

Research Article

Utilization and Demographic Trends of a Southeast Emergency Department: Psychiatric Visits by the Adult Population over a 5 Year Period

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• Mental health; Mental illness; psychiatric diagnoses; Psychotic disorders; Anxiety disorders

Abstract

Introduction: Mental illness is highly prevalent in the United States and approximately 43.8 million people experience mental illness in a year. The number of people seeking care for mental illness in the emergency department (ED) is increasing and it is the fastest growing component of emergency medical services.

Methods: We employed retrospective data of 22,711 psychiatric visits by adults aged 19 years and above who visited the ED of a tertiary medical center over a 5-year period (2010-2014). We studied demographics characteristics of the population and we examined psychiatric visits and discharge diagnoses by date of presentation and service hour. Proportions, frequency and chi-square values were provided.

Results: The number of ED psychiatric visits increased by 5.1% in 2014 compared to 2010. During the study period, males accounted for most visits (55%) and most visits (56%) occurred after regular office hours. The period June-August accounted for the highest number of visits (26.57, n= 6,035) followed by March-May (25.98%, n=5,900). There were more visits on weekdays and Tuesday had the highest number of visits (15%, n=3,409) and the least number of visits was on Sunday (1.3% n=2,956). The most prevalent ED psychiatric diagnoses were substance use disorder (37.7), anxiety disorders (20.7), mood disorders (20.1) and schizophrenia and other psychotic disorders (12.8%).

Implications: There is a necessity to meet the growing needs of people with mental health problems using the ED and also address factors driving the use of the ED for mental health problems.

ABBREVIATIONS

ED: Emergency Department; ICD-9: International Classification of Diseases Nine; DSM-IV: Diagnostic and Statistical Manual of Mental Disorders; NC: North Carolina; SC: South Carolina; US: United States

INTRODUCTION

The burden of mental illness in the United States (US) is profound [1-4]. Increased utilization of emergency departments (EDs) by mental health patients contributes to this burden exponentially. The number of people seeking care for mental illness in EDs is growing [2,5-7] and it is the fastest emerging component of emergency medical practice [4,8,9]. The increased use of the ED by patients with mental illness is compounded by the decreasing number of EDs in the US over the past two decades [4,7]. Utilization of EDs by the persons with mental health diagnosis not only exacerbates overcrowding and wait times, but also contributes to 'hospital boarding' [4,7,10], lack of access to appropriate care [4], and increased cost of hospital resources [11,12].

Mental illness is the leading cause of disease burden in the United States and accounts for more disability than any other group of illnesses including cardiovascular and circulatory diseases and cancer [13,14]. Approximately 1 in 5 American adults or 43.8 million people have a diagnosable mental illness in a year [15]. While most of these illnesses are not incapacitating, 1 in 25 or nearly 10 million adults have serious functional impairments due to a mental illness [15].

A critical step to address the increased utilization of EDs and associated hospital costs for adults with mental illness is to better understand the service utilization trends of this population. Understanding these demographic trends is important in projecting healthcare needs, improving mental health access to quality care, and providing implications for developing policies. This study was undertaken to ascertain the utilization and demographic trends of the adult population who visited the ED in a suburban tertiary care center for mental health visits over a 5-year period. We also hope to replicate the study over time in order to determine trends in evaluating mental health issues. Specifically, we explore utilization of the ED for mental health

visits by month and weekday. This paper also examines the common diagnoses that present to the ED by year, month and week day.

MATERIALS AND METHODS

Study design

A retrospective study of all psychiatric visits of adults aged 19 years and above who visited the ED between January 1, 2010 and December 31, 2014 was explored. An interdisciplinary team consisting of a psychiatrist, psychiatric residents, nurse practitioners, and psychiatric social workers evaluated all adults. The team met on a daily basis to review all cases presenting in the previous 24 hours, and the team's attending psychiatrist determined the adults' diagnosis and entered it into the electronic health record [16].

Study setting and population

The data used in this study was obtained from medical and administrative records from a suburban tertiary hospital in the Upstate South Carolina (SC) for the study period. We identified psychiatric visits of men and women using the primary International Classification of Diseases Nine (ICD-9) diagnosis codes of 290.0 to 319.0. The records of patients 18 years and younger were excluded from the study.

Measures

We obtained information on age, sex, race, insurance source, diagnosis, discharge status, year of visit, the day of the week visit took place, and time of visit from patient medical record. Psychiatric visits are defined as; mental health diagnosis, mental health reason for visits and /or psychotropic drug prescription [16]. This study was approved by the hospital Institutional Review Board (IRB).

Data analysis

The study population was categorized into six age groups: ages 19-24 years; 25-34 years; 35-44 years; 45-54 years; 55-64; and 65 years and older. The time of presentation/admission was categorized into regular hours (between 8am and 5pm) and after hours (before 8am and after 5pm). The mental health related diagnoses were categorized into 10 groups based on the (DSM-IV) Diagnostic and Statistical Manual of Mental Disorders, 4th Edition (1. Substance-related disorders 2. Disorders first usually diagnosed in infancy, childhood, or adolescence (we include this group because of the transition from adolescent into adulthood and the cumulative changes that can impact individual's life-course transition) 3. Mood disorders 4. Anxiety disorders 5. Adjustment disorders 6. Personality Disorder 7. Schizophrenia and other psychotic disorders 8. Mental disorders due to a general medical condition not elsewhere classified 9. Impulse-control disorders not elsewhere classified and 10. Eating or Sleep Disorders). We compared demographic characteristics among the age groups using chi-square test with provision of percentages; p-values < 0.05 were considered statistically significant. The number of psychiatric ED visits was aggregated by year, month, day of the week and we provided frequencies and percentages for the number of visits by year and day of the week. Data analysis was done using SAS software, Version 9.3 (Statistical Analysis System, Cary, NC) and the graphs were created with excel.

RESULTS

ED psychiatric utilization by patient demographics

The study population had 22,711 ED psychiatric visits during the study period which accounted for 89.38% of the total psychiatric ED visits in the study timeframe. A detailed description of the study population characteristics is displayed in Table (1). The study population was made up of White (71%), Black (23%) Hispanic (3.9%) and other racial/ethnic groups (1.9%). Frequent psychiatric visits to the ED were predominantly males (55%) while females accounted for (45%). Those between the ages of 25-34 were more likely to visit the ED in both females and males (24.4% and 24.1% respectively). Overall, there was a higher percentage of uninsured (43.6%) followed by Medicare (22.5%), Medicaid (17.2%), commercial insurance (15.9%), and other insurance (0.8%).

The number of uninsured was higher among males (49.7%) than females (35.7%) as shown in Table (1). A higher percentage of females (15.8%) compared to males (12.5%) were more likely to be admitted to a psychiatric facility (Table 1).

Mental health visits by year, month and day of the week

Mental health visits increased from n=4,435 visits in 2010 to n=4,662 visits in 2014 (5.1% increase) though there was no appreciable increase over the study period. Approximately (56%) visits were more likely to occur after regular hours, whereas (44%) of visits occurred during regular hours. The number of visits increased in all age groups in 2014 compared to 2010 except in age groups 35-44 years. The number of visits among adults 45- 54 years decreased from n=1,014 in 2010 to n=980 in 2014 and n= 968 in 2010 to n=961 in 2014 respectively. As illustrated in Figure (1), age groups 25-34 years remain fairly constant and accounted for most of the visits throughout the study period (2010-2014).

Throughout the study period (January 1, 2010-December 31, 2014), there was a significant increase in the diagnostic presentations and trends by year, month and day of the week for adult. The summer months of June to August accounted for most visits (26.57, n=6,035) followed by March-May (25.98%, n=5,900) September-November (24.57%, n=5,580) and December-February (22.88%, n=5,196). Majority of the visits (15%, n=3,409) were more likely to occur on Tuesday with (13%, n=2,956) of visits least likely to occur on Sunday. Overall, the weekend accounted for 26.7% of the visits as shown in Figure (2).

Mental health diagnosis by year, month and day of the week

Over the five year period, substance related disorders accounted for most of the psychiatric ED visits (Figure 3) followed by anxiety disorders or mood disorders, however, percentage differences varies from year to year (Figure 3). Substance use disorders accounted for 37.7% of the visits during the study period while anxiety disorders, mood disorders and schizophrenia and other psychotic disorders accounted for 20.7%, 20.1% and 12.8% respectively. The number of substance use disorder decreased by 11.1% in 2014 compared to 2010

Table 1: Characteristics of the study population.

Characteristics	Female		Male		Chi-square
Race					
White	7647	(74.8)	9252	(74.1)	0.0004
Black	2219	(21.7)	2670	(21.4)	
Hispanic	243	(2.4)	371	(3.0)	
‡Other	110	(1.1)	196	(1.6)	
Age Group					
19-24 years	1417	(14)	1681	(13.5)	<.0001
25-34 years	2472	(24.4)	2992	(24.1)	
35-44 years	2240	(22.1)	2584	(20.8)	
45-54 years	2042	(20.1)	2840	(22.9)	
55-64 years	1155	(11.4)	1626	(13.1)	
65+ years	825	(8.1)	696	(5.6)	
Insurance Plan					
Commercial	1792	(17.5)	1826	(14.6)	<.0001
Medicaid	2240	(21.9)	1645	(13.2)	
Medicare	2459	(24.1)	2711	(21.7)	
Uninsured	3645	(35.7)	6199	(49.7)	
‡Other insurance	83	(0.8)	104	(0.8)	
Discharge Status					
Home	6714	(65.7)	8168	(65.4)	<.0001
Psych Facility	1617	(15.8)	1562	(12.5)	
Other Facility	897	(8.8)	940	(7.5)	
§AMA	415	(4.1)	593	(4.8)	
*Other	576	(5.6)	940	(7.5)	

Abbreviations: §AMA: Against Medical Advice. ‡Other race represents other racial/ethnic minorities like Asians and American Indians. † Other insurance include commercial, workers compensation and for example, state paid funds for persons incarcerated. *Other discharge status includes outpatient services and other psychiatric facilities: *Significance level: $p < 0001$

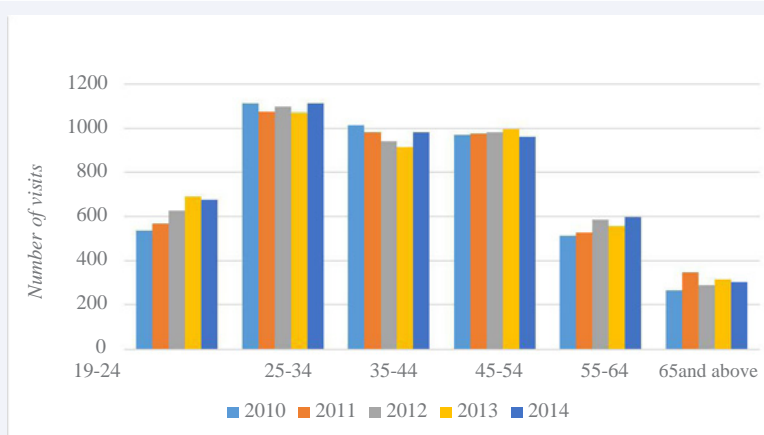


Figure 1 Number of Psych ED visits per year by Age group.

($n=1,773$ visits in 2010 and $n=1,576$ visits in 2014) whereas, the number of anxiety disorders increased from $n=813$ in 2010 to $n=1,226$ in 2014 (50.8% increase). Additionally, the number of mental health visits to the ED for mood disorders decreased from $n=958$ in 2010 to $n=855$ in 2014 (10.8% decrease) whereas, adjustment disorders and schizophrenia and other psychotic disorders increased from $n=79$ and $n=558$ in 2010 to $n=131$ (65.8%) and $n=640$ (14.7%) in 2014 respectively.

Substance use disorders were most prevalent in May (9.3%,

$n=795$) followed by August (9.1%, $n=777$) comparing month to month. However, seasonally the percent of adults visiting the ED for substance use disorders was highest in the summer months. For example, in June-August (26.9%, $n=2,301$) March-May (25.9%, $n=2,222$) September-November (24.2%, $n=2,077$) and December-February (22.9%, $n=1,965$) respectively. Visits for adults diagnosed with anxiety disorders in May were (9.5%, $n=448$) however, during the months of June-August they were more likely to visit the ED for increased anxiety disorders (26.7%, $n=1,257$) September-November (25.9%, $n=1,220$) March-May

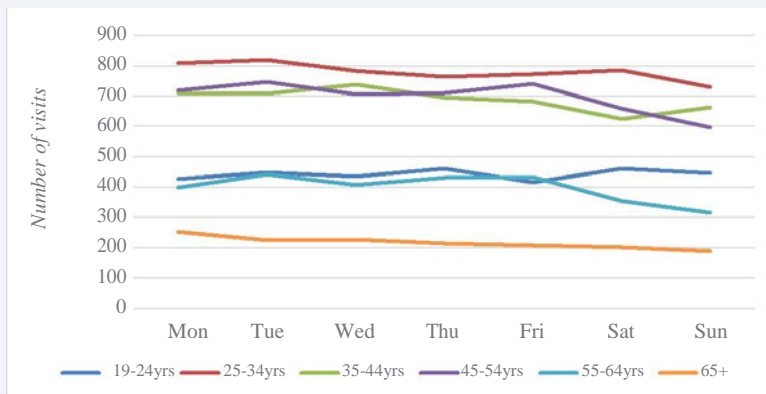


Figure 2 Mental health visit by Weekday and Age group.

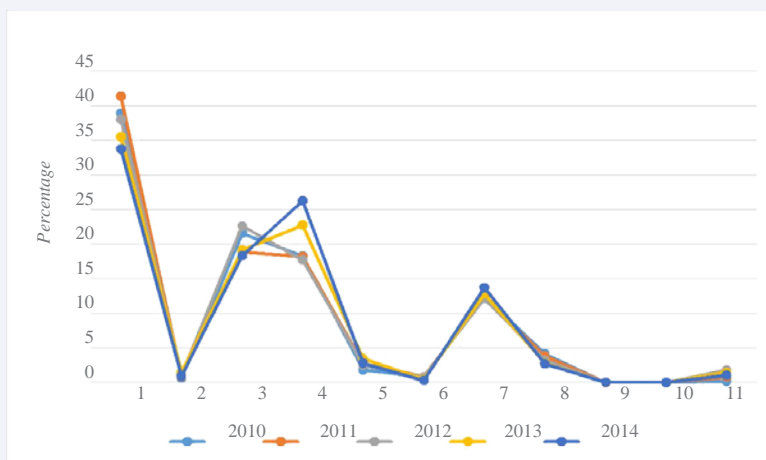


Figure 3 Diagnostic group by year.

1. Substance-related disorders 2. Disorders first usually diagnosed in infancy, childhood, or adolescence 3. Mood disorders 4. Anxiety disorders 5. Adjustment disorders 6. Personality Disorders 7. Schizophrenia and other psychotic disorders 8. Mental disorders due to a general medical condition not elsewhere classified 9. Impulse-control disorders not elsewhere classified 10. Eating or Sleep Disorders 11. All others

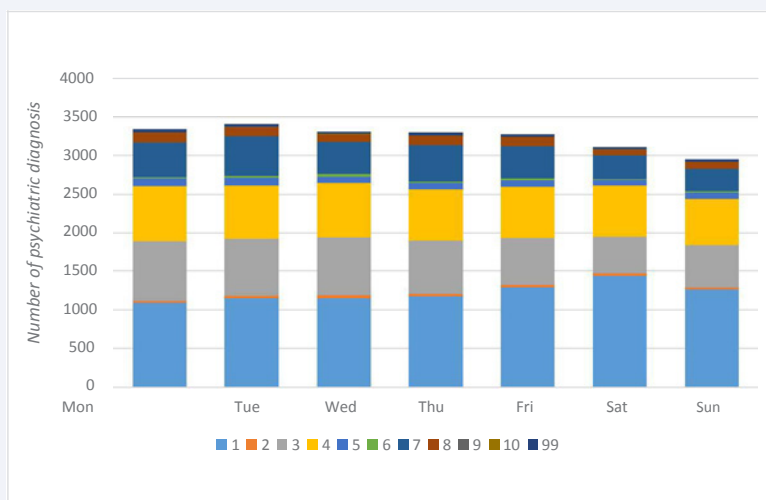


Figure 4 Emergency department psychiatric diagnostic group by weekday.

1. Substance-related disorders 2. Disorders first usually diagnosed in infancy, childhood, or adolescence 3. Mood disorders 4. Anxiety disorders 5. Adjustment disorders 6. Personality Disorders 7. Schizophrenia and other psychotic disorders 8. Mental disorders due to a general medical condition not elsewhere classified 9. Impulse-control disorders not elsewhere classified 10. Eating or Sleep Disorders 11. All others

(25.4%, n=1,194) and December-February (22%, n=1,035). The analysis also shows that adults with mood disorders were most likely to visit the ED in January (9.7%, n=441) June-August (26.3%, n=1,201) and December-February (23.6%, n=1,080). The month of June (9.2%, n=267) had the most visits to the ED for diagnosis of schizophrenia and other psychotic disorders. Increased visits for diagnosis of schizophrenia and other psychotic disorders were between June-August (26.3%, n=2,301) followed by March-May (26.2%, n=758), September-November (24%, 694) and, December-February (23.5%, n=682). Adjustment disorders were most prevalent between March-May (28.7%, n=173) followed by June-August (25.4%, n=153), September- November (23.6%, n=142) and December- February (22.6%, n=136).

As evident in Figure (4), these trends followed the frequency of ED psychiatric diagnostic groups by weekday. Most visits for mood disorders occurred on Mondays (17%, n=775) followed by Wednesdays (16.4%, n=748), Tuesdays (16%, n=731) and Thursday (14.9%, n=679) which is similar to the distribution for anxiety disorders.

Mondays (15.2%, n=715), Wednesdays (14.9%, n=700), Tuesdays (14.8%, n=696) and Thursday (14.3%, n=672). The number of visits for substance use disorders was highest on Saturday (16.8%, n=1,437) followed by Friday (15.1%, 1,295) and Sunday (14.8%, n=1,267) as depicted in Figure (4). Adjustment disorder visits was most common on Monday (16.6%, n=100) while schizophrenia or other psychotic disorders was on Tuesday (17.7%, n=513).

DISCUSSION

Employing retrospective data from 2010 - 2014, the study explores utilization and demographic trends of psychiatric visits for adults presenting to the ED by year, month and weekday. The measures year, month and weekday are strategically important in reference to placement of staff when they can have a more meaningful impact on patient care delivery. Additionally, strategic placement of personnel will also have a positive economic impact on ED utilization. Thus, detailed knowledge of the temporal component of the presentation of diagnoses can help to create more effective prevention and intervention measures.

Consistent with previous studies [1,5,8,9,19-21] on ED utilization and trends, our study found a 5.1% increase in 2014 in the number of mental health visits to the ED. One possible explanation for this increase is the presence of increased mental health personnel's including a full time psychiatrist, psychiatric residents, and psychiatric social workers in the ED. Thus, most of the visits occurred after regular hours and majority of the visits were due to substance use disorders. Substance use problems are argued to be a contributing factor of mental health visits to the ED throughout the US [5,6,8,9,22]. Similarly, Curran and colleagues [22] found that in the Southern US patients with substance use and psychiatric comorbidity were significantly more likely to visit the ED. It has been postulated that factors such as 24 hours' accessibility of the ED, poor community mental health coverage, dearth of insurance, social support, homelessness, and increased rate of mental illness in the general population are plausible reasons for the increased ED visits [2,5,8,23-25]. The Upstate of SC is composed of 10 counties in the westernmost

part of the state and includes: Greenville, Spartanburg and Anderson counties [16]. Due to the lack of umbrella programs addressing dual diagnoses (substance use and mood disorder) in these counties, patients are more likely to be undertreated, and therefore their only option is the ED. Additionally, as a result of problematic disposition patients will use the ED as a safe haven. It could also be argued that treatment plans without an emphasis on substance use in this population of ED high utilizers may place patients at higher risk for failure and this could be perceived as a poor quality of care.

The ED mental health visit was made up primarily of White and African Americans, a reflection of the demographic composition of Upstate SC. Frequent visits were made by males in the younger age groups (between 19-64 years) while females had a higher percentage in the older age group (65 years and above). This finding is consistent with previous studies showing higher utilization of health services for female in all ethnic groups [26,27].

It has been suggested that people with mental illness are more likely to be uninsured [28,29], or depend on Medicaid and other public health insurance [1]. These factors increase the risk for lack of primary care, resulting in increased ED utilization. Xiang and colleagues [2] argued that medical comorbidity has higher incidences among adults with mental illness, which poses additional barriers to access to care in a timely manner. Mental illness is associated with downward social drift, which would also be manifested with being in a lower socio-economic class. This in turn is associated with lack of health insurance [28].

Our study found that the summer months (June to August) had the highest number of mental health visits. It could be argued that summer is a time when there are less structured activities such as school and those who are parents are more likely to experience increased stress as a result of having children at home. The increased substance use also places individuals at risk for an ED visit, directly as result of substance use or indirectly through experiencing mental health visits that are exacerbated by substance abuse. However, the most common diagnoses found were mood disorders, anxiety disorders, adjustment disorder, schizophrenia and other psychotic disorders and presented more frequently on weekdays, while substance use disorders were more prevalent on Fridays and weekends. This pattern may be partly explained by the effect of psychosocial work environment (such as high job demands, and low occupational social support) on mental health during the week day [30-32]. Cultural norms in our society promote relaxation and recreational activities on non-work days which tend to be the weekend, which may offer some explanation for the increased incidents of substance use disorder presentations on weekends. Theoretically, the impact of work related stress and depression on ones' mental health may be the result of ED utilization trends during the weekday. Also, in the demographic groups referred to as the working poor (those below the poverty level), time off for medical reason are likely to result in the patient being penalized by their employer also impacting their stress level for ED visits.

A number of limitations to this study should be noted. First, employing retrospective data the variables available for analysis were limited. Also, the study population was limited to a small

geographic region, which limits its generalizability. Secondly, ED mental health visits may not have been captured completely due to reliance on diagnostic codes as studies have shown underestimation of medical disorders when diagnostic codes are relied upon [19]. Also, our study focused on the trends and did not address factors that may lead to increase use of the ED for mental health problems. Factors such as homelessness and lack of family support among patient with mental illness that can lead to increased ED utilization were not addressed. Additionally, a psychiatric diagnosis may have been an important reason for ED visit which may have been addressed poorly as the primary diagnosis was listed as a non-psychiatric.

CONCLUSION

Despite the study's limitations, and in light of its strengths (large and multi-year design), the findings have important clinical and policy implications. We demonstrated increased utilization of the ED for mental health problems in a tertiary center with most of the visits occurring after regular office hours. Our findings underscore the need to provide mental health services around the clock and seven days a week in the ED. Additionally, there is a need to address the factors that may be driving the use of the ED as the initial point of entry into the healthcare system as over utilization of the ED translates into greater limitations overall on ED and hospital resources. From both clinical and policy perspectives, few would contest that frequent use of the ED is not an optimal treatment approach. Thus, this study will serve as a benchmark for monitoring mental health visits and diagnostic trends in our ED. Further research should focus on establishing practical screening and prevention methods to re-direct initial access to mental health care. In addition, this research can be instrumental in providing impetus for enhancing medical education and training regarding use of preventive measures and well as comprehensive diagnostic practices.

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