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Under-Reporting of Pelvic Inflammatory Disease in Hawaii: A Comparison of State Surveillance and Hospitalization Data

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Abstract

Hawaii is one of only 19 states for which pelvic inflammatory disease (PID) is a mandated notifiable disease. In order to assess the completeness of PID reporting, we compared the number of hospitalized PID cases in the state of Hawaii with the total number of PID cases reported to the Hawaii State Department of Health surveillance system from 2007 through 2010. While 828 unique PID cases were diagnosed in Hawaii hospitals, only 240 unique PID cases were reported through the state's surveillance system. Severe PID underreporting was seen despite mandatory reporting laws.

Keywords

Pelvic inflammatory disease; Surveillance; Hospitalizations

Introduction

Pelvic inflammatory disease (PID) is a spectrum of inflammatory disorders of the upper female reproductive tract. Many cases are related to sexually transmitted bacteria most notably *Neisseria gonorrhoeae* and *Chlamydia trachomatis* [1, 2]. These bacteria can move from the cervix to the uterus, fallopian tubes, and ovaries with serious sequelae such as chronic pelvic pain, ectopic pregnancy, and infertility. Prompt diagnosis and treatment of PID are essential to prevent or limit tissue damage and scarring. However, it is difficult to achieve early detection because symptoms of PID are often mild, vague, or unrecognized. Although PID can be treated with antibiotics, any damage that has already occurred is not reversible [2].

The Centers for Disease Control and Prevention (CDC) estimates that about 750,000 women in America experience an acute episode of PID annually, and 10–15 % of cases result in infertility [3]. Although PID is a serious infectious disorder, it is only deemed “notifiable” in 19 states, the District of Columbia, and Puerto Rico [4]. Even in the states and territories that require notification of PID diagnoses, reporting can be inconsistent and incomplete [5].

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Without dependable reporting, incidence and prevalence of diseases, trends, and assessments of control and prevention programs can be distorted and inaccurate.

In Hawaii, PID is a notifiable disease with legal implications for noncompliance (Hawaii Administrative Rules, Title 11, Department of Health, Chapter 156, Communicable Diseases, Hawaii State Department of Health). However, Hawaii PID notification (like that of all states with mandatory PID reporting) is based on passive surveillance. Passive surveillance systems have known limitations [6]. Specifically for PID, Stephens et al. [7] determined that passively collected surveillance data are limited because of likely underreporting by diagnosing providers, suggesting that additional data sources are necessary to measure and monitor PID incidence.

Administrative data sets are another source for disease surveillance data and have been commonly used for various medical conditions [8]. The population coverage of many administrative data sets, along with their timeliness and low cost, make them a popular source for surveillance research [8]. Hospital discharge diagnosis data, a component of administrative data sets, offer another means to assess PID occurrence.

The objective of this study was to compare the number of hospitalized PID cases in the state of Hawai'i with the total number of PID cases reported to the Hawaii State Department of Health (HDOH) surveillance system. This would allow an assessment of possible underreporting of PID in Hawaii. However, it is important to note that PID is usually treated in an ambulatory care setting; only an estimated 9–15 % of women with PID are hospitalized [9]. Thus, a count of PID diagnoses among hospitalized cases will grossly underrepresent the full number of PID cases within a community. Ideally, the count of PID cases from hospitalization discharge data should be much smaller than the total number of cases identified through the state's surveillance system which would include PID cases from both inpatient and outpatient sources.

Methods

Data from the Hawaii Health Information Corporation (HHIC) was used to assess inpatient PID hospitalized cases. HHIC collects, cleans and disseminates data on all hospitalizations in Hawaii, including information on demographics and diagnoses. Diagnoses from each visit are available from one primary and 19 secondary International Classification of Diseases—9th revision—Clinical Modification (ICD-9) codes. Long-term care and psychiatric hospitals are excluded from the HHIC dataset [10]. HHIC data allows the identification of unique individuals across all hospitals in Hawaii. Because we did not wish to double count PID cases, we considered hospitalizations by unique individuals. All 248,483 hospitalizations by 138,090 unique females aged 14 years or older from January 2007–December 2010 in Hawaii were investigated.

Pelvic inflammatory disease diagnosis of hospitalized patients was identified with relevant ICD-9 codes [11]. These included salpingitis and oophoritis, parametritis and pelvic peritonitis, pelvic inflammatory disease, and inflammatory disease of the uterus, except

cervix (Table 1). PID diagnoses were identified across all possible primary or secondary diagnostic fields.

The aggregate number of PID cases reported to HDOH by year during the same time period was used for comparison purposes (HDOH unpublished data). All statistical analyses were performed using STATA 12 (StataCorp. 2011. Stata Statistical Software: Release 12. College Station, TX: StataCorp LP).

Results

A total of 828 unique hospitalized PID cases were identified using the HHIC database. During the same time period, the HDOH surveillance database included only 240 unique PID cases (Table 2). The magnitude of the differences between these two data sources varied slightly by year, though in every year there was at least a threefold difference with consistently less cases identified through the HDOH surveillance database. Both hospitalization and HDOH surveillance trends demonstrated a decline in the number of annual PID cases identified during the study period.

Discussion

The discrepancy between the number of diagnosed hospitalized PID cases and the number of cases identified through the HDOH passive surveillance system is an underestimate of the severity of PID under-reporting in Hawaii, as <15 % of women with PID are treated in hospital [9]. Also, 54.7 % of the women with PID in our study population had more than one PID hospitalization for a total of 1,261 hospitalizations by the 828 unique women, providing additional opportunities for a provider or administrator to report the case.

Healthcare providers are primarily responsible for reporting notifiable diseases, but face many barriers [7]. For example, many physicians don't know which diseases are reportable [12, 13]. Others believe that the reporting process is too time-consuming and difficult, or think that no useful action will result from notifications [13].

The challenge of diagnosing PID presents a particular barrier. No diagnostic test exists for PID [14]. PID also has broad case definitions, along with variable signs and infectious etiologies, which can result in inconsistent and imprecise diagnoses. If physicians are not completely confident in their diagnosis, they may be less likely to report a PID case [7].

In our study, PID hospitalizations as well as HDOH reported cases of PID decreased slightly from 2007 to 2010. This decline corresponds with a shift in care for PID from inpatient to outpatient settings, as well as a decrease in PID diagnoses overall. A recent California study found that PID hospitalization rates declined from 1991 to 2001 [11]. Sutton et al. [15] observed an overall decrease in PID diagnoses from 1995 to 2001 in both inpatient and outpatient settings. Bohm et al. [9] demonstrated that rates of PID diagnoses among privately insured women declined from 2001 to 2005. Data from the National Hospital Discharge Survey from 2001 to 2009 and National Disease and Therapeutic Index from 2001 to 2010 have also shown a consistent decrease in PID cases from both inpatient and outpatient settings [16].

This study had several limitations. The first relates to ICD-9 coding. As PID is a clinical diagnosis without definitive laboratory or radiographic confirmatory findings, the ICD-9 coding accuracy may be imperfect [11]. However, this is the case with many conditions. Second, because of the overall shift in treatment of PID from inpatient to outpatient settings, it is likely that the snapshot provided by the HHIC dataset is incomplete, indicating even greater PID under-reporting than identified in this study. Furthermore, PID cases included in the HHIC database represent only the most severe cases. PID frequently goes undiagnosed as many women experience mild symptoms or may even be asymptomatic [1, 2].

The data collected confirms that although PID is a mandated reportable disease in Hawaii, it is severely underreported. Strategies to improve the state PID surveillance system and encourage physicians to report PID are needed. Our findings underscore the need for a more valid estimate of PID incidence in Hawaii to allow for improved PID prevention and control.

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Table 1

ICD-9 codes used for pelvic inflammatory disease identification among hospitalized patients in Hawaii, 2007–2010

ICD-9 Code	Description
614.0–614.2	Salpingitis and oophoritis
614.3–614.5	Parametritis and pelvic peritonitis
614.7–614.9	Pelvic inflammatory disease
615.0, 615.1, 615.9	Inflammatory disease of the uterus, except cervix

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Comparison of unique pelvic inflammatory disease (PID) cases diagnosed in Hawaii's hospitals [Hawaii Health Information Corporation (HHIC) data] with unique cases identified through Hawaii State Department of Health (HDOH) surveillance data, 2007–2010

Table 2

	2007	2008	2009	2010	Total
Number of PID cases in HHIC data	231	227	207	163	828
Number of PID cases identified by HDOH surveillance data	69	58	62	51	240
Ratio of case reports HHIC:HDOH	3.3:1	3.9:1	3.3:1	3.2:1	3.5:1