

The Predictive Syndemic Effect of Multiple Psychosocial Problems on Health Care Costs and Utilization among Sexual Minority Women

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ABSTRACT *Previous studies documenting sexual minority women's disproportionate risk for a range of medical, mental health, and substance use disorders have not provided a predictive framework for understanding their interrelations and outcomes. The present study aimed to address this gap by testing the syndemic effect of co-occurring psychosocial problems on 7-year health care costs and utilization among sexual minority women. The sample was comprised of sexual minority women (N=341) who were seen at an urban LGBT-affirmative community health center. Medical and mental health care utilization and cost data were extracted from electronic medical records. Demographically adjusted regression models revealed that co-occurring psychosocial problems (i.e., childhood sexual abuse, partner violence, substance use, and mental health distress [history of suicide attempt]) were all strongly interrelated. The presence of these indicators had a syndemic (additive) effect on medical costs and utilization and mental health utilization over 7-year follow-up, but no effect on 7-year mental health costs. These results suggest that the presence and additive effect of these syndemic conditions may, in part, explain increased medical costs and utilization (and higher medical morbidity) among sexual minority women.*

KEYWORDS *Lesbian, Bisexual, Mental health, Health care costs, Health care utilization, Sexual minority*

The health problems of sexual minority women (i.e., women who do not identify as exclusively heterosexual) have been understudied and underrepresented in the extant literature on women's health. This is troubling, given that sexual minority women are at disproportionately higher risk for a range of co-occurring psychosocial problems relative to heterosexual women. Previous research on the health of sexual minority women has revealed that, relative to heterosexual women, sexual minority women are more likely to engage in health risk behaviors (e.g., cigarette smoking, problematic drinking and substance use, poor diet, and low exercise levels) and are more likely to be diagnosed with a range of health conditions (e.g., obesity, cardiovascular disease, and associated risk factors), and mental health problems.¹⁻¹⁰

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In recent years, a small but growing body of research has sought to characterize and explain physical and mental health differences between sexual minority and heterosexual women.^{11–13} These studies have primarily focused on describing sexual minority women's disproportionate risk for cancer,^{7,14} obesity and related morbidity,^{10,13–16} and mental health or substance abuse problems,^{17,18} rather than providing a framework for understanding the interrelations and health outcome associated with these differences.

Over the past decade, public health researchers who study co-occurring psychosocial problems in other minority groups, including racial and ethnic minority groups and sexual minority men, have employed a biosocial syndemic theory to explain the relations between common within-group psychosocial problems and adverse health outcomes.¹⁹ Syndemics typically develop under conditions of health disparity (enhanced by harmful social conditions and injurious social connections) and contribute to a significant burden of disease in affected populations.¹⁹ At the individual level, syndemic theory asserts that the presence of multiple psychosocial problems has a synergistic effect on the likelihood of poor health outcomes. Further, these co-occurring problems interact with one another to produce negative health effects that are above and beyond the effect of any singular health problem.¹⁹ More recently, syndemic theory has been applied to the understanding of HIV acquisition risk among sexual minority men (i.e., men who did not identify as exclusively heterosexual), whereby the presence of multiple co-occurring psychosocial health problems (i.e., childhood sexual abuse, partner violence, mental health distress, polysubstance use)—termed “indicators”—increases men's risk of acquiring HIV.^{20–24}

In parallel to findings from public health research on sexual minority men, there is a growing body of evidence to suggest that sexual minority women experience these same indicators of poor psychosocial health at disproportionately high rates relative to heterosexual women.²⁵ For instance, findings from a study comparing rates of various types of interpersonal violence experienced by sexual minority women to rates experienced by their heterosexual siblings indicated that sexual minority women experience victimization at higher rates across the life span relative to their siblings of the same gender; specifically, rates of child sexual abuse are higher among lesbian (18–60 %) and bisexual women (15–76 %) relative to their heterosexual counterparts (9–30 %).^{26–30} As adults, 7.5 % of heterosexual women reported a history of rape as adults, compared with 16.9 % of bisexual women, and 15.5 % of lesbians.²⁶ Sexual minority women are also at high risk of partner violence, despite the myth that sexual minority women may be at lower risk of partner violence due to limited contact with male perpetrators.²⁶ As one national study found, 39.0 % of heterosexual women versus 49.2 % of bisexual women and 47.5 % of lesbian women reported a history of partner physical assault.²⁶ Together, these findings point to sexual minority status as a unique vulnerability to interpersonal violence.

Sexual minority status has also been examined as a vulnerability for mental health distress and problematic substance use.¹⁸ For example, studies have identified higher incidence of mental health symptoms such as anxiety, anger, depressive symptoms, self-injury, and suicidal ideation and attempts among sexual minority women relative to heterosexual women.^{31–33} In addition, lesbians are more likely to report alcohol use (57–80 %), including heavy alcohol use, compared to rates in the general population of women (45–72 %).^{11,34,35} Given the alarming rates of these co-occurring psychosocial problems among sexual minority women, it is likely that

these indicators adversely affect the health of sexual minority women in the same way that these experiences have had deleterious effects on the health of sexual minority men.³⁶ Further, the high prevalence of costly co-occurring psychosocial problems among sexual minority woman may be associated with higher health care cost and utilization.³⁷

Only one cross-sectional study that has investigated syndemics among sexual minority women was identified.²⁵ Thus, the present study will utilize a syndemic framework¹⁹ to test indicators that have previously been investigated in sexual minority men, namely, childhood sexual abuse, partner violence, problematic substance use, and mental health distress (suicidality).²⁰⁻²³ We will examine the syndemic effect of these indicators on health care cost and utilization in a sample of sexual minority women who completed a brief survey prior to a medical or mental health visit at a community health center. To examine the syndemic effect, we will first investigate the interrelations between co-occurring psychosocial problems. Second, we will test the synergistic effect of these co-occurring problems on both health care cost and utilization variables. We hypothesize that possessing more than one co-occurring psychosocial problem will be associated with higher medical and mental health costs as well as higher number of medical and mental health visits during a 7-year follow-up period (2001–2007).

METHODS

Participants

Participants were biologically female patients from a large urban community health clinic in Massachusetts that specializes in sexual minority health care ($N=1060$). Only the subset of women who self-identified as lesbian or bisexual were included in our analyses ($N=341$).

Procedures

Initial survey data were gathered over a 12-month period, ending in 2002. Patients were given a survey by registration staff to complete in the waiting room prior to either a medical or mental health appointment. The brief paper-and-pencil survey assessed demographic information as well as a range of psychosocial and health variables. At the time of the survey, all patients receiving care were notified that researchers may access data from their electronic medical record. For this study, limited data were extracted from the electronic medical record data including billing records for medical and mental health visits and a total count of medical and mental health visits between 2001 and 2007. All study procedures, including detail of specific analyses, hypotheses, and variables to be extracted from the electronic medical record were approved by the Institutional Review Board at Fenway Health following an expedited review.

Measures

Demographic Variables. Demographic data were collected from survey responses, including self-reported age, education level, race, and ethnicity. Demographic variables representing age, education, and race/ethnicity were used in adjusted models.

Sexual Orientation Classification. Participants were classified as sexual minority women if they identified as biologically female and identified with the label “lesbian” or “bisexual” on the paper-and-pencil survey.

Syndemic Indicators. We selected childhood sexual abuse, partner violence, problematic substance use, and mental health distress (suicidality) as indicators of psychosocial health based on (a) established health disparities among sexual minority women and (b) syndemic indicators previously established among sexual minority men.³⁵ Childhood sexual abuse was assessed using the item, “Were you ever sexually harmed as a child (under 15 years old)?” Partner violence victimization was assessed with the item, “Have you ever been slapped, punched, kicked, beaten up, or otherwise physically or sexually hurt by your spouse (or former spouse) or some other intimate partner?” Substance use was assessed using the item, “In your lifetime, have you ever felt you had a problem with substance use?” Suicidality was assessed using the item, “In your lifetime, have you thought seriously about killing yourself?” Each indicator was coded dichotomously to represent the presence or absence (referent) of that indicator. A four-level ratio variable was created to represent the number of syndemic indicators endorsed by each participant; thus, codes indicated the presence of zero, one, two, or three to four indicators. We collapsed responses of three or four indicators as only 16 (4.7 %) women endorsed four indicators.

Outcome Variables. Our primary outcome variables included medical and mental health care costs, and medical and mental health care utilization (i.e., number of visits). These data were extracted using computer software to link survey data to the electronic medical record via the participant’s unique identifier. After these were linked, billing record data was extracted for each participant. We did not extract specific information on the content of the billing code attached to medical or mental health visits. Health care costs were calculated by summing the cost of each visit that was billed between 2001 and 2007. Costs reflect the amount (in US dollars) that was billed to individual patients. Health care utilization was operationalized as two continuous variables representing the number of medical and mental health visits billed between 2001 and 2007. Medical visits included services billed by physicians, physician assistants, nurse practitioners, nurses as part of primary medical care, routine physical exams, episodic care, chronic care management, diagnostic procedures and screenings, minor office procedures, injections, and vaccinations. Mental health visits included services (individual or group therapy, substance abuse, psychopharmacology) billed by licensed social workers, psychologists, psychiatrists, and mental health counselors. All four outcome variables were quartile transformed to adjust for overdispersed data.

Statistical Analysis

First, we examined interrelations between syndemic indicators by running a series of logistic regression models, adjusted for age, education, and race, in which each indicator was regressed on another. Next, we used linear regression models, adjusted for age, education, and race, to test the relation between our composite syndemic variable and health care utilization (total medical visits, total mental health visits) and costs (total medical care costs, total mental health care costs) between 2001 and 2007.

RESULTS

Sample Demographics

For detailed demographics of the analytic sample, see Table 1. The majority of women in our sample identified as lesbian (76.5 %) and White, non-Hispanic (85.3 %) and reported having a college degree (75.1 %). Ages ranged from 29 to

TABLE 1 Sample characteristics (total $N=341$)

	<i>M</i>	<i>SD</i>
Age (years)	44.04 Range=29–69 Number	8.8 Percent
Sexual orientation		
Lesbian	261	76.5
Bisexual	80	23.5
Race/ethnicity		
White/European American	291	85.3
Black/African American	29	8.5
Asian/Asian American	8	2.3
Hispanic/Latino	6	1.8
Other	7	2.1
Education		
Some high school	4	1.2
High school graduate	15	4.4
Some college	66	19.4
College graduate	256	75.1
Employment status		
Full-time	222	65.1
Part-time	28	7.9
Student	42	12.3
Unemployed	28	8.2
Other	20	5.9
Relationship status		
Single	111	32.6
Partnered, living separately	54	15.8
Partnered, living together	172	50.4
Refused to answer	4	1.2
Syndemic indicators		
Childhood sexual abuse	93	27.3
Partner violence	67	19.6
Problematic substance use	66	19.4
Mental health distress (suicidality)	48	14.1
Number of syndemic indicators		
0	189	55.4
1	70	20.5
2	55	16.2
3 or 4	26	7.6
Outcome variables	Median	Range
Medical costs (\$)	1180.50	0–9488.99
No. of medical visits	13.50	1–73
Mental health costs (\$)	3255.00	0–58,982
No. of mental health visits	30.00	1–632

69 years, with a mean age of 44.04 ($SD=8.59$). Most women in our sample were employed full time (65.1 %) and half of the women (50.4 %) were living with a romantic partner. In terms of the syndemic indicators, 27.3 % reported a history of childhood sexual abuse, 19.6 % reported a history of partner violence, 19.4 % reported a history of problematic substance use, and 14.1 % reported a history of suicide attempt. As for the composite syndemic variable, 55.4 % of the sample

endorsed zero indicators, 20.5 % endorsed one indicator, 16.2 % endorsed two indicators, and 7.6 % endorsed three or four indicators.

Interrelations

A series of logistic regression models (see Table 2) were run such that each indicator was regressed on all others; these models were each adjusted for age, education, and race/ethnicity. All regression models were statistically significant ($p < .001$), meaning that all indicators were interrelated. Those who reported experiencing childhood sexual abuse were at 3.6 greater odds of reporting problematic substance use (95 % confidence interval [95 % CI], 1.93–6.78), 4.1 greater odds for reporting partner violence (95 % CI, 2.15–7.66), and 9.4 greater odds of mental health distress (suicidality; 95 % CI, 4.25–20.57). Those with problematic substance use were at 6.4 greater odds of reporting partner violence (95 % CI, 3.29–12.25), and 5.7 greater odds of reporting mental health distress (suicidality; 95 % CI, 2.70–11.95). Finally, those with partner violence were at 3.8 greater odds of reporting a suicide attempt (95 % CI, 1.78–7.95).

Main Outcomes

All four main outcome variables were overdispersed, indicating more variability in the data than centrality. As such, we applied a quartile transformation to all dependent variables prior to running regression analyses. Four linear regression models (see Table 3) were used to assess a relation between the syndemic indicator and health care costs and utilization (visits) for medical and mental health between 2001 and 2007. All models were adjusted for age, education, and race/ethnicity. Regression analyses revealed that the syndemic variable was associated with higher medical costs, indicating the additive effect of possessing more than one indicator on medical costs. The syndemic variable was also associated with a higher number of medical and mental health visits, indicating the additive effect of possessing more than one indicator on number of medical and mental health visits. The syndemic variable was not associated with mental health costs. Means and standard deviations of main outcome variables by number of syndemic indicators are presented in Table 4. Examination of means revealed a linear relationship between number of syndemics and medical costs and utilization, and mental health utilization.

TABLE 2 Interrelations between indicators, expressed as odds ratios and 95 % confidence intervals

	Childhood Sexual Abuse	Partner violence	Problematic substance use
Childhood sexual abuse	–	–	–
Partner violence	4.06 (2.15–7.66)*	–	–
Problematic substance use	3.61 (1.93–6.78)*	6.35 (3.29–12.25)*	–
Mental health distress (suicidality)	9.35 (4.25–20.57)*	3.76 (1.78–7.95)*	5.68 (2.70–11.95)*

All models adjusted for age, education, and racial/ethnic minority status

* $p < .001$

TABLE 3 Linear regression models of health care utilization and costs associated with syndemics (2001–2007)

Outcome variable ^a	<i>B</i>	<i>SE</i> (<i>B</i>)	β	<i>p</i>	95% <i>CI</i>
Medical costs	0.14	0.07	0.12	<i>p</i> <.05	0.001–0.28
No. of medical visits	0.16	0.07	0.14	<i>p</i> <.05	0.02–0.31
Mental health costs	0.14	0.11	0.14	<i>p</i> =0.18	–0.07–0.35
No. of mental health visits	0.04	0.02	0.25	<i>p</i> <.05	0.01–0.07

All models were adjusted for age, education, and racial/ethnic minority status

CI confidence interval, *SE* standard error

^aQuartile transformed

DISCUSSION

The current study documented the interrelations between co-occurring (within an individual) psychosocial problems among urban sexual minority women: As such, we are the first to propose a predictive syndemic model for understanding health disparities in this minority group. Our findings support that syndemics indicators of poor psychosocial health for sexual minority women, namely, childhood sexual abuse, partner violence, problematic substance use, and mental health distress (suicidality), are common occurrences, with nearly half (45 %) of these women endorsing at least one indicator. Further, we found that the experience of any one of these indicators is associated with increased odds of reporting the others. Our study is also the first to demonstrate the additive effect of these co-occurring psychosocial problems on health care costs and utilization. Consistent with our hypotheses, our findings suggest that these indicators interact to create an additive effect on longitudinal (7-year) medical costs and utilization, and mental health utilization, such that, for each additional indicator, medical costs and number of medical visits increase. Contrary to our hypotheses, syndemic indicators were not related to mental health costs.

Regarding the association to medical care, our findings extend previous research, which has established that sexual minority women are at disproportionate risk for interpersonal violence across the lifespan (childhood, adult, partner),²⁶ problematic substance use,¹⁷ and a range of mental health problems.^{11–13,17,18,38} By providing a syndemic framework, our findings support that these co-occurring psychosocial problems predict medical utilization and costs among sexual minority women, such that each additional indicator is associated with high medical costs and utilization, and higher mental health utilization. Previous research has demonstrated that sexual minority women have worse health outcomes and higher rates of mental health problems relative to heterosexual women^{4,8,9,15,38} and these high rates of medical and mental health co-morbidity may be one way to explain our observations regarding high medical costs and utilization. Although the syndemic indicators were associated with higher medical cost and utilization, this does not imply a causal association between these psychosocial problems and all types of health care utilization. This is important to note, as a subset of the previous literature had found that, as a group, sexual minority women are under-engaged in medical care (especially preventive care).^{3,7,12,39–41} We presume that cost and utilization in the current analysis is a better indication of medical morbidity, as the frequency of medical visits (Median = 13.5, Range: 1–73) is beyond expected number of visits for routine preventive care. Therefore, the relations between syndemics and health care

TABLE 4 Mean health care costs and utilization by no. of indicators endorsed

Indicators	Medical costs (\$)		No. of medical visits		Mental health costs (\$)		No. of mental health visits	
	<i>n</i>	<i>M (SD)</i>	<i>n</i>	<i>M (SD)</i>	<i>n</i>	<i>M (SD)</i>	<i>n</i>	<i>M (SD)</i>
0	161	967.02 (1008.96)	161	8.80 (9.36)	53	5498.71 (8533.53)	53	51.36 (75.78)
1	61	1018.99 (806.63)	61	10.52 (9.40)	25	8056.90 (10,455.22)	25	75.32 (92.61)
2	46	1465.49 (1711.34)	46	15.34 (19.75)	17	12,437 (12,478.63)	17	117.76 (124.18)
3 or 4	23	2125.50 (2383.94)	23	19.82 (19.52)	18	9341.72 (15,476.20)	18	100.67 (74.50)

costs and utilization may differ in other samples of sexual minority women, who may be less engaged in care altogether.

We found that syndemics predicts mental health utilization, but not costs. Such that women who possessed three or four indicators reported double (95 % more) the mental health visits reported by women with no indicators. These findings suggest that syndemic indicators are associated with higher mental health morbidity. This finding is consistent with previous research indicating higher rates of mental health utilization sexual minority women.⁴² We did not find a predictive relationship between syndemics and mental health costs. There are a few possible reasons for this, including payment method (i.e., insurance by type and paying out of pocket). Our limited dataset precludes us from exploring this possibility empirically, but it is an explanation for the overdispersed nature of the mental health cost variable, which ranged from cost of \$0–58,982 over a 7-year time frame. It is plausible that mental health costs varied so greatly due to lack of parity in coverage of care. Null findings regarding mental health costs may be also be due to missing data from services accessed outside of the community health center; therefore, we interpret these findings with caution.

These results have potentially important implications for public health interventions. Given that these psychosocial problems are common among sexual minority women and are associated with high economic cost with regard to medical service utilization, it is important for providers to screen for these psychosocial problems in routine care. Together, these findings support the need for culturally competent screening for these indicators and related mental health sequelae in primary care settings, as primary care providers are often the gatekeepers for specialty services. Improved identification of the psychosocial problems among sexual minority patients may confer social as well as economic benefits. These data also suggest that mental health interventions may help to decrease medical health care cost and utilization, as it is plausible that these co-occurring psychosocial problems may contribute, in part, to poor health outcomes. Although we have provided a framework, further research is needed to fully understand associations between health outcomes and these syndemic indicators. For example, immediate next steps may include analysis of the effect of these syndemic indicators on other health disparities commonly observed in sexual minority women (i.e., obesity and cardiovascular disease).

Beyond better screening practices for sexual minority women seen in medical settings, there is a need for increased cultural competency among providers. All of the syndemic indicators examined in this study represent highly stigmatized psychosocial problems that are underreported in the general population. The addition of minority stress for lesbian and bisexual women likely further compounds experiences of stigma and discrimination, which, in turn, may result in these women being less likely to disclose such problems to medical providers. As a result, the onus may be on medical professionals to initiate a discussion of these topics in a non-judgmental, non-pathologizing way. This recommendation is consistent with recent research on structural stigma and sexual minority health disparities^{43,44}, where improvements in social climates around sexual orientation may reduce overall mental health burden, thereby ameliorating some syndemic processes.

We have provided novel data on the interrelations of co-occurring psychosocial problems and the associated effect on health care cost and utilization, yet there are several limitations to the current study that should be noted. First, this study relied on single items to screen for syndemic indicators: Thus, the reliability of these items

has not been established. These indicators are conceptually related to established health disparities among sexual minority women and parallel to syndemic models established for sexual minority men. However, it is possible that we have missed additional indicators of psychosocial health that may further explain the health problems facing sexual minority women. For example, this study used an item regarding suicidality as a proxy for depression and mental health status: Although this was the best approximation that we could make given the limitations of the survey, future research should aim to include current mental health symptoms, including diagnosis and acuity, as a more robust syndemic indicator. In addition, future research should use psychometrically sound measure of all indicators to bolster empirical support for the proposed syndemic model: This includes precise screening of behavioral (rather than subjective) markers of CSA. Second, our sample consists of urban primarily educated White (non-Hispanic) women; thus, our findings may not generalize to all sexual minority women. Given the intersection of race, ethnicity, socioeconomic status, and violence exposure, there are likely differences in syndemic processes among women with multiple minority identities. Thus, this model should also be tested in the context of a more diverse, representative sample of sexual minority women. Another limitation is that data on health care cost and utilization was only available for services billed through the study clinic; therefore, we are missing data that represents the full array of services that women may have received. Further, power limitations due to minimal or missing data on health care cost and utilization, particularly for mental health services where we observed large confidence intervals, may have contributed to non-significant findings. Future research should take a more systematic approach to collecting cost and utilization data, for example, examining all claims billed to a patient's insurance rather than claims billed by a single institution.

The results of the current study suggest the adoption of a syndemic approach to address social determinants of health disparities among sexual minority women. Our findings also support the need to address structural stigma: And, given that rates of utilization in our sample are much higher than rates observed in other samples of sexual minority women (i.e., racial or ethnic minority, and living in rural communities), there is a need for further investigation of the relations between these indicators, health cost and utilization, and health outcomes.

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