

INMATE SELF-INJURIOUS BEHAVIORS

Distinguishing Characteristics Within a Retrospective Study

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The current study examines demographic, health functioning, and criminogenic correlates of self-injurious behaviors. Incident reports for all 28 South Carolina correctional facilities were collected during a 30-month period, evidencing 189 inmates who self-injure contrasted with 22,794 inmates who do not. Self-injury was significantly associated with the disproportionate utilization of health resources, specifically through major mental health treatment and institutional restriction. Characteristics of incarcerated self-injurers revealed discernible maladjustment to the correctional milieu, with each self-injury incident being associated with a 37% increase in the number of disciplinary incidents. Moreover, the earlier incarceration period represented a period of greater risk. Each additional year in prison was associated with a 25% increase in self-injurious events, which then declined with further years of imprisonment. These unique characteristics are discussed, and salient policy implications are recommended.

Keywords: self-injurious behaviors; incident reports; prison inmates; corrections; count models

Self-injurious behavior (SIB) is defined as “the deliberate destruction or alteration of body tissue without conscious suicidal intent” (Favazza, 1989, p. 137; see Favazza & Rosenthal, 1993, for discussion). This includes moderate acts such as cutting, scratching, or burning the skin; hitting oneself; pulling one’s hair; reopening one’s wounds; and breaking one’s bones and severe acts such as eye enucleation, face mutilation, and amputation of limbs, breasts, and genitals. Excluded from this definition of self-injury are common expressive forms of body modification such as tattooing and piercing (Favazza, 1989). It is also important to note that attempted and completed suicides, although sometimes grouped with self-injury in previous investigations, are viewed as etiologically distinct and therefore deserving of separate investigation (Canadian Centre on Substance Abuse, 2006; Lohner & Konrad, 2006). Prevalence estimates reveal that 2% to 4% of the general prison population and 15% of prisoners receiving psychiatric treatment routinely engage in SIBs (Toch, 1975; Young, Justice, & Erdberg, 2006). Subpopulations may exhibit higher rates of self-injury; for example, Gray and colleagues (2003) estimated that 52.9% of mentally disordered inmates within a maximum-security hospital had engaged in self-injury during their incarceration.

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Deliberate inmate self-injury is perceived to be increasingly widespread and severe, contributing to disorder and safety risks for others in the correctional setting, draining institutional resources, and taking a considerable toll on the morale of staff and inmates alike (DeHart, Smith, & Kaminski, 2009). The constraints inherent in correctional facilities may generate SIBs, with reported contagion effects leading previously non-self-injuring inmates to learn from and imitate the behavior of self-injuring inmates (Traver & Rule, 1996).

The manifestation of self-injury presents several challenges for correctional staff. The harming of oneself violates the basic biological imperative of self-protection and requires immediate and often costly treatment. Self-injury is also significantly associated with mental disorders, specifically borderline personality disorder and antisocial personality disorder, which require specialized interventions to address issues of comorbidity. DeHart et al. (2009) found that mental health professionals working in corrections tended to protect themselves emotionally from the effects of self-injury by creating rigid boundaries and by employing emotional dissonance (i.e., "I'm just doing my job"). Moreover, the surveyed mental health professionals unequivocally supported a need for specialized training, equipment, and staffing to respond to acts of self-injury and held the consensus that correctional institutions are currently ill equipped to adequately treat inmates who self-injure.

There are few interventions that address SIBs in correctional settings. An emerging practice is a derivative of cognitive behavioral therapy termed "dialectical behavior therapy," which is principally directed toward borderline personality disorder and thus addresses self-injury indirectly. One program based on dialectical behavior therapy principles is START NOW, which can be targeted to specifically address self-injury within the correctional setting (R. Trestman & S. Sampl, personal communication, January 15, 2009; also see Sampl, Trestman, & Harrison, 2007). Although such interventions demonstrate potential, they are still emerging and require program evaluations to fully test their efficacy. One line of empirical research that can direct future interventions focuses on identifying risk factors that are unique to inmates who self-injure. Here, inmates who have documented self-injury episodes are compared to inmates without documented self-injury episodes, and key risk factors are identified. As self-injury becomes increasingly recognized as a major problematic behavior that affects the correctional milieu, it is crucial that interventions are evidence based.

LITERATURE REVIEW

SIB has become increasingly recognized by academicians and practitioners as a significant challenge for correctional systems. However, empirical research on the topic now includes a diverse range of studies, often contradictory in sample selection and dependent variables (see Lohner & Konrad, 2007). As a result, there is little consensus in potential protective factors that can drive the development of interventions. One avenue of research documents key differences between inmates with reported cases of SIBs and prisoners without reported cases of SIBs. To date, these empirical studies of self-injury have focused on demographic, physical and mental health functioning, and criminogenic correlates.

Demographic comparisons reveal an overrepresentation of White (Johnson, 1973; Jones, 1986), young/younger than 25 years of age (Dear, Thomson, Hall, & Howells, 2001; Jackson, 2000), and nonmarried (Young et al., 2006) inmates who self-injure when compared to non-self-injuring inmates.

In terms of mental health, the disproportionate utilization of services by inmates with SIBs can be attributed in part to comorbidity with borderline, narcissistic, dependent, and antisocial personality disorders. Furthermore, comparisons of inmates who self-injure to incarcerated comparison groups consistently reveal greater psychological vulnerability in generalized categories of distress and disorder. Dear, Thomson, Howells, and Hall (2001) matched SIB and non-SIB inmates in Australia and found that self-injury was associated with a history of mental illness, previous psychiatric visits while in prison, and the presence of a significant medical problem at statistically significant levels. Ivanoff (1992) found that previous psychiatric history, measured via mental health diagnostic and treatment records, was the strongest risk factor for self-injury when contrasted with other problem history variables such as homelessness and substance abuse. When compared to inmates with no psychiatric history, inmates with previous psychiatric treatment were more than 10 times more likely to later self-injure. This research has since been replicated in a Canadian women's prison with similar results; that is, inmates with SIBs were much more likely to have undergone recent psychological treatment when compared to inmates without SIBs (Wichman, Serin, & Abracen, 2002).

To date, no research on SIB events has attempted to document the consumption of general medical services by inmates with SIBs. Yet, a host of case study analyses (see Applebaum, 2003) suggest that incarcerated populations have the potential to engage in more severe, potentially deadly, forms of SIBs when compared to mainstream populations. Self-injury research on nonincarcerated populations has identified an association between receiving treatment for a physical illness and risk of self-injury (see Pierce, 1977). A prospective cohort study of self-injurers found that cutting as a method of self-harm, previous psychiatric treatment, and physical health problems were significantly related to future suicide (Cooper et al., 2005). As such, poor physical health may represent an important harbinger of future self-injury and/or suicide attempts for those at risk. In this context, poor physical health and the consultation of medical doctors in relation to SIB can also be viewed as an ambivalent communication act.

Related to mental and physical health is the issue of generalized cognitive health functioning. To date, no research has documented differences between inmates with SIB and comparison groups on the basis of standardized IQ and Wide Range Achievement Tests (measuring reading recognition, spelling, and arithmetic computation). Therefore, we conceptualize health through the tripartite scheme of physical, mental, and generalized cognitive health capacity.

Another topic of interest is the criminality and deviancy associated with self-injury. Early research indicated that "the severity of disciplinary reports a prisoner had received was found to be the single most important variable in predicting self-mutilation" (Jones, 1986, p. 292). Self-injurious inmates display higher levels of hostile and aggressive communication, disciplinary infractions, and violence when compared to matched comparison groups. A study of correctional inmates in Connecticut indicated that when matched randomly, the self-injurious group was more aggressive with respect to verbal and physical aggression when compared to a randomized non-SIB group at statistically significant levels (Hillbrand, 1993). However, no differences were found in terms of history of violence. Similarly, self-injurious inmates, when compared to non-self-injurious inmates and college students, were distinguished by urges to act out hostile feelings, critical feelings toward others, and paranoid feelings of hostility and guilt (Haines, Williams, & Brain, 1995).

A matched sample comparing female inmates with SIBs to female inmates without SIBs identified statistically significant differences with regard to criminal histories and current disciplinary infractions (Wichmann et al., 2002). The group engaging in SIBs demonstrated a higher risk of youthful conviction, conviction for a violent offense, institutional maladjustment via disciplinary segregation, prior escape behaviors, and reclassification to higher levels of security. This trend continued upon release, with the women who engaged in SIBs more likely to recidivate than non-SIB inmates. Criminogenic expressions in SIB populations were evident in both genders. Wichmann and colleagues (2002) found that 73.1% of female self-injuring inmates committed violence while incarcerated compared to only 16.9% of female non-self-injuring inmates. Likewise, in a men's prison, inmates who harmed themselves were 8.36 times more likely than non-self-injuring inmates to harm treatment staff (Young et al., 2006). Dear, Thomson, Howells, et al. (2001) reported that inmates who self-injure had statistically significantly higher rates of conflict with staff and other prisoners compared to a matched comparison group.

The presence of mental dysfunction can further increase aggression in inmates who engage in self-injury. Virkkunen (1976) studied inmates with antisocial personality disorder who engaged in SIBs and found them more likely than controls with similar personality disorders who did not engage in SIBs to be prone to outbursts of rage or fighting. The former group was also more likely to be withdrawn and anxious and more likely to direct blame toward the environment rather than self. This group also experienced the closed space of corrections as being much more oppressive when compared to the comparison group.

Consideration of differences between self-injurers and noninjurers also includes contextual factors, such as the relationship between time served and risk of self-injury. Smyth, Ivanoff, and Jang (1994) noted an increase in psychological distress among self-injurers during the first week of incarceration followed by slightly decreasing levels of distress during a 12-month period. Such distress corresponds with elevated self-injury symptomatology during the first 72 hours of incarceration, which then decreases as inmates adjust to institutional conditions (see Gibbs, 1987; Haines et al., 1995). Harding and Zimmermann (1989) found that inmates in general experience cognitive stress and psychiatric symptoms within the initial 8 weeks of incarceration. The majority of these inmates employ socially acceptable coping mechanisms that decrease psychological vulnerability. For a subset of inmates, institutional confinement generates negative affective states in vulnerable individuals who then produce the maladaptive response of self-injury to regulate emotions.

The existing literature indicates that inmates who self-injure differ significantly from inmates with no documented reports of self-injury in significant ways. As such, we tested the hypotheses that inmates who self-injure are associated with a specific demography (i.e., White, younger, males), possess health deficiencies that disproportionately consume resources, and are more likely to display unique criminogenic traits that are present before and after the incarceration date. Although previous studies have explored some of these variables independently, this research investigates three distinct components and compares differences between self-injurers and noninjurers. Moreover, this research utilizes zero-inflated negative binomial regression models to adjust for skewed data. A more complete conceptualization of self-injury and advanced statistical modeling is designed to link findings to clear policy implications.

METHOD

The current research was reviewed and approved by the University of South Carolina's institutional review board. Supplementary review and approval were provided by the South Carolina Department of Corrections.

PARTICIPANTS

Data regarding inmates were obtained electronically directly from the South Carolina Department of Corrections. SIBs were identified from the Department's Corrections Management Information Notes System, which gathers information about all 28 prison facilities in South Carolina. The Management Information Notes System includes a series of categorizations in which correctional staff document events or incidents that warrant institutional response. These categorizations are numerous and include assaults, attempted/completed suicides, use-of-force responses, and self-injury events. Correctional officers are responsible for identifying acts of self-injury and documenting events in conjunction with health professionals. Both correctional officers and health workers are provided annual training on the Management Information Notes System as well as specific instruction about identifying and responding to acts of self-injury.

This study included all documented acts of self-injury occurring between January 1, 2004, and June 30, 2006, for prison-incarcerated populations within the state of South Carolina. The period of 30 months was selected because the sample frame was subsumed under a larger study of SIBs. From the cohort of 22,983 inmates from the Management Information Notes System, 189 had one or more SIB events, whereas 22,794 did not have recorded self-injury events.

MEASURES

Dependent variable: SIB. SIBs were defined as any physically harmful action against oneself, the severity of which required an institutional response. The data included an indicator of whether an inmate self-injured during the period of observation as well as the number of times inmates self-injured.

Independent variables: Demographic factors. Demographic profiles of self-injurers and noninjurers included inmate age, race, education level, and marital status and whether the inmate had a dependent child.

Mental and physical health factors. Health functioning and use of services by inmates with self-injury included mental health, cognitive functioning, and physical health measures. Although these variables are distinct, the impact of dysfunction in one area has considerable overlap with functioning in other areas. Therefore, these measures are included under a measure of health functioning. Physical health measures assess whether the inmate has a medical problem that is linked to work restriction status within the facility. As such, the measurement of physical health compares categories of various combinations of medical condition and medical-related work restrictions (*Medical 1*: no medical problem/no work restriction, *Medical 2*: medical problem/no work restriction, *Medical 3*: medical problem/

work restriction, *Medical 4*: severe medical problem/work restriction). Substance abuse needs were measured via status as chemically dependent (yes/no), and mental health included categorization as major mental health treatment (yes/no). Major mental health treatment denotes an inmate who requires ongoing health services, psychotropic medication, and increased supervision from specialized staff, typically psychologists and/or psychiatrists.

An indicator of general institutional restriction (yes/no) merged the following statuses into a single measure: chronic infirmary care, inpatient psychiatric, HIV treatment, dialysis treatment, intermediate care unit, mental retardation unit, handicap unit, area mental health center, 24-hour nursing coverage, outpatient mental health, regional medical center, residential substance abuse, sex offender, and general substance abuse. This category includes both physical and mental health needs that affect individual-level functioning. Also included are two measures of generalized cognitive functioning: mental retardation (IQ-Beta < 70 = yes vs. IQ-Beta ≥ 70 = no) and reading score test (Wide Range Achievement Tests reading level score). The IQ score and Wide Range Achievement Tests use standardized procedures to measure intelligence and reading/arithmetical competence, respectively.

Criminogenic factors. Criminogenic factors were measured with consideration of variables present during the initial intake process and those occurring during the incarceration period. Criminogenic variables include prior record (yes/no), eligibility for parole (yes/no), and whether the most serious offense at the time of arrest was sex related (*Sex Offense*) or violent (*Violent Offense*) versus other types of offenses. Inmate misconduct (excluding acts of self-injury) was measured via reported disciplinary infractions recorded within the previous 12 months (*Disciplinaries*).

Time served. We measured time served as the number of years for which inmates were continuously incarcerated as of June 30, 2006.

ANALYSIS

Figure 1 presents the distribution of the dependent variable Number of self-injurious incidents (NSIBs); note that because the vast majority of inmates (99.2%) did not self-injure, zero counts are excluded. As can be seen, these data are highly skewed. Two common strategies for dealing with skewed data are (a) to transform the dependent variable to approximate normality and proceed with linear regression and (b) to combine all outcomes greater than zero into a single category and employ binary logistic regression. Transformations of these data, however, are unable to approximate a normal distribution, and dichotomizing the dependent variable for use with binary logistic regression results in a loss of efficiency (Cameron & Trivedi, 1998, p. 86). A more appropriate method for analyzing outcomes with many zeros and large positive skew is an event-count model, such as the Poisson or negative binomial (Cameron & Trivedi, 1998; Long, 1997). However, because the inmate self-injury data contain far more zeros than assumed by either of these models, their application would produce incorrect parameter estimates and biased standard errors (Hardin & Hilbe, 2007).

Furthermore, Poisson and negative binomial regression models assume that each inmate has a positive probability of self-injuring some number of times, with the probability differing across individuals according to their characteristics (Long, 1997). However, all inmates are at risk of self-injuring, and all inmates are at risk of not self-injuring. This is unreasonable

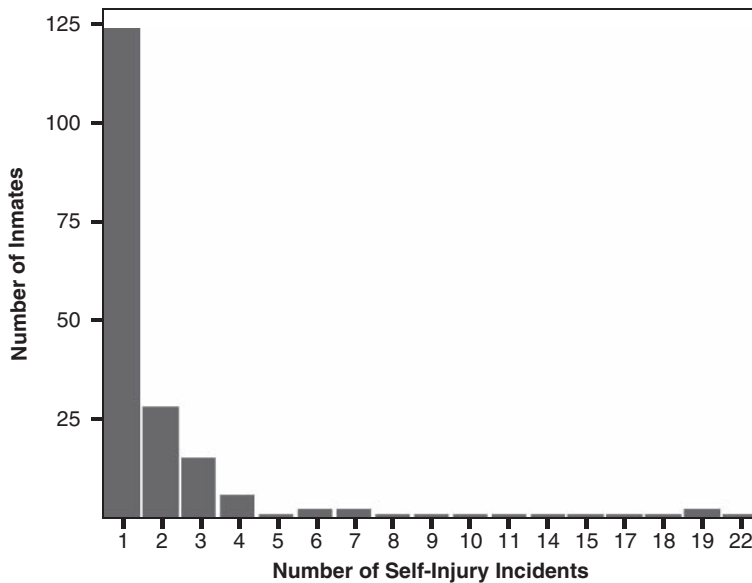


Figure 1: Distribution of Self-Injury Incidents, January 1, 2004, through June 30, 2006
 Note. Zero counts are excluded.

because some inmates will never self-injure; that is, their probability of never self-injuring is 1. Zero-inflated regression models allow for this possibility by considering two distinct sources of zero outcomes. In the present case, this includes inmates who will never self-injure (an “always zero” group) and inmates who may or may not self-injure (a “not always zero” group). Inmates in this latter group may not self-injure, or they may self-injure one or more times. Furthermore, some inmates who self-injure are not detected, and some inmates who self-injure, if detected, are not reported. For these cases, we do not know whether they belong to the first or second group, and group membership is inferred from the data. The distinction between the two groups is a source of unobserved heterogeneity and overdispersion that need to be accounted for (Cameron & Trivedi, 1998; Long, 1997). Zero-inflated models are appropriate under such conditions (Zorn, 1998). A likelihood ratio test of model fit (Long, 1997) indicates that a zero-inflated negative binomial regression model provides a significantly better fit to the data than the zero-inflated Poisson regression model ($p \leq .000$). We therefore employ the zero-inflated negative binomial regression model for the analysis.

RESULTS

DESCRIPTIVE STATISTICS

Table 1 presents the descriptive statistics for the variables used in the analysis separately for inmates who self-injured and for those who did not. Chi-square tests and t tests of independence are used to test for significant differences between the two groups. Note that for dichotomous variables, the variable’s name represents a code of 1 (e.g., *ChemDep* inmates

TABLE 1: Descriptive Statistics for Variables Used in the Analysis

Variable	Description	Self-Injurious Inmates (n = 189)			Non-Self-Injurious Inmates (n = 22,764)			Diff ^a
		Minimum- Maximum	M	SD	Minimum- Maximum	M	SD	p
NSIBs	Number of self-injurious incidents	1-22	2.34	3.45	0-0	0.00	0.00	.000*
Age	Inmate age	18-61	31.30	8.81	17-86	34.45	10.74	.000*
Race	Inmate race (1 = White)	0-1	0.41	0.49	0-1	0.32	0.47	.015*
Education	Inmate education (years)	0-20	9.99	2.05	0-20	10.46	2.01	.002*
Married (ref ^b)	Inmate is married	0-1	0.20	0.40	0-1	0.26	0.44	.057
Single	Inmate is single	0-1	0.71	0.45	0-1	0.60	0.49	.001*
Other Relation	Inmate is in other relationship	0-1	0.08	0.28	0-1	0.14	0.35	.034*
Children	Inmate has children	0-1	0.46	0.50	0-1	0.63	0.48	.000*
Medical 1 (ref ^b)	No medical problem, no work restriction	0-1	0.19	0.39	0-1	0.39	0.49	.000*
Medical 2	Medical problem, no work restriction	0-1	0.27	0.45	0-1	0.37	0.48	.006*
Medical 3	Medical problem, work restriction	0-1	0.53	0.50	0-1	0.24	0.43	.000*
Medical 4	Severe medical problem, work restriction	0-1	0.01	0.07	0-1	0.01	0.08	.921
ChemDep	Has chemical dependency	0-1	0.44	0.50	0-1	0.42	0.49	.463
MH Treat	Major mental health treatment	0-1	0.33	0.47	0-1	0.02	0.15	.000*
Restriction	General institutional restriction	0-1	0.30	0.46	0-1	0.79	0.41	.000*
IQ-Beta<70	Mentally retarded	0-1	0.15	0.36	0-1	0.11	0.32	.153
WRAT	Reading score test	0-13	7.46	3.89	0-13	8.20	3.93	.010*
Prior Record	Has prior record	0-1	0.69	0.47	0-1	0.69	0.46	.993
Parole	Eligible for parole	0-1	0.50	0.50	0-1	0.41	0.49	.019*
Sex Offense	Most serious offense was sex related	0-1	0.12	0.32	0-1	0.07	0.25	.011*
Violent Offense	Most serious offense was violent	0-1	0.54	0.50	0-1	0.38	0.49	.000*
Disciplinarys	Number of non-self-injury disciplinary incidents	0-50	8.05	8.17	0-61	1.84	3.55	.000*
Time Served	Years served in prison	0.1-25.6	5.77	5.54	0-40.4	3.89	5.17	.000*

Note. *t* tests are used for continuous and semicontinuous variables (NSIBs, Age, Education, WRAT, and Disciplinarys); Pearson chi-square tests are used for the remaining nominal variables.

a. Diff = tests for significant differences between self-injuring and non-self-injuring inmates.

b. ref = reference group for regression analysis.

* $p < .05$.

who had a chemical dependency received a code of 1 and a code of 0 otherwise). Among the 189 inmates who self-injured, the majority (80.4%) self-injured 1 or 2 times. The average number of self-injuries, 2.34, was skewed by a few inmates with higher frequencies, including 9 inmates who self-injured between 9 and 22 times.

Inmates who self-injured were slightly younger on average than those who did not (31.3 vs. 34.5, $p \leq .000$), and a greater proportion were White (.41 vs. .32, $p = .015$). A greater proportion of self-injurers were single (.71 vs. .60, $p = .001$), whereas smaller proportions

were married (including common-law marriage) (.20 vs. .26, $p = .057$) or in some other relationship (.08 vs. .14, $p = .034$). Note that we anticipated including inmate gender in the analysis, but only 11 female inmates self-injured. Given the low number, gender is excluded.¹ However, the data show that 11 of 1,560 women self-injured (0.71%), whereas 178 of 21,393 men self-injured (0.83%). The risk ratio (using men in the numerator) is 1.169.

As seen in Table 1, inmates who self-injured were less likely to have a medical problem with no work restriction (*Medical 2*) than inmates who did not self-injure (.27 vs. .37, $p = .006$). Inmates who self-injured, however, were more than twice as likely to have a medical-related work restriction (*Medical 3*) than inmates who did not self-injure (.53 vs. .24, $p \leq .000$). There was no difference, however, between the two groups in the likelihood of having a severe medical-related work restriction (*Medical 4*; .01 vs. .01, $p = .921$). The proportion of self-injurious inmates with a chemical dependency (*ChemDep*) was only slightly greater than that for inmates who did not self-injure (.44 vs. .42, $p = .463$). The proportion of self-injurers requiring major mental health treatment (*MH Treat*), however, was much greater (.33 vs. .02, $p \leq .000$). The proportion of self-injurers subject to a general institutional restriction was substantially lower than the proportion of inmates who did not self-injure (.30 vs. .79, $p \leq .000$).

The data show that inmates who self-injured and those who did not were equally likely to have a prior record, but inmates who self-injured were substantially more likely to have disciplinary infractions (8.05 vs. 1.84, $p \leq .000$). Self-injurious inmates were more likely to be eligible for parole (.50 vs. .41, $p = .019$), and their most serious offense was more likely to be sex related (.12 vs. .07, $p = .001$) or violent (.54 vs. .38, $p = .000$). Finally, inmates who self-injured were on average imprisoned for more years than inmates who did not self-injure (5.77 vs. 3.89, $p \leq .000$).

REGRESSION ANALYSIS

Table 2 presents the regression results. The column on the right (labeled "Logit") presents the odds of inmates' being in the always zero group (never self-injuring), whereas the column on the left (labeled "Negative Binomial") presents estimates for the expected number of self-injury incidents for those not always in the zero group (inmates may not self-injure, or they may self-injure one or more times). Coefficients are interpreted in the usual ways for logistic and negative binomial regression models (Long, 1997). Because the coefficients are exponentiated, values greater than 1 indicate positive relationships whereas values less than 1 indicate inverse relationships.

The results show that the likelihood of inmates' never self-injuring is significantly associated with inmate age.² Specifically, each additional year in age is associated with an approximately 9% increase in the odds of never self-injuring ($\beta = 1.090$, $p = .002$), controlling for other variables in the model. In other words, older inmates are less likely than younger inmates to self-injure. Inmate age, however, is unrelated to the expected number of self-injury incidents ($\beta = 1.023$, $p = .314$), controlling for other factors in the model. Being White is associated with a 65.2% reduction in the odds of never self-injuring ($\beta = 0.348$, $p = .024$). Thus, Whites are significantly more likely than non-Whites to self-injure. However, like inmate age, race is unrelated to the expected number of self-injury incidents ($\beta = 1.269$, $p = .501$). Major mental health treatment (*MH Treat*) is significantly associated with both the odds of being a self-injurer and the incidence of self-injury. Specifically, receipt of major mental health treatment is associated with a 78% reduction in the odds of

TABLE 2: Zero-Inflated Negative Binomial Regression Model of Self-Injury

Variable	Negative Binomial (Expected Count for Those Not Always 0)			Logit (Odds of Always 0)		
	β	SE	p	β	SE	P
Age	1.023	0.023	.314	1.090	0.027	.002*
White	1.269	0.355	.501	0.348	0.466	.024*
Education	0.890	0.075	.123	0.948	0.101	.599
Single	0.607	0.356	.160	0.784	0.482	.613
Other Relation	0.370	0.624	.111	0.551	0.740	.420
Children	1.113	0.293	.684	1.495	0.429	.349
Medical 2	0.634	0.549	.405	0.520	0.870	.453
Medical 3	1.086	0.639	.897	0.893	0.951	.905
Medical 4	4.286	1.801	.419	3.946	1.696	.418
ChemDep	1.045	0.266	.868	1.096	0.394	.816
MH Treat	4.989	0.360	.000*	0.217	0.485	.002*
Restriction	0.211	0.560	.005*	1.600	0.805	.559
IQ-Beta<70	0.590	0.445	.236	0.822	0.642	.760
WRAT	0.966	0.042	.412	0.978	0.063	.730
Prior Record	1.346	0.324	.359	0.833	0.491	.710
Parole	0.882	0.303	.679	0.952	0.444	.912
Sex Offense	0.566	0.482	.237	0.384	0.698	.170
Violent Offense	0.798	0.315	.475	0.439	0.518	.112
Disciplinary	1.052	0.023	.026*	0.688	0.069	.000*
Time Served	1.253	0.078	.004*	1.110	0.109	.337
Time Served ²	0.991	0.004	.015*	0.994	0.005	.255
Constant	-1.598	1.212	.188	1.655	1.673	.322
Log likelihood = -1009.17						
LR $\chi^2(21) = 124.60, p \leq .0000$						
Pseudo $R^2 = .256$						

Note. β s are exponentiated coefficients. Constants are not exponentiated. *Time Served*² is a quadratic term. LR χ^2 = test of estimated model vs. naïve model; pseudo R^2 = McFadden's.

* $p < .05$

being in the never self-injuring group ($\beta = 0.217, p = .002$), and it is associated with a nearly 400% increase in the expected number of self-injury incidents ($\beta = 4.989, p \leq .000$). Thus, not only are inmates who self-injure more likely than inmates who do not self-injure to receive major mental health treatment, but each self-injury incident is significantly associated with the receipt of such treatment as well. Whether inmates were self-injurers is unrelated to general institutional restriction status ($\beta = 1.600, p = .559$), but being restricted is associated with a 78% decrease in the expected number of self-injury incidents ($\beta = 0.218, p = .007$). Each disciplinary incident is associated with a 31% decrease in the odds of never self-injuring ($\beta = 0.688, p \leq .000$), meaning that the frequency of disciplinary incidents is positively associated with inmates' self-injuring. We also observe that each disciplinary incident is associated with a 5.2% increase in the number of self-injury events ($\beta = 1.052, p = .026$). The potential effect of the number of years spent in prison is captured through both a linear term (*Time Served*) and a quadratic term (*Time Served*²). Length of time in prison is unrelated to the odds of being in the never self-injuring group ($\beta = 1.110, p = .337$ and $\beta = 0.994, p = .255$, respectively).³ Each additional year in prison, however, is associated with a 25% increase in the number of self-injury incidents ($\beta = 1.253, p = .004$). Interesting to note, the statistically significant quadratic term indicates that the

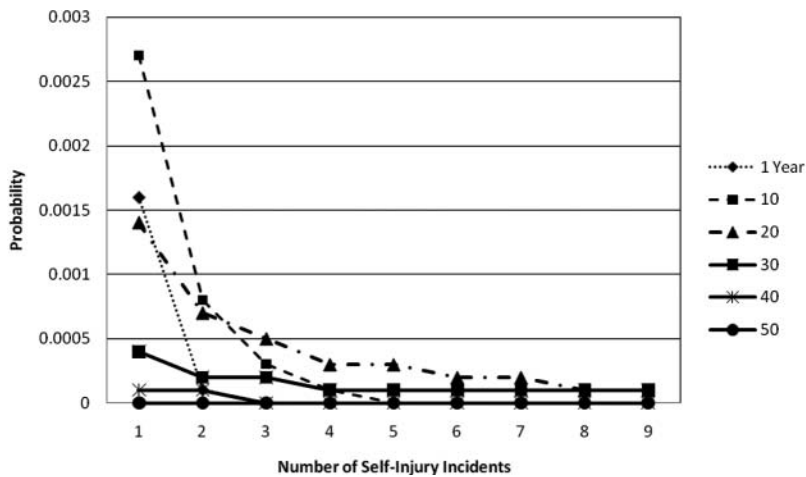


Figure 2: Probability of Number of Self-Injury Incidents, by Years in Prison

expected number of self-injury incidents then decreases with additional years in prison ($\beta = 0.991, p = .015$).

To examine the nature of this relationship further, Figure 2 shows how the probability of self-injury changes with increases in time served in prison, holding all other independent variables at their means (Long & Freese, 2006). Although the overall probability of one or more self-injury incidents is extremely low, the graph shows that inmates who spent relatively fewer years in prison are more likely to self-injure one or more times than those who were in prison for longer periods. Specifically, the probability of self-injury is higher for those who served 20 or fewer years (broken lines), whereas the probability declines substantially for those who served 30 or more years in prison (solid lines). The probability of self-injury is virtually 0 for those who served 50 years. Additional graphing (not shown) shows a similar pattern for inmates incarcerated for 5, 15, 25, 35, and 45 years. Specifically, compared to inmates serving 5 or 15 years, the probability of self-injury is substantially lower for those serving 25 years or more. The probability of self-injury is virtually 0 for those who served 45 years. Thus, it appears that the probability of self-injury begins to decline after roughly the 15-year mark and is virtually 0 at 40 years or more.

None of the other independent variables in the model were significantly associated with self-injury. However, we were interested in examining further the relationship between self-injury and major mental health treatment services (*MH Treat*) and self-injury and the frequency of disciplinary incidents (excluding disciplinary actions for self-injury). For *MH Treat*, we estimated a logistic regression model, regressing major mental health treatment on the other independent variables listed in Table 2. We estimate this model twice, once including whether inmates self-injured (coded 1 if yes) and a second time using the number of times inmates self-injured (table not shown). The findings indicate that compared to inmates who do not self-injure, the odds of receiving major mental health services are nearly 10 times greater for inmates who do self-injure ($\beta = 10.745, p \leq .000$). The second model shows that each additional self-injury more than doubles the odds of receiving major mental health treatment services ($\beta = 2.225, p \leq .000$).

We followed the same procedure to model the number of disciplinary incidents, except that we used negative binomial regression to model the counts. These results show that inmates who self-injure are associated with a 213% increase in the number of disciplinary incidents ($\beta = 3.133, p \leq .000$), whereas each additional self-injury incident is associated with a 37% increase in the number of disciplinary incidents ($\beta = 1.371, p \leq .000$).

DISCUSSION AND CONCLUSION

The hypothesis that self-injuring inmates had a specific demographic profile when compared to non-self-injuring inmates was supported. This study found that inmates whose SIB was reported at the institutional level were more likely to be younger, be male, be White, have less education, be single, and have no children compared to noninjuring inmates. During the 30-month study period, there were only 189 reported SIB inmates, suggesting that self-injury remains a relatively rare event that disproportionately consumes resources (or perhaps suggesting that many SIB events resulting in minor injury remain undocumented). There was an average of 2.34 reported self-injury events among injuring inmates, with 9 inmates self-injuring between 9 and 22 reported occasions. The quantification of SIB events indicates that a majority of inmates who engage in SIB will experiment with the behavior on one or two occasions to the point of institutional response and that another subgroup of high-rate self-injurers will likely engage in SIBs with ferocity.⁴ In fact, mental health and correctional professionals who assisted with data collection and cleaning noted that some high-rate and severe self-injurers had since committed suicide or lethal self-injury. What emerges is three distinct populations: the noninjuring inmate who is unlikely ever to self-injure; the majority of self-injuring inmates, who will engage in the behavior on one or two occasions; and a small group of severe and frequent self-injurers at risk of fatal injury.

The hypothesis that self-injuring inmates are at increased risk of health deficits that consume institutional resources was supported. Assessments of health functioning indicate that incarcerated self-injurers are at increased risk of comorbidity, particularly related to major mental health treatment and/or institutional restriction. In fact, compared to the comparison group, the odds of receiving major mental health services were nearly 10 times greater for inmates who self-injured. As such, interventions should include consideration of mental health vulnerabilities, particularly borderline personality disorder and antisocial personality disorder. One potential strategy would be a nested intervention that addresses self-injury within the context of comorbidity due to health deficits. The linkage between self-injury and institutional restriction suggests that a substantial portion of self-injurers are already identified or known by correctional staff. Although these data do not provide insight into whether institutional restrictions are due to self-injurious events or other causes, it remains salient that a significant portion of self-injurious inmates face elevated risk of debilitating physical and mental health conditions. In short, inmates who self-injure disproportionately consume health resources, and many remain institutionally restricted due to health problems, thus placing further demands on the correctional facility. Quantifying the utilization of medical resources may also serve as economic justification for efficacious SIB interventions to correctional stakeholders.

The hypothesis that self-injuring inmates display more deviant and criminal behaviors than non-self-injuring inmates was partially supported, with the caveat that these differences were statistically significant only for variables relating to postincarceration (e.g., disciplinary

infractions) and not for variables relating to preincarceration (e.g., incarceration for violent or sexual crimes). This suggests that institutional effects may increase SIBs, although this requires further research. Criminogenic characteristics of incarcerated self-injurers did reveal discernible maladjustment to the correctional milieu. Inmates who self-injured were associated with a 213% increase in the number of disciplinary infractions, with each SIB event's being associated with a 37% increase in the number of disciplinary infractions. This supports previous research documenting elevated levels of aggression (Hillbrand, 1993), hostility and guilt (Haines et al., 1995), and violence (Wichmann et al., 2002) among inmates who self-injure. Future interventions should employ coping strategies designed to promote socially acceptable means of alleviating anger-affective states. More precisely, anger is a temporary expression. Therefore, interventions should focus on sustained negative affectivity experienced primarily as hostility, distress, and guilt. It appears that in the dichotomy of "anger-in" and "anger-out" expressions (Linden et al., 2003), the self-injuring inmate is at greater risk of demonstrating aggression, hostility, and potentially violence both toward self and toward others. As such, SIB interventions should address negative affect and focus on security protocols that deescalate hostility to protect treatment staff and other inmates.

Another implication for SIB treatment is based on an examination of the relationship between time served in prison and self-injury. Inmates who self-injure are most likely to engage in this behavior as a result of maladjustment to incarceration (Haines et al., 1995). This study supports traditional measures of prisonization indicating an inverted U-shaped relationship with time of incarceration (Alpert, 1979). The peak of the street-to-prison transition places vulnerable inmates at greater risk of self-injury. Gibbs (1982) explains,

A man has just come from the street where he had some measure of control over his life, and he has not yet been immersed in the daily routine of doing time. He is between worlds, and has mastery over neither. In this situation, feelings of anxiety, confusion, and helplessness surface. A man's sense of control may be destroyed. The need for some measure of predictability, certainty, and order may be very difficult to satisfy. (p. 35)

These emotional states are common among neophyte inmates, but they accumulate and threaten coping mechanisms in the inmate already at risk of self-injury. Gibbs (1982) refers to a "discordant limbo" (p. 35) that is acute during the initial incarceration phase and then decreases with time. Likewise, inmates in our study who were incarcerated for relatively fewer years were more at risk of self-injury, which decreased substantially with additional years of incarceration. Inmates with the greatest length of incarceration (40 to 50 years) were at negligible risk for self-injury. As such, efficacious interventions should target recently admitted, at-risk inmates through suitable surveillance methods.

The identification of inmates susceptible to SIBs can occur through self-reporting and a physical examination. There is consensus that self-reporting data provide a valid and reliable measure of most areas of deviance and crime, particularly when multiple data sources are added (see Thornberry & Krohn, 2000). This strategy is currently employed during intake procedures for suicidal ideation, previous suicide attempts, gang affiliation, and the potential risk of prison rape offending and victimization. In the case of suicide, Osher, Scott, Steadman, and Robbins (2006) argued that the need for a standardized identification tool during the intake process is crucial when one considers that one third of jail suicides occur within the first week of custody. Likewise, the current study lends support to the development of a standardized screening tool for SIBs that can be utilized during the intake process.

Self-reporting of SIBs should be coupled with a physical examination by a health professional. A physical examination is currently a ubiquitous aspect of prison intake procedures; however, health professionals can maximize this process by examining the body for the presence of scars, wounds, or other physical evidence of SIBs. The severity of previous self-injury, the location of the bodily injury, and the method used to self-injure afford health and correctional professionals further insight (Rosen & Heard, 1995). Favazza and Rosenthal (1993) stated that evidence of major self-injury, that is, previous acts of castration, eye enucleation, and tissue damage to the face or genitals, is indicative of a unique group. Such major self-injurers are more likely to exhibit symptoms of schizophrenia and psychoticism, have explanatory themes that contain religious and/or sexual content, and may alter their physical appearance (e.g., shave head or pluck eyebrows) shortly before future self-injurious acts (Favazza & Rosenthal, 1993). More characteristic expressions are superficial to moderate in severity, yet this group may retain variability in etiology and manifestation of self-injury. Here, the physical examination may even include documentation of the frequency and location of previous self-injury acts, and this file can be retained for future documentation of additional acts (see Rosen & Heard, 1995, for an example of personnel reporting self-injury in a nonincarcerated population).

In our study, the logit portion of the regression model estimated the odds of an inmate's never self-injuring. Risk factors for being a self-injurer included being younger, being White, having had major mental health treatment, and having had increased disciplinary infractions, all at statistically significant levels. The negative binomial portion of the regression model estimated the number of SIB events. Risk factors included having had major mental health treatment, being on institutional restriction, having had increased disciplinary infractions, and having served more time, all at statistically significant levels. These findings provide salient policy implications. Most at risk are young, White inmates, and surveillance should target this population. One caveat is that other populations, particularly incarcerated females and minorities, may be engaging in SIBs but escaping detection (Hannah-Moffat, 2006).

This study includes several limitations that require explication. First, trained correctional staff report only institutional events that they assess to be serious. Therefore, incident-based reporting must undergo the purview of several gatekeepers of information, and it is expected that some number of low to moderately severe acts of SIB were either unobserved or, if observed, excluded from reports and this study. This limitation is moderated by the perspective that incident reports supply an accurate and reliable illustration of the demands that SIBs place on institutional staff and resources, a key goal of this study.

Second, self-injury remains a statistically rare event, even in the correctional milieu. The infrequency of self-injury indicates that researchers must carefully select their methodology (see Lohner & Konrad, 2007). The present study utilized advanced modeling to address the issue of skewed data. In addition, retrospective data were used because this allowed the researchers the opportunity to identify a suitable number of SIB events. Future endeavors would benefit from prospective designs that follow newly incarcerated inmates and test SIB-specific interventions. Unfortunately, such interventions are still in their infancy, and no specific intervention for self-injury was operational during the study period.

A third issue concerns the inadvertent criminalization of mental illness. To date, researchers are only beginning to understand the psychometric dynamics underlying self-injury. The inclusion of criminogenic variables in this study was predicated on research indicating that inmates who self-injure disproportionately consume institutional resources and threaten security and

safety. As such, SIBs include elements of both the “bad” (i.e., free-willed decisions to commit criminal acts) and the “mad” (i.e., deterministic forces including psychopathology that drive maladjustment). No efforts were made to disentangle these motivations; rather, we aimed to be sensitive to mental health problems that may or may not promote disciplinary infractions.

Despite these limitations, this study identified statistically significant differences between inmates who self-injure and inmates with no reported self-injury events by age, race, mental health treatment, institutional restriction, number of disciplinary incidents, and time served. Self-injury in corrections has received scant attention by criminologists and public health researchers for a number of years. We support a continued line of research that links unique characteristics of inmates who self-injure to efficacious surveillance and treatment interventions.

NOTES

1. Given the extreme rarity of self-injury in the inmate population, we decided to retain the female inmates to avoid losing the 11 who self-injured. However, because women may differ from men regarding self-injurious behavior (e.g., severity, frequency, motivation), it is important for future research to explore these potential differences.

2. We also tested a quadratic term for inmate age, but it was not statistically significant at the .05 level.

3. Time served is also insignificant when the quadratic term is excluded from the model.

4. The colloquial term frequently used by practitioners for this self-injuring group is “high-flyers.” It denotes a subpopulation of incarcerated self-injurers who actively engage in the behavior to the point of drawing considerable institutional and staff attention.

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