Short Research Article

Mental Illness and Medical Co-morbidity Using Automated Surveillance Data: BioSense 2008 – 2011

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ABSTRACT

Background: Recent national surveys indicate that 5% of ambulatory care visits involved patients with mental disorder diagnosis.

Objective: The objective of this study is to demonstrate the use of automated surveillance data for describing the burden of co-morbidity among patients with mental illness.

Methods: We used Emergency Department (ED) visits data from over 650 non-federal hospitals that participated in BioSense from 2008-2011. The variables used in this descriptive analysis are age, gender, and syndromes as defined by BioSense program. The study included only ED visits from people of ≥ 18 years old and with the discharge diagnosis ICD-9-CM codes of mental illness (290 – 312). Co-morbidity was defined broadly as the co-occurrence of other medical condition among patients with mental illness in the same ED visit regardless of the chronological order. We used 89 syndromes as defined by BioSense to identify co-morbid conditions. The percentage was calculated as the number of ED visits with concomitant mental illness associated with co-morbidity divided by the total number of mental illness relevant visits.

Results: From 2008-2011, a total of 4.6 million ED visits (5.4%) reported mental illness out of 85.1 million visits. Among ED visits with concomitant mental illness, the most common co-morbid conditions were cardiovascular (37%), diabetes (11%), and asthma (7%). One third of the broad “other” category was related to chest and abdominal pain co-morbid conditions.

Conclusion: Prevalence and complexity of mental health and co-morbidity underscores the need to prevent, recognize, and address in a timely matter such a serious public health problem. Receiving information quickly using automated data allows local, state, and federal public health decision makers not only to provide timely situational awareness but also monitor healthcare utilization for chronic conditions. BioSense holds large amounts of data that can be utilized for national public health surveillance and practice.

Keywords: mental health, co-morbidity, public health practice, information systems, hospital records, population surveillance

1. INTRODUCTION

Mental illness is an important public health problem both on its own and because the condition is associated with other chronic diseases (1,2). Recent national surveys indicate that 5% of ambulatory care visits involved patients with a diagnosis of a mental disorder (3). BioSense is a national automated biosurveillance system developed by the Centers for

Diseases Control and Prevention to provide rapid assessment of all-hazards health events and to enable health situational awareness (4). Although the system is designed for early detection and rapid assessment of all-hazards health events, BioSense can also be used to examine patterns of healthcare utilization. The objective of this report is to demonstrate the use of automated surveillance data for describing the burden of co-morbidity among patients with a diagnosis of mental illness.

2. METHODS

We used Emergency Department (ED) visits data from over 650 non-federal hospitals that participated in BioSense. Details of BioSense are described elsewhere (4). We analyzed BioSense data from 2008 – 2011 by single years as well as the aggregate. The variables used in this descriptive analysis are age, gender, and syndromes as defined by BioSense Program. The study included only ED visits from people of ≥ 18 years old and with the discharge diagnosis ICD-9-CM codes of mental illness (290 – 312). Mental illness was further categorized as schizophrenia (295), mood disorders (296, 300.4, 311), and anxiety, stress & adjustment disorders (300.0, 300.2, 300.3, 308, and 309) (1). For the purpose of this study, co-morbidity was defined broadly as the co-occurrence of other medical condition among patients with mental illness in the same ED visit regardless of the chronological order (2). We used 89 syndromes as defined by BioSense to identify co-morbid conditions. The BioSense syndromes were assigned based on free-text chief complaints and discharge diagnoses (4). Syndromes that contributed 5% and more to ED visits with concomitant mental illness were included in this study. Using these criteria, 14 syndromes (abdominal pain, asthma, cardiac dysrhythmias, chest pain, diabetes mellitus, dyspnea, falls, headache, heart disease, hypertension, injury non-specific (NOS), nausea & vomiting, sprains & strains, and urinary tract infection) were identified. Based on literature review, these 14 selected BioSense syndromes were categorized into the following: cardiovascular, asthma, diabetes, and other (2,5,6). Hypertension, heart disease, and cardiac dysrhythmias were included in cardiovascular group; chest pain, abdominal pain, dyspnea, nausea and vomiting, headache, falls, injury NOS, sprains and strains and urinary tract infection were included in a broad “other” category. The percentage was calculated as the number of ED visits with concomitant mental illness associated with co-morbidity divided by the total number of mental illness relevant visits.

3. RESULTS AND DISCUSSION

From 2008-2011, a total of 4.6 million ED visits (5.4%) reported mental illness out of 85.1 million visits. Average age of those who reported mental illness in ED visits was 44 (18 - 100) years; 55% visits were by women and 45% visits were by men. Among men, 17% ED visits were related to mood disorders followed by anxiety, stress & adjustment disorders (10%), and schizophrenia (4%). While among women, 28% ED visits were related to mood disorders followed by anxiety, stress & adjustment disorders (18%), and schizophrenia (2%). The Figure 1 shows an increase in the percentage of visit with mental illness in the middle and older age groups for all mental illness categories.

From 2008-2011, among ED visits with concomitant mental illness ICD-9-CM codes, the most common listed comorbid conditions were cardiovascular (37%), diabetes (11%) and asthma (7%) (Table 1). One third of the broad “other” category was related to chest and abdominal pain comorbid conditions. These findings were consistent over the 4 years of study period.

The results are consistent with prior reports of common conditions among people with mental illness such as cardiovascular disease, diabetes, asthma etc. with possibility of their

synergistic relationship (1, 5-10). Similar pattern was found for almost all mental illness visits increasing with the age (11-12). Understanding co-morbid conditions affecting persons with adult mental illness may assist programs providing medical care for the mentally ill. Prevalence and complexity of mental health and co-morbidity underscores the need to prevent, recognize, and address in a timely matter such a serious public health problem (2). Receiving information quickly using automated or electronic data allows local, state, and federal public health decision makers not only to provide timely situational awareness but also monitor healthcare utilization for chronic conditions.

The findings of this study are subject to several limitations. This study data reflects only co-occurrence of multiple conditions and cannot speak to causality or temporality. Mental illness was listed as any one of the diagnosis and not necessarily the primary reason for that ED visit. It only includes data on mental illness and co-morbidity recorded by hospital ED s while people who sought care in other settings or did not seek care were not included in this study. BioSense receives ED visits data from voluntary participation of hospitals and therefore the geographic coverage is not representative of US population (4).

Table 1. Number and percent of Emergency Department (ED) visits with concomitant mental illness and co-morbid conditions: BioSense data 2008 - 2011

	ED visits with mental illness							-		
	2008		2009		2010		2011		2008-2011	
Co-morbid conditions:	N= 1,028,064[a]	%	N= 1,146,704[a]	%	N= 1,210,669[a]	%	N= 1,177,216[a]	%	N= 4,562,653[a]	%
Cardiovascular	358,852	34.9	421,922	36.8	460,459	38.0	433,377	36.8	1,674,610	36.7
Hypertension	238,288	23.2	283,271	24.7	310,857	25.7	297,880	25.3	1,130,296	24.8
Heart disease	65,673	6.4	75,594	6.6	80,966	6.7	72,840	6.2	295,073	6.5
Cardiac dysrhythmias	54,891	5.3	63,057	6.6	68,636	5.7	62,657	5.3	249,241	5.5
Diabetes	109,233	10.6	128,131	11.1	140,648	11.6	134,217	11.4	512,229	11.2
Asthma	70,615	6.9	82,162	7.2	84,171	6.9	79,786	6.8	316,734	6.99
Other	766,973	74.6	855,895	74.6	922,344	76.2	880,967	74.8	3,426,179	75.1
Chest pain	136,894	13.3	147,990	12.9	156,154	12.9	147,821	12.5	588,859	12.9
Abdominal pain	118,241	11.5	135,006	11.8	151,118	12.5	146,888	12.5	551,253	12.1
Dyspnea	82,675	8.0	89,835	7.8	94,316	7.8	88,881	7.5	355,707	7.8
Nausea and vomiting	98,696	9.6	112,903	9.8	124,222	10.3	115,799	9.8	451,620	9.9
Headache	71,689	7.0	81,902	7.1	84,820	7.0	80,571	6.8	318,982	7.0
Falls	72,222	7.0	83,739	7.3	90,511	7.5	87,453	7.4	333,925	7.3
Injury, NOS	72,377	7.0	76,812	6.7	82,028	6.8	79,833	6.8	311,050	6.8
Sprains & strains	57,401	5.6	63,041	5.5	68,541	5.7	67,066	5.7	256,049	5.6
Urinary tract infection	56,778	5.5	64,667	5.6	70,634	5.8	66,655	5.7	258,734	5.7

[a]The numbers for cardiovascular group, diabetes, asthma and other group will not add up to total because Emergency Department visits can have multiple co-morbid condition codes

N: Number, Injury NOS: Injury Not Otherwise Specified

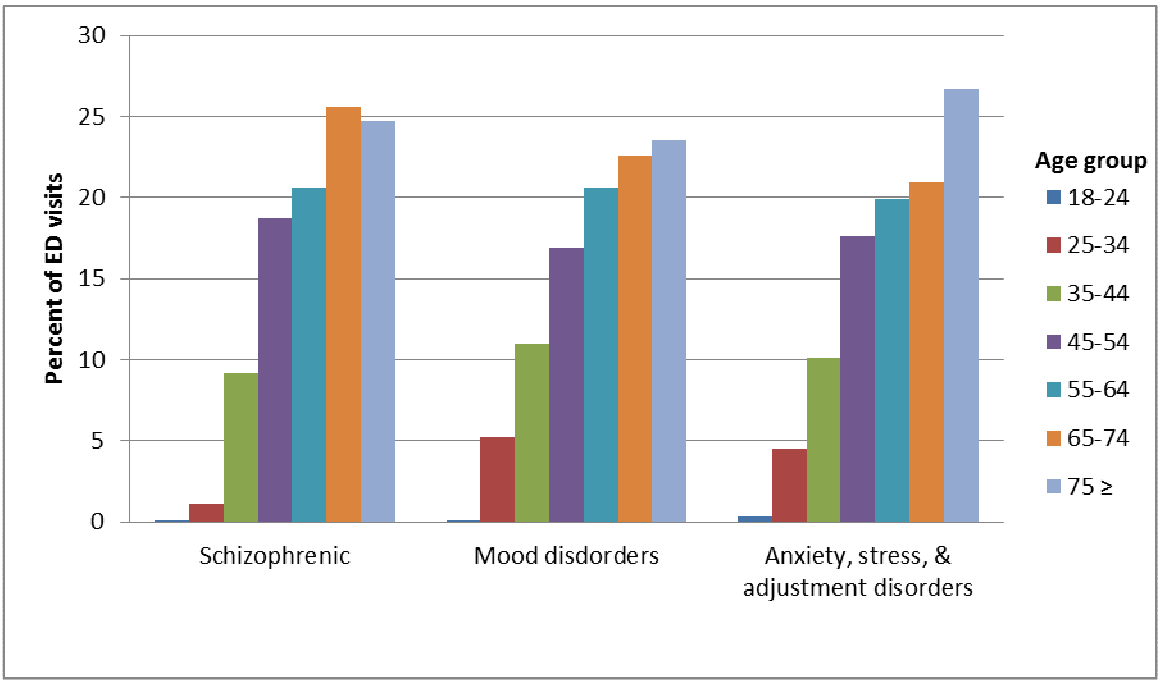

Figure 1: Percent of Emergency Department (ED) visits with selected mental illness by age group: BioSense 2008-2011

4. CONCLUSION

Despite these limitations, the study explores the potential utility of the automated syndromic surveillance data for analysis of non-communicable diseases such as mental illness, heart disease, diabetes, etc. Automated electronic systems provide timely data without burdening healthcare personnel with manual medical chart abstraction. BioSense holds large amounts of data that can be utilized for national public health surveillance and practice. In addition, making efficient use of electronic data collected for syndromic surveillance should be considered to support public health actions.

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