



Research Article

Health Disparities in Patients with Congestive Heart Failure Exacerbations in Los Angeles County

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Abstract

Background: Congestive Heart Failure (CHF) is a leading cause of death in the USA, with over 500,000 new cases diagnosed each year. While rates of CHF exacerbation across all races and ethnicities decreased from 2005 to 2009, the number of Black patients with CHF exacerbation who present in Los Angeles (L. A.) County Emergency Departments (ED) remained the highest. We examine disparities in CHF exacerbation rates in L. A. County, and in Los Angeles Service Planning Area (SPA) 6, and compare CHF-related outcomes, and the disposition of these patients post-ED visit.

Methods: This is a retrospective analysis using the Office of Statewide Health Planning and Development (OSHPD) Emergency Department, and Ambulatory Surgery Center database from 2005 to 2009. We used the following variables: congestive heart failure, ICD-9 code 428.0, age, gender, race/ethnicity, insurance status, and disposition. Univariate and descriptive statistics identified distributions of the study variables. There were a total of 13,766 in the study population.

Results: SPA 6 had higher hospitalization rates across all races and ethnicities, compared to L.A. County as a whole. Blacks constitute 9.1% of the County population, but represented 32% of patients diagnosed with CHF in the ED. Only about 10% of L. A. County's population resides in SPA 6, yet over 22% of the entire County's CHF patients reside there.

Conclusions: CHF continues to disproportionately affect Black individuals in L.A. County, and younger adults in SPA 6. Our results indicate that residing in this service planning area, in addition to race, can predict greater likelihood of presenting with CHF exacerbation in the ED, and greater likelihood of hospitalization. Future research on the association of CHF exacerbation with different sociodemographic measures among minority, underserved and disadvantaged patients is needed. These can identify and help mitigate inequities and weaknesses in our health care system, which are manifest through stark health disparities among different racial, ethnic and socioeconomic groups.

Keywords: Congestive Heart Failure; CHF Exacerbation; Emergency Department; Hospitalization; Race; Health Disparities.

ED : Emergency Department

SPA : Service Planning Area

Abbreviations

CHF : Congestive Heart Failure

L.A. : Los Angeles

OSHPD : Office of Statewide Health Planning and Development

Introduction

Affecting more than six million people a year, heart failure extracts a heavy toll in morbidity, mortality, and health care costs in the United States [1]. A Congestive Heart Failure (CHF) exacerbation is characterized by the development of dyspnea. This is generally associated with the rapid accumulation of fluid within the lung's interstitial and alveolar spaces, the result of acutely

elevated cardiac filling pressures [2]. Over 500,000 new cases of CHF are diagnosed every year, and CHF incidence and mortality are higher in the Black community than among White patients [3-5].

There are eight Service Planning areas (SPAs) in Los Angeles County, California. SPA 6 includes the cities of Athens, Compton, Crenshaw, Florence, Hyde Park, Lynnwood, Paramount, and Watts. Historically, this planning area has been medically underserved, and plagued with poor access to health care, with expected poor health outcomes [6]. According to the 2009 Los Angeles County Public Health Report, SPA 6 had the highest percentage of obese adults, and higher rates of diabetes, coronary heart disease, and stroke death than all other SPAs [6].

CHF is a leading cause of hospital admissions, particularly in underserved populations [7]. Research suggests that hospitalization rates may be reduced through access to quality care [8]. A preliminary search of the literature, however, revealed little additional findings on racial, ethnic and demographic factors and rates of CHF exacerbations, specifically among patients presenting to emergency departments in SPA 6 and in Los Angeles (L. A.) County.

Specific Aims and Goals

We first assessed five-year trends of CHF exacerbations in Emergency Departments (EDs) in Los Angeles County from 2005 to 2009. We also compared CHF prevalence, and certain demographic factors of adults who presented with CHF in SPA 6, and in L. A. County as a whole. Lastly, we examined differences in patient disposition after the ED visit between SPA 6, and the entire County.

Our study goal was to provide insight into the CHF exacerbation population seen in the emergency department in L. A. County, and in SPA 6. Our research was intended to lay the foundation for future studies involving congestive heart failure in underserved populations, as found in these populations. We sought to identify structural and demographic factors that contribute to observed health disparities, and to provide conclusions and recommendations that might improve health outcomes in our study population. Findings may guide future CHF research in identifying patients at risk for CHF exacerbation, and reduce both overutilization of emergency department services, and subsequent hospitalization rates.

Materials and Methods

This is a retrospective analysis of Emergency Department and Ambulatory Surgery Center data, from the Office of Statewide Health Planning and Development (OSHPD. www.oshpd.ca.gov). These data represent basic, standby, or comprehensive medical service encounters in hospitals licensed to provide emergency medical services. Each record consists of one outpatient encounter

or service visit. Data collected include demographic information, clinical details, and expected payer and facility information. We included all ED visits in California from 2005 to 2009, due to a congestive heart failure exacerbation identified using ICD-9 code 428.0. Our study variables included:

- Age.
- Gender.
- Race/ethnicity as White, Black, Hispanic, and Asian/Other.
- Disposition as discharged home, hospitalized, transferred, left against medical advice, or expired.
- Insurance type, or method of payment.
- Principal diagnosis.

Subject records with missing or masked demographics were excluded, as were patients younger than 18, and those who resided outside of L. A. County. The prevalence of CHF exacerbation rates was calculated by dividing the number of admissions by the number of the population at risk. Univariate and descriptive statistics were used to identify distributions of the study variables. Chi-square tests determined statistical difference in the prevalence of CHF between SPA 6, and the rest of Los Angeles County. Data were analyzed using SAS version 9.4 (SAS Institute Inc, Cary, NC). In all cases, $p < 0.05$ was considered statistically significant.

Results

We identified 13,766 patients with congestive heart failure exacerbation who presented to the emergency department in Los Angeles County from 2005 to 2009 (Table 1). Whites constituted the largest percentage (41.1%), followed by Blacks (32%), Hispanics (20.9%), and Asians/Other (6.1%). It is significant to note that the corresponding racial/ethnic demographic composition of L.A. County is 30.1% White, 9.1% Black, 47.3% Hispanic, and 13.5% Asian/Other.

Race/ Ethnicity	Total no. of CHF cases	% of CHF Cases in L. A. County	% of L.A. County Population
White	5644	41.07%	30.10%
Black	4397	31.99%	9.10%
Hispanic	2869	20.87%	47.30%
Asian/Other	834	6.07%	13.50%
Age Range			
Under 1 year	NA	NA	NA
1-17 years	NA	NA	NA
18-34 years	302	2.20%	NA
35-64 years	5439	39.57%	NA
65 years or greater	8003	58.23%	NA
Gender			

Male	6689	48.67%	49.50%
Female	7055	51.33%	50.50%
Service Planning Area (SPA)			
SPA 1	448	3.27%	3.42%
SPA 2	2388	17.45%	21.10%
SPA 3	1904	13.92%	18.36%
SPA 4	1256	9.18%	12.39%
SPA 5	585	4.28%	6.25%
SPA 6	3042	22.23%	10.24%
SPA 7	1560	11.40%	13.56%
SPA 8	2500	18.27%	15.78%
NA = Not Available			

Table 1: Congestive heart failure exacerbation cases seen in the Emergency Department in Los Angeles County (2005-2009).

We also noted that SPA 6 represents only 10.2% of the total L.A. County population, but reported 22.2% of all CHF exacerbations. In contrast, SPA 8 represents 15.8% of the L.A. County population, but reported only 18.3% of CHF exacerbations. The Black population in SPA 6 also suffered an alarmingly high and disproportionate prevalence of CHF exacerbation (84.2%) seen in the ED, followed by Hispanics (10.6%), Whites (3.12%), and Asians/Other (2.0%) (Table 2).

Race/Ethnicity	Total CHF cases seen in ED	% of CHF Cases in ED Encounters
White	95	3.12%
Black	2562	84.22%

Hispanic	323	10.62%
Asian/Other	62	2.04%
Age Range		
Under 1 year	NA	NA
1-17 years	NA	NA
18-34 years	95	3.12%
35-64 years	1714	56.34%
65 years or greater	1233	40.53%
Gender		
Male	1470	48.32%
Female	1572	51.68%

Table 2: Congestive heart failure exacerbation cases seen in SPA 6 emergency departments (2005-2009).

SPA 6 also had the highest prevalence of CHF exacerbation from 2005 to 2009, compared to the other service planning areas (Table 3). During this period, the mean CHF exacerbation rate was highest for Blacks, at 136.8 per 100,000 per year. For Whites, Hispanics, and Asians/Other, the rate was 47.3, 20.3, and 14.9 per 100,000, respectively. There was a decrease in CHF exacerbation across all races and ethnicities from 2005 - 2009 ($p < 0.001$). However, prevalence during this time period was the highest for the Black population, relative to all other races and ethnicities ($p < 0.001$).

	2005-2009 (Mean)	2005	2006	2007	2008	2009
White						
N	1129	1336	1217	1137	1017	937
Population	2388231	2427135	2404210	2384459	2376037	2349313
Ratio*	47.27	55.04	50.62	47.68	42.80	39.88
Black						
N	879	951	983	1020	706	737
Population	642772	646414	643563	641222	641034	641626
Ratio*	136.7514879	147.12	152.74	159.07	110.13	114.86
Hispanic						
N	573	599	623	580	556	511
Population	3072510	2955497	2991504	3031737	3184452	3199360
Ratio*	18.64924768	20.27	20.83	19.13	17.46	15.97
Asian/Other						

N	167	156	156	170	188	164
Population	1076288	1049363	1060326	1073100	1089820	1108831
Ratio*	15.51629304	14.87	14.71	15.84	17.25	14.79
*per 100,000						

Table 3: Congestive heart failure exacerbation cases in L.A. County (N) from 2005 to 2009 by race and ethnicity.

In L.A. County and in SPA 6, the majority of patients were discharged home (Table 4). This was followed by hospitalization, transfer to a different location, leaving against medical advice, and expiring, in that order. In SPA 6, 28.6% of White CHF exacerbation patients were hospitalized, followed by Asians/Other (25.8%), Blacks (18.6%), and Hispanics (18.0%). Hospitalization rates in SPA 6 were higher, though, for all races and ethnicities, compared to L.A. County as a whole ($p < 0.001$).

L. A. County	Discharged Home	Hospitalized	Transferred	Left Against Medical Advice	Expired
White	4030 (71.4%)	855(15.2%)	360(6.4%)	261(4.6%)	47(0.8%)
Black	3195 (72.7%)	710(16.2%)	182(4.1%)	278(6.3%)	12(0.3%)
Hispanic	2228 (77.7%)	343(12%)	136(4.7%)	119(4.2%)	12(0.4%)
Asian/Other	590(70.7%)	132(15.8%)	56(6.7%)	40(-4.8%)	7(0.8%)
SPA 6					
White	56(59.0%)	27(28.4%)	9(9.5%)	3(3.2%)	0
Black	1797 (70.1%)	476(18.6%)	113(4.4%)	162(6.3%)	6(0.2%)
Hispanic	224(69.4%)	58(18.0%)	13(4.0%)	20(6.2%)	1(0.3%)
Asian/Other	37(59.7%)	16(25.8%)	5(8.1%)	2(3.2%)	1(1.6%)

Table 4: L. A. County and SPA 6 discharge outcomes for CHF patients seen in the ED.

Discussion

Heart disease remains a serious medical condition in the United States. However, its prevalence has decreased from 2005 to 2009 in Los Angeles County, benefiting all races and ethnicities. L. A.’s Black population, however, still exhibits the highest prevalence of CHF exacerbation each year, compared to other races and ethnicities. Our investigation reveals that, between 2005 and 2009, Blacks represented almost 32% of all CHF cases in the County, despite constituting only about 9% of its population. SPA 6 was especially hard hit. Over 22% of the entire County’s CHF cases were seen in its EDs, although SPA 6’s population is only about 10% of the County as a whole.

CHF is labeled an “Ambulatory Care Sensitive Condition” (ACSC) by the Agency for Healthcare Research and Quality (AHRQ) [9]. This indicates that the condition and its adverse effects could be avoided or minimized through timely and appropriate health intervention and services [10]. Our findings and other research suggest that, despite available preventive clinical guidelines to reduce CHF-related hospitalizations [11], many patients are not benefiting from screening, diagnosis and treatment recommendations [5].

Socioeconomic factors may explain this disparity, at least in part. South Los Angeles constitutes a large part of this service planning area. It has the County’s highest poverty levels, largest percentage of families with multiple children, highest percent of adults with less than a high school education, lowest percent of adults with a college or post-graduate degree, the highest unemployment rate, the highest percent of single adults, and the highest percent of uninsured individuals [6]. SPA 6 also has the highest percent of individuals reporting difficulty accessing medical care. Access to services as a social determinant of health may help explain why Blacks exhibit the highest CHF exacerbation prevalence, both in SPA 6 (84.2%) and in L. A. County as a whole (32%).

Economic factors may also explain the high prevalence of CHF exacerbation rates among Blacks in SPA 6, who represent almost a third of its population. This service planning area had a higher percent of self-pay (16.7%) and Medicaid (18.5%) patients, compared to all of L.A. County, at 12.2% and 13.9%, respectively. Insurance coverage, or the lack thereof, are also seen to affect the type and frequency of medical care patients seek, as well as follow up visits, and even filling necessary prescriptions. SPA 6 had the highest number of individuals who said they could not afford needed

medication [4]. For those who suffer from or are predisposed to CHF, sociodemographic factors can even determine whether a patient receives care and treatment from a cardiologist [12].

Our results also show that the majority (56.3%) of CHF exacerbation patients in SPA 6 were 35 to 64 years old. In L.A. County, the majority (58%) of CHF exacerbation patients were 65 and older. This is significant in that CHF has been found to be the most frequent cause of hospitalization among individuals 65 years of age or older [3]. The fact that younger people in SPA 6 are almost equally affected suggests limitations in access to healthcare, the quality of healthcare received, and essentially how managing CHF in this area appears limited in both inpatient and outpatient settings.

In comparison to all of L.A. County, SPA 6 CHF exacerbation patients across all races and ethnicities were hospitalized more often, with the highest rates in California [3]. Limitations in accessible and available inpatient and outpatient care may worsen existing conditions among SPA 6 residents, especially Blacks. Patients with heart disease, for example, may present at emergency departments with severe exacerbations after delayed treatment and care, and with a higher likelihood of requiring hospitalization.

Limitations

This is a retrospective, observational study. We were limited to records in the OSHPD Emergency Department database, from 2005 to 2009. Patients may have visited the emergency department for multiple CHF exacerbation events. However, the dataset does not distinguish between separate visits, or events involving the same individual. As a result, one person may have had multiple exacerbations, which are reported separately in OSHPD.

We did not have access to information about patients' comorbidities, CHF severity, medication adherence patterns, or number of visits per year to his or her primary care physician. This may have been helpful in identifying other factors, such as compliance and pre-existing conditions, associated with CHF exacerbations treated in the emergency department.

Conclusions

Our findings indicate that: 1) SPA 6 suffered the highest burden of CHF exacerbations, compared to all other SPAs; 2) Blacks are consistently and disproportionately affected with CHF exacerbations compared to other races and ethnicities, every year from 2005 to 2009; 3) a younger population in SPA 6 was affected by CHF exacerbations, compared to the rest of L.A. County; and 4) all races and ethnicities living in SPA 6 were more likely to be hospitalized for a CHF exacerbation, compared to L.A. County as a whole.

Improving these health outcomes appears to depend on overcoming barriers in access to regular and quality healthcare, and through patient education and outreach. Clearly, enabling better routine and preventative primary care and other provider visits, and access to free or affordable prescriptions is warranted. This is especially true for the Black population, which appears to suffer disproportionately from CHF, as well as other negative health outcomes. Future research on the association of CHF exacerbation with different sociodemographic measures among minority, underserved and disadvantaged patients is needed. These can identify and help mitigate inequities and weaknesses in our health care system, which are manifest through stark health disparities among different racial, ethnic and socioeconomic groups.

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