

## Commentary

# Alcohol and HIV: Barriers and opportunities to improving women's sexual and reproductive health

Ariadna Capasso\* and Ralph J. DiClemente

Social and Behavioural Sciences Department, College of Global Public Health, New York University, USA

\*Corresponding Author: Ariadna Capasso MFA, Social and Behavioural Sciences Department, College of Global Public Health, New York University, USA; Tel: +12129923709; E-mail: ac7113@nyu.edu

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In spite of recent scientific advances, HIV continues to exact a significant toll on morbidity, mortality and societal resources in many parts of the world, including the United States (U.S.). In the US, between 2010–2014, 207, 120 new HIV cases were diagnosed [1]. HIV prevalence increased by 9.1% during this period, and by 2014 there were 1.1 million persons living with HIV (PLWHA) [1]. Despite the availability of rapid diagnostic tests, 17.1% of PLWHA remain unaware of their infection [1]. However, HIV is not uniformly distributed among U.S. populations. Minority women bear a disproportionate burden of the epidemic, with 24.9/100,000 Black women and 5.0/100,000 Latinas being diagnosed with HIV in 2017, as opposed to 1.7/100,000 White women [2]. Heterosexual contact accounted for 85.5% of all new HIV diagnoses among women in 2017 [2].

As is well established in the literature, while risk factors, singly, may increase risk of HIV acquisition, these risk factors often occur in clusters, further amplifying woman's HIV risk, and reflect multi-level social determinants of health among minority women. A socio-ecological framework that includes individual, interpersonal, neighborhood and societal-level factors provides a lens for identifying and, more importantly for a public health perspective, understanding the mechanisms through which these social determinants create disparities in HIV infections and related health outcomes [3]. For example, epidemiologic data at the individual level suggests that risky sexual practices, such as number of lifetime sexual partners and noncondom use by male partners, early sexual debut, and substance use, increase risk for HIV and other sexually transmitted infections (STIs) [4]. Conversely, efficacy in negotiating male partner's condom use, assertive communication skills, intention to use condoms, and stronger ethnic identification have been observed to be protective factors for sexual risk-taking among Latina and Black female adolescents [5–9]. However, while informative, individual-level predictors do not fully account for marked inequities observed in HIV and STI rates [10, 11]. At the interpersonal level, unprotected sex with risky, mainly primary, sex partners, such as those with existing HIV or STI infections, place minority women at elevated risk [11, 12]. A study found that Black female adolescents were at 5-fold risk for STIs, relative to White peers; the observed risk disparity was largely attributable to male sex partner characteristics [4]. Conversely, a systematic review of sexual health among Latinas found that partner communication about birth-control methods predicted contraceptive

use and that woman's power in the relationship was associated with lower risk of pregnancy [8]. Attitudes and expectancies with regards to sexual behavior informed by gender norms underlie some of the observed disparities in sexual and reproductive health risk; [4, 13] for instance, overall, more equitable relationships are associated with sexual health [14]. At the broader structural level, neighborhood overcrowding and economic deprivation have been associated with higher rates of chlamydia, gonorrhea and HIV infection [15, 16]. Discrimination based on race/ethnicity coupled with socioeconomic disadvantage is associated with segregated high-risk sexual networks; networks with a high prevalence of HIV and other STIs, which limit minority women's male partner choice [10, 17, 18].

Within this socio-ecological framework, alcohol use interacts with sexual behaviors and HIV risk and disease progression at all levels. Alcohol is by far the most common psychoactive drug consumed in the U.S. According to the 2015 National Survey on Drug Use and Health (NSDUH), 78.3% of women in the U.S. ever drank alcohol; and almost half (47.4%) did so in the last month [19]. In 2015, 1 in 5 adult women (20.5%) engaged in heavy episodic drinking [20]. Over the past 10 years, there has been a significant increase in alcohol use (0.3% per year) and binge drinking (0.7% per year) in the U.S., particularly among women [21]. On average, an estimated 26,000 women die annually from alcohol-related causes [22], making alcohol the third leading preventable cause of death in the U.S. Globally, alcohol consumption is the leading cause of death among 15–49 year-old women [23]. The costs of excessive alcohol consumption in the U.S. is estimated at \$223.5 billion, or \$746 per person, 76.4% attributable to binge drinking [24].

Individual, interpersonal, and social level factors are linked to alcohol consumption and poor sexual health. A study among Latinas found that heavy episodic drinking was associated with higher odds of having more lifetime partners, regretting sexual initiation after alcohol use, and noncondom use [25]. Even at non abuse levels, alcohol consumption predicts STI acquisition and noncondom use with casual partners among Black females [26]. Another study revealed that female Black adolescents with high alcohol consumption were more likely than those with lower alcohol consumption to test positive for STIs, use condoms inconsistently, report multiple male sexual partners, and engage in anal sex [27]. Among PLWHA, alcohol use is associated with poorer antiretroviral treatment (ART) adherence and

could hinder ART effectiveness, by interfering with drug metabolism [28]. In a Brazilian study, PLWHA who were alcohol dependent were nine times ( $p < 0.01$ ) more likely to have CD4 cell count  $\leq 200/\text{mm}$ , independent of ART adherence [29]. Several reviews have identified any level of alcohol consumption to be associated with unprotected sex among PLWHA [28, 30]. Unfortunately, despite the observed health risks of alcohol use, few women are engaged in alcohol treatment. For instance, one study found that only 19% of HIV+ women with alcohol use disorders utilized any alcohol treatment [31]. Gender-based violence is also associated with both woman's and male partner's alcohol consumption. In the context of abusive relationships, often fueled and intensified by male partner's alcohol abuse, women are less likely to initiate sexual negotiation and engage in safe sex [14, 32]. A study of HIV+ Russian women found that non condom use was not significantly associated with the woman's alcohol consumption, but with male partner's alcohol consumption [33]. At the environmental level, higher concentrations of alcohol outlets have been associated with lower ART adherence and increased alcohol consumption among PLWHA [34]. Substantial evidence links exposure to alcohol marketing with earlier initiation of alcohol use and engagement in heavy episodic drinking [35, 36]. A study found that in high-income countries higher quantities of drinking among youth were mediated by liking alcohol ads [37]. A South Africa study identified pathways by which access to alcohol contributes to women's poor health at multiple levels; [38] increased access to alcohol and exposure to alcohol advertisements was associated with negative pregnancy outcomes, intimate partner violence, heavy episodic drinking among partners, and community-level hazardous drinking [38].

There is growing evidence to support no safe threshold for alcohol consumption [39]. However, the alcohol industry continues to invest substantial sums of fiscal resources in lobbying and advertisement in the U.S. and abroad [40]. In 2015, the alcohol sector spent 13.2 million USD lobbying in state legislatures, and donated 27 million USD to Congressional representatives in 2016 alone [41]. In 2011, the 14 major alcohol beverage companies invested 3.45 billion USD on marketing activities [41, 42]. In spite of evidence that exposure to alcohol advertisement is positively associated with number of drinks consumed, and that young people consume more in markets with more expenditure in ads [35, 43], alcohol marketing is ubiquitous. In New York City, for example, 90% of retail-dense blocks have some type of stationary alcohol advertisement [44] and, before the ban, over half (53.1%) of subway stations with any advertisement displayed at least one alcohol advertisement [45]. Since then, in 2017, New York City's Metropolitan Transit Authority has followed the lead of other large urban centers, such as Los Angeles, San Francisco, Detroit, Seattle, San Diego, and Baltimore, and banned alcohol advertisement [46].

Curtailling availability, increasing prices and restricting marketing have been found to be cost-effective policies for regulating alcohol consumption [37, 47]. Restrictions on alcohol outlet density and age and time of sale, alcohol taxes, self-screening and commercial liability are CDC recommended strategies to curtail excessive drinking [48]. The most cost-effective public health strategies for reducing drinking have been raising the price of alcohol and banning advertising [49]. Based on this evidence, the World Health Organization recommends

the establishment of a global framework, with clear monitoring and enforcement mechanisms, to regulate marketing of alcohol [43].

It will be challenging to prevent the harmful effects of alcohol consumption for as long as it is socially acceptable [50]. Similar to tobacco control, continuing to restrict alcohol availability and marketing, while increasing access to treatment to those with an alcohol use disorder coupled with public health messaging about harm reduction, is necessary to make alcohol less socially acceptable [40]. While reducing public acceptability of alcohol, it is also critical to implement and scale up multi-level interventions to reduce alcohol consumption targeted specifically to women [51], their partners and their communities. These interventions should be targeted to prevent adverse sexual and reproductive health outcomes for HIV+ women [52]. Linking the women most affected by alcohol, including PLWHA, with prevention programs that address alcohol use in the context of sexual behavior are needed, and these interventions may be more effective if they engage male partners to promote gender equitable relationships.

Improving woman's sexual and reproductive health requires a coordinated and concerted multi-sectoral effort. Without addressing key drivers of woman's risk for HIV, other STIs, and unintended pregnancy, programs are not likely to be optimally effective. And, importantly, strategies need to address multiple risk factors, across ecological domains. The resolve of governments, academia, and private sector agencies, to implement and sustain these health promotion programs will be critical for enhancing woman's sexual and reproductive health.

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