)	76 (53.15)	34 (53.97)		
2000 - 3000 MXN ($100.5-150.8 USD)	37 (25.87)	17 (26.98)		
3000 - 4000 MXN ($150.8-201.6 USD)	20 (13.99)	9 (14.29)		
4,000 + MXN ($201.6+ USD)	10 (6.99)	3 (4.76)	0.3738	0.9456
Number of children, n (%)				
0	12 (7.95)	3 (4.69)		
1-2	89 (58.94)	47 (73.44)		
3-4	36 (23.84)	13 (20.31)		
5+	14 (9.27)	1 (1.56)	6.252	0.1000

Children under 3 years, n (%) No Yes	 41 (27.15) 110 (72.85)	 6 (9.38) 58 (90.63)	 8.3161	 0.0039
Travel time to CAPASITS, n (%) 0-30 minutes 31-60 minutes 61-90 minutes 91+ minutes	 47 (31.13) 27 (17.88) 32 (21.19) 45 (29.80)	 28 (43.75) 15 (23.44) 8 (12.50) 13 (20.31)	 6.0895	 0.1073
Number of transportation units, n (%) 1 2 3 +	 64 (42.38) 54 (35.76) 33 (21.85)	 27 (42.19) 30 (46.88) 7 (10.94)	 4.3006	 0.1164
Travel costs to CAPASITS, n (%) 0 - 50 pesos 51 - 100 pesos 101 - 200 pesos 201 + pesos	 36 (23.84) 41 (27.15) 30 (19.87) 44 (29.14)	 24 (37.50) 17 (26.56) 11 (17.19) 12 (18.75)	 5.043	 0.1687
Food Insecurity, n (%) [c] Food secure Food insecure (mild, moderate, severe)	 19 (12.75) 130 (87.25)	 5 (8.20) 55 (91.80)	 0.8871	 0.3463
Exposure to violence, n (%) [d] No Yes	 93 (61.59) 58 (38.41)	 26 (40.63) 38 (59.38)	 7.9936	 0.0047

Note: Chi-squared was conducted for all tests unless otherwise noted.

[a] T-test was conducted for this variable.

[b] No history of virological failure (n = 143), history of virological failure (n = 63).

[c] No history of virological failure (n = 149), history of virological failure (n = 61).

[d] No history of virological failure (n = 100), history of virological failure (n = 41).

Table 4. Logistic Regression Model of Predictors of Virologic Failure (n = 215)

Variable	Odds ratio	95% Confidence Interval	P value
Relationship status			
Single	0.223	(0.054 - 0.743)	0.022*
Separated/Divorced	1.450	(0.459 - 4.644)	0.510
Widow	0.987	(0.340 - 2.351)	0.977
Employment type			
Homemaker	0.331	(0.133 - 0.802)	0.015*
Commerce/Retail	1.331	(0.477 - 3.746)	0.584
Agricultural work	0.242	(0.011 - 2.044)	0.248
Other	1.228	(0.200 - 6.709)	0.814
Days worked per week	1.282	(0.737 - 2.279)	0.386
Number of children	0.591	(0.352 - 0.959)	0.039*
Children under 3 years old	0.391	(0.136 - 0.952)	0.054
Time to CAPASITS appointment	0.999	(0.992 - 1.004)	0.642
Number of transportation methods used to get to CAPASITS appointment	0.914	(0.529 - 1.581)	0.746
Money spent to get to CAPASITS appointment	0.883	(0.553 - 1.392)	0.594
Food insecurity	1.073	(1.007 - 1.145)	0.032*

Note: '*" denotes significance at 0.05

Chapter V: Discussion

The focus of this study was to assess the relationships between social determinants of health and history of virologic failure. Several studies from the last two decades have observed links between intimate partner violence and HIV outcomes, as well as food insecurity and HIV outcomes, respectively (Weiser et al., 2008; Aibibula et al., 2016; Normén et al., 2005; Anema et al., 2009). However, none of these studies have focused their efforts on exploring food insecurity among women living with HIV in Mexico. Likewise, to our knowledge, there are no current examinations of how many women living with HIV experience intimate partner violence in Mexico. We hypothesized that women living with HIV within Mexico experience high levels of food insecurity and intimate partner violence, and thus, consequently experience negative effects in their HIV care. More specifically, we hypothesized that food insecurity and intimate partner violence would be associated with increased odds of virologic failure among women living with HIV.

Our results both support and challenge the original hypotheses. Participants who were single, homemakers, and had at least one child under the age of three were less likely to experience virologic failure. However, if they were single, homemakers, had at least one child under the age of three and experienced some sort of food insecurity, then the relationship shifted and the participant was more likely to experience virologic failure. When different experiences of violence were added to the model and considered alongside relationship status, employment type, days worked, number of children, children under three, time to get to an appointment, money spent, and food insecurity, then food insecurity continued to be positively associated with virologic failure. For women in the latter model, having a child under the age of 3 served as a protective factor against virologic failure.

Previous studies on gender-based violence and HIV indicate some variability in terms of GBV prevalence. To illustrate, while 60.8% of the participants in our study experienced some sort of violence, other studies done on women living with HIV across Latin America report lower or higher rates. In a study done in 2017 among 223 women living in Bogota, Colombia, 33.6% of women reported having experienced any sort of violence (Arévalo-Mora, 2019). Meanwhile, an older study done in Chile in 2004 had a higher rate of violence prevalence, where among 100 women, 77% of them had faced an experience with gender-based violence (Vidal et al., 2004). In literature focused on South Africa, Tanzania, Rwanda, and India, prevalence of GBV among women living with HIV points to similar variability in prevalence of violence (Dunkle and Decker, 2013; Nabila El-Bassel et al., 2022; Dunkle et al., 2004; Maman et al., 2002; Silverman et al., 2008; van der Straten et al., 1995; van der Straten et al., 1998). The notable differences between the rates across countries raise concerns surrounding the lack of interventions in the region, including South America, Central America, and the Caribbean, that could be used to reduce the high levels of intimate partner violence and HIV. This is supported by a systematic review of progress, gaps, and opportunities to address the intertwining epidemics of GBV and HIV in women (El-Bassel et al., 2022).

Our findings on food security reflect studies done previously across Canada, the United States, and countries within the African continent. The impact of HIV/AIDS on food insecurity consistently shows that in addition to lower rates of economic income and heightened caregiver burden, there is also an increased risk for adverse clinical outcomes among people living with HIV. Namely, food insecurity is associated with increased risk for unsuppressed viral loads, risk of mother-to-child transmission, decreased ART adherence, postponing the seeking of health services, and lower counts of CD4 at the start of antiretroviral therapy (Anema et al., 2009). In

our study, we expect to see about a 79% increase in odds of experiencing virologic failure, for a one-unit increase in food insecurity. Among the 215 participants, this is a notable finding given the fact that 88% of participants experienced food insecurity without consideration for severity. Even more important is the fact that more than half of all participants reported severe food insecurity, whereas the current moderate to severe food insecurity prevalence for the general Mexican population is estimated to be approximately 28.2% (Mundo-Rosas et al., 2013). Though, it is important to note that across the state of Chiapas, the prevalence of food insecurity is disproportionately higher than the national average, with an overall food insecurity prevalence rate of 83% (Instituto Nacional de Salud Pública, 2012). Our outcome is similar to a retrospective study done in San Francisco, CA among houseless individuals living with HIV, who were on highly active antiretroviral therapy, where the individuals experiencing severe food insecurity were 70% less likely to achieve viral suppression (Weiser et al., 2008). One solution to this problem is to make HIV care a more comprehensive package, in such a way that allows various needs to be addressed at once. A study in Kenya demonstrated the difference supporting people living with HIV can make. Encouragingly, it was found that when ART patients are provided with food support, their antiretroviral adherence is reportedly higher compared to ART patients who do not receive the same support (Byron et al., 2008). This finding supports growing concerns around exploring the relationship between food and ART pharmacokinetics.

An apparent limitation in our work is that while the study contributes meaningfully to the abundant literature on intimate partner violence and food insecurity among people living with HIV, our findings may not be generalizable as our sample consisted of people already engaged in care and registered within national clinics. On the other end, we provide an exploration of social determinants of health among women living with HIV in Mexico, which is novel given the lack

of focus on the HIV epidemic among women in Mexico and across Latin America and the Caribbean. Henceforth, our exploratory study contributes meaningfully to existing literature on the impacts of food insecurity and intimate partner violence on women living with HIV in the West.

Our results highlight opportunities for decreasing food insecurity and reducing intimate partner violence vulnerability among women living with HIV. Next steps should include incorporating food support programs and evidence-based violence prevention programs into comprehensive HIV care packages, alongside the provision of treatment and healthcare assistance. The intertwined epidemics of food insecurity, intimate partner violence, and HIV need to be addressed collectively to reduce the risk of virologic failure.

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