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Research Article

Behavioral Health Hospitalizations in Central California: Are Demographics and Clinical Characteristics Accurate Predictors of Readmission Rates?

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Abstract

This study examined the question as to whether there is a positive correlation between demographics and clinical characteristics of clients enrolled in a rural community health care program, on the one hand, and behavioral health hospital readmission rates, on the other. A rural community electronic health records data bank for 2012 to 2013 was used to conduct a retrospective examination of demographics and clinical characteristics of residents age 18 and older. Enrolled individuals were either previously hospitalized or in community treatment programs or both. Non-enrolled individuals included those never hospitalized and never enrolled in community treatment programs. The researcher examined 902 records for individuals hospitalized in a rural community behavioral health acute care hospital and out-of-county behavioral health hospitals from January 1 to June 30, 2012. Data were analyzed over a 12-month period, for information on demographics and clinical characteristics, including diagnosis at admission, primary provider, length of stay, and number of hospital readmissions, as well as concurrent, prior, and discharge treatment. Simply stated, the study found that enrolled individuals had higher rates of readmission than non-enrolled individuals and that demographics in this case were indeed accurate indicators of hospital readmission rates.

Introduction

Hospital readmission rates have important implications financially and with regard to quality of care. Several studies have documented community hospital readmission rates for all medical causes, including 30-day readmissions for Mental Health (MH) and Substance Abuse (SA) disorders [1-3]. There are limited studies on behavioral health hospital readmission rates for this population. In California, approximately16% of the adult population-more than four million people-have mental health care needs. Of those, an estimated one million adults have a severe mental illness that impairs their daily functioning [4]. Without good access to health care, people resort to using the Emergency Department (ED) in community hospitals when care is needed [5]. In 2007, for example, 12 million Emergency Department (ED) visits involved a diagnosis related to an MH and or SA condition, accounting for 12.5 percent or one out of every eight ED visits. An impressive 41 percent of the ED-related visits resulted in hospitalization [6]. Mood disorder was the most common MH and SA reason for an ED visit (42.7%), followed by anxiety (26.1%) and alcohol-related conditions (22.9%). The remaining conditions included drug-related conditions, schizophrenia and other psychosis, and intentional self-harm.

In addition, hospital readmission rates for individuals with Serious Mental Illness (SMI) and SA disorder were also among the highest, based on data collected from general hospitals [1]. A similar study by Tong, et al. [7], which examined community hospitalization rates among residents of Stanislaus County from [8], found that MH and SA disorders accounted for 5.2% and 1.2%, respectively. The Institute of Medicine (IOM) publication, crossing the Quality Chasm: Adaptation to mental health and addictive disorders [9], and the New Joint Commission (JCAHO) standards represent two federal initiatives that address issues related to management of patients with MH and SA conditions [10]. Both publications focused on improving access and the overall quality of health and health care needs for patients with MH and SA conditions. The IOM initiative has focused on making health care more safe, effective, patient-centered, timely, efficient, and equitable. The JCAHO initiative has approved standard revisions

that specifically address challenges facing patients with MH and SA conditions.

Hospital readmission rates have been proposed as an important indicator of quality of care [2]. The ability to identify factors that have the potential to reduce behavioral health hospital readmissions for at-risk individuals can lead to a more effective allocation of case management resources to those with the greatest need. While there have been extensive studies on behavioral health hospital readmissions to community hospitals, the literature on readmissions rates and predictors of behavioral health hospitalizations for this population is extremely limited.

Problem Statement

The purpose of this study was to explore the characteristics of two populations of clients, those who are enrolled and those who are not enrolled in community services, along with the hospital readmission rates for these two groups. In order to examine these issues, the following research questions were explored: (1) Are demographics and clinical characteristics of clients previously hospitalized or enrolled in community treatment accurate predictors of behavioral health hospital readmission? (2) Are characteristics of new clients (Hospitalized for the first time and never previously enrolled in a community treatment program) accurate predictors of behavioral health readmissions? (3) Do characteristics of new clients vary significantly from those of enrolled clients?

Theoretical Framework

The Behavioral Model for Vulnerable Populations [11] was used to capture categorical determinants of healthcare utilization for this population. Vulnerable populations are social groups whose members have increased morbidity and mortality risks, secondary to factors such as low socioeconomic status and lack of environmental resources [12]. This model describes the determinants of access to health care and health outcomes in vulnerable populations. Health behaviors (Including Health Care Use) and health care outcomes are determined by an individual's predisposing, enabling and need factors [13]. Predisposing factors include demographic characteristics, social structure (e.g., education and employment history), homelessness, and underlying MH and SA conditions. The enabling factors include personal resources such as insurance, income, presence or absence of a regular source of health care and community resources. Need factors include self-perception of health care needs and comorbid illnesses [13]? In addition, this type of framework can assure that issues in each of these domains are addressed.

A study by Small, [11] demonstrates the utility and application of this model. In this study, the Behavioral Model of Vulnerable Populations evaluated utilization of physician visits, emergency room use, and hospitalizations for a 12-month period. The sample (n =1466) included individuals with one or more vulnerable health issues such as substance disorders, homelessness, and MH problems, victims of violent crimes, persons diagnosed with HIV/AIDS, and persons receiving public health benefits. This study found that individuals with enabling characteristics were more likely to utilize Emergency Department (ED) care and hospitalization, relative to those without vulnerable predisposing characteristics. The findings from this study suggest that vulnerable populations experience a multitude of barriers not faced by the general population and that these barriers lead in turn to different patterns of health care utilization. These findings can be helpful to health care providers, policy makers, and researchers, enabling them to better understand the motivations for health care use among this population.

Literature Review

The researcher searched the CINAHL, PubMed, and Medline databases for studies conducted on predictors for behavioral health hospital readmissions. The majority of the research focused on admissions to acute care community hospitals, medical emergency department utilization, non-adherence to or discontinuation of medications, specific psychiatric disorders as risk factors for psychiatric hospitalization, the efficacy of community interventions in preventing hospital readmissions, and government studies examining health care cost and utilization.

Admission to Community Hospital

The Agency for Healthcare Research and Quality (AHRQ) has completed several studies on readmissions to U.S. hospitals by diagnosis [1,3,14,15]. They found that MH and SA use disorders ranked among the top five diagnoses, with a 30-day all-cause readmission, accounting for about one of every five Medicaid readmissions.

Medical Emergency Department Utilization

Use of medical hospital EDs by individuals with predisposing factors such as homelessness, being uninsured, and diagnosed with MH and SA conditions are common [6,16-18]. A similar study by Karaca, et al. [19] compared characteristics of homeless and non-homeless individuals using inpatient and ED services in 2008. The sample (N = 177,056) included data from all community and mental health hospital stays by homeless patients, as well as data for treatment-and-release ED visits. There were ten states with hospitals that recorded homelessness on the discharge record: Arizona, California, Colorado, Florida, Georgia, Massachusetts, Missouri, New York, Pennsylvania, and Wisconsin. Data for treatment-and-release ED visits by homeless patients were collected from seven states that collect ED data: Arizona, Florida, Georgia, Massachusetts, Missouri, New York, and Wisconsin. Findings from this study reported that 42.8% of patients seen in EDs were uninsured. Nearly three out of four (73.7%) of inpatient hospital stays by homeless individuals began

in the ED. Mental disorders accounted for 22.4% of inpatient hospital stays and 49& of treatment and release ED visits. Schizophrenia and other psychotic disorders accounted for 33.8% of inpatient hospital stays, alcohol-related disorders accounted for 52.8% of treat-and-release ED visits, and 42.8% were uninsured. Results from this study suggest that vulnerable populations provide multidimensional health challenges for public policymakers and healthcare providers.

Characteristics of Frequent Users of Inpatient Services

Geller, et al. [20] examined the characteristics of frequent users of hospital treatment under public-sector managed care in Massachusetts between 1992 and 1995. Individuals in this study had fewer than five admissions to inpatient care in one year. Patients with multiple admissions were found to be younger and were more likely to be Caucasian and female, with a personality disorder diagnosis. In addition, patients with multiple admissions were more likely to have a history of substance abuse, but less likely to have an active diagnosis of SA disorder.

A retrospective review by Kolbasovky, et al. [21] examined administrative data from a large, northeastern Health Maintenance Organization (HMO). Index hospitalization and pre-index inpatient, emergency room, and outpatient utilization data were collected for 766 adult member's age 18 years and older at the time of hospital discharge. Sample individuals had ICD-9 codes for depression, bipolar disorder, psychotic anxiety, and other mental health disorders. Seven member characteristics were included in the study: age, gender, location of residence, marital status, Medical Delivery System, (HMO) prescription drug coverage, type of insurance coverage, and continued enrollment with the HMO for one year. The purpose of this study was two-fold: to identify administrative variables at the time of discharge and to create a model predicting hospital days for mental health conditions during a 12-month follow-up period for adult members discharged from a hospital for a mental health condition. An Ordinary Least Squares (OLS) regression model, stepwise regression, and t- test were used to analyze data. A total of 101 (13.2%) members had one or more inpatient admissions for MH conditions in the pre-index period. The average number of inpatient MH days in the hospital was 3.04. Depression (43.9%) was the most common primary index hospitalization diagnosis; 397 (51.8%) had a comorbid medical diagnosis, while 168 (21.9%) had a comorbid substance abuse diagnosis. The average length of index hospitalization was 10.45 days. The results of this study suggest that this type of model can be used to predict a member's risk for future days in the hospital for mental health conditions during the 12 months following a mental health hospitalization discharge.

Boaz, et al. [22] conducted a retrospective review of Medicaid and service use data from 2004-2008 to examine risk factors for readmission to acute care among Medicaid enrollment and claims data (Inpatient, Outpatient, and Pharmacy) on use of community services from the Florida State Mental Health authority. Characteristics of 3,563 Florida Medicaid enrollees with a schizophrenia discharge from hospitals and crisis units, who were taking antipsychotics, were examined for service use before admission, psychopharmacologic treatment after discharge, and readmission for acute behavioral health care. Cox proportional hazards regression was used to estimate risk of readmission to behavioral health acute care (Hospital or Crisis Stabilization Unit). The mean ±SD age was 43.4±11.1 and 61% were male. The ethnicity percentages were: 38% white, 32% black, 19% Hispanic, and 10% other backgrounds. The mean length of inpatient treatment was 10.6±7.0 days. In 46% of the episodes, participants were receiving antipsychotic polypharmacy on discharge. Conclusions from this study suggest that shorter inpatient stays and a shorter time receiving medication before discharge were both associated with increased risk of early readmission to acute care for persons treated with antipsychotic medication. Patients with shorter stays and those not sufficiently stabilized on their medications should receive rigorous discharge planning and follow-up care, the study concluded.

Community Treatment

Mennis, et al. [23] investigated geographic barriers to continuity of care for dually diagnosed patients (Those with co-occurring mental health and substance abuse disorders) discharged from acute inpatient psychiatric care. This included patients with co-occurring MH and SA disorders, and positive drug screen for prototypical illicit drugs at admission (N = 294). Demographics and clinical characteristics such as race, gender, chief complaint, positive drug screen on admission, length of stay, and DSM-IV-TR Axis I diagnoses were collected from hospital records. All were in-patients in an inner city hospital in Philadelphia, Pennsylvania between September 30 and December 31, 2003. Patients were referred to outpatient treatment to one of 52 community based MH programs located throughout Philadelphia. Logistic regression was employed to test the significance of each independent variable with treatment continuity. Results indicated that both longer travel time to treatment and high crime neighborhood for treatment suppress treatment continuity. Evidence from this study suggested that geographic characteristics might be a factor in determining successful community based treatment for dually diagnosed individuals. Findings from this study suggest that future research should incorporate more accurate measures of how patients actually travel to their treatment programs, as well as commute times. Both treatment providers and those conducting treatment outcome studies need to examine the role of geographic mechanisms and their potential impact on adherence to follow-up out-patient care.

Rapp, et al. [24] completed a review of 21 studies employing experimental or quasi-experimental designs to identify the

common denominators of case management interventions that produced statistically significant positive outcomes for people with psychiatric disabilities. This research included 16 randomized control studies, and five non-randomized control studies conducted in the United States. Seventeen Assertive Community Treatment (ACT) and four Strengths Models studies qualified for inclusion. Reports were significant at $p < .05$. Five levels were used to characterize the evidence in support of the selected model. The researchers found that the ACT model showed the best results for reducing psychiatric hospitalizations and keeping people engaged in treatment. Results appeared uneven, however, in terms of quality-of-life related outcomes. The Strengths Model demonstrated a positive pattern in affecting non-hospitalization outcomes. The researchers identified ten "active ingredients" of level 1 effective case management. The level 1 status requires at least six published studies with scientifically rigorous designs (RCT, well-controlled quasi-experimental), using a variety of meaningful outcomes. The most important points were: (1) Case managers should deliver as much of the "Help" or service as possible, rather than making referrals to multiple formal services. (2) Natural community resources are the primary partners. (3) Work is in the community. (4) Individual and team case management works. (5) Case managers have primary responsibility for a person's services. (6) Case managers can be para-professionals. Supervisors should be experienced and fully credentialed. (7) Caseload size should be small enough to allow for a relatively high frequency of contact. (8) Case management service should be time-unlimited if necessary. (9) People need access to familiar persons 24 hours a day, 7 days a week. (10) Case managers should encourage choice. Results from this study suggest that all persons with psychiatric disabilities should have a case manager (if they choose) whose practice conforms to the ten ingredients. Results also suggest that the ACT model is the most effective approach if one is concerned with reduction of psychiatric hospitalization use.

With regard to determining the most important points of case management based on the literature review, the authors acknowledged difficulty due to variations in stringency in research design, methodology, and outcome measures. These findings suggest that further research is needed to determine which outcome measures are meaningful indicators of patient recovery.

Methods

Study Design

This project used a descriptive and retrospective study design. Descriptive research enables a researcher to gain new insights about a particular phenomenon, develop new concepts or theoretical perspectives about the phenomenon and discover the problems that exist within the phenomenon [25].

Data Collection and Source

Data for this study were obtained from a rural community Electronic Health Record (EHR) and data warehouse. Individual de-identified sets of data were provided in Excel format by the facility Outcomes Manager, DMS/ Performance Measurement and Software Developer III. These data were received fully de-identified and compliant with the Health Insurance Portability and Accountability Act (HIPAA). The data set will not be included in the report and individuals will not be identified for the purpose of differential treatment. The investigator stored de-identified sets of data on a secure computer with access limited solely to the primary investigator. All applicable mid-size community agency and Fresno State University regulations concerning confidentiality were followed during the course of this study.

Population and Sample

The sample included all individuals hospitalized in a rural community acute care behavioral hospital or out of county acute care behavioral health hospitals from January 1 to June 30, 2012. The study included enrolled and non-enrolled individuals. Enrolled individuals were either previously hospitalized or those in community treatment or both. The non-enrolled were individuals never hospitalized and never enrolled in community treatment. Community treatment is defined as receiving services from outpatient, mental health, and AOD services.

Data for individuals in this study were followed for one year. Individuals were given a sequential identification number that was not connected to any Protected Health Information (PHI), including name, date of birth or Social Security number. Rural community agency staff maintained crosswalk documentation between the identification numbers and case numbers.

Data Sets

The aim of this study was to examine whether demographics and clinical characteristics of individuals enrolled in community treatment are different from new clients (Hospitalized for the first time and never previously enrolled in treatment) and whether these are accurate predictors of readmission rates. Demographics included age at time of hospital admission, gender, race/ethnicity, marital status, educational level, and preferred language.

Clinical characteristics included diagnoses at admission (Diagnostic and Statistical Manual (DSM-IV) codes), primary provider, employment status, housing status, date of behavioral health hospitalization, length of stay, payor source, enrollment in an out-patient program while hospitalized, discharge disposition, out-patient treatment follow-up after behavioral health hospitalization, and dates of subsequent hospitalizations (Readmissions within 30, 60, and 90 days).

Statistical Analysis

Descriptive statistics were used to analyze demographics. To analyze clinical characteristics, a variety of inferential statistics were used: t-test, chi square, and p-values with a significance level of 0.5. The Statistical Package for the Social Sciences (SPSS) 21 was used to analyze data trends.

Results

Demographic and Clinical Characteristics

This was the first study to have examined whether demographics and clinical characteristics of individuals previously hospitalized and enrolled in community treatment or both are different from new clients (Hospitalized for the first time and never enrolled in community treatment) in Central California, and whether these are accurate predictors of readmission rates. Community treatment is defined as receiving services from a community hospital, out-patient mental health, and AOD services.

Mean age of the total sample was 35 years. There were 203 males and 343 females. Of the 546 total individuals, the data were missing for 356 of them. Figure 1 and Table 1 provide a summary of sample demographics.

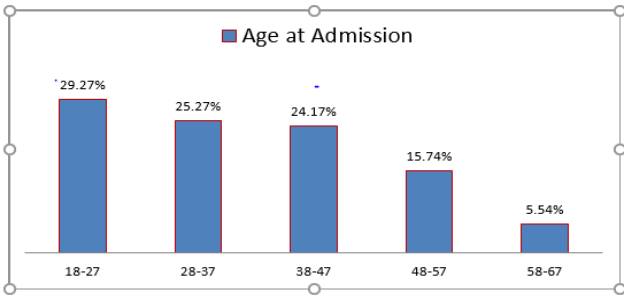

Figure 1: Age at Admission.

Demographics N=902	N	%
Gender		
Male	203	22.5
Female	343	38.9
Unknown	356	39.5
Race/ethnicity		
White	413	45.8
Hispanic	196	21.7
African American	33	3.7
Asian and other	48	6.4
Unknown or missing	212	22.4
Preferred Language		
English	663	73.5
Spanish	19	2.1
Other	11	0.3
Unknown	208	23.1
Unknown/not reported	1	1

Table 1: Demographics.

Many of the patients did not report gender, race, marital status or preferred language. With regard to marital status, the percentages were as follows: 55.8% unknown, 20.3 % never married, 6.7% married or living with partner, 4.5% divorced or annulled, and 2.8% separated. A total of 515 (74.6%) reported highest educational level completed as primary (K-8); 140 (20.3%) secondary (9^{th}-12^{th} grade); 28 (4.1%) associates degree; and 1% other. For a total of 212 (23.5 %), the data were reported as missing. Figure 2 summarizes the highest level of education completed for this sample (N = 690).

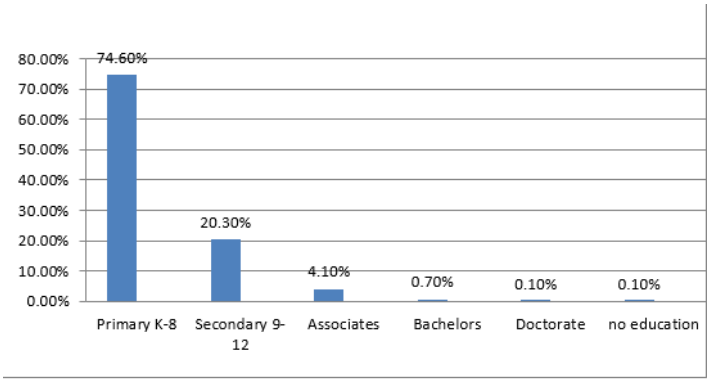

Figure 2: Highest Level of Education Completed.

Clinical characteristics included diagnoses at admission (using (DSM -IV codes), primary provider, employment status, housing status, date of behavioral health hospitalization, length of stay, payer source, enrollment in an out-patient program while hospitalized, discharge disposition, program open to after behavioral health hospitalization, and dates of subsequent hospitalizations (Readmissions within 30, 60, and 90 days). For the purpose of this study, primary diagnoses were categorized to include these diagnostic categories; Alcohol and Other Drugs (AOD), schizophrenia/schizoaffective and other psychotic disorders, affective disorders, and anxiety. Of the 707 primary diagnosis codes listed, 3.8% were AOD; 31 % schizophrenia/ schizoaffective; 60.7% affective disorders; and 4.2% anxiety. No diagnosis listed comprised 0.1%; 21.6% of the diagnostic code data were missing. A summary of diagnostic categories is presented in Figure 3.

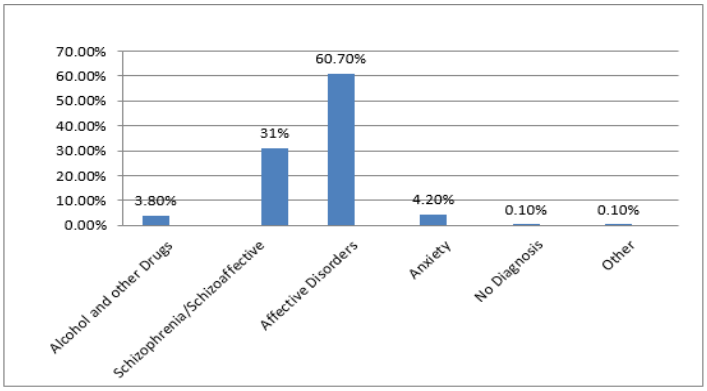

Figure 3: DSM-IV Admission Diagnoses.

Primary Provider: Of the 902 records, 192 (21.3%) reported having a primary provider; 78.7% were reported as unknown or missing.

Employment Status: N = 373 (41.4%) reported employment status; 38.4 % were unemployed and not seeking work; 33.7 % were not in the labor force; 12.4 % reported being unemployed and seeking work; 8.8 % were full-time students; 2.6 % were employed working 35 hours or more per week, while 529 (58.6%) were missing (N = 902).

Living Situation: N = 386 (42.8%) reported housing status; 26.9 % reported living in a house or apartment; 7.6% reported living in a house or apartment with support or a friend; 5% reported being homeless from Stanislaus County; 0.6 % were homeless from another county; 57.2 % were unknown or not reported; and the remaining 2.7 % included other, such as residential group/rehab, board and care or supported housing (N = 902).

Average Length Of Stay: Overall length of stay was 3.76 days (N = 902).

Insurance Status: 453 (50.2%) clients reported the payer source as Medi-Cal and 447 (49.6%) were reported as uninsured (N = 902).

Of the 902 client records, 606 enrolled individuals (Those previously hospitalized and enrolled in treatment or both) reported prior program treatment Prior treatment was highest for mental health hospital (51.1%) (N = 310) and 26.7% (N = 162) mental health treatment. The non-enrolled comparison group consisted of 296 individuals. Table 2 provides a summary of prior programs.

Program	N=606	%
AOD	28	4.6
AOD hospital	16	2.6
Mental Health Hospital	310	51.1
Mental Health	162	26.7
Mental Health/AOD	53	8.7
Mental Health/AOD Hospital	37	6.1

Table 2: Prior Program.

Descriptive statistics were used to analyze enrolled and non-enrolled group demographics. Inferential statistics (t-test and chi-square) were used to analyze clinical characteristics and differences, and p-values with a significance of 0.05. Criteria for samples are enrolled individuals either previously hospitalized or those in community treatment or both and individuals never hospitalized and never enrolled in community treatment. Community treatment is defined as being enrolled in mental health or AOD services or both.

Enrolled and Non-Enrolled Demographic and Clinical Characteristics

Characteristics were similar for enrolled and non-enrolled groups in terms of gender, race/ethnicity, and preferred language, unemployed and not seeking work.

Gender: Of the enrolled individuals, 240 (39.6%) were female, 234 (38.6%) were male, and 21.8% were listed as unknown. Of the non-enrolled individuals, 103 (34.8%) were female and 122 (41%) were male; for 203 (22.5%), the data on gender were reported as missing (N = 902).

Race/Ethnicity: Although race and ethnicity were not found to be significant, enrolled individuals reported a higher percentage. For this group, 296 (42.9%) were white. For non-enrolled individuals, the number was significantly lower: 117 (17%). The Hispanic population for enrolled was 70 (10.1%), while for non-enrolled, the number was 126 (18.3%). Enrolled and non-enrolled individuals self-reported as African American 21(3%) and 12 (1.7%), respectively. For Asian and other, the figures were 27 (3.8%) and 21 (3%), respectively. For 212 (22.4%), the data were reported as missing (N = 902).

Preferred Language: English was reported as the preferred language for both enrolled (454/50.3%) and non-enrolled (209/23.2%) individuals, with 208 (23.1%) reported as unknown. A total of 2.8% for both groups listed Spanish as their preferred language.

Employment Status: Of the 902 client records, 373 (41%) reported work status; for 529 (58.6%), those data were missing. A higher percentage of enrolled individuals (110/37%) were reported as not in the workforce and unemployed or not seeking work (114/42.2%). Results were similar for both groups with regard to being unemployed and seeking work: 37/13.7% for enrolled and 14/13.6% for non-enrolled. Overall, employment status was highest among non-enrolled individuals. Figure 4 provides a summary of employment status.

Housing Status: Of the 902 client records a higher percentage of non-enrolled individuals reported a house or apartment as their residence (82.4%), as opposed to enrolled individuals (55.4%). Enrolled individuals reported higher rates of living in a house or apartment with support (20.9%), compared to those who were

non-enrolled (10.2%). Homeless status in the Central Valley was 14.7% for enrolled and 3.7% for non-enrolled. Living in Board and Care homes was 1.4% for enrolled and 0.9% for non-enrolled. A total of 516 were reported missing in the housing status category.

Age: Mean age for enrolled individuals was older (37.24±12.168) than for non-enrolled (35.08±12.165), with a significance of (.013) p-.05. Reported marital status for enrolled individuals was higher than non-enrolled for divorce/annulled, and never married. The percentages were 85.4% and 80.3%, respectively. Figure 4 provides a summary of findings.

Primary Provider: Of the 902 client records, 192 (21.3%) were missing. There were 439 for enrolled individuals, with 167 (87%) reported as having a primary provider. Of the 271 non-enrolled individuals, only 25 (13%) reported having a primary provider, while 192 were reported as missing.

Concurrent or Open Treatment Program: 694 (76.9%) were not open to a treatment program at the time of admission. Of the 208 (23.1%), 26 (2.9%) enrolled individuals reported receiving AOD. For MH, the number was 131 (14.5%), while for MH and AOD, the number was 51 (5.7%). Total N = 902.

Treatment Programs Enrolled to after Hospitalization: 112 were missing or not reported. Of the 494 enrolled individuals, 3 (0.5%) reported being enrolled in to AOD services, 95 (15.7%) to MH services, 14 (2.3%) to MH and AOD services. None of the non-enrolled individuals (n=296) reported being opened to services after hospitalization. Total N = 902.

Marital Status: A total of 312 individuals reported marital status: enrolled individuals were higher (35/80.3%) than non-enrolled (6/14.6%) for divorce/annulled. The number for never married of enrolled was 147 (80.3%), as opposed to 36 (12.2%) for non-enrolled. A total of 590 were reported as unknown. Total N = 902. Figure 5 provides a summary of findings.

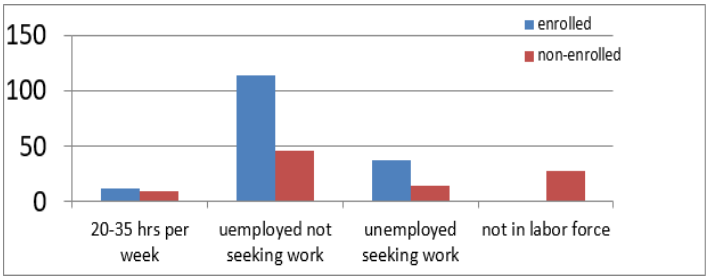

Figure 4: Employment Status.

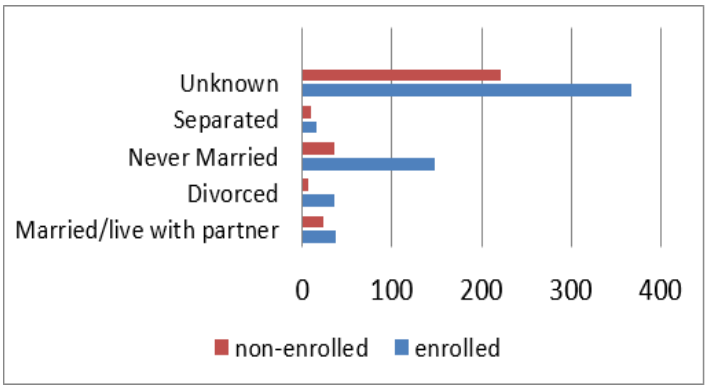

Figure 5: Marital Status.

With regard to highest level of education completed, 85.2% of non-enrolled individuals reported primary (K-8), compared to 69.8% of enrolled individuals. However, enrolled individuals (26.2%) reported higher rates of secondary education (grades 9-12). The percentage reporting a bachelor degree as the highest level of education completed was similar for both groups: 0.6% and 0.9%, respectively. One enrolled individual reported having no education whatsoever. N = 690, with 212 missing or reported as unknown. Total N = 902. A summary is provided in Figure 6.

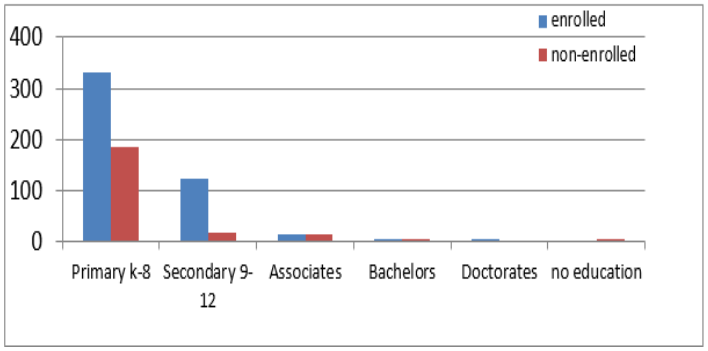

Figure 6: Highest Level of Education.

No significance was found between enrolled and non-enrolled individual readmissions at 30 days, but readmission rates were significant for enrolled and non-enrolled individuals for 60 days (.029, $p < 0.05$). Of the (N = 446) enrolled individuals, 113 had 1 readmission versus (N = 240) 44 for non-enrolled; 31 enrolled individuals and 7 non-enrolled had 2 readmissions; 10 enrolled and 1 non-enerolled had 3 readmissions. Figure 7 provides a summary of findings.

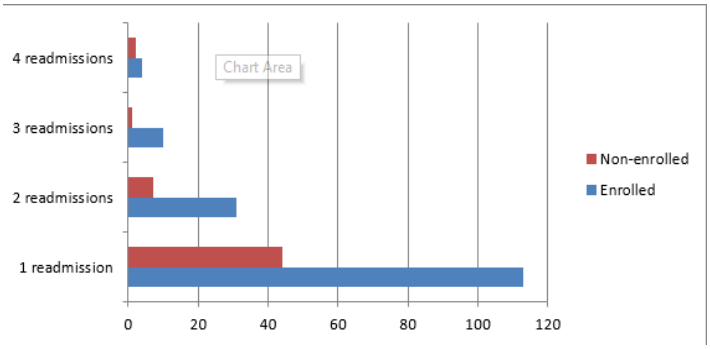

Figure 7: Readmissions within 60 Days.

For readmissons over 90 days, the difference between the two groups was even larger ($p < 0.000$). Of the 337 enrolled individuals, 115 had 1 readmision, as opposed to 51 non-enrolled (N = 212). Sixty enrolled individuals and 15 non-enrolled individuals had 2 readmissions; 32 enrolled and 4 non-enrolled individuals had 3 readmissions, and 19 enrolled and 6 non-enrolled individuals had 4 readmissions over 90 days. Figure 8 provides a summary of findings.

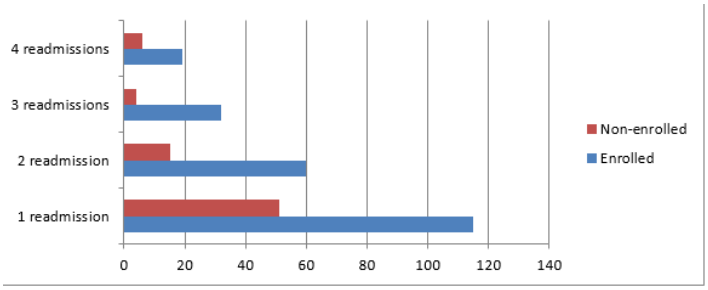

Figure 8: Readmissions over 90 Days.

Compared to non-enrolled individuals (First time hospitalization and never enrolled in treatment), enrolled individuals (Previously hospitalized, enrolled in treatment or both) had higher rates of AOD (74.1%), schizophrenia/ schizoaffective (75.8%), and anxiety disorder (73.3%). Non-enrolled individuals had higher rates of affective disorder (67.9%). A total of 300 were reported as missing or unknown. Total N = 902. Figure 9 provides a summary of findings.

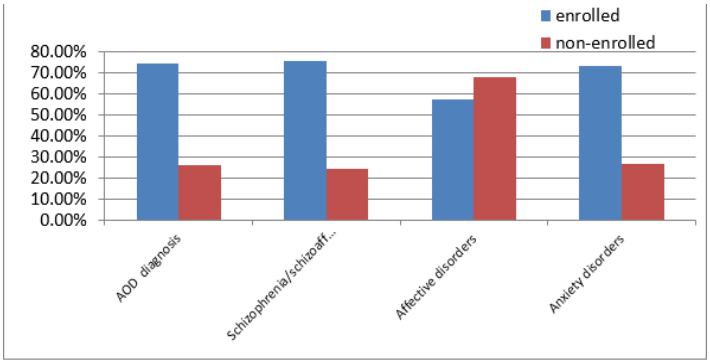

Figure 9: DSM-IV Primary Diagnoses.

Note: Enrolled individuals were either previously hospitalized or those in community treatment or both. Non-enrolled individuals included those never hospitalized and never open to community treatment.

Discussion

The major findings from this study are consistent with the current body of research with regard to vulnerable populations and health care utilization. Predisposing factors such as education, employment history, homelessness, and underlying MH and SA condition have been associated with behavioral health readmission rates [11]. In this study individuals with a history of schizophrenia/ schizoaffective and affective disorders had the highest rates of readmissions within 60 and over 90 days. This was a different finding from most studies, in that many studies limit examining the number of readmissions within 30 days. The majority of the sample reported educational level as K-8 (74.6%), unemployed (38.4%) or not in the labor force (33.7%), and uninsured (49.6%). Similar findings were reported in studies on psychiatric readmissions [26,27]. Both Machado, et al. [26] and Shi, et al. [27] reported an association between socio-economic demographics and clinical characteristics, and psychiatric readmission rates. Significance was found for low levels of education, young age group, female gender, and a diagnosis of schizophrenia. It has been well documented that socio-economic status is associated with health care utilization and disparities in health [28]. Several studies have documented that individuals with higher education

and income can expect to live five years longer than those who have lower incomes and have not completed high school [28,29]. For the uninsured, the enactment of the 2010 Affordable Health Care Act will expand benefits for individuals with MH and SA conditions. According to the Department of Health and Human Services [30], the Essentials Health Benefits final rule ensures that the uninsured will have access to MH and SA treatment through private health insurance in the individual, small group markets and Medicaid.

Limitations

There were several limitations to this study. Data were obtained from a rural community agency electronic health record data warehouse, which is subject to incomplete record keeping and data coding. There were missing data for many of the variables. As the sample size was large, however, this does not affect the validity and the ability to generalize findings to this population.

Implications

The data reported here have important implications for planning. Health care providers such as advance practice nurses are in key positions to prepare individuals to transition from hospital to community. Discharge planning is an important activity in which nurses have the opportunity to identify and explore individual treatment and plans for recovery, and to provide patient-centered care. This is particularly important for individuals with underlying MH and SA conditions, who often have impaired decision-making abilities. According to Pincus, et al. [31], there are several ways to promote patient-centered care: (1) by endorsing and supporting patient decision making by patients with underlying MH and substance use conditions as the default practice policy, (2) by providing decision-making support to all patients, including those coerced into care, and (3) by supporting illness self-management practices for all consumers and formal self-management programs for individuals with chronic illnesses. In addition, for advanced practice nurses, this is consistent with the American Association of Colleges of Nursing (AACN) [32] Essential II: Organizational and Systems Leadership for Quality Improvement and Systems Thinking. Doctoral level knowledge and skills in these areas are consistent with nursing and health care goals to eliminate health disparities and to promote patient safety and excellence in practice [32].

Further research is needed to better understand the relationship between the quality and quantity of community treatment and behavioral health readmission rates. Behavioral health care providers may want to consider implementing the Assertive Community Treatment (ACT) model, since it has shown the best results for reducing behavioral health hospital readmissions. In addition, the outcomes from this research study will be useful to both the JCAHO [10] and IOM [9] initiatives, in that they will identify patient needs, and also lend support to solutions that provide better access to resources, and quality patient outcomes.

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