GYNECOLOGY

Trends in pelvic inflammatory disease emergency department visits, United States, 2006–2013

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BACKGROUND: Pelvic inflammatory disease is a female genital tract disorder with severe reproductive sequelae. Because of the difficulties in diagnosing pelvic inflammatory disease, it is not a reportable condition in many states. Females seeking care in emergency departments are a sentinel population for pelvic inflammatory disease surveillance.

OBJECTIVE: The objective of the study was to determine trends in diagnoses of acute pelvic inflammatory disease in a nationally representative sample of emergency departments.

STUDY DESIGN: All emergency department visits among females aged 15–44 years with an *International Classification of Diseases*, ninth revision, Clinical Modification diagnosis code indicating pelvic inflammatory disease during 2006–2013 were assessed from the HealthCare Utilization Project Nationwide Emergency Department Sample. Total and annual percentage changes in the proportion of pelvic inflammatory disease emergency department visits were estimated using trend analyses.

RESULTS: While the number of emergency department visits among females aged 15–44 years during 2006–2013 increased (6.5 million to 7.4 million), the percentage of visits because of pelvic inflammatory disease decreased from 0.57% in 2006 to 0.41% in 2013 (total percentage change, 28.1%; annual percent change, −4.3%; 95% confidence interval, −5.7% to −2.9%). The largest decreases were among those aged 15-19 years (total percent change, −40.6%; annual percentage change, −6.6%; 95% confidence interval, −8.6% to −4.4%) and living in the South (total percentage change, −38.0%; annual percentage change, −6.2%; 95% confidence interval, −7.8% to −4.6%). Females aged 15-19 years who lived in the South had a 47.9% decrease in visits because of pelvic inflammatory disease (annual percentage change, −8.4%, 95% confidence interval, −10.4 to −6.5). Patients living in ZIP codes with the lowest median income (<$38,000) had the highest percent of visits with a pelvic inflammatory disease diagnosis; the smallest declines over time were in patients living in ZIP codes with the highest median income (i.e., >$64,000, total percent change, −24.4%; annual percent change, −3.8%; 95% confidence interval, −5.2% to −2.4%). The percentage of emergency department visits because of pelvic inflammatory disease was highest among patients not charged for their visit, self-paying, or those covered by Medicaid, with total percentage changes in these 3 groups of −27.8%, −30.7%, and −35.1%, respectively. Patients with Medicaid coverage had the largest decrease in visits with a diagnosis of pelvic inflammatory disease (total percent change, −35.1%; annual percent change, −5.8%; 95% confidence interval, −7.2% to −4.3%).

CONCLUSION: Nationally representative data indicate the percentage of emergency department visits with a pelvic inflammatory disease diagnosis decreased during 2006–2013 among females aged 15-44 years, primarily driven by decreased diagnoses of pelvic inflammatory disease among females aged 15–19 years and among women living in the southern United States. Despite declines, a large number of females of reproductive age are receiving care for pelvic inflammatory disease in emergency departments. Patients with lower median income and no or public health insurance status, which may decrease access to and use of health care services, consistently had the highest percentage of emergency department visits because of pelvic inflammatory disease. Future research should focus on obtaining a better understanding of factors influencing trends in pelvic inflammatory disease diagnoses and ways to address the challenges surrounding surveillance for this condition.

Key words: chlamydia, emergency department, gonorrhea, pelvic inflammatory disease, trends

Pelvic inflammatory disease (PID) is an infection of the upper female genital tract, producing inflammation of the endometrium, fallopian tubes, and/or peritoneum as well as tuboovarian abscesses.[1] Based on self-report data from the National Health and Nutrition Examination Survey, approximately 2.5 million women of reproductive age have received a PID diagnosis in their lifetime.[2]

Acute PID can result in adverse reproductive sequelae such as chronic pelvic pain, infertility, and ectopic pregnancy. Approximately 40% of PID diagnoses are symptomatic; 10–20% of these cases result in infertility or ectopic pregnancy.[1,3] Acute PID can result from untreated bacterial infections; *Chlamydia trachomatis* (CT) and *Neisseria gonorrhoeae* (GC) are frequently identified.[4-8] CT and GC are the 2 most commonly reported notifiable diseases in the United States; screening of females at risk for these sexually transmitted infections (STIs) can help to reduce the risk of PID.[9-11]

Monitoring trends in PID is difficult because there is no single test for its diagnosis.[12] There is no laboratory-based case definition and laparoscopy (the gold standard for diagnosis) is infrequently used, so clinicians often rely on signs and symptoms for diagnosis.[13] Symptoms of PID may be mild, nonspecific, or absent, making its diagnosis often imprecise. As such, in many jurisdictions, PID is not a reportable condition (required to be reported to public health authorities), and its surveillance relies on the use of alternative data sources.

Population-based surveys provide estimates of women reporting a history of PID and show that women of lower

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TABLE 1
ICD-9-CM codes, associated descriptions, and distribution of codes used to identify acute PID among women aged 15-44 years visiting EDs, HCUP, United States, 2006–2013[a]

ICD-9-CM code	Diagnosis	All diagnoses, %
098.10	Gonococcal infection (acute) of upper genitourinary tract, site unspecified	0.07
098.16	Gonococcal endometritis (acute)	0.02
098.17	Gonococcal salpingitis, specified as acute	0.05
098.19	Other gonococcal infection (acute) of upper genitourinary tract	0.12
098.86	Gonococcal peritonitis	0.53
099.56	Other venereal diseases due to *Chlamydia trachomatis*, peritoneum	0.06
614.0	Acute salpingitis and oophoritis	1.12
614.2	Salpingitis and oophoritis not specified as acute, subacute, or chronic	4.66
614.3	Acute parametritis and pelvic cellulitis	9.41
614.5	Acute or unspecified pelvic peritonitis, female	0.26
614.8	Other specified inflammatory disease of female pelvic organs and tissues	0.60
614.9	Unspecified inflammatory disease of female pelvic organs and tissues	75.41
615.0	Acute inflammatory diseases of uterus, except cervix	1.36
615.9	Unspecified inflammatory disease of uterus	6.34
	Total	100.00

ICD-9-CM, International Classification of Diseases, Ninth Revision, Clinical Modification; *PID*, pelvic inflammatory disease; *ED*, emergency department; *HCUP*, Healthcare Utilization Project.

[a] There is the possibility of >1 diagnosis code indicating acute pelvic inflammatory disease per visit.

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socioeconomic status (SES) frequently report a history of PID.[2,14] Although these survey data provide insight into the epidemiology of PID in the United States, temporal trends are difficult to interpret because biases from self-report may change over time.

Administrative claims data have been used to monitor trends in PID based on diagnostic codes, which may be less likely to change over time; however, previous studies of PID trends have focused on privately insured women and may not represent all US women.[15]

Because no single data source can fully elucidate trends in PID diagnoses in the United States and to complement previously published studies from population-based surveys and administrative claims data of privately insured women, we examined trends in PID diagnoses among females seeking care in emergency departments (EDs). The HealthCare Utilization Project (HCUP) Nationwide Emergency Department Sample (NEDS) gathers data from ED visits across the United States. In this study, we analyzed data from the HCUP NEDS database to determine trends in diagnoses of acute PID in a nationally representative sample of EDs.

Materials and Methods

Data source

Data were analyzed from the HCUP NEDS database, the largest all-payer, publicly available database of ED visits across the United States (http://www.hcup-us.ahrq.gov/). During 2006–2013, HCUP provided data from 24–30 states, representing 25.7 million to 31.0 million annual ED visits. Weights were used to calculate national estimates representing up to 120 million to 135 million ED visits annually (https://www.hcup-us.ahrq.gov/db/nation/neds/NEDS2013Introduction.pdf).

For each ED visit, the database included information about geographic, patient, and visit-specific characteristics; race/ethnicity and laboratory data were not included. Approval from the Centers for Disease Control and Prevention's Institutional Review Board was not required because the data are publicly available and permanently deidentified.

Case definition

For each year during 2006–2013, we selected all ED visits among females aged 15-44 years and assessed the proportion of visits in which acute PID was diagnosed. This population was selected because females of reproductive age are most likely to experience the adverse sequelae resulting from PID. Acute PID diagnoses likely represent incident cases and were the focus of these analyses.

International Classification of Diseases, ninth revision, Clinical Modification (ICD-9-CM) diagnosis codes were used to identify visits in which acute PID was diagnosed.[16] We selected visits with an ICD-9-CM code indicating acute PID in any of 15 diagnostic code fields. Diagnoses of acute infections of the upper genitourinary tract as well as inflammatory diseases of the female reproductive tract (Table 1) were included.[15,17-19] It is possible for a person to be represented more than once if they had ≥1 ED visit for acute PID in ≥1 years. Person-based analyses were not possible because of the lack of patient-level identifiers.

Covariates of interest

We examined acute PID visits by a number of covariates, including age, income, type of health care coverage, and the geographic region of the hospital. Ages were grouped into 5 year categories: 15–19, 20–24, 25–29, 30–34, 35–39, and 40–44 years. Income was assessed as the median household income quartile for the patient's residential

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