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Factors associated with long length of stay in an inpatient psychiatric unit in Lilongwe, Malawi

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Abstract

Purpose Studies of factors affecting length of stay during psychiatric hospitalization in sub-Saharan Africa are sparse. A better understanding of such factors may lead to interventions resulting in quicker patient stabilization and discharge, freeing up needed psychiatric beds and reducing health care system expenditures. Therefore, we sought to identify factors associated with long length of stay in Malawi.

Methods We reviewed the charts of 417 patients hospitalized at Kamuzu Central Hospital's Bwaila Psychiatric Unit in Lilongwe, Malawi from January 1 to December 31, 2011. Multivariate logistic regression analysis was employed to test for associations between patient factors and long length of stay (defined as more than 28 days).

Results Mean length of stay was 22.08 ± 27.70 days (range 0–243). 21.82% (91/417) of patients stayed longer than 28 days. Long length of stay was associated with living outside of Lilongwe district [aOR: 3.65 (1.66–8.01), $p = 0.001$] and treatment for antipsychotic extrapyramidal side effects (EPS) during hospitalization [aOR: 3.45 (1.32–9.03), $p = 0.012$]. Patients who had more interactions with medical providers for this episode of illness prior to presentation at the unit were less likely to have a long length of stay [aOR: 0.35 (0.16–0.76), $p = 0.008$].

Conclusions Our findings demonstrate areas of possible intervention to reduce length of stay, including securing means for patient transport home, rapid identification and treatment of EPS, and reducing the risk of EPS by decreased use of high potency first-generation antipsychotics.

Keywords Sub-Saharan Africa · Malawi · Mental disorders · Mental health · Psychiatry

Introduction

Inpatient psychiatric beds are scarce in Malawi, which has 2.56 per 100,000 people [1] compared to 6.5 per 100,000 people worldwide [2]. Data on factors associated with length of stay among patients in the country who are admitted for treatment of mental illness are not known to exist. Given Malawi's limited funding for mental healthcare [3], such data might assist clinicians in not only improving care, but also in reducing healthcare system costs through shorter hospitalizations. Research in other countries in Sub-Saharan Africa has elicited associations between longer length of stay and patients who are unmarried [4], unemployed [5], and older in age [6–8]. Patients diagnosed with schizophrenia [6, 8–11], bipolar disorder [6, 10], mental retardation [9], seizure disorder [9], and comorbid medical conditions [5] are also more likely to be hospitalized longer, as well as those experiencing extrapyramidal medication side effects (EPS) [10], those who have received electroconvulsive therapy [11] and those who do not misuse substances [5–7]. Studies have produced mixed results on the association of previous psychiatric hospitalizations [5, 7, 8, 11] and gender [5–7, 9] with length of stay.

Due to the lack of information about factors associated with length of stay among patients with mental illness in Malawi, we wanted to address this important gap in the medical literature. In particular, we sought to determine whether any modifiable factors are associated with long length of stay, so that clinicians might stabilize and discharge patients more quickly, reducing financial strain on the health care system and improving access to inpatient care for patients in need.

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Methods

Study setting

The study was conducted at the Bwaila Psychiatric Unit (BPU), which is on the grounds of Bwaila Hospital in Lilongwe, Malawi but is administered by Kamuzu Central Hospital (KCH). Lilongwe is the country's capital and has a population of approximately one million individuals. Inpatient psychiatric care in Malawi is highly centralized and the 25-bed unit has a catchment area that extends well beyond Lilongwe and encompasses 9 of the country's 28 administrative districts. Bed occupancy typically exceeds 150% due to the lack of inpatient facilities in the country, making strategies to reduce the length of stay particularly desirable. Both men and women are treated at the unit and, though most patients are adults, children are also treated there. During the study period, care at the unit was delivered exclusively by nurses who had taken an 18-month course in psychiatric care. Nurses received supervision regularly from mental health clinical officers and a psychiatrist based at Zomba Mental Hospital (ZMH), the country's largest inpatient psychiatric facility. Treatment at the unit is delivered according to Malawi's Mental Treatment Act (Chapter 34:02) of 1948 [12]. Providing care at BPU is challenging due to limited resources and primarily consists of psychopharmacological interventions. Medications are often supplied to the unit in an erratic manner, further complicating treatment. The lack of aftercare options and social or rehabilitative services, which are usually available to patients in better-resourced settings, also makes discharging and reintegrating patients into their communities particularly difficult.

Study design

We reviewed the charts of all patients who were hospitalized on the unit during a 1-year period ranging from January 1, 2011 through December 31, 2011. Charts were handwritten in English and were approximately five pages in length, though this varied from half a page to ten pages. Data describing patient demographic characteristics (including age, gender, marital status, location of residence, etc.), diagnoses, medical comorbidities, clinical outcomes, length of stay and other variables were extracted. Diagnoses were based on criteria in the International Classification of Diseases 10th revision [13]. Data were entered into REDCap electronic data capture tools hosted at Vanderbilt University [14].

Data analysis

Charts were available for 452 of admissions during the study period. Readmissions during the study period were excluded from our analysis to prevent duplication of data. Excluding

the 33 readmissions that occurred, records for 419 patient hospitalizations were available. Two patients did not have a length of stay recorded, so these were excluded, leaving a total of 417 records for our analysis. Statistical analyses were conducted with Stata® version 12.0 (Stata Corporation, College Station, TX, USA).

Because length of stay was not normally distributed, linear regression was not appropriate for analysis. Instead, length of stay was converted into a binary variable. Hospitalizations longer than 28 days were defined as a long length of stay. Chi-squared test was used to assess for bivariate associations between categorical patient variables and long length of stay, while two-tailed Student's t test was used for continuous patient variables. We used multivariate logistic regression to test for associations between patient variables and long length of stay. Independent variables were chosen based on findings in the medical literature and clinical relevance. The model was checked to ensure that assumptions of logistic regression were met. Pearson goodness of fit testing of the model produced a Chi-squared test statistic of 251.54 and a p value of 0.307, indicating sufficient goodness of fit. Statistical significance was set at a p value of < 0.05.

Ethical approval

The study was approved by the Malawi National Health Science Research Committee and the University of North Carolina, Chapel Hill Institutional Review Board.

Results

The mean patient age was 29.56 ± 9.51 years (range 10–74). Patients were primarily male (300/412, 72.82%), single (258/372, 69.35%), and living in Lilongwe District (275/407, 67.57%). Schizophrenia was the most common diagnosis on the unit (125/417, 29.98%), followed by cannabis use disorder (117/417, 28.06%) and alcohol use disorder (105/417, 25.18%). Patients had been diagnosed with a psychiatric disorder for 2.82 ± 5.16 years and had been experiencing symptoms of the current psychiatric episode for 24.14 ± 5.16 days. HIV was documented in 4.8% of patients (20/417). However, among the small number of patients who had HIV test results recorded in their charts, 43.48% (20/46) were HIV positive. Stabilization and discharge home was the most common outcome (283/416, 68.03%), followed by transfer to another hospital (81/416, 19.47%), discharge against medical advice (34/416, 8.17%), abscondment (14/416, 3.37%) and death (4/416, 0.96%). Further patient demographics are detailed in Table 1. This patient population has been described in detail by our group in a previous publication [15].

Mean length of stay was 22.08 ± 27.70 days (range 0–243). 21.82% (91/417) of patients stayed longer than 28 days. Several factors were associated with long length of stay on bivariate analysis (Table 2): antibiotic administration during the admission ($p < 0.001$), diagnosis of schizophrenia ($p = 0.046$), extrapyramidal side effects ($p = 0.002$), living outside of Lilongwe district ($p = 0.009$), not being accompanied by family members at presentation ($p = 0.001$), previous psychiatric hospitalizations ($p = 0.028$), and fewer medical treatment interactions for the current psychiatric episode prior to presentation ($p = 0.009$).

However, upon multivariate analysis, long length of stay was associated with living outside of Lilongwe district [aOR: 3.65 (1.66–8.01), $p = 0.001$] and treatment for antipsychotic extrapyramidal side effects (EPS) during hospitalization [aOR: 3.45 (1.32–9.03), $p = 0.012$], while patients who had more interactions with medical treaters prior to presentation were less likely to have a long length of stay [aOR: 0.35 (0.16–0.76), $p = 0.008$] compared to those who had fewer interactions or presented to the unit directly and had none. There was a non-statistically significant association between being married and having decreased risk of long length of stay [aOR: 0.40 (0.16–1.01), $p = 0.054$]. Details of the multivariate model are listed in Table 3.

Discussion

This analysis of a cohort of Malawian psychiatric inpatients found an average length of stay of approximately 22 days, which is similar to other facilities in Sub-Saharan Africa [4, 8, 10, 11]. Comparing the proportion of patients requiring hospitalization longer than 28 days to that of other facilities is difficult due to the different manner in which length of stay data has been reported. However, in cases where this was possible, it appears that the proportion of long stay patients is lower at BPU than at other facilities in sub-Saharan Africa [8, 10]. It is also comparable or only slightly higher than that of facilities in high income countries [16, 17], despite the vast differences in community treatment resources available. It should be noted though, that nearly a fifth of patients were transferred to other facilities, usually to ZMH. This likely resulted in a lower portion of patients requiring a long stay at BPU, since those who were most ill and required longer stays could be transferred there. It is unknown if the facilities in the other studies on length of stay in sub-Saharan Africa had the option of transferring patients to a larger and better resourced psychiatric hospital such as ZMH.

Our analysis identified three statistically significant patient level factors associated with long length of stay–living outside of Lilongwe district, the presence of EPS, and having fewer medical system treatment interactions prior to presentation at the unit. Some of these factors, or staff

Table 1 Patient demographic information

Variable	n (%)
Gender ($N = 412$)	
Male	300 (72.82)
Female	112 (27.18)
Relationship status ($N = 372$)	
Single	258 (69.35)
Married	114 (30.65)
Education ($N = 257$)	
None	12 (4.67)
Completed standard 8 or less	131 (50.97)
Completed form I, II, III or IV	103 (40.08)
Any university	11 (4.28)
Employment type ($N = 318$)	
No formal employment	102 (32.08)
Farmer	60 (18.87)
Laborer	43 (13.52)
Vendor	37 (11.64)
Student	34 (10.69)
Other	42 (13.21)
Place of residence ($N = 407$)	
Lilongwe district	275 (67.57)
Other district in Malawi	129 (31.70)
Other country	3 (0.74)
Religion ($N = 359$)	
Christian	279 (77.72)
Muslim	22 (6.13)
Other	58 (16.16)
Psychiatric diagnoses[a] ($N = 417$)	
Schizophrenia	125 (29.98)
Cannabis use disorder	117 (28.06)
Alcohol use disorder	105 (25.18)
Epileptic psychosis	30 (7.19)
Major depressive disorder	28 (6.71)
HIV associated psychosis	12 (2.88)
Other psychotic disorder	47 (11.27)
Other non-psychotic disorder	45 (10.79)
Outcome ($N = 416$)	
Stabilized and discharged home	283 (68.03)
Transferred to another hospital	81 (19.47)
Discharged against medical advice	34 (8.17)
Absconded	14 (3.37)
Died	4 (0.96)

[a]Percentage sums to greater than 100% due to some patients with multiple diagnoses

responses to them, appear to be modifiable with the potential for improving care and shortening length of stay.

Being married has previously been associated with shorter length of stay in a Nigerian cohort [4]. This could be due to patients with less severe illness being able to

Table 2 Bivariate tests of association between length of stay and patient-related variables

Variables	All patients [n (%)]	Short LOS[b] [n (%)]	Long LOS[b] [n (%)]	p value
Age (mean years ± SD[a]) (N=393)	29.56 ± 9.51	29.37 ± 9.46	30.33 ± 9.71	0.415
Alcohol use (N=360)	182 (50.56)	147 (51.04)	35 (48.61)	0.712
Antibiotic during admission (N=417)	51 (12.23)	28 (8.59)	23 (25.27)	**<0.001**
Extrapyramidal side effects (N=417)	55 (13.19)	34 (10.43)	21 (23.08)	**0.002**
Lives outside Lilongwe district (N=407)	132 (32.43)	94 (29.28)	38 (44.19)	**0.009**
Male (N=412)	300 (72.82)	232 (72.05)	68 (75.56)	0.509
Cannabis use (N=363)	151 (41.60)	116 (40.00)	35 (47.95)	0.218
Married (N=372)	114 (30.65)	96 (32.76)	18 (22.78)	0.088
Not accompanied by family (N=359)	143 (39.83)	99 (35.36)	44 (55.70)	**0.001**
Previously psychiatrically hospitalized (N=347)	196 (56.48)	152 (53.71)	44 (68.75)	**0.028**
# pre-presentation medical treatment interactions (N=411) (mean ± SD[a])	0.89 ± 0.53	0.93 ± 0.53	0.76 ± 0.50	**0.009**
Schizophrenia diagnosis (N=417)	125 (29.98)	90 (27.61)	35 (38.46)	**0.046**
Secluded during hospitalization (N=415)	121 (29.16)	96 (29.54)	25 (27.78)	0.745

Bold values indicate a statistically significant difference

[a]*SD* standard deviation

[b]*LOS* length of stay

Table 3 Multivariate logistic regression of factors associated with long length of stay

Variables	Coefficient (95% CI)	Odds ratio (95% CI)	p value
Age	0.03 (−0.01 to 0.07)	1.03 (0.98 to 1.07)	0.229
Alcohol use	−0.56 (−1.43 to 0.32)	0.57 (0.24 to 1.37)	0.212
Antibiotic during hospitalization	0.52 (−0.55 to 1.60)	1.69 (0.57 to 4.95)	0.341
Cannabis use	0.62 (−0.32 to 1.55)	1.85 (0.73 to 4.70)	0.196
Extrapyramidal side effects	1.24 (0.28 to 2.20)	3.45 (1.32 to 9.03)	**0.012**
Lives outside Lilongwe district	1.30 (0.51 to 2.08)	3.65 (1.66 to 8.01)	**0.001**
Male	0.87 (−0.16 to 1.89)	2.38 (0.85 to 6.65)	0.099
Married	−0.92 (−1.86 to 0.01)	0.40 (0.16 to 1.01)	0.054
Not accompanied by family on presentation	0.53 (−0.24 to 1.30)	1.70 (0.79 to 3.66)	0.178
Previously psychiatrically hospitalized	0.01 (−0.76 to 0.78)	1.01 (0.47 to 2.19)	0.977
# pre-presentation medical treatment interactions	−1.06 (−1.85 to −0.27)	0.35 (0.16 to 0.76)	**0.008**
Schizophrenia diagnosis	0.52 (−0.29 to 1.33)	1.68 (0.74 to 3.80)	0.211
Secluded during hospitalization	−0.42 (−1.26 to 0.41)	0.66 (0.28 to 1.51)	0.323
Constant	−2.81 (−4.55 to −1.07)	0.06 (0.01 to 0.34)	0.002

Bold values indicate a statistically significant difference

marry and maintain a marriage. Another explanation may be that having a spouse to care for the patient after discharge inclined providers to discharge patients earlier than they would have if the patient had no spousal support. Our study found a non-statistically significant association ($p = 0.054$) between being married and decreased odds of long length of stay, but our sample size may have been underpowered to detect a difference.

Living outside of Lilongwe district was associated with long length of stay. At the time of the study, Malawi was plagued by chronic fuel shortages that disrupted transportation throughout the country and may have contributed to this association. Anecdotally, many patients on the unit who lived outside of Lilongwe had been psychiatrically stabilized but did not have funds for transportation and reported waiting weeks to months until they could return home. The typical procedure is that if patients cannot afford to pay for their own transportation, they must wait for a government employee from their district to pick them up when that employee is dropping off another patient at BPU or if they happen to be in Lilongwe on other business. Given the significant demand for inpatient psychiatric beds in the

country, this is a difficult situation that should be addressed. Strategies to deal with this issue include obtaining money for transportation from family members accompanying patients at the time of admission or obtaining their contact information, since patients suffering from psychosis and other cognitive impairments may not be able to provide it once family members leave. However, it is rare in practice that family members contribute to these transportation costs. Another factor that must also be considered, and would likely be more difficult to address, is the fact that some family members of patients who exhibit problematic behaviors would prefer that the patient stay in the hospital [18]. Therefore, they are not inclined to pick them up and bring them home, especially if a barrier such as a great distance between their home and the unit exists. In this past, Malawi's Ministry of Health provided travel coupons through the unit for transport home of indigent patients living outside Lilongwe and might consider resuming this practice. However, greater financial resources would need to be committed to ensure that transportation companies are paid in a timely, since they were not previously, which led to the program's failure.

The association between location of patient residence outside Lilongwe and long length of stay also raises the question of whether the efficiency of delivery of psychiatric inpatient care in Malawi might be improved by partial decentralization of inpatient services. For example, if the district hospitals in the catchment are of BPU each had some designated inpatient psychiatric beds of their own, many patients could be treated there instead of at BPU. This would allow patients to be closer to their families, who could then visit them more often, and would reduce transportation costs. It is also possible that such a design might lead to decreased length of stay, since patients would not have to wait to be transported home over long distances following discharge.

More medical system treatment interactions on the path to admission at BPU were associated with shorter hospitalization. This could be due to patients having already been started on psychotropic medications by another care provider prior to presentation at the unit or more severely mentally ill patients presenting directly to the unit (likely those who had previously been hospitalized at BPU and knew where to find it). Another possibility is that concurrent medical conditions would have already been treated at other facilities and less likely to complicate and lengthen hospitalization at the unit. Aside from examining antibiotic administration during hospitalization as a proxy, our model did not assess the presence of co-morbid medical illnesses, since record keeping surrounding these diagnoses appeared to be extremely poor.

EPS such as dystonia, akathisia, parkinsonism, and tardive dyskinesia were associated with longer length of stay, a finding that was also identified in a cohort of Ethiopian patients [10]. EPS is a common side effect of treatment with first-generation antipsychotics (FGA). During the study period, these medications were used as the primary treatment for psychotic symptoms on the unit. The presence of physical comorbidities such as HIV [19] in patients being treated with FGA makes the emergence of EPS more likely. At least 4.8% of patients (20/417) on the unit were HIV positive, though this was likely higher since less than 12% (46/417) had HIV test results recorded in their charts, which may have exacerbated the prevalence of EPS on the unit. Besides being distressing to patients, these side effects are associated with violence and aggression, medication non-adherence and exacerbation of psychosis [20]. Some of these side effects are dose-dependent and may be preventable using lower doses of potent FGA and slower up-titration. It is possible that unit staff were administering higher doses of antipsychotics to patients who were more severely ill, which may explain their extended length of stay rather than the presence of EPS. However, reducing the impact of EPS should remain a goal, preferably through prevention, but also through rapid identification and appropriate treatment with anticholinergic medications, benzodiazepines and beta-blockers. Increasing clinician awareness of the relationship between HIV and EPS, as well as increasing screening for HIV so that it can be properly treated, can be helpful as well. Increased use of second-generation antipsychotics can also ameliorate this issue. Though they are more expensive than (FGA), second-generation antipsychotics (SGA) have a lower frequency of EPS and the country's mental health budget may actually benefit from their use if psychiatric hospital stays were shortened as a result or even reduced in frequency because of increased antipsychotic adherence in the community. During the study period SGA were not listed on Malawi's essential medication list [21]. However, the Malawian government did have access to some SGA. While they were in use at other psychiatric facilities, it is unclear why they were not used at BPU. One possible reason for this may have been that staff at BPU were not familiar with SGA and did not use them. However, risperidone is now included on the most recent version of the Malawi's essential medication list [22] and is in more regular use in the country. Erratic medication supplies were a problem at BPU during the study period for many types of medications, though it is unclear if this increased length of stay. In some cases, family members purchased necessary medications for their hospitalized relative from local pharmacies, which could have mitigated whatever effect these shortages may have had on extending length of stay.

In addition to patient-level factors, healthcare system factors relating to length of stay should also be mentioned, though we did not assess these directly in our study. Malawi has a public health system that is free for patients and funded by the government, as well as international donors. Therefore, inpatient mental health services are not subject to utilization review strategies used by private insurers in

high-income countries, which have been associated with decreased length of stay [23]. Since patients and their families do not have to be concerned about the direct costs of their stay, there is also a lack of pressure from these individuals for shorter hospitalizations. Taken in combination, these factors represent healthcare system level disincentives for shorter hospitalizations, even if longer hospitalizations may not be beneficial to the patient.

Determining the ideal length of stay for psychiatric patients in low and middle countries is a challenge. Average length of stay in high-income countries is approximately half of the average length of stay at BPU [24]. There is concern that in low and middle-income countries such as Malawi, which lack robust community mental health care treatment resources, decreased length of stay may lead to increased rates of patient readmission. A review of several studies in high-income countries, indicated that shorter length of stay and lack of mental health treatment services in communities surrounding hospitals there are associated with increased hospital readmissions [25]. Therefore, the issue of reducing length of stay in Malawi and the rest of sub-Saharan Africa, should be approached with caution as the pertinent evidence base grows over time and can guide these efforts.

Limitations

This study's primary limitation is its retrospective nature and the resulting missing data for some variables, which may have led to the use of data in our regression model that is not an accurate representation of the entire unit population. However, data appeared to be missing randomly from charts, with no evidence of systematic absence of data for particular types of patients. The lack of diagnoses of primary mood disorders and psychoses secondary to mood disorder raises questions about the validity of diagnoses on the unit. It appears that clinicians may have been more likely to diagnose individuals with primary psychotic disorders and substance use disorders than mood disorders. This could be due to incomplete understanding of diagnostic criteria for some disorders or a bias by clinicians towards ascribing all symptoms of mental illness exclusively to substance use rather than also acknowledging the role of co-occurring mental illness. This is particularly important for this study, since primary mood and psychotic disorders have been shown to increase length of stay, while substance use disorders are associated with shorter length of stay in high-income countries, where diagnoses are more reliable [26]. Therefore, the proportion of patients with long length of stay in our study might actually be more influenced by the presence of diagnoses of mood disorders and psychosis secondary to mood disorders than our data indicate.

There have also been numerous changes at BPU since the study data were collected several years ago, which may

affect the generalizability of our findings to the current time period. In addition to the nursing staff, there is now a psychiatrist at BPU and there are also psychiatric clinical officers. Resultant changes to clinical decision-making caused by these staff additions may have impacted patient length of stay, though further research is required to determine whether this is the case.

Conclusions

This study assessed factors associated with length of stay longer than 28 days in a psychiatric unit in Lilongwe, Malawi. Long length of stay was associated with living outside the district where the unit is located, receiving treatment from fewer medical providers prior to presentation to the unit and receiving treatment for EPS during the admission. Taking steps to streamline patient transportation home upon psychiatric stabilization may reduce length of stay and increase the region's availability of highly sought after psychiatric beds. Additionally, rapid identification and treatment of EPS, increased provider awareness of its association with HIV and other medical conditions, as well as prevention of EPS through decreased use of first-generation antipsychotics, may do the same.

Compliance with ethical standards

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