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Same-Sex Behavior and its Relationship with Sexual and Health-Related Practices Among a Population-Based Sample of Women in Puerto Rico: Implications for Cancer Prevention and Control

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Abstract

This secondary data analysis aimed to estimate the prevalence of same-sex behavior and sexual and health-related practices of a population-based sample (n=560) of women aged 16-64 years in Puerto Rico (PR). Data collection included interviews and biologic samples. Seven percent of the sample had had sex with other women (WSW). Age-adjusted logistic regression models indicated that WSW had higher odds of history of cancer, having ≥ 7 lifetime sexual partners, using sex toys and sharing them, and use of tobacco and illicit drugs. Future research is needed to address the health needs of WSW, including cancer-related risk factors and sexual practices.

Keywords

Same-sex behavior; women who have sex with women; cancer-related risk indicators; Hispanics

INTRODUCTION

Same-sex behavior among women, which include those who identify themselves as lesbians, bisexuals and women who have sex with women (WSW), is not uncommon in the United

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States (US). Data from the 2006-2008 National Survey of Family Growth, indicates that during that period approximately 12.5% of US women 15 to 44 years old engaged in sexual activities with another women at some point during their lifetime and 4.5% of women identified themselves as homosexual or bisexual (Chandra, Mosher, Copen, & Sionean, 2011). Despite the fact there is a considerable number of WSW, there is relatively little data available on their health outcomes, such as the prevalence of sexually transmitted infections (STIs), cancer screening behavior, cancer burden, and other health risk factors (Marrazzo & Gorgos, 2012; National Institutes of Health [NIH], 1999; US Department of Health and Human Services, n.d.). Based on published data, it seems that lesbians, bisexuals and WSW are less likely than heterosexual women to get cancer prevention services (Buchmueller & Carpenter, 2010; Dilley, Simmons, Boysun, Pizacani, & Stark, 2010). They also experience higher levels of prejudice, discrimination, victimization, and adverse physical and mental health as compared to heterosexual women (Lehavot & Simpson, 2013; Struble, Lindley, Montgomery, Hardin, & Burcin, 2010). Although sexual orientation does not directly influence disease occurrence, the Healthy People 2020 report indicated that psychosocial events related to sexual orientation, such as stigma and discrimination, have an impact on mental and physical wellbeing, and also influences the decision to seek healthcare.

Considering that sexual minority groups often bear a disproportionate disease burden, some have argued the need to include them in all levels of research and, furthermore, integrate sexual orientation into the social determinants of health dialogue as a step toward health equity for sexual minorities (Logie, 2012). One of these sexual minorities, the WSW, is usually addressed as a particular group; however, in reality, it is a diverse group with variations in sexual identities, behaviors, and practices (Marrazzo & Gorgos, 2012). In the “Agenda for Research on Women's Health for the 21st Century,” lesbians, bisexuals, and WSW are recognized to have unique health concerns that often go unaddressed in healthcare settings (NIH, 1999).

Assumptions about the sexual practices of lesbians and WSW by healthcare practitioners, and even the majority of women themselves, have contributed to the opinion that sex between women confers a relatively low risk for acquisition of STIs (Buchmueller & Carpenter, 2010; Dilley et al., 2010; Marrazzo & Gorgos, 2012). However, it has been documented that lesbians and WSW have particular gynecologic needs and other health needs (Buchmueller & Carpenter, 2010; Dilley et al., 2010; Marrazzo & Gorgos, 2012). For example, transmission of human papillomavirus (HPV), a common STI associated with multiple cancer types (Centers for Disease Control and Prevention [CDC], 2012; Parkin & Bray, 2006), can spread with only skin-to-skin contact; therefore, lesbians and WSW can also acquire HPV infections (Marrazzo, Koutsky, Kiviat, Kuypers, & Stine, 2001). Moreover, published data reveals that WSW may continue to have male sexual partners, thus, increasing their risk of infection via their male partners as well (Diamant, Schuster, McGuigan, & Lever, 1999; Koh, Gómez, Shade, & Rowley, 2005; Tao, 2008).

Regarding other health needs, lesbians and bisexual women have been found to have higher rates of breast cancer (NIH LGBT Research Coordinating Committee, 2013) and get less routine screening for preventable cancers, such as colon, breast, and cervical cancer compared to heterosexual women (American Cancer Society [ACS], 2014; Cochran et al.,

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2001). In addition, certain demographics and social determinants within this sexual minority group reduce their chance of seeking out healthcare services, leading to further delays in cancer detection. These determinants include: low rates of health insurance, financial barriers, isolation, mistrust, fear of homophobic reactions from providers, discrimination, negative experiences with healthcare providers, and personal misperceptions about the risk of STIs (ACS, 2014; Cochran et al., 2001; Logie, 2012; Marrazzo et al., 2001; O'Hanlan, 1995; Smith et al., 2011; White & Dull, 1997). Adding to the adverse health risk factors, WSW (especially those self-identified as lesbians and bisexuals) have a higher prevalence of being overweight/obese; using alcohol, tobacco and illegal drugs; and being sexually abused (Boehmer, Bowen, & Bauer, 2007; Roberts, Patsdaughter, Grindel, & Tarmina, 2004; US Department of Health and Human Services, n.d.).

Among the sexual minority groups, the lesbians and WSW are generally less vocal and less visible regarding public health issues and research inclusion than men who have sex with men (Muzny, Sunesara, Martin, & Mena, 2011). However, all sexual minorities have benefitted by receiving increased research attention in social sciences and public health forums; mostly due to the increased recognition of health disparities associated with sexual orientation. In spite of the increased attention, there is still limited information regarding public health issues in WSW in Puerto Rico (PR), the Caribbean region, and Latin America in general. This study described the prevalence of same-sex behavior and characterizes sexual and health-related practices among a population-based sample of women, aged 16-64 years, living in PR. The results generated by this study will contribute to a better understanding of the health and research needs of the WSW population, including tailoring cancer prevention and control strategies for them.

METHODS

Participants

This study is a secondary data analysis from a parent study consisting of a population-based cross-sectional study of 566 women, aged 16-64 years, living in the San Juan Metropolitan Area (SJMA) in PR. The parent study, which reported the prevalence of anogenital HPV infection and associated risk factors, has been described in detail elsewhere (Ortiz et al., 2015). Socio-demographic information, medical history, and health-related habits (such as smoking and alcohol use) were obtained through face-to-face interviews. An Audio Computer-Assisted Self Interview (ACASI) was employed to collect sensitive information, such as sex-related behaviors and drug use. Anthropometric measurements of the study participants were also taken, according to the National Health and Nutrition Examination Surveys (NHANES) III methodology (CDC, n.d.). From the 566 women in the parent study, 560 (98.9%) completed the information to determine WSW status, thus, were included in this current analysis.

Procedures

The subjects for the primary study were recruited following a four-stage cluster probability sampling design (Levy & Lemeshow, 1991; Pan, 2000). The target area consisted of households in the SJMA, which includes seven municipalities (Bayamón, Carolina, Cataño,

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Guaynabo, San Juan, Toa Baja, and Trujillo Alto). One eligible female from each of the selected households was asked to participate. Eligibility was based on the following criteria: resident of the selected household, aged 16-64 years old, sexually active, not pregnant and not infected with the human immunodeficiency virus (HIV). Those who agreed to participate were given an appointment for a home visit, where the informed consent process was performed, followed by the interview.

Having completed the interview, each participant was given verbal instructions on how to collect their own anal and cervical/vaginal specimens using a sterile collection kit for HPV, which also included written instructions. Once collected, all specimens were stored and shipped to the University of California in San Francisco for HPV typing. HPV typing was performed using L1 consensus primer polymerase chain reaction (PCR) analysis with the MY09/MY11 primers sets. β-globin as an internal control for sample amplification. PCR products from positive samples were typed by dot-blot hybridization using 38 individual type-specific probes (including oncogenic and non-oncogenic types) and two mixes. For HPV and *Chlamydia trachomatis* antibody detection, blood samples were collected from each participant by a professional phlebotomist. Detection of HPV antibodies in serum (HPV types 6, 11, 16, and 18) was performed at the Human Papillomavirus Laboratory at the CDC in Atlanta, using virus-like particles (VLP)- IgG ELISA. Detection of antibody against *Chlamydia trachomatis* was performed using an IgG ELISA kit (Mybiosource, San Diego, CA) according to manufacturer's recommendations at the University of Puerto Rico Comprehensive Cancer Center in San Juan, PR.

All aspects of this study were approved by the Institutional Review Board of the University of Puerto Rico Medical Sciences Campus.

Measures

The WSW status was specifically defined based on sexual behavior (i.e., women who ever had oral, vaginal, anal and/or digital sex with another woman), and was independent of sex assigned at birth or gender identity. However, gender identity was assessed by asking if they considered themselves to be heterosexual, lesbian or bisexual. Sociodemographic data included: age, birthplace (*PR, US,* or *other*), education (< *12* vs. ≥ *12 years*), annual family income (< *$20,000* vs. ≥ *$20,000*), healthcare coverage (*yes* vs. *no*), and marital status (*married/cohabitating, single/never married,* or *divorced/separated/widow*). Health characteristics included: ever been pregnant (*yes* vs. *no*); hormonal contraceptives use (*yes* vs. *no*); history of STIs (hepatitis B [HBV], gonorrhea, syphilis, genital warts, herpes, chlamydia, trichomonas, bacterial vaginosis, and *HPV*); history of chronic diseases (lupus, arthritis, inflammatory bowel diseases [IBD], diabetes mellitus [DM], and *periodontal disease*); history of cancer (*yes* vs. *no*); and cervical cancer screening (< *3* vs. ≥ *3 years ago).* Laboratory test results were defined as positive (*yes*) or negative (*no*) for: HPV infection (cervical and anal), *C. trachomatis* serum antibodies and HPV serum antibodies (types 6, 11, 16 and/or 18).

Data on sexual-related practices included: age at first sexual intercourse (< *15* vs. ≥ *15*); lifetime number of sexual partners (*1-6* vs. ≥ *7*); lifetime number of female sexual partners (*0*, *1*, ≥ *2*); lifetime number of male sexual partners (*1-6* vs. ≥ *7*); anal intercourse (*never* vs.

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ever); oral sex (*never* vs. *ever*); digital sex (*never* vs. *ever*); lifetime use of condoms (*never/sometimes* vs. *frequently/usually/always*); use of sex toys (*yes* vs. *no*); sharing sex toys (*yes* vs. *no*); male sexual partners in the past 12 months (*0* vs. ≥ *1*); female sexual partners in the past 12 months (*0* vs. ≥ *1*) and forced sex (*yes* vs. *no*). Lifestyle-related practices included: tobacco use classified as *never/former* vs. *current*); heavy drinking, as defined by consumption of ≥ 4 drinks per day in the last 30 days (*yes* vs. *no*); illicit drug use, such as marijuana, cocaine, heroin, crack, and methamphetamine (*yes* vs. *no*); physical activity, as defined by moderately intense activity ≥ 150 minutes per week or vigorously intense activity ≥ 75 minutes per week (*yes* vs. *no*); and body mass index (BMI) status (underweight/normal if ≤ 24.9 kg/m^2 vs. overweight/obese if ≥ 25.0 kg/m^2).

Descriptive analyses of sociodemographic, sexual practices, and health-related data were performed by sexual behavior status (non-WSW vs. WSW). Associations between categorical variables were analyzed using chi-square or Fisher's exact test. Group comparisons of continuous variables were made using Student's *t*-test or the Wilcoxon Mann-Whitney test. Logistic regression models were used to estimate the age-adjusted prevalence odds ratios (PORs) for the association of WSW (main independent variable) and sexual and health-related practices (outcomes), controlling for the correlation of block group (Ortiz et al., 2015). Variables associated with WSW status in bivariate analysis were evaluated in the age-adjusted models. Data management and statistical analysis were performed using the STATA statistical package (Version 12.0, College Station, TX, USA).

RESULTS

Socio-demographic characteristics by sexual behavior status are described in Table 1. A total of 39 women (7%) reported ever having sex with another woman. The mean age was 42.51 years (*SD* = 13.07) in the non-WSW group and 38.92 years (*SD* = 14.75) in the WSW group (p = .12). A higher proportion of WSW was observed among women who have never been married compared to the non-WSW group (44%; p = .003). No significant differences by sexual behavior status were observed for age (p = .14), birthplace (p = .61), years of education (p = .59), annual family income (p = .51), and healthcare coverage (p = .99).

Health characteristics by sexual behavior are described in Table 2. A higher burden of anal HPV infection (57% vs. 39%, respectively; p = .03) and history of cancer (13% vs. 4%, respectively; p = .02) was documented among WSW compared to non-WSW. Although marginally significant, a higher prevalence of cervical HPV infection (49% vs. 34%, respectively; p = .07) and HPV serum antibodies (62% vs. 46%, p = .06) was documented among WSW compared to non-WSW, although these findings were marginally significant. However, a significantly lower prevalence in the WSW group was observed regarding ever been pregnant (p = .002) and use of hormonal contraceptives (p = .008).

Sexual and lifestyle related practices by sexual behavior status are described in Table 3. Only 18% of WSW perceived themselves as lesbians and 30% as bisexual, whereas 1% of non-WSW perceived themselves as bisexuals. Overall, WSW reported more high-risk sexual behaviors, such as: a younger age at first sexual intercourse (p = .04), a higher number of lifetime sexual partners (p < .0001), and a higher number of lifetime male sexual partners (p

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= .002) when compared to non-WSW. With respect to the number of lifetime female sexual partners, 51% (n = 20) of WSW reported sex with only one woman, while 49% (n = 19) reported having two or more female partners. However, WSW reported a lower frequency than non-WSW in having sex with men in the past 12 months (68% vs. 86%, respectively; p = .003), and only 34% (n = 14) of WSW reported having sex with a woman in the past 12 months. A higher proportion of WSW reported forced sex (33% vs. 13%, respectively; p = .001), use of sex toys (62% vs. 34%, respectively; p = .001), sharing sex toys (18% vs. 8%, respectively; p =.03), and having digital sex (92% vs. 75%, respectively; p = .02) when compared to non-WSW. Additional risk factors seen in a higher proportion in the WSW group are: ever use of illicit drugs (64% vs. 39%, respectively; p = .002) and currently smoking (31% vs. 17%, respectively; p = .03) when compared to non-WSW. No significant differences, by sexual behavior status, were observed for anal intercourse (p = .97), oral sex (p = .25), alcohol consumption (p = .99), physical activity (p = .16), and BMI (p = .16)

Table 4 shows the age-adjusted prevalence odds ratio (POR) for selected characteristics of WSW compared to non-WSW. WSW had significantly (p < .05) higher odds of: being single/without a partner (*POR* = 2.86; 95% *CI*, 1.40-5.85), having a history of cancer (*POR* = 4.58; 95% *CI*, 1.56-13.45), having ≥ 7 lifetime sexual partners (*POR* = 4.94; 95% *CI*, 2.43-10.05), having ≥ 7 lifetime male sexual partners (*POR* = 2.53; 95% *CI*, 1.27-5.07), ever having digital sex (*POR* = 3.48; 95% *CI*, 1.06-11.41), ever using sex toys (*POR* = 2.93; 95% *CI*, 1.48-5.80), ever sharing sex toys (*POR* = 2.83; 95% *CI*, 1.18-6.79), having a history of forced sexual encounters (*POR* = 3.49; 95% *CI*, 1.71-7.13), currently using tobacco (*POR* = 2.19; 95% *CI*, 1.06-4.53), and ever used illicit drugs (*POR* = 2.80; 95% *CI*, 1.41-5.55). In addition, WSW had lower odds of using contraceptives (*POR* = 0.41; 95% *CI*, 0.21-0.80; p < .009) and of ever being pregnant (*POR* = 0.33; 95% *CI*, 0.15-0.72; p < .005). Our data also highlight that WSW have higher odds of having anal HPV infection (*POR* = 1.90; 95% *CI*, 0.96-3.77, p < .07) and of being HPV seropositive (*POR* = 1.85; 95% *CI*, 0.93-3.69; p < .08), although these associations were marginally significant. When the associations were adjusted by age and by number of lifetime sexual partners, the magnitude of these associations persisted (data not shown), only HPV seropositivity remained marginally significant (*POR* = 2.06; 95% *CI*, 0.96-4.40; p = .06).

DISCUSSION

To our knowledge, this is the first study to describe the demographic, lifestyle, and health-related characteristics of WSW within the SJMA region in PR. WSW are a diverse population with variations in sexual identity, sexual behaviors, sexual practices, and risk behaviors (Marrazzo & Gorgos, 2012). Unfortunately, their health concerns often go unaddressed in healthcare settings (NIH, 1999) due, in part, to lack of sufficient knowledge. The information revealed by our study should contribute to a better understanding of the health needs of lesbians, bisexuals, and WSW. Furthermore, this information should serve as a guide to better focus future areas of research, as well as, to better tailor cancer prevention and control strategies for this specific sexual minority population.

Our study found that 7% of the women interviewed disclosed to ever having sex with another woman. This is higher than the 3% disclosed in an island-wide study of women aged

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21 to 64 years (Ortiz et al., 2011), but similar to the 7% reported in a study of women aged 18 to 59 years in the US (Xu, Sternberg, & Markowitz, 2010). Within the WSW group, a higher proportion of women were younger and single. This is consistent with findings of a study in the US, that reported a higher prevalence of WSW behavior in younger women with a status of: never married, widowed, divorced or separated (Xu et al., 2010). They hypothesized that younger women are more willing to report same-sex behavior, as a result of less social stigma following the disclosure of homosexual behavior in the US. Also, it could be that it is easier for younger generations to express their same-sex desires and find same-sex partners. Nonetheless, further research is warranted to better understand these patterns in PR.

Similar to other studies, 1% of the overall sample (18% of WSW) identified themselves as lesbians in our study. In the 2013 US Adults National Health Interview Survey (NHIS), 2% of adults in the US identified themselves as lesbians (Ward, Dahlhamer, Galinsky, & Joestl, 2014). The 2010 Behavioral Risk Factor Surveillance System (BRFSS) from ten states in the US reported that 1% of women were self-identified as lesbians (Blosnish, Farmer, Lee, Silenzio, & Bowen, 2010). It is important to note how these numbers are quite similar, in spite of having different methods for gathering sensitive information. Our study used ACASI, whereas the NHIS and BRFSS studies employed personal and telephone interview methods, respectively. It is our understanding that using ACASI for information collection on sexual practices should reduce the potential for information bias (Ortiz et al., 2011) by providing a confidential and anonymous manner to disclose this sensitive information. We certainly believe that participants should feel more comfortable reporting their sexual practices via this method instead of by personal or telephone interviews. However, we acknowledge that further research is warranted to explore how different methodologies affect population estimates across studies, and if cultural differences regarding the perception of gender identity could influence these results.

Our study showed that WSW reported higher numbers of an age of sexual initiation ≤ 15 years, ≥ 7 lifetime sexual partners, and ≥ 7 lifetime male sexual partners than non-WSW. This correlates with the findings in a US study by Xu et al. (2010), which also reported significantly higher numbers in WSW for early onset of sexual intercourse (27% vs. 12%, respectively) and ≥ 10 lifetime sexual partners (68% vs. 21%, respectively) in WSW compared to non-WSW.

Although 49% of WSW in our study identified themselves as lesbians/bisexuals, 68% of these WSW reported having sex with men in the last 12 months. This finding is consistent with other studies reporting that WSW have had male partners in the past, and that 6% to 23% of them continue to have sex with males (Diamant et al., 1999; Koh et al., 2005; Tao, 2008). This tendency puts WSW at risk for heterosexual acquisition of STIs (such as HPV) and potential transmission to their female partners (Buchmueller & Carpenter, 2010; Diamant et al., 1999; Einhorn & Polgar, 1994; Muzny et al., 2011; O'Hanlan, 1995; Siegel, Schrimshaw, Lekas, & Parsons, 2008). Unfortunately, general assumptions about the sexual practices of lesbians and WSW have led to the opinion that sex between women confers a relatively low risk for acquisition of STIs (Bradford & Ryan, 2010; O'Hanlan, 1995). These assumptions could diminish their awareness of the need to access healthcare services for the

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diagnosis and management of STIs. Regarding sexual practices, it is known that digital-vaginal sex, oral sex and use of sexual aids/devices could also contribute to HPV transmission (Ferenczy, Bergeron & Rich, 1989; Sonnex, Strauss & Gray, 1999). In our study, using and sharing “sex toys” with their partners, as well as, digital sex was a more prevalent practice among WSW. However, the prevalence of oral sex practices was similar in both WSW and non-WSW.

Because the association between the HPV outcomes evaluated and WSW status could be confounded by the number of lifetime sexual partners, additional analyses were performed. Specifically, POR's were adjusted by age and the number of lifetime sexual partners simultaneously. Results showed that the magnitude of these associations persisted, however, they were not statistically significant. Thus, to further understand HPV burden and transmission dynamics in this specific sexual minority population, further research is required.

Although lesbians, bisexuals, and WSW all have the same risk of being infected with HPV as heterosexual women, most HPV infections in WSW often go unaddressed and unattended. Therefore, the recommendations for Pap smear and HPV testing should not be any different. In addition to the misperceptions about STI risks, lack of hormonal contraceptives use in WSW further reduces their chances of seeking out routine gynecologic care, which in turn delays early detection of certain cancers (ACS, 2014; Marrazzo et al., 2001; Smith et al., 2011). Several studies reported that only 44% to 81% of lesbians have a Pap smear annually, and 5% to 10% never even had one done, even though they are at risk for cervical cancer (Bradford & Ryan, 1988; Diamant et al., 1999; Johnson, Guenther, Laube, & Keettel, 1981; Johnson, Smith, & Guenther, 1987; Rankow & Tessaro, 1998; Roberts & Sorensen, 1999; Tracy, Lydecker & Ireland, 2010; Waterman & Voss, 2015). In our study, only 69% of WSW and 81% of non-WSW reported cervical cancer screening within the past three years. These estimates are similar to those found in the PR-BRFSS in 2010 (CDC, n.d.), where 75% of the women aged ≥ 18 years old reported having a Pap test done within the preceding three years. However, these estimates of Pap screening are all below the recommendations of attaining a 90% and 93%, as established by Healthy People 2010 and 2020, respectively (US Department of Health and Human Services, n.d.). It is clear that this sexual minority population requires further attention, since lower rates of cancer screening tests may lead to a later detection of cancer and increased morbidity and mortality rates.

Psychosocial and socioeconomic factors such as financial barriers, lack of health insurance and social services, isolation, mistrust, fear of homophobic reactions from providers, previous negative experiences, and lack of culturally competent health care providers regarding sexual health needs of WSW have also been identified as possible reasons for the reduced use of healthcare services by WSW (Bradford & Ryan, 1988; Marrazzo, 2004; O'Hanlan, 1995; Smith, Johnson, & Guenther, 1985; White & Dull, 1997). Unfortunately, poor utilization of healthcare services may result in worse health-related outcomes for WSW (Cochran et al., 2001; Marrazzo, 2004), including potential higher risk for certain cancers, such as breast and cervical. Although data on many of these potential barriers were not specifically collected in our study, we did document a higher prevalence of several

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modifiable behavioral risk factors for breast and gynecologic cancers among WSW. Previous studies have shown that WSW, particularly lesbians and bisexuals, tend to have a higher prevalence of known risk factors for cancer including: being overweight/obese, consuming alcohol/tobacco, and being less physically active compared to heterosexual women (Boehmer et al., 2007; Garland, Fiala, Ngo, & Moseley, 2014; Roberts et al., 2004; US Department of Health and Human Services, n.d.). Regarding adverse risk factors, our study reported a significantly higher number of WSW currently using tobacco as compared to non-WSW. On the other hand, of the known protective factors against endometrial and ovarian cancer (ACS, 2014; Cochran et al., 2001), our study found the WSW to have a higher prevalence of nulliparity and no use of hormonal contraceptives.

Regarding the limitations of our study, the cross-sectional nature of this investigation limits our ability to attribute a temporal relationship between health behaviors and WSW status, and how this information may have changed over time. Secondly, only 39 women reported same-sex preferences, making our analysis mostly exploratory in nature, since the power of our study may be limited regarding the evaluation of some of the associations of interest. Thirdly, there is an inherent methodological challenge in the definition of WSW due to the variations in self-identification as lesbian, gay, bisexual, and transgender (LGBT). This variability limits the comparison of results across studies, in addition to the use of different methods to categorize and define sexual contact with women, i.e. self-identified sexual orientation vs. reported sexual behaviors and same-sex partners throughout their lifetime (Marrazzo & Gorgos, 2012). This highlights the need of having a dual (or two-step) method to assess sex/gender identity status for surveys (Reisner et al., 2014) and for research studies, in order to determine the best way to approach these populations. Finally, because the focus of the parent study was to determine the epidemiology of anogenital HPV infection, it presents the limitation of not targeting important sociocultural factors, such as stigma, homophobia, and patient-provider interactions, which are contributors to global health disparities among sexual minorities.

Notwithstanding these limitations, the results from our study show that WSW have distinct health needs compared to non-WSW in PR. Furthermore, this study highlights the need for additional research studies and evidenced-based public health interventions that focus on health needs, preventive behaviors and cancer screening practices for the diverse group of WSW. To advance understanding of the health needs of this population, researchers will need to improve methods for collecting and analyzing data, attain larger sample sizes and promote increased participation of sexual/gender minorities in research. Our study identified some areas of concern, such as cancer-related risk factors and cancer burden. The sex-related health services provided to the lesbian and WSW populations should take into account their partners' heterogeneity regarding gender and all aspects of sexual orientation. Since sexual minorities remain marginalized due to the strong negative cultural stigmatization of homosexuality, educational interventions should examine structural, social and individual factors impacting the well-being and health outcomes of sexual minorities in PR. These structural, social and individual factors should be evaluated further, in terms of those that have a negative influence and inhibit WSW access-to-care in PR and the Caribbean.

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Table 1

Sociodemographic characteristics of women aged 16-64 years in the San Juan Metropolitan Area of Puerto Rico, by WSW status (n=560)

Characteristics	Non-WSW (n=521) N (%)	WSW (n=39) N (%)	P-value†
Age in years			0.14
16-34	160 (31)	18 (46)	
35-49	189 (36)	11 (28)	
50-64	172 (33)	10 (26)	
Age (mean ± SD)	42.51 ± 13.07	38.92 ± 14.75	0.11
Place of birth			0.61
Puerto Rico	461 (88)	36 (92)	
Other	60 (12)	3 (8)	
Years of education			0.59
< 12	84 (16)	5 (13)	
≥ 12	437 (84)	34 (88)	
*Annualfamily income**			0.51
< $20,000	277 (58)	23 (64)	
≥ $20,000	198 (42)	13 (36)	
Health care coverage			0.99
Yes	472 (91)	36 (92)	
No	49 (9)	3 (8)	
Marital status			0.003
Single/never married	114 (22)	17 (44)	
Married/cohab itating	278 (53)	11 (28)	
Divorced/Separated/Widowed	129 (25)	11 (28)	

*Count varies due to missing information

†P-values using chi-squared tests or Exact test for categorical variables and Wilcoxon Mann-Whitney test for continuous variables.

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Table 2

Health characteristics of women aged 16-64 years in the San Juan Metropolitan Area of Puerto Rico, by WSW status (n=560)

Characteristics	Non-WSW (n=521) N (%)	WSW (n=39) N (%)	P-value[§]
Pregnancies			0.002
0	61 (12)	12 (31)	
≥ 1	460 (88)	27 (69)	
Use of hormonal contraceptives			0.008
Yes	313 (60)	15 (38)	
No	208 (40)	24 (62)	
History of STIs[*]			0.13
Yes	85 (16)	10 (26)	
No	436 (84)	29 (74)	
History of chronic diseases[**]			0.77
Yes	131 (25)	9 (23)	
No	390 (75)	30 (77)	
History of cancer			0.02
Yes	18 (3)	5 (13)	
No	503 (97)	34 (87)	
Cervical cancer screening[‡]			0.09
< 3 years	408 (81)	25 (69)	
≥ 3 years	96 (19)	11 (31)	
Cervical infection with HPV			0.07
Yes	178 (34)	19 (49)	
No	343 (66)	20 (51)	
Anal infection with HPV[‡]			0.03
Yes	193 (39)	21 (57)	
No	304 (61)	16 (43)	
Chlamydia in serum[‡]			0.24
Yes	90 (18)	4 (11)	
No	397 (82)	33 (89)	
Any HPV in serum[†,‡]			0.06
Yes	226 (46)	23 (62)	
No	261 (54)	14 (38)	

[*] STIs included self-reported infection of HBV, gonorrhea, syphilis, genital warts, herpes, Chlamydia, trichomonas, bacterial vaginosis and/or HPV

[**] Chronic diseases included self-reported diseases as lupus, arthritis, IBD, DM and/or periodontal disease

[†] Infection with HPV subtypes 6-, 11-, 16- or 18- detected in serum

[‡] Count varies due to missing information

[§] P-values using chi-squared tests or Exact test.

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Table 3

Sexual and lifestyle related practices of women aged 16-64 years in the San Juan Metropolitan Area of Puerto Rico, by WSW status (n=560)

Characteristics	Non-WSW (n=521) N (%)	WSW (n=39) N (%)	P-value‡
Sexual self-identification †			< 0.0001
Heterosexual	508 (99)	20 (51)	
Bisexual	6 (1)	12 (31)	
Homosexual	0 (0)	7 (18)	
Age at first sexual intercourse			0.04
< 15	72 (13)	10 (26)	
≥ 15	449 (86)	29 (74)	
Lifetime number of sexual partners†			< 0.0001
1-6	403 (78)	14 (39)	
≥ 7	117 (22)	22 (61)	
Lifetime number of male sexual partners †			0.002
1-6	399 (77)	20 (54)	
≥ 7	120 (23)	17 (46)	
Lifetime number of women sexual partners			< 0.0001
0	521 (100)	0 (0)	
1	0 (0)	20 (51)	
≥ 2	0 (0)	19 (49)	
Anal intercourse			0.97
Never	159 (31)	12 (31)	
Ever	362 (69)	27 (69)	
Oral sex			0.25
Never	28 (5)	0 (0)	
Ever	493 (95)	39 (100)	
Digital sex			0.02
Never	128 (25)	3 (8)	
Ever	393 (75)	36 (92)	
Lifetime use of condom			< 0.0001
Never	0 (0)	6 (15)	
Ever	520 (100)	33 (85)	
Use of sex toys			0.001
No	344 (66)	15 (38)	
Yes	177 (34)	24 (62)	
Sharing sex toys			0.03
No	482 (93)	32 (82)	
Yes	39 (7)	7 (18)	
Number of male sexual partners in the last 12 months †			0.003
0	71 (14)	12 (32)	

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Characteristics	Non-WSW (n=521) N (%)	WSW (n=39) N (%)	P-value‡
1+	448 (86)	26 (68)	
Number of female sexual partners in the last 12 months †			< 0.0001
0	521 (100)	25 (64)	
1+	0 (0)	14 (36)	
Forced sex †			0.001
Never	454 (87)	26 (67)	
Ever	66 (13)	13 (33)	
Tobacco use			0.03
Never/former	434 (83)	27 (69)	
Current	87 (17)	12 (31)	
Heavy drinking †			0.99
0 drinks	18 (5)	1 (4)	
≥ 1 drinks	311 (95)	26 (96)	
Illicit drug use			0.002
Ever	205 (39)	25 (64)	
Never	316 (61)	14 (36)	
BMI			0.16
Underweight/normal	133 (26)	14 (36)	
Overweight/Obese	388 (74)	25 (64)	
Physical activity †			0.16
No	118 (42)	7 (28)	
Yes	161 (58)	18 (72)	

† Count varies due to missing information

‡ P-values using chi-squared tests or Exact test.

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Table 4

Age-adjusted prevalence odds ratio for selected characteristics associated with WSW among adult women (n=560)

Characteristics	Age-adjusted PORs (95% CI)	P-value
Marital status		0.004
Married/living together	1.0	
Single/without a partner	2.86 (1.40-5.85)	
Pregnancies		0.005
0	1.0	
≥ 1	0.33 (0.15-0.72)	
Use of contraceptives		0.009
No	1.0	
Yes	0.41 (0.21-0.80)	
History of cancer		0.006
No	1.0	
Yes	4.58 (1.56-13.45)	
Cervical cancer screening		0.13
< 3 years	1.0	
≥ 3 years	1.79 (0.85-3.78)	
Cervical infection with HPV		0.13
No	1.0	
Yes	1.67 (0.86-3.26)	
Anal infection with HPV		0.07
No	1.0	
Yes	1.90 (0.96-3.77)	
Any HPV in serum		0.08
No	1.0	
Yes	1.85 (0.93-3.69)	
Age at first sexual intercourse		0.18
≥ 15 years	1.0	
< 15 years	1.72 (0.77-3.83)	
Lifetime number of sexual partners		< 0.0001
1-6	1.0	
≥ 7	4.94 (2.43-10.05)	
Lifetime number of male sexual partners		0.008
1-6	1.0	
≥ 7	2.53 (1.27-5.07)	
Digital sex		0.04
Never	1.0	
Ever	3.48 (1.06-11.41)	
Use of sex toys		0.002
No	1.0	

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Characteristics	Age-adjusted PORs (95% CI)	P-value
Yes	2.93 (1.48-5.80)	
Sharing sex toys		0.02
No	1.0	
Yes	2.83 (1.18-6.79)	
Forced sex		0.001
Never	1.0	
Ever	3.49 (1.71-7.13)	
Tobacco use		
Never/former	1.0	0.04
Current	2.19 (1.06-4.53)	
Illicit drug use		0.003
Never	1.0	
Ever	2.80 (1.41-5.55)	