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Exploring Lifetime Accumulation of Criminal Justice Involvement and Associated Health and Social Outcomes in a Community-Based Sample of Women who Use Drugs

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Abstract Among people who use illegal drugs, engagement with the criminal justice (CJ) system often involves an ongoing, intermittent series of arrests, incarcerations, and periods of community supervision. The potential associations between the lifetime accumulation of CJ involvement and social and health outcomes is largely unexplored. In a cross-sectional sample of women who use crack, heroin, and/ or methamphetamine recruited from communities in Oakland, CA (N = 624), we developed an approach to characterize CJ accumulation. We used latent class analysis (LCA), a multivariate person-centered method that assumes an unobserved categorical variable that divides a population into a small number of mutually exclusive and exhaustive classes. Using observed measures of incarceration and community supervision as indicator variables, we developed a model of CJ accumulation that elucidates patterns of involvement as lived by the women in the sample. Based on model fit statistics, we selected a three-class model and labeled the classes "low," "medium," and "high." We then explored associations between the classes of CJ accumulation and health and health-related outcomes using logistic regression. The odds of homelessness (p for trend = 0.004), transience (p for trend = 0.017), and recent victimization (p for trend = 0.023) were higher among women in higher accumulation classes. Higher class of CJ accumulation was associated with higher odds of reporting unmet need for physical health care (p for trend < 0.001) and mental health care (p for trend = 0.002). The odds of physical health conditions, such as hepatitis C infection (p for trend < 0.001) and mental health conditions, such as depression (p for trend = 0.003), also increased with higher class of accumulation. While the findings described here are limited by the cross-sectional nature of the study, they suggest that CJ accumulation is a potentially meaningful concept for assessing associations between the CJ system and health-related issues.

Keywords Incarceration · Community supervision · Drug use · Latent class analysis · Women

Introduction

Although the correctional population has declined by 1% per year since 2007, the era of mass incarceration in USA is far from over [1]. In 2014, there were 2.2 million people in the nation's prisons and jails, compared to 500,000 in 1980 [1, 2]. Furthermore, people in prison or jail are vastly outnumbered by people on probation and parole (referred to here as "community supervision"). In 2014, 4.7 million people were on community supervision, compared to 1.3 million in 2000 [1]. These increases in correctional control have been attributed to an overall rise in "prosecutorial toughness" [3] with regard to bringing charges against people for behavior that is criminalized. As many scholars have pointed out [4, 5], policy decisions to address drug use among poor people by prosecuting

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them in the criminal justice (CJ) system instead of providing treatment in the public health system—often referred to as the "War on Drugs"—have contributed to the arrest, confinement, and supervision of scores of individuals for relatively low-level drug use or drug-related crimes. For example, in 2010, there were 80% more arrests for drug possession or use than in 1990 [6]. Concurrently, there is a dearth of substance abuse treatment services; in 2014, the need for opioid substitution therapy outstripped program capacity by more than 1 million treatment slots nationally [7]. As a result, the CJ system continues to play a large role in the lives of people who use drugs, lack access to treatment, and reside in heavily policed communities.

Women now make up 18% of the total correctional population in the USA, compared to 4% in 1980 [8]. The total female correctional population in 2014 was 1.25 million, with the vast majority (85%) of those women being on community supervision [1, 9]. Incarcerated women have high levels of infectious disease such as HIV, viral hepatitis, and sexually transmitted infections; [10–13] chronic health conditions such as hypertension and diabetes; [14] and mental illness [15]. Similar morbidities are found in the limited literature regarding the health of women on community supervision [16, 17].

Engagement with the CJ system is often not a discrete event, but rather an ongoing series of arrests, incarcerations, and periods of community supervision [18]. Recidivism is the norm. According to the Bureau of Justice Statistics, 59% of women released from state prison were arrested again within 3 years [19]. Probation sentences often lead to multiple periods of short-term incarceration for violation of the conditions of probation, rather than for new crimes [20]. Movement in and out of the CJ system, sometimes referred to as "churning," is profoundly disruptive to the process of reintegration at the individual and community levels [21].

The theories of weathering [22, 23] and social adversity [24] posit that the repetition of exposure to an adverse condition or event is important to consider when investigating possible relationships with health. In Geronimus' pioneering body of work [25, 26], repeated and sustained exposure to stressful life conditions is shown to be consequential, with associations between negative health outcomes and the "accumulation" of adversity among women. With its focus on accrued hardship rather than linear relationships, accumulation is a particularly salient framework for research on groups who experience an interplay of compounding factors related to poverty, racism, and sexism, and for whom disentangling causality is problematic [27].

Incarceration has been demonstrated to be an exposure event associated with enduring physical and mental health problems [28–31]. Given the broad spectrum of possible interactions an individual may have with the criminal justice system—from a one-time encounter with police to a brief jail stay to prolonged periods of incarceration and community supervision—it seems likely that the accumulation of CJ involvement may also be associated with health. Indeed, the few studies that have taken this approach to incarceration support further research in this vein. For example, it has been shown that frequent, short-term incarceration is associated with increases in HIV viral load among people who use drugs [32]. It has also been shown that frequent transitions between incarceration and homelessness are associated with poorer medication adherence and lower levels of viral suppression [33]. HIV-related and all-cause mortality have also been linked to the pattern of repeated short-term incarceration and homelessness [34]. In a study of post-prison mortality, each year spent in prison was found to produce a 2-year decline in life expectancy [35]. Furthermore, transitions between correctional and community settings in general have been marred by a lack of planning for continuity of health care [36], which suggests these transitions could have a disruptive effect on health [37].

We sought to investigate whether the accumulation of CJ involvement over the lifetime is associated with health and social outcomes in a vulnerable group of women. The accumulation of CJ involvement can be described as having *breadth*, referring to the range of different types of CJ system exposure (prison, jail, probation, parole) and *depth*, referring to the number of times and total amount of time people are involved in these components of the system. In this paper, we characterize CJ accumulation using latent class analysis (LCA), a multivariate person-centered method that assumes an unobserved categorical variable (in this case CJ accumulation), that divides a population into a small number of mutually exclusive classes. Using observed measures of breadth and depth, we develop a model of CJ accumulation that elucidates patterns of involvement as lived by the women in the sample. We then explore associations between the classes of CJ accumulation and social, physical, and mental health outcomes. We conclude by reflecting on the potential usefulness of the

concept of CJ accumulation in light of these exploratory results and identifying directions for further research suggested by our analyses.

Methods

Study Sample

This cross-sectional study had a total of 624 eligible participants. Data collection was conducted from to September 2014 to August 2015 in Oakland, California. Oakland is a racially diverse, mid-sized city (population 420,000) with documented health inequities by race and income [38]. Unlike neighboring San Francisco, there is no system of coordination between the public health and correctional health systems. Using targeted sampling techniques [39, 40], we conducted recruitment in street settings in two neighborhoods with high levels of poverty, police activity, drug trade, and urban blight. Community data collection sites were centrally located in each neighborhood. Recruitment was conducted by an outreach worker who was very familiar with the community drug use scene, having recruited over 2000 injection drug and crack cocaine users in the same neighborhoods during 2011–2013 [41]. The outreach worker approached potentially eligible women on the streets, in parking lots, homeless encampments, and similar venues, briefly explained the study procedures, and referred potential participants to the community field site, where they were screened for eligibility. Because the recruitment process was separate from the screening process, and no identifying information was requested from referred participants, refusal rates could not be documented. Eligibility criteria were (1) biological female, (2) age 18 or older, and (3) used heroin, methamphetamine, crack cocaine, or powder cocaine in the 30 days prior to interview. Eligible women gave informed consent and participated in a 30–45-min quantitative survey interview. The survey was administered by trained interviewers, who read items aloud and recorded responses in laptop-based survey instrument using Blaise (Westat®). Referrals to health and social services were provided as needed after completion of the survey. Data were uploaded daily to a secure server and deleted from laptops immediately afterwards. All procedures were reviewed and approved by the institutional review board (IRB) at RTI International.

Measures

Latent Class Indicators

To capture the accumulation of CJ involvement among study participants, we developed four indicator variables to represent CJ system experience. All variables were based on self-report. First, we focused on two types of exposure to the CJ system—(1) *incarceration*, including jail and/or prison, since the age of 18 and (2) *community supervision*, including probation and/or parole, since the age of 18. Next, we built in two additional dimensions—the *number of times* a participant was incarcerated or sentenced to community supervision and the *amount of time* a participant was incarcerated or on community supervision. The amount of time was collected in weeks, months, and years and converted to days for analysis. We made each of these an ordered categorical variable, split at the quartiles of the distribution. Thus, our four measures of CJ involvement included as latent class indicators were the number of times incarcerated (0–1, 2–3, 4–9, and ≥ 10), the number of days incarcerated (0–7, 8–122, 123–730, and ≥ 730), the number of times in community supervision (0, 1, 2–3, and ≥ 4), and the number of days in community supervision (0, 1–1096, 1097–2191, and ≥ 2192). As CJ involvement has greater potential for accumulation among people who are older, we included age (in years) as a covariate in the latent class model.

Outcome Indicators

Our outcome indicators included dichotomous measures in four different categories—individual and social factors influencing health ("health-related factors"), health risk behavior, unmet health care need, and health status. All items were self-reported. Drawn from the literature addressing influences on health among women who use drugs [42], health-related factors included current homelessness; residential transience, defined as moving two or more times in the past 6 months; physical assault in the past year, using the question, "in the past year, has anybody punched, slapped kicked or beat you?"; and sexual assault in the past year, using the question "in the past year, has someone used force or threats to make you have sex with them?"; For risk behavior, we included injection drug use past six months and high risk sex, defined as unprotected vaginal or anal sex with two or more male partners in the past 6 months.

Unmet physical health care need was defined as a "yes" response to the question, "In the past year, were there times when you thought you should see a health care provider for a physical health problem but didn't go?" The same wording was used for the item regarding unmet mental health care need.

Physical and mental health measures focused on conditions common among women in the criminal justice system based on existing literature [14, 43, 44]. For physical health, we included the following self-reported health conditions: current hepatitis C virus (HCV) infection; current hypertension; vision problems in the past year; hearing problems in the past year; dental problems, defined as having problems with teeth or gums in the last year; respiratory problems, defined as having problems with breathing in the last year; and chronic pain, defined as pain that lasted more than 3 months in the past year. Participants who responded affirmatively to the question, "Have you ever been told by a health care provider or other professional (e.g., social worker, counselor) that you have a mental health issue?" were defined as having a mental health condition. Women were then asked what condition(s) they had been diagnosed with. Specific conditions reported were depression, anxiety, bipolar disorder, and post-traumatic stress disorder (PTSD).

Statistical Analysis

We identified patterns of accumulated CJ involvement using LCA, a multivariate person-centered method that assumes an unobserved categorical variable that divides a population into a small number of mutually exclusive and exhaustive latent classes [45, 46]. Classes capture patterns, and are not created with any sort of ordering in mind. Characteristics of, and membership in, each class is modeled with a set of measured indicators. Results of the analysis include the number of latent classes, class prevalence, and the class-specific probability of each indicator. We fit models with 1–5 classes and selected the best-fitting model based on measures of absolute fit (G^2 likelihood ratio statistic); relative fit, including the Akaike information criteria (AIC), Bayesian information criteria (BIC), consistent AIC (CAIC), and adjusted BIC (aBIC); entropy (a summary measure of measurement error in class assignment); parsimony; class size; and the scientific interpretation of the classes [46]. Each model was run with 1000 random starting values to ensure model identification. As CJ involvement has greater potential for accumulation among people who are older, we included age (in years) as a covariate in all models.

Women were assigned to classes based on the highest posterior probability of class membership. Relationships between latent class membership and measures of health factors, risk behavior, unmet health care need, and health status were assessed using logistic regression. A separate regression model was run for each outcome. Because the study is exploratory and many of the outcomes we chose are interrelated, we opted not to control for confounders in multivariable analyses aside from age. Latent class membership was included in the model as a group-linear term to test for a dose-response relationship (i.e., trend) between class membership and study outcomes. All analyses were conducted in Stata 14.1, and latent class analyses used the Stata LCA Plugin [47].

Results

The sample was predominantly African American, with a mean age of 48 (IQR 38, 54). Crack cocaine was the most common drug used, followed by heroin (Table 1). In addition, 64% of women smoked marijuana and 90% smoked cigarettes in the past 6 months, and 29% drank alcohol daily in the past 30 days. Over half the participants were homeless. The vast majority of women had health insurance, primarily Medicaid. Adult lifetime CJ involvement in this community-recruited sample was high:83% had been in jail, 19% had been in prison, 70% had been on probation, and 16% had been on parole. In all, 85% of women had some form of CJ involvement as adults.

Results of Latent Class Analysis

Latent class membership was estimated using four categorical variables of criminal justice involvement, organized into four-level ordinal variables. Model fit statistics for models with one through five classes (Table 2) suggest that the three or five latent class model was optimal. The three-class model was selected based on: (1) clear, interpretable classes; (2) minimum BIC and CAIC; (3) relatively small AIC and aBIC; and (4) higher levels of entropy. Research has suggested that BIC is a preferred statistic to AIC with sample sizes similar to our own [48]. In addition, the best-fitting three-class model had a G2 statistic of 309.674 and was reached

Table 1 Characteristics of study participants ($N = 624$).

	Number (%)
Race/ethnicity	
African American	537 (86)
White	32 (5)
Latina	30 (5)
Other	25 (4)
Mean age	48 (IQR 38, 54)
Drug use past 30 days	
Crack cocaine	495 (79)
Heroin	199 (32)
Powder cocaine	237 (38)
Methamphetamine	147 (24)
Daily alcohol use	181 (29)
Criminal justice involvement	
Incarceration	
# of times, median (IQR)	3 (1–9)
# of days, median (IQR)	122 (7–730)
Community supervision	
# of times, median (IQR)	1 (0–3)
# of days, median (IQR)	1096 (0–2191)
Health-related factors	
Has health insurance	500 (81)
Homeless	373 (60)
Moved > 1 time past 6 months	229 (43)
Income below poverty level	511 (82)
Physical assault past 6 months	193 (31)
Sexual assault past 6 months	68 (11)
Risk behavior	
High risk sex past 6 months	168 (27)
Injected drugs past 6 months	115 (18)
Unmet health care needs	
Physical health care	401 (64)
Mental health care	309 (50)
Health conditions	
HCV	117 (19)
Hypertension	246 (40)
Vision problems	391 (63)
Hearing problems	134 (21)
Dental problems	367 (59)
Breathing problems	256 (41)
Chronic pain	193 (31)
PTSD	66 (11)
Depression	138 (22)
Anxiety	67 (11)
Bipolar	109 (17)
Any mental health diagnosis	290 (46)

in 97.5% of model runs, compared to a G2 statistic of 162.358 reached at 65.2% of model runs for the 5-class model. Given our interest in looking at associations between latent class membership and study outcomes, we preferred a higher entropy value as research suggests entropy values closer to one suggest clearer delineation of classes [49]. The five-class model also yielded one class size with only 6% ($n = 36$) of the study population, thereby limiting its utility in regression analyses.

Distribution of Criminal Justice Involvement across Latent Classes

The prevalence of the three classes and the probabilities of reporting each type of CJ system involvement given latent class membership are depicted in Fig. 1. We labeled these classes "low," "medium," and "high" CJ accumulation for simplicity's sake, while noting that each also reflects a particular combination of CJ involvement across the four indicator variables (number of times incarcerated, amount of time incarceration, number of times on community supervision, amount of time on community supervision). The smallest class (30% of the sample) was characterized by low levels of CJ accumulation, with 76% reporting being incarcerated 0–1 times and 75% reporting being incarcerated from 0 to 7 days, and less than 2% having experienced community supervision. This class was defined as *CJ-Low*. The other two classes each represented 35% of the sample. The *CJ-Medium* class was characterized by a mix of incarceration and community supervision experiences, with 47% reporting being incarcerated 2–3 times, 44% reporting being incarcerated for 8–122 days, 66% reporting being on community supervision 1 time, and 56% reporting being on community supervision for 1–1096 days. The *CJI-High* class also had a mix of incarceration and community supervision experiences, but at a very high level, 57% reporting being incarcerated ≥ 10 times, 59% reporting being incarcerated for ≥ 731 days, 52% reporting being on community supervision 2–3 times, and 53% reporting being on community supervision for ≥ 2192 days.

Associations between Latent Classes and Study Outcomes

The odds of homelessness, transience, physical assault, and drug injection were higher among women with greater CJ accumulation (see Table 3). Compared to

Table 2 Statistics for latent class models: comparing models with one to five latent classes.

Model	G^2-statistic	AIC	BIC	cAIC	aBIC	Entropy	% Solution
1-class	1917.801	1941.801	1995.034	2007.034	1956.936	1.000	100%
2-class	691.802	741.802	852.705	877.705	773.334	0.992	100%
3-class	309.674	385.674	554.248	592.248	433.604	0.889	97.80%
4-class	227.540	345.472	571.716	606.783	409.798	0.819	27.50%
5-class	162.358	343.793	627.707	638.271	424.516	0.798	65.20%

BIC Bayesian Information Criterion, *AIC* Akaike Information Criterion, *cAIC* consistent AIC, *aBIC* adjusted BIC, *% Solution* the percentage of seeds associated with the best fit model

women in the low CJ accumulation class, women in the medium and high classes tended to have higher odds of unmet need for physical health care and mental health care. A large proportion of women overall had health insurance, with no statistical difference by class. With regard to health conditions, the odds of HCV, vision problems, and dental problems were higher among women with greater CJ accumulation. There were no differences in hypertension or chronic pain, however. With regard to mental health, the odds of self-reported mental health conditions, including depression and bipolar disorder were higher among women with greater CJ accumulation. Anxiety and PTSD disorders did not significantly differ by class of CJ accumulation.

Discussion

In this sample of 624 women who use drugs in Oakland, CA, we observed relationships between higher levels of CJ accumulation and unmet mental and physical health care needs, as well as health-related factors, such as homelessness. The prevalence of certain health conditions—most notably mental health problems—also trended upward with higher class of CJ accumulation. Because the data are cross-sectional, these associations could operate either way: for example, CJ accumulation could increase the risk for homelessness, or homelessness could increase the risk for CJ accumulation. Also, there could be intervening factors that moderate these

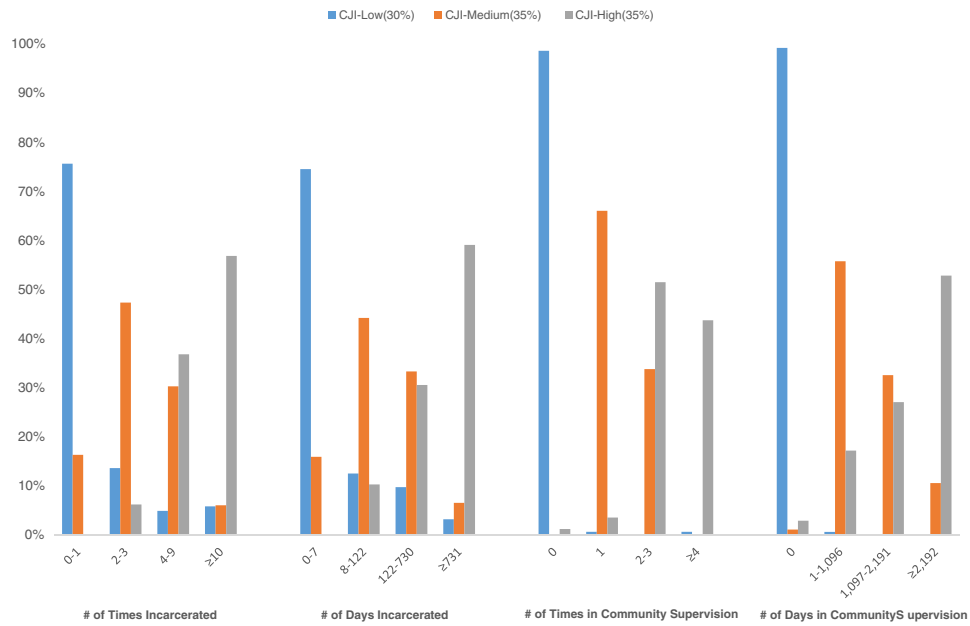

Fig. 1 Probabilities of reporting each type of CJ system involvement given latent class membership

Table 3 Associations between criminal justice latent class membership and health-related factors, unmet health needs, and physical and mental health conditions

	Criminal justice accumulation					*p* value[a]
	Low	Medium		High		
		AOR	95% CI	AOR	95% CI	
Health-related factors						
Has health insurance	(ref)	1.004	(0.602, 1.675)	0.841	(0.510, 1.386)	0.478
Homeless	(ref)	1.460	(0.982, 2.169)	1.799	(1.203, 2.688)	0.004
Moved > 1 time past 6 months	(ref)	1.417	(0.919, 2.185)	1.706	(1.104, 2.638)	0.017
Income below poverty level	(ref)	0.788	(0.454, 1.315)	0.579	(0.340, 0.986)	0.044
Physical assault past 6 months	(ref)	1.186	(0.764, 1.840)	1.630	(1.061, 2.506)	0.023
Sexual assault past 6 months	(ref)	1.483	(0.743, 2.960)	1.914	(0.981, 3.732)	0.056
Risk behavior						
High risk sex past 6 months	(ref)	1.379	(0.875, 2.173)	1.457	(0.925, 2.296)	0.115
Injected drugs past 6 months	(ref)	1.579	(0.888, 2.807)	2.748	(1.593, 4.741)	< 0.001
Unmet need-physical health care	(ref)	1.550	(1.040, 2.311)	2.411	(1.590, 3.658)	< 0.001
Unmet need-mental health care	(ref)	1.957	(1.312, 2.918)	1.921	(1.288, 2.864)	0.002
Health conditions						
HCV	(ref)	1.811	(0.990, 3.314)	3.729	(2.112, 6.583)	< 0.001
Hypertension	(ref)	0.888	(0.595, 1.326)	0.967	(0.649, 1.442)	0.891
Vision problems	(ref)	1.872	(1.253, 2.795)	2.196	(1.462, 3.300)	< 0.001
Hearing problems	(ref)	2.296	(1.389, 3.797)	1.513	(0.897, 2.554)	0.194
Dental problems	(ref)	1.365	(0.920, 2.025)	1.643	(1.102, 2.449)	0.015
Respiratory problems	(ref)	0.948	(0.634, 1.415)	1.266	(0.851, 1.883)	0.222
Chronic pain	(ref)	1.397	(0.910, 2.142)	1.216	(0.789, 1.874)	0.420
PTSD	(ref)	1.286	(0.661, 2.501)	1.415	(0.734, 2.276)	0.308
Depression	(ref)	2.120	(1.260, 3.568)	2.291	(1.365, 3.845)	0.003
Anxiety	(ref)	0.957	(0.508, 1.805)	1.009	(0.538, 1.892)	0.970
Bipolar	(ref)	1.203	(0.691, 2.097)	1.833	(1.081, 3.108)	0.019
Any mental health diagnosis	(ref)	1.455	(0.975, 2.173)	2.237	(1.497, 3.344)	< 0.001

[a] Test for trend from group-linear term

relationships, which we did not examine here. Still, this work extends previous findings about associations between CJ involvement and health, which has relied predominantly on binary (yes/no) measures of CJ involvement, and typically omit community supervision experiences. It hones in on a salient aspect of CJ system experience, particularly for women who use drugs—accumulation. Our findings suggest that accumulation is a meaningful concept in terms of investigating and understanding health consequences of CJ involvement for women.

It is worthwhile to consider the underlying reasons that CJ accumulation and women's health might be associated. First, repeated movement in and out of various dimensions of the criminal justice system may foster instability. German found that, among low-income women, instability was associated with infectious disease risk [50], risk of chronic illness, and mental illness history [27]. In our sample, key components of German's conceptualization of instability were common, including homelessness, residential transience, and low income. Instability and CJ accumulation likely act in tandem, each increasing the chances of the other. Second, ongoing CJ system involvement results in deprivation, through loss of employment opportunities; restrictions in public

benefits; and difficulty obtaining housing [51, 52]. The challenges of unemployment, poverty, and marginal housing are clearly associated with poor health among low-income women [53, 54]. Finally, it is important to consider the potential role of trauma. As Fuentes (2014) writes, "traumatic experiences are a primary unifying characteristic of incarcerated women." [55] Repeated exposure to the CJ system may reactivate and compound trauma, contributing to poor mental health outcomes. Anderson [30] found strong associations between a history of incarceration and trauma exposure in a nationally representative sample of Black Americans that was 55% female. These are theories of how CJ accumulation may produce or amplify instability, deprivation, and trauma, with consequent negative health impacts. Similarly, instability, deprivation, and trauma may result in greater CJ accumulation, also with potential negative health consequences.

Comparing our results to other works assessing history of CJ involvement and health outcomes, it is interesting that we did not find an association between hypertension and class of CJ involvement. This stands in contrast to findings by Wang [29], in which early adult hypertension was associated with incarceration, and the groups with the most extensive history of incarceration most profoundly affected. By contrast, Howell [31] found that hypertension was associated with recent incarceration but not a history of incarceration. Both of these studies used a stronger, biometric measure of hypertension, had predominantly male samples, and did not stratify analyses by sex. Thus, it is difficult to evaluate whether our findings is comparable. In a New York City jail population, Akiyama [56] found an association between HCV infection and recidivism, which is consistent with our findings regarding higher class of CJ accumulation and self-reported HCV infection. Interestingly, the association held in separate analyses of both IDU and non-IDU in the New York sample. Consistent with our findings regarding increased social vulnerability and CJ accumulation, a North Carolina study of women in prison [57] found that women who had been incarcerated more than once experienced more housing instability, were more likely to inject drugs, and reported a higher prevalence of physical and sexual assault. In making these comparisons, it is worth reiterating that our findings are exploratory in nature, and provide additional food for thought rather than conclusive evidence regarding potential health and social effects of repeated CJ system involvement among women.

The ubiquity of CJ involvement in this sample is worth noting. Women participating in the study were recruited from poor, predominantly African American neighborhoods and screened for recent drug use, but not CJ involvement. Fully 85% had been involved in some aspect of the system, reflecting the influence of a criminalized approach to addressing drug use. Our findings on the associations between CJ accumulation and social and health problems among women add to the literature on the links between punitive drug policy and health inequities. It is also interesting that, despite a notably high prevalence of having health insurance (81%), many women reported unmet physical and health care needs. Early research on the Medicaid expansion has noted the gap between having insurance and using it, particularly for routine and preventive care [58]. In this vein, the authors are currently conducting research to understand challenges to Medicaid use for routine care among women on probation, and to improve health insurance literacy in this population (NIMHD grant #R01MD010439).

This cross-sectional study is exploratory and presents several important limitations. First, all data are based on self-report. Participant recall regarding CJ involvement could be inaccurate, particularly among those who experienced frequent, brief jail stays or who have had probation sentences extended repeatedly. In addition, there could be inaccuracies in self-reported health conditions. Official criminal justice and medical records would provide a more verifiable source of data. In addition, our data are cross-sectional. Although we detected trends towards certain outcomes with greater class of CJ accumulation, we cannot establish causality. By testing the concept of CJ accumulation in longitudinal datasets, more definitive relationships could be determined. These datasets would also be better suited to determining mediating factors in the relationships we discuss here—for example, the relationship between victimization and CJ accumulation could be mediated by mental health. Given the exploratory character of our inquiry, and the interrelated nature of many of our outcomes, we did not control for confounding factors beyond age. In addition, because latent class membership is probability-based, classification errors may exist. Finally, findings from this predominantly crack cocaine-using sample in one city may not be generalizable to women who predominantly use other drugs, or to other locales.

There are many promising future directions for research regarding the health effects of CJ system accumulation. Conceptual work could include broadening and testing the idea of "breadth" of accumulation to include juvenile

justice system involvement and "indirect" exposure to the system through the incarceration of loved ones, in response to the growing literature on the collateral damages of incarceration [59, 60]. Additional theoretical work could investigate whether the depth of CJ system exposure is simply additive, or whether different combinations of type and length of exposure compound differently in terms of health consequences. For example, a prison sentence of 3 years could result in a period of relatively good health, while multiple short-term jail sentences that total 3 years could be harmful. Future studies should consider the impact of CJ accumulation on the health of men as well as women.

We found associations between higher class of CJ accumulation and a variety of negative health and health-related outcomes, indicating that CJ accumulation is a concept worthy of additional inquiry. Similarly, the use of LCA to identify patterns reflecting the breadth and depth of CJ experience is an area ripe for additional research. Ultimately, our conceptual and analytic innovations seek a path to better reflect the lived reality of people caught up in the CJ system, and to contribute to a richer understanding of the association between this experience and health outcomes.

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