Physical Partner Violence and Medicaid Utilization and Expenditures

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Abstract:

Objectives. Little research has addressed differences in health care expenditures among women who are currently experiencing intimate partner violence (IPV) compared with those who are not. The purpose of this work is to provide estimates of direct medical expenditure for physician, drug, and hospital utilization among Medicaid-eligible women who screened as currently experiencing IPV compared with those who are not currently experiencing IPV.

Methods. In this family practice-based cross-sectional study, women were screened for current IPV using a 15-item Index of Spouse Abuse–Physical (ISA-P) between 1997 and 1998. Consents were obtained from study subjects to review Medicaid expenditure and utilization data for the same time period.

Results. Mean physician, hospital, and total expenditures were higher for those women with higher IPV scores compared with those who scored as not currently experiencing IPV, after adjusting for confounders. Higher IPV scores were associated with a three-fold increased risk of having a total expenditure over $5,000 (95% confidence interval [CI] 1.3, 8.4). The mean total expenditure difference between the high IPV and no IPV groups was $1,064 (95% CI $623, $1506). The adjusted risk ratio for high IPV score and the log of total Medicaid expenditures was 2.3 (95% CI 1.2, 4.4).

Conclusions. Women screened as experiencing higher IPV scores had higher Medicaid expenditures compared with women not currently experiencing IPV. Early IPV assessment partnered with effective clinic or community-based interventions may help to identify IPV earlier and reduce the health impact and cost of IPV.

Article:

Intimate partner violence (IPV) is linked to physical injuries,[1,2] poor mental health[3]—including depression, anxiety, post-traumatic stress disorder, and suicide ideation and actions—and a wide range of adverse physical health outcomes. 3–7 While these associations may be used to characterize the health impact of IPV, little research has addressed differences in health care expenditures among women who are currently experiencing IPV compared with those who are not.[8–10]

Prevalence estimates for current IPV among women receiving care in primary health care settings range between 7% and 50%.[11–15] An estimated 1.5 million women are raped and/ or physically assaulted by an intimate partner each year, and 500,000 women require medical treatment for injuries sustained in these assaults each year.[16] Conservative estimates provided by the National Crime Victimization Survey have shown that annual medical costs incurred because of family violence exceed $44 million .17 Morbidity due to family violence has been estimated to cause 21,000 hospitalizations, 99,800 days of hospitalization, 28,700 emergency room visits, and 39,900 visits to physicians annually.[17] Based on these estimates, the annual cost of IPV may range from $3 to $5 billion in lost productivity, labor turnover, and health expenses.[17] More recent estimates based on data from the National Violence Against Women Survey indicate that the cost of IPV exceeds $4.1 billion in direct costs of medical care and mental health care, with an additional $1.8 billion in indirect costs of

lost productivity.[18] The average cost of medical care for a woman assaulted (but not murdered) by an intimate partner and requiring medical care was $19,845.[18]

Two recent studies based in private health maintenance organizations (HMOs) that used medical records to identify IPV found that IPV was associated with very large increases in health care costs.[8,9] Ulrich et al.[9] found that women experiencing IPV had 2.3-fold higher estimated health care costs compared with all women enrolled in the HMO on which their study was based. Wisner et al.[8] found that women identified as experiencing IPV had more hospitalizations, mental health care visits, physician visits, and out-of-plan referrals than women selected at random from those continually enrolled in the health care plan and presumed not to experience IPV; the annual total cost difference between the two groups was $1,774. Both studies relied on medical records to identify IPV (which is typically under-reported),[19,20] and those IPV-positive women whose violence is documented in their medical records are likely to have experienced severe violence with physical or mental health consequences.

This cross-sectional study of IPV represents one of the first clinical studies to screen for physical assault, sexual assault, and psychological battering by a current male partner, and to link these IPV types with health status, medical service utilization, and Medicaid expenditures. We add to the emerging literature by providing estimates of direct medical expenditure for physician, drug, and hospital utilization among Medicaid-eligible women currently experiencing IPV compared with those not currently experiencing IPV.

METHODS

Data sources

The analysis of IPV-related Medicaid expenditures utilized data collected as part of a large cross-sectional study of partner violence based in two large primary care clinics.15, [21] The larger study was designed to (*1*) estimate the frequency of IPV by type (physical, sexual, and psychological), (*2*) describe correlates of IPV, and (*3*) identify mental and physical health outcomes potentially associated with IPV.

Eligible subjects (for both studies) were women ages 18 to 65, insured either by Medicaid or a managed care provider. Study participation included a five- to 10-minute in- clinic interview to screen for male partner violence and a 30- to 45-minute telephone interview to assess the woman's medical history and current health status. To reduce errors, we used computer-assisted interviewing for both in-clinic and telephone interviews. Study participants were reimbursed for the time it took to complete the interviews. Women who were currently in abusive relationships were counseled by recruiters and referred to local services for victims. For safety reasons, women currently in violent relationships were given the option to complete the longer interview in the clinic rather than by telephone; 6.8% (*n*=98) of all the study interviews were conducted in the clinics. The University of South Carolina Institutional Review Board approved this project; all women signed consent forms.

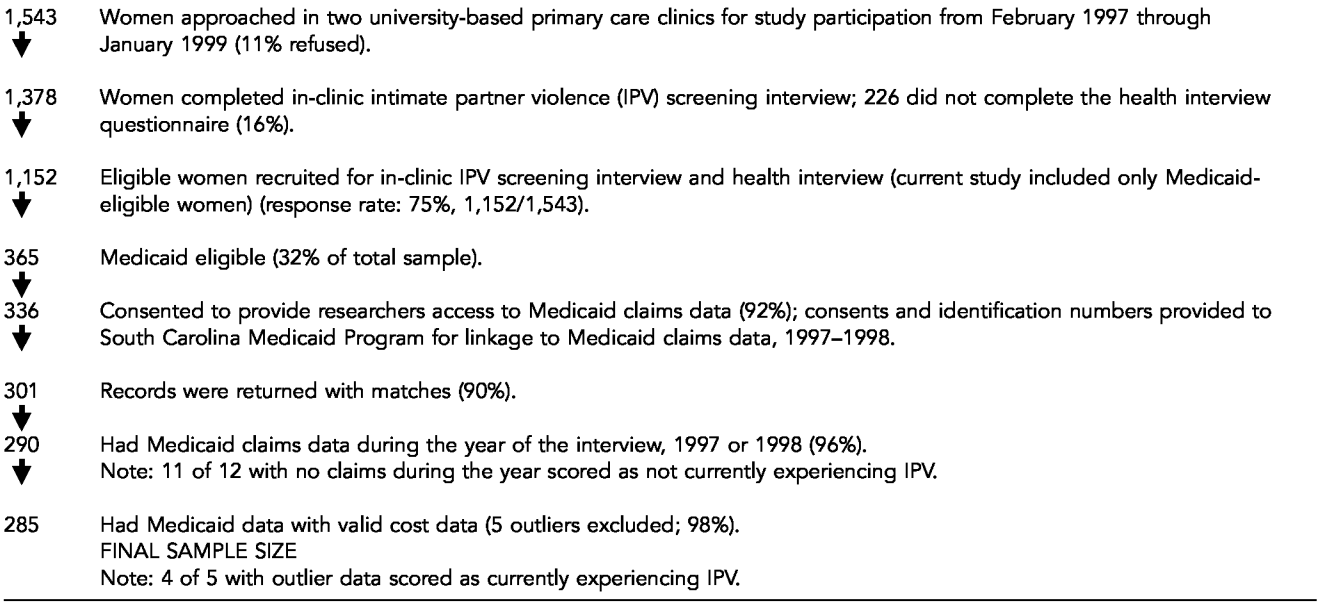
After interviews were completed, women were asked for permission to obtain health care claims data. The cost analysis was restricted to Medicaid-eligible women and utilized paid claims data from the South Carolina Medicaid program.

Figure 1 is a flow chart of subject recruitment, response rates, and data available for analyses. Trained recruiters for the cross-sectional study approached 1,543 women attending primary care clinics in two university-associated family practice clinics between February 1997 and January 1999; 165 (11%) refused participation. Of the 1,378 consenting women, 1,152 (84%) completed both the IPV screening interview and the health interview; 226 (16%) completed only the screening interview. For the cost analysis, we focused exclusively on consenting subjects who were insured through Medicaid (*n*=336). Medicaid eligibility was determined at the time of recruitment based on the woman's self- report of insurance coverage, not on Medicaid data. Not surprisingly, 35 women did not have Medicaid claims data.

Medicaid claims data. This analysis is based on the Medicaid paid claims history for those Medicaid-eligible women who consented to access. Medicaid paid claims data were provided by the South Carolina Department of Health and Human Services (see Figure 1). Copies of signed consent forms and a unique identifier number were provided to the Medicaid agency for each consenting subject. South Carolina Medicaid provided paid claims data for 1997 through 1998 for all physician, drug, and hospital claims for each consenting subject. These Medicaid paid claims data were linked to the IPV experience and health status data from the cross-sectional study.

To avoid the issue of having multiple observations per woman, we restricted this analysis to one year of Medicaid

Figure 1. Flowchart of subject recruitment, response rates, and available data sources



claims data. This was defined as the year in which the woman was interviewed for the study, either 1997 or 1998. The other advantage of restricting this analysis is that we reduced misclassification of the IPV exposure as we had access to the woman's self-report of her recent IPV experience for the year of interview. For each of the three types of claims (physician, drug, and hospital), we created three variables for the year of data: *(1)* the number of claims by category, *(2)* the annual total dollar expenditure by claim type, and *(3)* the average cost per claim. The total number of claims by year and the total costs per year were then summed to obtain total claims and expenditure per subject over the one-year period.

To address outliers in the cost data, we eliminated those data points beyond four standard deviations from the mean (n=5); those excluded were disproportionately (4 of 5) women who had experienced IPV. We also eliminated those individuals who had no claims of physician visits in 1997 or 1998 because women were recruited from physician offices during these time periods and therefore should have had a claim (n=12); these were largely women not experiencing IPV (11 of 12).

Because Medicaid eligibility may change frequently, we created a variable to indicate the total number of months the individual was eligible for Medicaid during the study period. This variable was calculated from dates on the Medicaid eligibility file. Medicaid eligibility is determined at the local (county) level and entered into the eligibility file; thus it is possible to have an eligible recipient with no claims, but not vice versa.

IPV screening interview. Study staff conducted computer- assisted interviews with eligible women in private examination rooms. We screened for current IPV using both the Index of Spouse Abuse–Physical (ISA-P)[22] and the Women's Experience with Battering (WEB) Scale .23,24 We modified the 25-item ISA-P, a continuous measure of physical IPV severity, by reducing the scale to 15 items (Cronbach's alpha=0.96). In addition, we created a three-level measure of physical IPV severity. First, we created two groups of women who scored as experiencing IPV based on the ISA-P: women with higher ISA-P scores (ranging from 11 to 84) were labeled the more severe IPV group, while those with lower scores (ranging from 3 to 10) were labeled as the less severe IPV group. The comparison non -IPV group was composed of those whose ISA-P score was :52. These cutpoints were selected based on the distribution of the scores in the data and the suggestions of ISA authors.[22] The WEB Scale has good construct validity, accurately discriminates battered from nonbattered women, and shows strong internal consistency reliability (Cronbach's alpha=0.95 in current sample).[23,24] The WEB score identified those who are and are not currently experiencing physical assaults. Finally, we asked about physical assaults by a current or most recent partner that resulted in an injury (dichotomous variable).

Demographic characteristics of the woman and her partner. We obtained the following demographic characteristics from the women: current marital status, age, race/ ethnicity, education, number of people living in the respondent's household, current employment status, and whether she has an alcohol or drug use problem. For their current male partners, we asked women his age, race/ ethnicity, employment status, and whether she perceived him to have an alcohol or drug problem. These data were collected during the in- clinic screening interview.

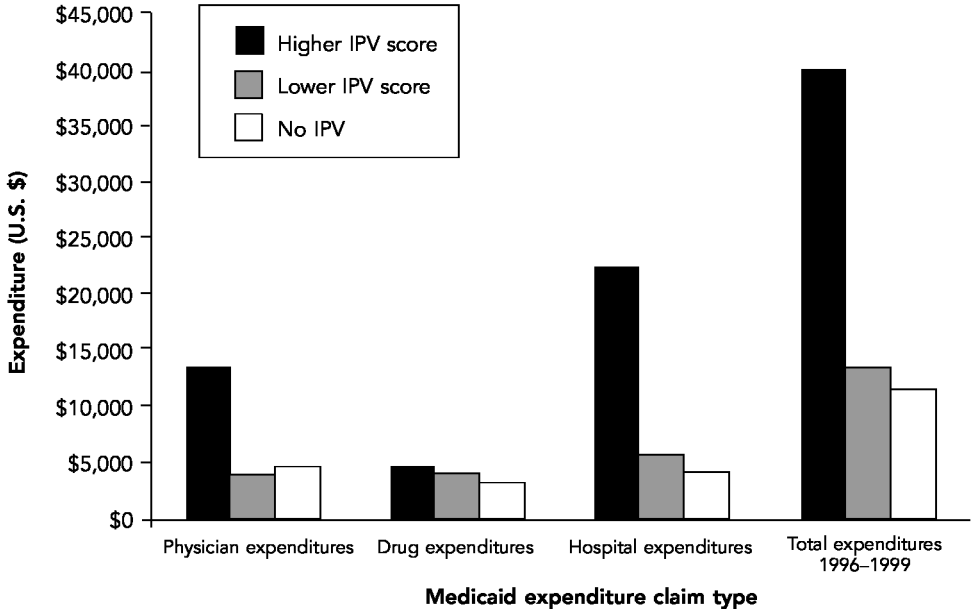
Mental and physical health assessment (health interview). A health interview was conducted either by phone within the next two weeks or in person immediately following the screening interview. Measures used in the health interview to assess current mental and physical health status included the Drug Abuse Screening Test (DAST)[25] (Cronbach's alpha =0.76); the Tolerance, Worried, Eye Opener, Amnesia, and Cutdown (TWEAK)[26] (Cronbach's alpha =0.71) to measure alcohol abuse; an injury frequency and severity scale specific to partner violence (Cronbach's alpha= 0.76); the Spielberger State -Trait Anxiety Inventory[27] (Cronbach's alpha =0.77) to measure anxiety; the Center for Epidemiologic Studies Depression Scale [28] (Cronbach's alpha =0.79) to measure depressive symptoms in the past two weeks; the *Diagnostic and Statistical Manual of Mental Disorders, fourth edition* (DSM -IV) symptom checklist[29] (Cronbach's alpha=0.98) to assess current post-traumatic stress disorder (PTSD) symptoms; and the Social Support Questionnaire–Short Form[30] (Cronbach's alpha= 0.89) to measure social support. The following question was used to assess current self-perceived mental and physical health: "Compared to others your own age, do you consider your current mental/ physical health to be excellent, very good, good, fair, or poor?" We asked women the number of times they were seen by a physician in any clinic or office-based facility in the year prior to recruitment, and the number of times they were hospitalized in the same time period.

Statistical analyses

All analyses were conducted using the Statistical Analysis System (SAS) version 8.1.t[31] We computed the distribution (mean and standard error [SE]) of Medicaid expenditures (actual value, not log transformed) by claim type and the three-level physical IPV severity measure, adjusted for age, race, and months of Medicaid eligibility (Figure 2 and Table 1); statistical significance was determined using the log of the cost data. Because the expenditure data were not normally distributed and highly skewed to the right, all expenditure data were log transformed. To remove zero values for the log transformation, a constant of $10 was added to all expenditures before the log transformation. The methods described by Ulrich[9] were used to provide comparable methodology (Tables 2 and 3). To identify potential confounding factors, we described the sociodemographic and health status characteristics of the study population correlated with the log-transformed total Medicaid expenditure for claims during the interview year (1997 or 1998) as the dependent variable in univariate logistic regression models (Table 2). Multivariate linear regression modeling was used to investigate the association between three IPV groups based on the ISA-P score (No IPV=0% –2%, Lower IPV=3%–10%, and Higher IPV=11%–84%), service utilization (number of claims), and the log-transformed expenditure data by claim type, adjusting for potentially confounding factors identified in Table 3. Age, race, having a chronic disease, and months of

Medicaid eligibility were included in regression models as covariates. Based on past research and univariate analyses, several modeling decisions were made. Because the WEB, ISA-P, and the IPV-associated injury variables were highly covariate, we used only the ISA-P as the continuous measure of IPV for this analysis. Partner violence frequently results in women becoming separated or divorced, so we did not include marital status in subsequent models because this factor can be viewed as an intervening and not a confounding

Figure 2. Mean Medicaid expenditures by claim type (1996–1999) and intimate partner violence (IPV) severity



NOTE: IPV score based on the modified Index of Spouse Abuse–Physical (ISA-P) scale.

Table 1. Medicaid expenditures by type of charge (physician, drug, or hospital) in the year of intimate partner violence (IPV) screening (1997 or 1998) and for all years by severity of IPV adjusted for age, race, chronic disease, and months of Medicaid eligibility

Actual expenditure or claims (not log transformed)	*Higher IPV score*[a] *(n=35)*		*Lower IPV score*[b] *(n=38)*		*No IPV*[c] *(n=212)*	
	Mean	*SE*	*Mean*	*SE*	*Mean*	*SE*
Physician expenditures	$2,776[b]	$407	$1,192	$387	$932	$165
Number of physician claims	24.0[b]	3.1	11.9	2.9	12.9	1.2
Average cost per claim	$141.90[c]	$36.30	$87.30	$34.40	$86.70	$14.60
Drug expenditures	$902	$146	$722	$138	$688	$59
Number of drug claims	15.1	1.6	14.3	1.5	13.6	0.7
Average cost per claim	$45.50	$5.90	$36.50	$5.50	$38.90	$2.30
Hospital expenditures	$2577[c]	$564	$826	$536	$1,116	$227
Number of hospital claims	8.5[c]	1.2	6.1	1.1	6.1	0.5
Average cost per claim	$212.70[c]	$47.40	$119.20	$45	$113.10	$19.10
Total expenditures (1997 or 1998)	$6,262[c]	$1,065	$2,782	$1,011	$3,211	$428
Total number of claims (1997 or 1998)	47.5[b]	4.8	32.3	4.5	32.6	1.9
Average cost per claim	$118.10[c]	$19.10	$82.10	$18.20	$81.50	$7.70

[a]IPV score based on the modified Index of Spouse Abuse–Physical (ISA-P) scale: Higher IPV score is 11–84; Lower IPV score is 3–10; No IPV is 0–2.

[b]*p* value <0.01 for t test of different means in expenditure or number of visits by claim type between higher physical IPV score and No IPV.

[c]*p* value ≤0.05 for t test of different means in expenditure or number of visits by claim type between higher physical IPV score and No IPV.

SE = Standard Error

variable. Mental health indicators (e.g., PTSD symptoms, depression, anxiety) are also strongly associated with and probably are consequences of IPV.3,32–34 We decided not to include these factors as confounders because they would be in the causal pathway between IPV and expenditure costs and should not, therefore, be included in the models.

In addition to the log transformation of the cost data, we created meaningful categorical groups of actual cost and claims data (for example: <$500, $500–$1,999, $2,000– $4,999, and >_$5,000 for physician and hospitalization costs) as dependent variables for multinomial logistic regression analyses. Similarly, quantiles of the number of claims and expenditures per claims in a year were created based on the distribution of those not experiencing IPV (Table 4).

As a check on the reliability of the Medicaid claims data with that of the woman's recall, we compared the woman's self-report of the number of physician visits in the previous year with the number of claims in the Medicaid claims data. The time periods do not completely overlap, as women were asked to recall the past 12 months and the Medicaid data were available from January through December of a given year. The woman's record of number of physician visits, however, was highly correlated with Medicaid claims data (the mean number of physician visits reported by women was 14.3, while the mean number of Medicaid claims for physician visits was 15.3 (coefficient= 0.211; $p<0.001$).

RESULTS

Table 1 presents the mean dollar expenditure, number of claims, and SEs by claim type and IPV severity. These values have not been log transformed, but the mean values are adjusted for age, race, having a chronic disease, and months of Medicaid eligibility in the interview year (1997 or 1998). The *p* values are provided as based on analyses with the log- transformed expenditure and claims data. In general, the mean physician, hospital claim, and total expenditures were higher for women who scored as currently experiencing severe IPV (Higher IPV Scores) compared with those who scored as not currently experiencing IPV (No IPV) or those with low ISA-P scores (Lower IPV Scores).

The mean number of claims and average cost per claim were higher for those experiencing more severe IPV compared with the No IPV group for these same three claim types. There was no difference in either expenditure, number of claims, or cost per claim between those scoring as experiencing less severe IPV compared with those not currently experiencing IPV. Figure 3 graphically presents these expenditures by claim type and IPV severity for 1997 or 1998.

Table 2 presents a sociodemographic and health status profile of the 301 Medicaid-eligible women in this cross-sectional analysis. Three-quarters of the middle-aged sample were African -American, 40% were currently unemployed, 66% had high school educations or less, and 28% were currently either divorced or separated. The majority of women in the sample (56.5%) had a health condition requiring medication: 23.2% had diabetes, 52.0% had hypertension, 50.0% had some type of digestive disorder, and 42% had some disability that prevented working outside the home. The following demographic factors were associated with increasing costs: age, white race, and current marital status (divorced or separated). As anticipated, current medication use, having a chronic disease, and a self-perception of poorer

Table 2. Correlates of increasing total Medicaid expenditures (one year only, *N*=285)

	Prevalence of correlate in population	*Correlated with log-transformed total Medicaid expenditures (dependent variable)*		
		Parameter estimate	*SE*	*p value for t test*
Socio-demographic factors				
Age (range 18–65): mean (SD)	38.4 (13.6)	0.0246	0.006	<0.0001
Race: % white	22.7%	0.59	0.202	0.004
Number of months eligible for Medicaid in 12-month period of interview (0–12): mean (SD)	6.0 (5.0)	0.025	0.017	0.14
Woman's current mental or physical health				
Ever diagnosed with a chronic disease (% yes)	56.5%	0.449	0.171	0.009
Current self assessment of physical health (range 1 as excellent, 5 as poor): mean (SD)	3.3 (1.2)	0.194	0.079	0.01
Current self assessment of mental health (range 1 as excellent, 5 as poor): mean (SD)	2.9 (1.21)	0.111	0.08	0.16
Drug abuse scale (DAST: range 0–6, 17.8% some use): mean (SD)	0.42 (1.15)	0.22	0.082	0.009
Alcohol abuse scale (TWEAK: range 0–5, 13.3% any problem use): mean (SD)	0.28 (0.85)	0.17	0.11	0.14
Post-traumatic Stress Disorder Score (range 0–50, 42.5% had traumatic event): mean (SD)	11.6 (15.1)	0.018	0.006	0.005
Current depression (range 0–2, 40% had depressive symptoms): mean (SD)	1.05 (0.91)	0.15	0.111	0.16
Spielberger Anxiety Scale (range 10–37): mean (SD)	21.3 (5.7)	0.028	0.017	0.10
Current social support scale (range 5–25; higher score better support): mean (SD)	12.7 (4.4)	0.016	0.022	0.48
Current smoker: %	29.6%	0.34	0.19	0.07
Current partner violence experience				
Women's Experience with Battering (WEB) Scale (range 10–60): mean (SD)	20.1 (14.5)	0.012	0.006	0.04
Index of Spouse Abuse–Physical (ISA-P) (range 1–100): mean (SD)	4.6 (11.3)	0.022	0.007	0.004
IPV-associated injury with current/recent partner (yes/no): % yes	18.0%	0.31	0.225	0.16

SE = standard error

SD = standard deviation

DAST = Drug Abuse Screening Test

TWEAK = the Tolerance, Worried, Eye Opener, Amnesia, and Cutdown test to measure alcohol abuse

IPV = intimate partner violence

physical and mental health were each associated with increasing expenditure. Higher PTSD symptoms, depression, anxiety, and drug abuse scores were associated with higher total claims. Finally, the three indicators of increasing IPV severity, (ISA-P score, WEB, and IPV-associated injury score) were all strongly associated with increasing total expenditure.

Table 3 presents the result of the multivariate linear regression model with the grouped IPV categories (based on the ISA-P scores) as a measure of partner violence. Each of the four log-transformed expenditures by claim type pre sented in Table 3 was included in a separate model as the dependent variable. The mean log-transformed value for total expenditures was 7.2 (standard deviation [SD] 1.5, median 7.2), and the skewness value of –0.12 indicates that the transformed distribution is more normally distributed than the actual expenditures. The log-transformed value of 7.2 corresponds to $1,320.

The following were included in all models as confounding factors: age, race, having a chronic disease, and months of Medicaid eligibility during the study. Intervals ranged

Table 3. Current physical intimate partner violence (IPV) and Medicaid expenditures by claim type and number of claims (one year only); log-transformed Medicaid expenditures by claim type

	Parameter estimate (SE) log-transformed Medicaid expenditure/claims[a]			
Independent variable in models	*Total expenditures*	*Hospital expenditures*	*Drug expenditures*	*Physician expenditures*
Higher IPV (ISA-P >10)[b]	0.62 (0.01)	0.866 (0.02)	0.402 (0.10)	0.906 (0.007)
Lower IPV (ISA-P 3-10)[b]	0.21 (0.38)	0.262 (0.48)	0.109 (0.64)	0.202 (0.52)
Covariates				
Age (continuous)	0.016 (0.02)	−0.023 (0.03)	0.068 (<0.0001)	−0.018 (0.04)
White race (vs. African-American)	0.433 (0.03)	0.156 (0.61)	0.178 (0.36)	0.594 (0.02)
Months eligible 1–12 (continuous)	0.026 (0.12)	0.066 (0.01)	0.004 (0.79)	0.052 (0.02)
Chronic disease (yes vs. no)	0.237 (0.21)	0.199 (0.48)	0.281 (0.11)	0.482 (0.04)
R squared for model	0.100	0.054	0.384	0.079

NOTE: In each of the four models, ISA-P, age, race, chronic disease, and months eligible for Medicaid during the year period were included as independent variables.

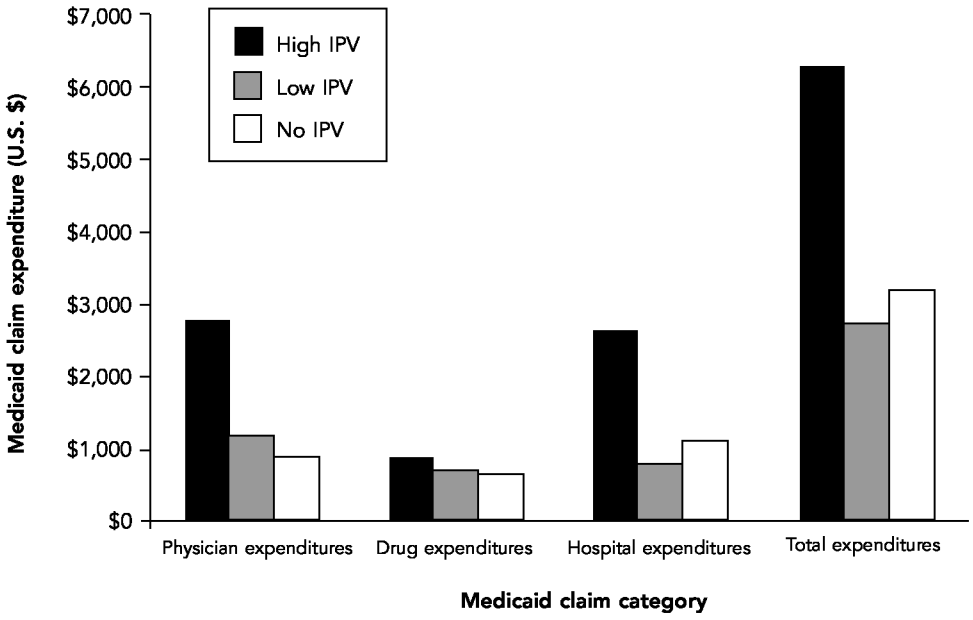
[a]$10 added for women who had no costs incurred.

[b]Reference group is No IPV (Index of Spouse Abuse–Physical [ISA-P] score used as the measure of IPV).

SE = standard error

from one to 12 months for the annual expenditure estimates for the interval 1997 or 1998. The Higher IPV exposure group was associated with increasing expenditure for hospital, prescription drug, physician visits, and with total expenditures. As can also be seen from Table 3, age, white race, and having a chronic disease were also associated with increasing log-transformed cost expenditures. The log-transformed mean total expenditure for Higher IPV compared with No IPV for total costs were 7.73 and 7.10; this corresponds to an actual mean expenditure of $2,276 and $1,212 for a mean difference in total expenditures of $1,064 (95% confidence interval [CI] $623, $1506) for the Higher IPV compared with No IPV groups. Similar conversions for the physician and hospital expenditures yield an average expen-

Figure 3. Mean Medicaid expenditures[a] by intimate partner violence (IPV) scores[b] among women screened for IPV in 1997 or 1998



[a]Actual expenditure or claims (not log transformed).

[b]IPV measured with the Index of Spouse Abuse–Physical (ISA-P) scale; High IPV=ISA-P score of 10–84; Low IPV=ISA-P score of 3–10; and No IPV=ISA-P score of 0–2.

diture difference for Higher IPV vs. No IPV groups for physician visits of $413 (95% CI $312, $516) and hospitalizations of $217 (95% CI $119, $315).

Adjusted risk ratios were calculated for the log-transformed expenditure and claims data as the dependent variables with Higher IPV category relative to No IPV included in multiple logistic regression models as the exposure. Again models were adjusted for age, race, months of Medicaid eligibility, and having a chronic disease. The adjusted rate ratio for the Higher IPV group compared with the No IPV group was 2.3 (95% CI 1.2, 4.4) for total expenditures, 2.0 (95% CI 1.1, 3.7) for total claims, and 2.0 (95% CI 1.0, 3.7) for expenditures per claim. Total expenditures and number of claims were twice as high for women currently experiencing more severe IPV relative to women not currently experiencing IPV. The comparison of Lower IPV and No IPV was not associated with increased claims or expenditures. For this analysis, we averaged risk ratios over the logged expenditure or claims data to provide a ratio of geometric means.

Table 4 presents the adjusted risk ratios for the analysis of more meaningful (actual) cost and number of claims cutpoints for the four claims categories. We present only the comparison of the Higher IPV compared to all other IPV groups because we have consistently seen that the Lower IPV group was not associated with higher expenditure or claims. The Higher IPV exposure group was associated with a 7.5-fold increase in having an annual physician expenditure of >_$2,000 (95% CI 3.0, 18.9), a three -fold increase in having hospital expenditures of $2,000 or higher (95% CI 1.4, 7.4), and a three -fold increased risk of having a total expenditure of $5,000 or higher (95% CI 1.3, 8.4). Neither increasing number of claims nor expenditure per claims for the four claim types was associated with high IPV scores.

DISCUSSION

These findings are similar to the two published comparable studies that address health care utilization and costs among women who are or are not experiencing IPV; both found IPV to be associated with increased health care utilization and costs.[8,9] Our finding that women experiencing more severe IPV have health care expenditures twice that of women not experiencing IPV is very consistent with the range reported by Ulrich et al.[9] of 1.6 to

2.3 for health care costs and utilization among women whose IPV was documented in medical records compared to women without such documentation.

Wisner et al.[8] found a significant difference in expenditure for women identified as experiencing IPV based on a chart review compared with a group thought not to have experienced IPV. As the authors note, some selection bias may be present in the study. Women identified as IPV- positive by chart reviews of mental health care represent those experiencing abuse severe enough to cause either physical injuries or psychological distress, which could result in an over-estimate of the true association between IPV and medical care cost and utilization. Ulrich et al.[9] also used chart reviews to identify partner violence; however, all records in the sample were reviewed for any evidence of current or lifetime IPV. Thus, based on medical records, the potential for misclassification of IPV is reduced. The IPV definition for both groups, however, was based on medical records review, and documentation of this type of violence in medical reports is infrequent.[19,20] In a chart review study relative to self-reports, we found that only 17% of women screened as currently experiencing IPV had any indication of IPV in their medical record; the more severe the violence, the greater the likelihood that IPV was mentioned in the medical record.[19] Because this analysis included direct questioning about the subjects' current IPV experience and linked their interview data with Medicaid claims data, we have a more accurate measure of IPV, including IPV severity based on ISA-P scores.

This study also adds to the existing literature addressing IPV and health care costs in that our population of Medicaid-eligible women is more ethnically diverse, from a lower income bracket, and more likely to have a chronic condition than those populations previously investigated.[8,9] This is the first study to assess the cost of IPV in a Medicaid sample. Further, this is the first study to compare health care utilization and expenditures among women who were directly screened for IPV. We limit confounding bias as we have detailed data on potential confounding factors and we adjust for these factors. Our measures of expenditures and IPV are provided for the same year, reducing the potential for misclassification.

Our finding of an association between IPV severity and expenditures, yet not between IPV severity and utilization of care (measured as number of claims or expenditures per claim), deserves comment. We did find that the adjusted risk ratio (RR) for the log-transformed number of claims and expenditures per claim was two - fold higher for the Higher IPV group vs. the No IPV group. While the RRs for the higher quantiles of claims and expenditure per claim for the Higher IPV group relative to the No IPV group were consistently the highest of the RRs, these associations did not reach statistical significance. This finding may be a consequence of limited study power or a function of the data skewness. From these data, it appears that IPV has a greater impact on health care expenditures than utilization.

It is possible that our estimate of the association between higher IPV scores and cost may be an underestimate. Those excluded from the analysis due to having no Medicaid claims in the year of interview (n=12) were disproportionately in the No IPV group, while those excluded because their cost data were very high (outliers, n=5) were disproportionately in the Higher IPV group. Our estimates may therefore be conservative.

Our finding that only those in the Higher IPV group (ISA-P score >10) have higher Medicaid expenditures is not surprising, as this group is likely to experience repeated assaults and psychological battering. Both physical and psychological battering have been associated with short- and longer-term physical and mental health consequences.[21, 32–37]

There are now several studies that consistently show an increase in health care costs[8,9] and utilization [8,9, 35–37] for women experiencing IPV. Clinic-based IPV assessment and effective clinic or community referrals can be used to identify violence before women begin experiencing the health consequences of the violence. These interventions have the po-

Table 4. Current intimate partner violence (IPV) and Medicaid expenditures, claims, and expenditures per claim:[a] adjusted[b] risk ratio (RR) and 95% confidence interval (CI)

			High IPV scores and Medicaid expenditures or claims by type	
	High IPV	*No and low IPV*	*Adjusted[b] RR*	*(95% CI)*
Physician expenditures				
<$500	11	144	1.0	Reference
$500–$1,999	8	79	1.3	0.5, 3.5
≥$2,000	16	24	7.5	3.0, 18.9
Number of physician visits				
0–2	6	63	1.0	Reference
3–7	8	61	1.6	0.5, 5.1
8–17	6	71	0.9	0.3, 3.1
18–146	15	55	2.5	0.9, 7.0
Physician expenditures per claim				
$0–$28	9	82	1.0	Reference
$29–$61	7	82	0.7	0.3, 2.1
≥$62	19	86	1.9	0.8, 4.5
Drug expenditures				
<$100	6	80	1.0	Reference
$100–$499	10	75	1.7	0.5, 5.1
≥$500	19	95	2.5	0.7, 7.9
Number of drug visits				
0–3	6	61	1.0	Reference
4–10	8	67	1.4	0.4, 3.4
11–23	8	63	1.1	0.3, 3.8
24–44	13	59	1.6	0.5, 5.3
Drug expenditures per claim				
$0–$21	9	85	1.0	Reference
$22–$41	7	79	0.7	0.2, 2.1
≥$42	19	86	1.9	0.8, 4.5
Hospital expenditures				
<$500	19	177	1.0	Reference
$500–$1,999	4	40	1.0	0.3, 3.3
≥$2,000	12	33	3.2	1.4, 7.4
Number of hospitalization claims				
0	7	63	1.0	Reference
1–4	7	66	1.2	0.4, 3.9
5–10	12	72	1.8	0.6, 4.9
11–44	9	49	1.9	0.6, 5.9
Hospital expenditures per claim				
$0–18	9	82	1.0	Reference
$19–$47	8	81	1.1	0.4, 3.1
≥$48	18	87	2.0	0.8, 5.0
Total Medicaid expenditures				
<$1000	10	103	1.0	Reference
$1,000–$4,999	11	112	0.9	0.3, 2.1
≥$5,000	14	35	3.3	1.3, 8.4
Total number of claims				
<14	9	62	1.0	Reference
14–27	5	65	0.5	0.2, 1.6
28–45	4	68	0.3	0.1, 1.1
≥46	17	55	1.6	0.6, 4.2
Total expenditures per claim				
$1–$36	8	82	1.0	Reference
$37–$66	7	82	0.8	0.3, 2.4
≥$67	20	86	2.3	0.9, 5.6

[a]Claims and cost per claims data grouped based on quantiles among those not currently experiencing IPV.

[b]RR adjusted for age, race, chronic disease, and months of Medicaid eligibility.

tential to not only improve women's health, safety, and quality of life, but also to reduce overall Medicaid expenditures. If we extrapolate from our study, Medicaid in this example could save $1,000 per year for each IPV case identified early and effectively treated. We found that 12% of Medicaid-eligible women were currently experiencing more severe IPV and the average cost of care was twice as high for this group as those not currently experiencing IPV. If we assume that the average annual total expenditure for a Medicaid client

was $3,000, early IPV assessment and effective intervention could save Medicaid (and presumably other health insurers) $48 million per 100,000 clients (12,000 IPV clients with a conservative estimate of $4,000 total expenditures per client). Clearly, this assumes that all IPV will be identified early and the health consequences observed as increased expenditures will be eliminated; however, this example suggests that IPV has a significant impact on Medicaid expenditures.

Women who experience IPV are vulnerable in many ways. Economic independence is an important factor in a woman's decision to leave a violent relationship.[38] To become economically sufficient, abused women need jobs, transportation, and childcare .39 Leaving a violent relationship may increase a woman's risk of becoming impoverished 38 and homeless.[40,41] Batterers are also a barrier to self-sufficiency as they are less likely to pay child support.[42,43] Abused women are more likely than non-abused women to be fired from their jobs because they miss work or because employers fear the abuser.[44] Women experiencing IPV need support from health care providers and the health care system to address their disproportional mental and physical health needs. If IPV screening is used, it should be used to target women for needed services to reduce the longer-term costs of IPV and not to deny insurance coverage .[45]

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