

The revolving door of mental, neurological, and substance use disorders re-hospitalization in rural KwaZulu-Natal Province, South Africa.

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Abstract

Objective: Little is known about the extent of mental, neurological and substance-use (MNS) disorders re-hospitalization in South Africa. We examined the extent of one-year MNS re-hospitalization (MNS-R) in a rural South African primary health care facility (PHCF).

Methods: We conducted a retrospective analysis of hospital administrative data from 10,525 adults discharged from a rural PHCF in KwaZulu-Natal Province, South Africa. Chi-squared tests were utilized to describe MNS-R within one year of an index hospital admission in individuals with MNS, with a sub-analysis also being conducted to describe schizophrenia re-hospitalization (S-R).

Results: The prevalence of MNS and schizophrenia recorded at an index hospitalization was 5% and 1%, respectively. A total of 44/67 (66%) individuals with a diagnosis of MNS at the index hospitalization were classified as having MNS-R during one-year follow-up period. Half of those diagnosed with schizophrenia at the index hospitalization (6/12 patients) were classified as having S-R during one-year follow-up period. There was a significant association between re-hospitalization outcomes (MNS-R and S-R) and MNS ($p < 0.01$) or schizophrenia diagnosis ($p < 0.01$) at index baseline hospitalization.

Conclusion: The extent of MNS-R and S-R remains relatively high in rural South Africa, and needs further health systems strengthening to prevent revolving door occurrences.

Keywords: Rural mental health, severe mental illness, administrative data, South Africa.

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Introduction

Despite evidence that mental, neurological and substance-use (MNS) disorders accounts for a substantial proportion of premature mortality and disability globally¹, a deficit of services to treat the condition is a persistent challenge throughout sub-Saharan Africa², including South Africa. While funding for mental health services is acknowledged to receive a disproportionately small proportion of health budgets across many developing coun-

tries³, policy-makers and researchers seldom focus on this regional and urban-rural resource inequity in an effort to address such conditions. In South Africa, post-apartheid urban-rural inequality in health services remains an ongoing challenge⁴, and nowhere is this more evident and challenging than for mental health services in KwaZulu-Natal (KZN) Province⁵.

For certain MNS disorders, such as schizophrenia⁶ and psychosis⁷, relapse is a disturbing and frequent occurrence, often due to treatment cessation. With each subsequent relapse, refractoriness may arise⁸, and even when pharmacologic treatment is restored, individuals with schizophrenia may not be able to return to the previous level of social functioning⁹. Approximately two thirds of people diagnosed with schizophrenia relapse¹⁰, with unmet needs for mental health treatment in rural areas being well documented in a large U.S.-based National Comorbidity Survey Replication study¹¹. Cohort studies of

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non-tertiary rural patients with MNS, including schizophrenia, remains limited. According to a South African study, approximately half of the inpatients interviewed at a KZN tertiary psychiatric hospital reported experiencing mental health related hospitalization one year prior to initial [index] admission¹². Our study investigated the extent of MNS re-hospitalization (MNS-R) and schizophrenia re-hospitalization (S-R) among a cohort of rural patients accessing mental health care services at a rural primary healthcare facility.

Methods

Study design, setting, population, and data source

This study utilized the longitudinal data from the Hospital Information System (HIS) for a government hospital providing services at primary care level located approximately 250 km North of the largest city in KZN. The hospital oversees 17 fixed clinics, and services a large and predominantly rural sub-district population of over 200,000 mainly Zulu speaking individuals within an area of 1400 km². The general population of the district as well as details about the Health Information System have been described in detail elsewhere^{13,14}.

The dataset contains demographic information and International Classification of Disease version 10 (ICD-10) codes assigned by healthcare professionals with a clinical and coding background. Information on 24,262 inpatient individuals of all ages between January 2011 and February 19, 2015 were available. Record selection criteria were adults 15 years and above discharged from the hospital prior to February 19, 2014 (to allow minimum one-year observation), with surgical adult patients being excluded from the study. The dataset is de-identified and publicly available, and the study was approved by the Biomedical Research Ethics Committee of the University of KwaZulu-Natal, South Africa.

Measures

The primary outcome was MNS-R [discharge diagnosis ICD-10 codes: F00-F99, G30 and G40], where re-hospitalization was defined as a subsequent hospital admission for the same patient that occurred between 24 hours and one year following discharge from the index hospitalization. A study indicated that reports of hospitalization obtained from administrative databases are a particularly useful proxy for relapses in population settings¹⁵. The main study predictors were MNS [discharge diagnosis ICD-10 codes: F00-F99, G30 and G40] diagnosis during index hospitalization. In addition to F00-F09 (mental and behavioral disorders), our study included Alzheimer's (ICD-10 G30) and epilepsy (G40) to operationalize MNS, consistent with a previous publication¹⁶. As described previously, the relapse among individuals with debilitating disorders, such as schizophrenia, is pronounced. A sub-analysis to describe the risk of schizophrenia re-hospitalization (S-R) within one year of an index hospital admission in individuals with schizophrenia [discharge diagnosis ICD-10 codes: F20] was also conducted.

Statistical analysis

First, demographic characteristics and mental health diagnoses at the index hospitalization were established using descriptive statistics. Second, the proportion of individual with MNS/schizophrenia re-hospitalized with the same diagnoses category during a one-year follow-up period was computed. The association between index hospitalization and re-hospitalization diagnoses in MNS/schizophrenia was explored using χ^2 . A p-value <0.05 was considered statistically significant. STATA 14 was utilized to check for sample duplication (and analyses).

Results

The demographic characteristics and mental health diagnoses at the index hospitalization are described in Table 1.

Table 1. Demographic characteristics and mental health diagnoses at index (baseline) hospitalization

Variable	All adults		Study cohort	
	n	%	n	%
Gender:				
Male	3,774	35.9	462	41.6
Female	6,751	64.1	650	58.5
Age categories:				
15-24	2,898	27.5	186	16.7
25-34	3,055	29.0	302	27.2
35-44	1,711	16.3	212	19.1
45+	2,861	27.2	412	37.1
MNS diagnosis (based on ICD-10 codes F00-F99, G30 and G40) :				
No	10,045	95.4	1031	92.7
Yes	480	4.6	81	7.3
Schizophrenia (based on ICD-10 codes F20):				
No	10,440	99.2	1102	99.1
Yes	85	0.8	10	0.9

Of the 10,525 adults in the dataset, 6,751 (64%) were female, with a mean (\pm SD) age of 37 (\pm 18) years. The prevalence of MNS and schizophrenia in the baseline sample were 480 (5%) and 85 (1%) respectively. When the dataset was limited to a study cohort who experience re-hospitalization from all causes within a year from index hospitalization, the sample size was 1,112 adults. Of these adults in the baseline analyses, 650 (59%) were female, with a mean (\pm SD) age of 42 (\pm 18) years. The prevalence of MNS and schizophrenia in the limited baseline sample were 81 (7%) and 10 (1%) respectively.

A total of 44/67 (66%) individuals with a diagnosis of MNS at the index hospitalization were re-hospitalized for the same condition during the one-year follow-up period. Similarly, a total of 6/12 (50%) individuals with a diagnosis of schizophrenia at the index hospitalization were re-hospitalized for the condition during the one-year follow-up period. In both re-hospitalization outcomes (i.e. MNS-R and S-R), there was significant association with MNS and schizophrenia diagnosis at index baseline hospitalization ($p < 0.01$) based on χ^2 testing (Table 2)

Table 2. Association between index hospitalization and re-hospitalization diagnoses

Index hospitalization		Re-hospitalization but <u>not</u> due to MNS (A)		Re-hospitalization due to MNS (A)		df, χ^2	p	Total n
		due to schizophrenia (B)		due to schizophrenia (B)				
		n	%	n	%			
(A)	No MNS	1,008	96.5	37	3.5	1, 359	<0.001	1045
	MNS	23	34	44	66			
(B)	No schizophrenia	1,096	99.6	4	0.4	1, 328	<0.001	1,100
	Schizophrenia	6	50	6	50			

Discussion

Two thirds of patients with MNS at their index hospital admission were re-hospitalized within the one year follow-up period in this study. This suggests a 'revolving door' phenomenon among this vulnerable population, which warrants the attention of hospital clinicians and community-based services. Bearing in mind that there are few studies describing re-hospitalization in rural populations, recent studies of severe mental illness from developing and developed nations reported one-year risk of re-hospitalization to range from 40-52%¹⁷⁻¹⁹, within which our estimate falls.

The major caveat or limitation is the extent of potential under-reporting/diagnosis of MNS and schizophrenia in our study dataset, with the number of cases (who experienced re-hospitalization within a year from index hospitalization) being particularly limited, which an examination of re-hospitalization outcomes using narrow categories of disorders within MNS. It may be speculated that the extent of MND found in our study should be have been considerably higher, as it is based on clinical samples, and that the scarcity of mental health services in rural areas makes hospitalization in other facilities unlikely. The possible explanation with respect to our underestimates is a general shortcoming associated with the use of administrative data²⁰, as well as limitations in validity, coding verification, and misclassification of diagnoses.

Efforts to prevent subsequent revolving door phenomenon of mental health re-hospitalization will require more than the customary hospital discharge plan. For individuals with MNS and schizophrenia, specifically for the first time, the period after hospital discharge can be a difficult transition time, given the lack of and fragmented nature of mental health services in the community. This period may require care coordination interventions that promote access to formal services, hospital discharge plans to be implemented, and systematic links to broader social system fostered that allow person with MNS to receive ongoing support in the community and avoid unnecessary re-hospitalization. There are several promising randomized controlled trials underway in LMIC (low and middle-income countries) settings. These include Task Sharing for the Care of Severe Mental Disorders in a low-income country (TaSCS) in Ethiopia²¹, and time-limited Crite-

cal Time Intervention-Task Shifting (CTI-TS) in Brazil, Chile, and Argentina²². Greater effort need to be places on attempts to advance the lives of individuals with MNS and severe mental disorders by promoting sustainable community-based mental health care. Despite the limitations of our study, as a first step, our findings uniquely identify the challenges related to revolving door phenomenon among individuals with MNS in a rural South African population, highlighting the need for much work to be done in rural mental health services.

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Conflict of interest

None to declare.

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