


# Intimate partner violence among pregnant women reporting to the emergency department: findings from a nationwide sample

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## ABSTRACT

**Objective** Intimate partner violence (IPV) describes physical violence, sexual violence, stalking, or psychological harm by a current or former partner or spouse. During pregnancy, IPV has substantial negative implications for maternal and child health. The aim of the present study was to better understand the prevalence and sociodemographic and psychiatric correlates of IPV among pregnant females in the emergency department (ED).

**Methods** Using the 2016 Nationwide Emergency Department Sample (NEDS), logistic regression was employed to examine the relationship between IPV during pregnancy, sociodemographic factors, substance abuse and mental health disorders.

**Results** Bivariate analyses indicated that approximately 0.06% of pregnant women who visited EDs in 2016 were coded as experiencing abuse by a spouse or partner. Pregnant women abused by a spouse or partner were more likely to have a diagnosis of each of the disorders coded as complicating pregnancy, childbirth and the puerperium examined in this study, including alcohol use (0.77%, aOR 8.38, 95% CI 2.80 to 29.50), drug use (2.26%, aOR 3.49, 95% CI 1.60 to 6.15), tobacco use (11.05%, aOR 1.90, 95% CI 1.34 to 2.54) and general mental disorders (4.13%, aOR 2.64, 95% CI 1.60 to 4.79).

**Conclusion** Screening for IPV in EDs, especially among at-risk women identified in this study, may lead to referrals and coordination of care that could reduce the violence and improve maternal and child health outcomes.

## INTRODUCTION

Over 7 million women in the US experience intimate partner violence (IPV) annually.<sup>1</sup> Research estimates that between 3%

## Key messages

- ▶ Overall, 0.06% of pregnant women who visited EDs in 2016 had a diagnostic code for intimate partner violence (IPV).
- ▶ Pregnant women with a code for IPV were younger, have Medicaid/Medicare or no insurance, and reside in urban areas compared with pregnant women without IPV.
- ▶ Pregnant women with a diagnostic code for IPV were more likely to use substances compared with pregnant women without a diagnostic code for IPV.

and 9% of women experience IPV during pregnancy.<sup>2</sup> Additionally, studies indicate that the severity of abuse increases significantly and incrementally during pregnancy.<sup>3</sup>

IPV during pregnancy may have substantial negative implications on maternal and neonatal health. Adverse maternal health outcomes related to IPV during pregnancy include higher risk for miscarriage, substance use, smoking, depression, post-traumatic stress disorder and increased risk for sexually transmitted infections.<sup>4 5</sup> Furthermore, deleterious effects of IPV on birth outcomes include Caesarean delivery, spontaneous abortions, increased risk for preterm birth, poor intrauterine growth and fetal death.<sup>6–8</sup>

Research on risk factors for IPV among pregnant individuals have contributed to a range of findings that are predominately partner-related, such as verbal abuse.<sup>9–11</sup> IPV during pregnancy is associated with an increased risk of suffering from substance abuse and mental health



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problems.<sup>12</sup> Martin and colleagues found that women who were abused during pregnancy were about twice as likely to report poor mental health outcomes, such as psychopathology, an altered psyche and substance use, to cope with their partner's violence compared with those who did not experience IPV during pregnancy.<sup>13</sup>

One important area that warrants investigation is the utilisation of hospital emergency departments (EDs). EDs are a crucial point of contact that pregnant individuals' interface with that may serve as a platform for launching prevention programming. IPV often results in physical injury which may require immediate medical care. A recent study showed that up to one-third of women ED patients have a history of IPV.<sup>14</sup> A review of cases of women who were murdered by an intimate partner revealed that almost 45% had visited the ED at least 2 years before death. Of these visits, 93% reported to the ED for injury-related cases.<sup>15</sup> Women experiencing IPV are more likely to seek healthcare than services offered by criminal justice or social service agencies.<sup>16</sup>

### Study aims

The aim of the present study was to explore the prevalence and correlates of IPV among pregnant women in the ED by examining data from the 2016 Nationwide Emergency Department Sample (NEDS).

## METHODS

### Patient and public involvement

No patients were involved in this study.

### Sample

The present study employed data from the 2016 Nationwide Emergency Department Sample (NEDS) developed for the Healthcare Cost and Utilisation Project (HCUP). In 2016, 37 states contributed to the NEDS which contains data on 33 million ED visits from 953 hospitals approximating a 20% stratified sample of US hospital-owned EDs. Weighted estimates describe 145 million ED visits.<sup>17</sup> The analytical sample included ED patients who were pregnant at the time of their visit as indicated by the diagnostic coding described below.

### Measures

#### Pregnancy

Each ED visit included in the NEDS contains up to 30 diagnostic codes from the International Classification of Diseases, Tenth Revision, Clinical Modification/Procedure Coding System (ICD-10-CM/PCS).<sup>18</sup> Regardless of the reason for the visit, the code Z3A is used to record weeks of gestation from Z3A.0 signifying less than 10 or unspecified number of weeks to Z3A.4 for those in weeks 40 or greater. All visits with a Z3A diagnostic code were included in this analysis.

#### Intimate partner violence

A single dichotomous code was used to identify cases with an external cause of morbidity code for assault

by a spouse or partner (code Y07.0). These patients comprise the IPV group.

#### Maternal mental disorder codes

The ICD-10 CM includes codes for mental disorders that complicate the pregnant state, are aggravated by the pregnancy or are the main reason for the obstetric code. The substance use disorders in this coding section include alcohol use (099.31), drug use (099.32) and tobacco use disorder (099.33). All other non-substance use disorders were coded as other mental disorders (099.34).

#### Sociodemographic characteristics

Patient covariates included age in years, insurance status, median household income in quartiles designated by the patient's ZIP (postal) code and urbanicity. Patient age was recoded into three categories (18–25, 26–35 and >35 years) based on extant data that highlights age-related risk factors for IPV and suggests that women between the ages of 18 and 25 years are most vulnerable.<sup>1</sup> Furthermore, several empirical studies on IPV among females have similarly coded age.<sup>19 20</sup> The median household income estimates for each ZIP code are divided into four quartiles.<sup>21</sup> In 2016, the US dollar ranges for estimated median household income by ZIP code represented by each category are \$1–\$42 999 for quartile 1, \$43 000–\$53 999 for quartile 2, \$54 000–\$70 999 for quartile 3 and >\$71 000 for quartile 4. Insurance status represented the expected primary payer for each visit and included Medicaid/Medicare, private insurance or other (self-pay, no charge or other). Urbanicity refers to the urban–rural classification system for US counties developed by the National Center for Health Statistics. Central metropolitan areas of ≥1 million population (akin to inner cities) were labelled central city, fringe metro areas of ≥1 million population (akin to suburbs) labelled suburban, medium metropolitan (250 000–999 999 population) and small metropolitan (50 000–249 999 population) were combined into a medium/small city category, and micropolitan and not metropolitan or micropolitan counties were combined into rural.<sup>22</sup>

#### Statistical analysis

Bivariate analyses served to identify the prevalence and sociodemographic characteristics of ED patients who were pregnant at the time of their visit and had a diagnostic code for abuse by a spouse or partner. Seven unadjusted bivariate logistic regression models were conducted with IPV as the dependent variable and each of the independent variables (age, income, payer, urbanicity, maternal alcohol use, tobacco use, drug use and other mental health) separately to determine which variables were associated with IPV during pregnancy in the ED. The five adjusted models accounted for all sociodemographic variables. One of the adjusted models contained only sociodemographic

**Table 1** Characteristics of pregnant females in US emergency departments in 2016

Characteristic	With IPV code (sample n=387)	Non-IPV (sample n=651 682)
	Weighted % (sample N)	Weighted % (sample N)
Age (years)*		
18–25	55.26 (208)	45.54 (285 923)
26–35	41.13 (151)	44.42 (282 322)
>35	3.61 (14)	10.04 (63 929)
Income quartile by ZIP code		
0–25th percentile	45.21 (167)	40.02 (254 892)
26th–50th percentile	28.04 (106)	27.54 (174 685)
51st–75th percentile	18.59 (72)	19.88 (130 102)
76th–100th percentile	8.17 (32)	12.56 (85 194)
Payer*		
Medicaid/Medicare	65.11 (246)	56.82 (367 726)
Private insurance	18.10 (72)	29.71 (192 383)
Self-pay/No charge/Other	16.79 (67)	13.47 (88 134)
Urbanicity*		
Central city	47.52 (186)	38.14 (263 835)
Suburban	15.14 (63)	18.76 (129 690)
Medium/small city	28.04 (100)	29.72 (177 764)
Rural	9.30 (35)	13.37 (78 661)
Maternal codes complicating pregnancy, childbirth and the puerperium		
Alcohol use*	0.77 (3)	0.09 (598)
Drug use*	2.26 (9)	0.66 (4192)
Tobacco use*	11.05 (43)	6.15 (38 162)
Other mental disorders*	4.13 (16)	1.60 (10 105)

\*Indicates results of chi-square tests for differences between these groups were significant.

IPV, intimate partner violence.

variables. Subsequent models focused on each of the maternal substance and mental health variables separately with sociodemographic controls, to further investigate these relationships and whether they are influenced by sociodemographic characteristics. Given the small percentage of pregnant individuals who were abused in the sample (0.06% of pregnant women) and, subsequently, the large comparison group for the logistic regression models, the models were also run with a 10% sample of pregnant individuals without an abuse code as the comparison group. All analyses were weighted to account for the NEDS complex sampling design using the *svyset* command and *svy* prefix in Stata 14.2.<sup>23</sup>

## RESULTS

Sociodemographic and mental health characteristics of pregnant women who presented to the ED in the US in 2016 who experienced abuse by a spouse or partner are shown in table 1. There were approximately 387 pregnant individuals with a diagnostic code of abuse in our sample, which represents approximately 0.06% of pregnant women who visited EDs in 2016. Most of our sample were aged 18–25 years (55.26%, 95%

CI 50.47% to 59.96%). With respect to income, estimates suggest that most pregnant individuals in the IPV group resided in ZIP codes in the lowest median household income quartile (45.21%, 95% CI 38.28% to 52.33%) and their expected payer was Medicaid (63.31%, 95% CI 58.05% to 68.28%).

With respect to obstetric-specific disorders, the most prevalent substance use disorder coded as complicating pregnancy, childbirth and the puerperium was tobacco use disorder (11.05%, 95% CI 8.24% to 14.66%). Approximately 2% had drug use disorder-related complications (95% CI 1.21% to 4.18%) and less than 1% had alcohol use complications (0.77%, 95% CI 0.24% to 2.41%). Of pregnant women in the IPV group, it is estimated that 4% were diagnosed with ‘other mental disorder’ that complicated pregnancy (95% CI 2.48% to 6.80%).

Table 2 displays estimates from logistic regression models examining the relationship between IPV and substance use and mental health disorders complicating pregnancy in US EDs in 2016. In the unadjusted models, pregnant individuals with a diagnostic code for IPV were more likely to be younger (18–25 years

**Table 2** Associations with intimate partner abuse among pregnant females in US emergency departments in 2016

Characteristic	Unadjusted		Adjusted	
	OR	95% CI	OR	95% CI
Age (years)				
18–25	<b>3.37</b>	<b>(1.83 to 6.22)</b>	<b>4.30</b>	<b>(2.18 to 8.47)</b>
26–35	<b>2.57</b>	<b>(1.40 to 4.73)</b>	<b>3.35</b>	<b>(1.69 to 6.62)</b>
>35	Reference			
Income quartile by ZIP code				
0–25th percentile	<b>1.74</b>	<b>(1.14 to 2.64)</b>	1.40	(0.90 to 2.19)
26th–50th percentile	<b>1.56</b>	<b>(1.03 to 2.37)</b>	1.38	(0.91 to 2.10)
51st–75th percentile	1.44	(0.89 to 2.32)	1.33	(0.82 to 2.17)
76th–100th percentile	Reference			
Payer				
Medicaid/Medicare	<b>1.88</b>	<b>(1.41 to 2.51)</b>	<b>1.76</b>	<b>(1.30 to 2.38)</b>
Self-pay/No charge/Other	<b>2.05</b>	<b>(1.42 to 2.95)</b>	<b>2.00</b>	<b>(1.37 to 2.93)</b>
Private insurance	Reference			
Urbanicity				
Central city	<b>1.79</b>	<b>(1.09 to 2.94)</b>	<b>1.93</b>	<b>(1.16 to 3.23)</b>
Suburban	1.16	(0.69 to 1.94)	1.34	(0.78 to 2.30)
Medium/small city	1.36	(0.83 to 2.22)	1.37	(0.82 to 2.28)
Rural	Reference			
Maternal mental health codes complicating pregnancy, childbirth and the puerperium				
Alcohol use	<b>8.34</b>	<b>(2.58 to 26.91)</b>	<b>9.14</b>	<b>(2.82 to 29.66)</b>
Drug use	<b>3.49</b>	<b>(1.84 to 6.63)</b>	<b>3.14</b>	<b>(1.60 to 6.16)</b>
Tobacco use	<b>1.90</b>	<b>(1.37 to 2.62)</b>	<b>1.85</b>	<b>(1.34 to 2.54)</b>
Other mental disorders	<b>2.64</b>	<b>(1.57 to 4.46)</b>	<b>2.79</b>	<b>(1.61 to 4.82)</b>

Adjusted ORs adjusted for age, median household income, payer source and urbanicity. ORs and CIs in bold type are significant ( $p < 0.05$ ). CI, confidence interval; OR, odds ratio.

odds ratio (OR) 3.37, 95% CI 1.83 to 6.22) and reside in ZIP codes with a lower median household income (first quartile OR 1.74, 95% CI 1.14 to 2.64). They are significantly more likely to have either Medicaid/Medicare (OR 1.88, 95% CI 1.41 to 2.51) or have no insurance (OR 2.05, 95% CI 1.42 to 2.95), and live in a central city (OR 1.79, 95% CI 1.09 to 2.94). Pregnant women reporting IPV were significantly more likely to have a diagnostic code for maternal substance use or mental disorder complicating pregnancy, with the largest magnitude observed for alcohol (OR 8.34, 95% CI 2.58 to 26.91) and drug use (OR 3.49, 95% CI 1.84 to 6.63).

Results of the adjusted models displayed in table 2 indicate that pregnant individuals who experienced IPV were more likely to be younger (adjusted odds ratio (aOR) 4.30, 95% CI 2.18 to 8.47) with either Medicaid/Medicare (aOR 1.76, 95% CI 1.30 to 2.38) or no insurance (aOR 2.00, 95% CI 1.37 to 2.93). Pregnant females presenting to the ED with IPV are twice as likely to reside in cities than in rural areas (aOR 1.93, 95% CI 1.16 to 3.23). The significant association between median household income by ZIP code and

IPV seen in the unadjusted model was not observed in the models adjusted for other characteristics.

Pregnant women who were abused by a spouse or partner were more likely to have a diagnosis of each of the mental health disorders coded as complicating pregnancy, childbirth and the puerperium. Specifically, pregnant individuals in the IPV sample had nine times greater odds of an alcohol use disorder complicating pregnancy (95% CI 2.82 to 29.66) than the non-IPV group. Given the magnitude of the association, we further explored the relationship between alcohol use and IPV in pregnant females through supplemental analyses with only the subpopulation of pregnant women diagnosed with alcohol use disorder. No significant differences were found between experience of IPV and the other variables in the model.

Pregnant women coded for IPV were three times more likely to have drug use disorder complications (95% CI 1.60 to 6.16), 85% more likely to have tobacco complications (95% CI 1.34 to 2.54) and had almost three times greater odds of other mental health disorders complicating pregnancy (95% CI 1.61 to 4.82).

The ORs for the models run with a 10% sample of pregnant individuals without an abuse code as the comparison group were similar in magnitude and significance to both the unadjusted and adjusted models.

## DISCUSSION

We used the latest available data from the HCUP NEDS to explore the prevalence and correlates of IPV among pregnant women presenting to the ED. Our results indicate that pregnant individuals coded for IPV were more likely to drink, smoke, use other substances, and have mental health disorders complicating pregnancy, compared with pregnant females not coded for IPV. Additionally, we found pregnant individuals coded for IPV were more likely to be younger, from lower income neighbourhoods, have either Medicaid/Medicare or no insurance, and reside in urban areas compared with pregnant individuals not coded for IPV. Below we expound on these findings and offer clinical and research implications.

Our results should be interpreted considering some limitations. First, given the nature of IPV, the likelihood of repeat ED visits for each patient may be large, and therefore cannot be established using the HCUP NEDS. Second, data on race of the patient were not collected; consequently, racial disparities in IPV among pregnant women were not assessed. The cross-sectional research design does not make it possible to ascertain causal or temporal relationships between IPV among pregnant women and mental health and/or substance abuse disorders. IPV is both underreported and underidentified, especially in ED settings, which could be indicative of high false-negative rate.<sup>24</sup> Our study found that an estimated 0.06% of pregnant women reported IPV in the ED, which is significantly lower in comparison to estimates from general and clinical population surveys.<sup>2</sup> This discrepancy between our findings and others may be attributed to the fast-paced nature of EDs that often preclude comprehensive IPV screening. While there are many IPV screening tools available, no universal gold standard exists for diagnosing IPV in an ED setting.<sup>24</sup> Therefore, our ability to assess the sensitivity and specificity of ICD-Y07 codes in the context of IPV is limited.<sup>24</sup> Likewise, coding practices may vary between hospitals and possibly among individuals within the same hospital. These differences may significantly affect prevalence estimates drawn from hospital data.<sup>25</sup> Notwithstanding the limitations, our study provides the most recent exploration of IPV among pregnant individuals presenting to the ED.

Our study contributes to the literature and corroborates the findings of previous studies; pregnant women experiencing IPV are more likely to use substances, and have mental health disorders, compared with pregnant women not experiencing IPV.<sup>5-7</sup> Co-occurring instances of substance use and/or mental health disorders and IPV among pregnant individuals may elevate their risk for pregnancy complications and subsequent negative health

outcomes.<sup>13</sup> We found that pregnant women experiencing IPV had nine times greater odds of an alcohol use disorder complicating pregnancy. Therefore, it is critical to identify and link at-risk pregnant individuals presenting to the ED with appropriate referrals and resources (eg, alcohol and substance abuse treatment, case management, counselling). Research is also needed to assess the temporal and causal relationship between substance use, mental health disorders and IPV.

Extant research suggests that young age, poverty and living in urban areas are significantly associated with a higher likelihood of experiencing IPV.<sup>10 11</sup> Our study demonstrated that these factors are also correlated with IPV among pregnant women in the ED. Our study found urbanicity differences in pregnant individuals experiencing IPV which may be indicative of regional differences pertaining to income, payment by insurers due to adjustment for cost-of-living, and the variations in healthcare by region.<sup>26</sup> Therefore, targeted screening and outreach is needed for pregnant women in these sociodemographic groups presenting to the ED.

While our study identified subpopulations of pregnant women at greater risk of experiencing IPV, universal and comprehensive screening for IPV in EDs is imperative. Screening for IPV is endorsed by multiple organisations, including the US Preventative Services Task Force, yet screening rates remain quite low due to a variety of reasons including gaps in provider knowledge and providers' perceptions that patients will not comply with recommendations.<sup>25</sup> These barriers to screening are likely exacerbated by environmental factors inherent in EDs including waiting room pressures and insufficient time.<sup>27</sup>

Although research demonstrates that screening by healthcare professionals is acceptable to women, studies have highlighted that women are unlikely to disclose their experience with IPV unless explicitly asked.<sup>27-29</sup> A recent meta-analysis found screening for IPV increased identification by 133% compared with usual care.<sup>30</sup> Identification provides women with opportunities to access critical supports (eg, education, referrals and safety planning) which may reduce the violence and, for pregnant females especially, improve health outcomes.<sup>27</sup>

Social workers in EDs may be integral in supporting physicians and nurses in identifying IPV and connecting patients to resources. In a study conducted by Dawson and colleagues, ED clinical staff reported that social workers provided them with crucial training and education to screen for IPV.<sup>16</sup> The study reported that social workers provided referrals and optimised the transition of care back to the community for women experiencing IPV.<sup>16</sup> Therefore, the integration of social workers in EDs may address some of the barriers to screening for IPV and ultimately connect survivors with critical and potentially life-saving resources.

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**Ethics approval** The Nationwide Emergency Department Sample (NEDS) is considered a 'limited dataset' under the Health Insurance Portability and Accountability Act (HIPAA) Privacy Rule and contains no direct patient identifiers; therefore, the current study did not require review from an institutional review board.

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#### REFERENCES

- Smith SG, Zhang X, Basile KC, *et al.* The National Intimate Partner and Sexual Violence Survey: 2015 data brief—updated release 2018.
- Alhusen JL, Ray E, Sharps R, *et al.* Intimate partner violence during pregnancy: maternal and neonatal outcomes. *J Womens Health* 2015;24:100–6.
- Saftlas AF, Wallis AB, Shochet T, *et al.* Prevalence of intimate partner violence among an abortion clinic population. *Am J Public Health* 2010;100:1412–5.
- Díaz-Olavarrieta C, García SG, Feldman BS, *et al.* Maternal syphilis and intimate partner violence in Bolivia: a gender-based analysis of implications for partner notification and universal screening. *Sex Transm Dis* 2007;34:S42–6.
- Bailey BA, Daugherty RA. Intimate partner violence during pregnancy: incidence and associated health behaviors in a rural population. *Matern Child Health J* 2007;11:495–503.
- Cha S, Masho SW. Intimate partner violence and utilization of prenatal care in the United States. *J Interpers Violence* 2014;29:911–27.
- Mogos MF, Araya WN, Masho SW, *et al.* The feto-maternal health cost of intimate partner violence among delivery-related discharges in the United States, 2002–2009. *J Interpers Violence* 2016;31:444–64.
- Fanslow J, Silva M, Whitehead A, *et al.* Pregnancy outcomes and intimate partner violence In New Zealand. *Aust N Z J Obstet Gynaecol* 2008;48:391–7.
- Hall M, Chappell LC, Parnell BL, *et al.* Associations between intimate partner violence and termination of pregnancy: a systematic review and meta-analysis. *PLoS Med* 2014;11:e1001581.
- Walton-Moss BJ, Manganello J, Frye V, *et al.* Risk factors for intimate partner violence and associated injury among urban women. *J Community Health* 2005;30:377–89.
- Brownridge DA, Taillieu TL, Tyler KA, *et al.* Pregnancy and intimate partner violence: risk factors, severity, and health effects. *Violence Against Women* 2011;17:858–81.
- Martin SL, Li Y, Casanueva C, *et al.* Intimate partner violence and women's depression before and during pregnancy. *Violence Against Women* 2006;12:221–39.
- Holden KB, McKenzie R, Pruitt MV, *et al.* Depressive symptoms, substance abuse, and intimate partner violence among pregnant females of diverse ethnicities. *J Health Care Poor Underserved* 2012;23:226.
- Daugherty JD, Houry DE. Intimate partner violence screening in the emergency department. *J Postgrad Med* 2008;54:301.
- Crandall ML, Nathens AB, Kernic MA, *et al.* Predicting future injury among women in abusive relationships. *J Trauma* 2004;56:906–12.
- Dawson AJ, Rossiter C, Doab A, *et al.* The emergency department response to women experiencing intimate partner violence: insights from interviews with clinicians in Australia. *Acad Emerg Med* 2019;26:1052–62.
- Agency for Healthcare Research and Quality A., 2017. Available: <https://www.hcup-us.ahrq.gov/nisoverview.jsp> [Accessed January 2018].
- World Health Organization. *The ICD-10 Classification of Mental and Behavioural Disorders: Diagnostic Criteria for Research*. Vol 2. World Health Organization, 1993.
- Cunradi CB, Level D. Drinking level, neighborhood social disorder, and mutual intimate partner violence. *Alcohol Clin Exp Res* 2007;31:1012–9.
- Finnbogadóttir H, Baird K, Thies-Lagergren L. Birth outcomes in a Swedish population of women reporting a history of violence including domestic violence during pregnancy: a longitudinal cohort study. *BMC Pregnancy Childbirth* 2020;20:1–10.
- Agency for Healthcare Research and Quality (AHRQ) AfHRAQ. *Description of data elements. Healthcare Cost and Utilization Project (HCUP)*. Rockville, MD: Agency for Healthcare Research and Quality, 2016.
- Ingram DD, Franco SJ. *NCHS Urban-Rural Classification Scheme for Counties*. Vital And Health Statistics Series 2, Data Evaluation And Methods Research, 2017: 1–65.
- Version release 14StataCorp. 2015. Statistical software.
- Beydoun HA, Williams M, Beydoun MA, *et al.* Relationship of physical intimate partner violence with mental health diagnoses in the nationwide emergency department sample. *J Womens Health* 2017;26:141–51.
- Rangachari P. Coding for quality measurement: the relationship between hospital structural characteristics and coding accuracy from the perspective of quality measurement. *Perspect Health Inf Manag* 2007;4:4.
- Singh JA, Yu S. Emergency department and inpatient healthcare utilization due to hypertension. *BMC Health Serv Res* 2016;16:303.
- Saberi E, Eather N, Pascoe S, *et al.* Ready, willing and able? A survey of clinicians' perceptions about domestic violence screening in a regional hospital emergency department. *Australas Emerg Nurs J* 2017;20:82–6.
- Usta J, Antoun J, Ambuel B, *et al.* Involving the health care system in domestic violence: what women want. *Ann Fam Med* 2012;10:213–20.
- Hegarty K, O'Doherty L, Taft A, *et al.* Screening and counselling in the primary care setting for women who have experienced intimate partner violence (WEAVE): a cluster randomised controlled trial. *Lancet* 2013;382:249–58.
- O'Doherty LJ, Taft A, Hegarty K, *et al.* Screening women for intimate partner violence in healthcare settings: abridged Cochrane systematic review and meta-analysis. *BMJ* 2014;348:g2913.