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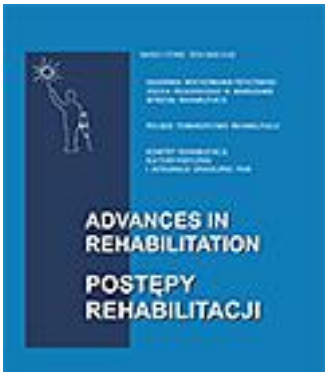

Original article

Title: Adults with acquired brain injury at inpatient rehabilitation: discharge comparison of patient-reported outcomes at follow-up with functional status

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Adults with Acquired Brain Injury at Inpatient Rehabilitation: Discharge Comparison of Patient-Reported Outcomes at Follow-up with Functional Status

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Abstract

Introduction: This article was to determine the correlation between self-care and mobility status at time of discharge from an inpatient rehabilitation hospital and perception of patient reported physical and mental health outcomes for individuals with acquired brain injury (ABI).
Material and methods: Design: Retrospective electronic health data was collected as part of routine care from an inpatient rehabilitation hospital. The clinician-rated functional data for individuals with ABI at the time of discharge was linked to the telephonic follow-up data assessing health-related quality of life. Setting: Inpatient Rehabilitation Hospital. Participants: Data was obtained from patients discharged between the dates of January 1, 2020-December 31, 2021 with completion of the instrument via telephone at one point in time after discharge.
Results: The study included 143 individuals with ABI, with a mean age 70 years, over half being female (55.42%) and White (68.53). The model predicting patient's perception of good physical health had 69.23% sensitivity and 62.5% specificity: C statistic 0.72. Sex and mobility scores at discharge were found to be significant predictors of good mental health. This model had a sensitivity of 63.55% and specificity of 63.89%: C statistic 0.68.
Conclusions: Despite the importance of understanding patient reported outcomes (PROs), there remains limited data to demonstrate the relationship between PROs and clinician-rated measures. Understanding the relationship between clinician-rated functional status, demographic variables, co-morbidities and patient-reported outcomes following inpatient rehabilitation status-post ABI can assist in proactively addressing expectations related to physical and mental health and guide rehabilitation and behavioral health intervention during home and community reintegration.

Keywords: Patient Reported Outcomes, Functional Status, Stroke, TBI, Brain Injuries

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Introduction

Patient reported outcomes in the neurological population is increasing in importance for understanding and engaging patients in clinical care and outcomes [1-3]. In the management of acquired brain injury (ABI), the focus of outcomes is on survival, prevention of secondary complications, burden of care, and measures of function [4]. Use of questionnaires that measure important health domains such as Quality of Life (QOL) measures are frequently used in conjunction with other clinician reported measures [4]. The combination of both clinician-rated functional status and patient-reported outcomes can have a strong impact in directing the care of the patient and designing program components.

A patient-reported outcome (PRO) is "any report of the status of a patient's health condition that comes directly from the patient, without any interpretation of the patient's response by a clinician, or anyone else" [5]. Patient reported outcome measures (PROM) are "tools or instruments used to measure PROs" [6]. The inclusion of PROMs is widely endorsed by such agencies as the National Quality Forum (NQF) and the National Institute of Health (NIH). The Patient Reported Outcome Information System (PROMIS®) was developed by the NIH as a research initiative to establish measurement across a variety of conditions [1]. Initiatives that drive patient engagement and patient-centered care inform healthcare consumers and contribute to the need for inclusion of PROMs in routine care. The International Consortium of Health Outcomes Measurement (ICHOM) recommended guidelines on the use of PROs that are specific to ischemic or hemorrhagic stroke [7]. The authors discovered that most PROMs were generic and not specific to stroke and that industry-funded studies collected the fewest PROs. Similarly, there has been limited research on clinical application of health-related quality-of-life PROs for individuals with traumatic brain injury [8].

Despite the increasing interest in and support for patient reported outcomes in clinical practice, the integration of such measures has been met with suboptimal success. Among allied health practitioners, the outcome collection process may be seen as a barrier or a facilitator [9]. Measurement challenges in clinical practice and uncertainty about clinical utility showcase the relationship between PROs and clinician-rated performance measures [10]. Thus, although the feasibility of incorporating the practice of collecting PROMs in inpatient rehabilitation has been established, adoption into the clinical setting remains a challenge [11].

Gaining an understanding about clinical connection between clinician-rated measures and PROMs may incentivize utilization of patient reported outcomes. Further, understanding which

clinical factors have the most effect on patient-perceived physical and mental health may focus interventions. Thus, instituting processes that facilitate utilization of PROMs in practice may improve quality care, patient experience, and fulfillment of regulatory and reimbursement standards. The aims of this study were: (1) to determine correlation between clinician-rated functional status in the areas of self-care and mobility at discharge from an inpatient rehabilitation hospital and follow-up perception of patient reported physical health outcomes in acquired brain injury, (2) to determine if there is a correlation between clinician-rated functional status in self-care and mobility at discharge from an inpatient rehabilitation hospital and follow-up perception of patient reported mental health outcomes, and (3) to identify demographic and clinical factors that impact the perception of patient reported outcomes in physical and mental health.

Materials and methods

Sample and Design

Data was collected as part of routine quality improvement endeavors monitoring patient reported health-related quality of life at one rehabilitation hospital in an urban area with a focus on health-related quality of life in the areas of physical health and mental health using the PROMIS-10 Global Health (PROMIS GH) measure. Clinical data were obtained from patients discharged between the dates of January 1, 2020-December 31, 2021 and had completion of the PROMIS GH via telephone by rehabilitation clinicians at one point in time after discharge that ranged between 30 days and one year. Electronic health data were linked to the quality data at follow-up based on admission date, date of birth, and name. Data were linked using a deidentified code. The study was approved by the Institutional Review Board.

Inclusion/Exclusion Criteria

Inclusion criteria included patients who were age 18 and older, had a diagnosis of acquired brain injury (stroke or other acquired brain injury such as traumatic brain injury (TBI) and non-traumatic brain injury), were admitted to a free-standing rehabilitation hospital in Los Angeles, California and responded to the PROMIS GH [12] measure at the time of follow-up (at a point in time after inpatient rehabilitation discharge). Excluded patients include those under the age of 18, presented with cognitive impairment or cognitive-linguistic impairment (e.g. aphasia) that would prevent survey completion, expired during the inpatient rehabilitation stay or before the time of follow-up, discharged from the inpatient rehabilitation hospital to hospice, short term general hospital, long term care hospital, inpatient psychiatric facility, or critical access hospital, if initial

rehabilitation stay was less than three days, and did not respond to the quality Patient Reported Outcome PROMIS-GH questions at the time of follow-up.

Data from the electronic health record included demographic data such as: age, sex (male/female), race (American Indian, Asian, African American, Hispanic/Latino, Pacific Islander, White), marital status (single, married, divorced, widowed, separated), time from onset of diagnosis to follow-up (less than or equal to 3 months or greater than 3 months), and time from discharge to follow-up (less than or equal to 3 months or greater than 3 months). Medical variables and health conditions included etiologic diagnosis, and number of comorbidities (less than or equal to 14 or greater than 14) using a median cutoff. Comorbidities included diseases or medical conditions that occur at the same time and are often chronic or long-term conditions.

Functional variables included quality data, the patient reported outcome data, self-care functional score at the time of inpatient rehabilitation discharge, and mobility functional score at the time of inpatient rehabilitation discharge. Self-care and mobility scores at discharge were displayed as sums and calculated according to the Inpatient Rehabilitation Facility (IRF) manual (13). Discharge functional status is measured in two domains, self-care and mobility as referenced in the functional section of the Inpatient Rehabilitation Facility-Patient Assessment Instrument (IRF-PAI) manual [13]. Specifically, the functional section is a standardized assessment utilized by the Centers for Medicare and Medicaid Services (CMS) in post-acute care settings designed to measure a patient's need for assistance with self-care and mobility.

The patient reported outcome variables included in the study are patient's perception of their mental and physical health. The PROMIS-GH [14] is a 10-item questionnaire designed to measure constructs related to health-related quality of life. Nine of the 10 PROMIS-GH items are scored on a Likert scale from 1 to 5, with "1" representing the worst possible rating and "5" representing the best possible rating for the respective item. The remaining item, "How would you rate your pain on average," is scored from 0 (no pain) to 10 (worst pain imaginable) and is recoded to the 5-point scale per instrument instructions. PROMIS-GH produces 2 index scores: Physical Health and Mental Health [15]. The Physical Health index score comprises 4 items on physical health, physical functioning, pain intensity, and fatigue, and the Mental Health index score includes 4 items on overall quality of life, mental health (mood and ability to think), satisfaction with social activities and relationships, and emotional problems (i.e., feeling anxious, depressed, or irritable). Two PROMIS-GH items (general health and social roles) are not used to calculate the Physical Health and Mental Health index scores. Index scores are compared to United States population-based standard scores and are transformed to a T-score metric with a mean of 50 and SD of 10. Higher scores indicate perceived higher levels of physical and mental well-being. Patient

perception of physical health was dichotomized as "good" if physical health t-scores were greater than or equal than 46.71 and "fair-poor" if less than 46.71. Patient perception of mental health was dichotomized as "good" if mental health t-scores were less than or equal to 40 and "fair-poor" if less than 40 [16]. Duplicate records were identified and records with an earlier date of admission were kept for analysis. Continuous variables age and mobility score at discharge were scaled per 10-unit increase for interpretation of model results.

Statistical Analysis

Statistical analysis was carried out using SAS® Version 9.4 and STATA® Version 17. For predictive modeling, separate univariate analyses were conducted for each independent variable and either physical or mental health as the outcome. Collinearity was assessed among continuous predictors. Clinically relevant predictor variables were tested for association with the mobility score at discharge and self-care score at discharge. Since the sample is skewed toward older adults and clinical characteristics of elderly patients vary by age, analyses of age groups by quartile were conducted (younger cohort, < 62 years; youngest-old, 63 to 70 years; middle-old, 71 to 83 years; and oldest-old, > 84 years), with a classification that was comparable to other studies [17,18]. Variables were kept in the final models if they were statistically significant ($p < 0.05$). Fractional polynomials were used to assess linearity of continuous predictors. R-square, goodness-of-fit tests, and ROC curves were used to assess the best fitted model for each health outcome. Sensitivity and specificity were assessed for the chosen prediction models. Model diagnostics were used to determine any observations with extreme residual values.

Results

Descriptive Statistics

Descriptive statistics for participants are found in Table 1. One hundred and forty-three were admitted for acquired brain injury and included in the analysis, of which 55% experienced stroke and 45% had an acquired brain injury. The mean age of admitted acquired brain injury patients was 70 years. Over half (55.42%) of acquired injury patients were female and the majority were White, 68.53%. Of the acquired brain injury patients, 57.35% were divorced, widowed, never married, or separated.

Table 1. Descriptive variables

Variable	Acquired Brain Injury n = 143	Perception of Good Physical Health n = 39	Perception of Good Mental Health n = 107
Age (years)	70.53 (14.98)	65.18 (17.61)	69.81 (15.85)
Sex			
Male	64 (44.76)	20 (51.28)	46 (43.00)
Female	79 (55.42)	19 (48.72)	61 (57.00)
Race			
American Indian	1 (0.70)	0	0
Asian	13 (9.09)	4 (10.26)	8 (7.50)
African American	22 (15.38)	4 (10.26)	15 (14.00)
Hispanic/Latino	8 (5.59)	2 (5.13)	7 (6.54)
Pacific Islander	1 (0.70)	0	0
White	98 (68.53)	29 (74.36)	77 (72.00)
*N=1 missing			
Marital Status			
Divorced, widowed, never married, separated	78 (57.35)	17 (47.22)	60 (58.20)
Married	58 (42.65)	19 (52.78)	42 (41.18)
*n = 9 missing			
Comorbidities			
≤ 14	64 (44.76)	19 (48.72)	50 (46.73)
> 14	79 (55.24)	20 (51.28)	57 (53.27)
Mobility score at discharge	58.48 (18.65)	65.38 (17.71)	59.55 (17.69)
Moderate/Maximal/Dependent	21.00%	12.80%	17.80%
Supervision/Touching Assist	30.80%	23.10%	29.90%
Set-up/Independent	48.30%	64.10%	52.30%
Self-care score at discharge	31.91 (8.28)	35.36 (7.36)	32.64 (7.76)
Moderate/Maximal/Dependent	10.50%	5.10%	7.50%
Supervision/Touching Assist	19.60%	10.30%	16.80%
Set-up/Independent	69.90%	84.60%	75.70%
Time from onset of diagnosis to follow-up			
≤ 3 months	64 (44.76)	18 (46.15)	47 (43.93)
> 3 months	79 (55.24)	21 (53.85)	60 (56.07)
Time from discharge to follow-up			

≤ 3 months	81 (56.64)	21 (53.85)	59 (55.14)
> 3 months	62 (43.36)	18 (46.15)	48 (44.86)

Frequencies and percentages are shown for categorical variables. Mean and standard deviation are shown for continuous variables.

The majority of acquired brain injury patients had greater than 14 comorbidities (55.24%), with a trend for increased incidence of comorbidities within the oldest-old cohort (Table 2). The mean mobility score at discharge for acquired brain injury patients was 58.48, with a standard deviation of 18.65. Mean self-care score at discharge was 31.91 with a standard deviation of 8.28 with functional classifications including 69.9%, 19.6%, and 10.5% for set-up/independent, supervision/touching assist, and moderate/maximal/dependent assist, respectively. Mean mobility score at discharge of 58.48 with a standard deviation of 18.65 with functional classifications including 48.3%, 30.8%, and 21.0% for set-up/independent, supervision/touching assist, and moderate/maximal/dependent assist, respectively. Self-care and mobility functional deficits were statistically lower for the oldest-old cohort when compared to other age cohorts (Table 2). On average, follow-up from onset of diagnosis was less than 3 months. Univariate logistic regression outcomes are shown in Table 3.

Table 2. Clinical variables across age quartiles

Variable	1st Quartile Younger Cohort (n = 34)	2nd Quartile Younger-old (n = 33)	3rd Quartile Middle-old (n = 39)	4th Quartile Oldest-old (n = 37)	p-value
Age (years)	49.91 (11.00)	66.61 (2.45)	75.49 (3.71)	87.8 (3.01)	
Comorbidities					
≤ 14	47.1%	51.5%	43.6%	37.8%	0.33
> 14	52.9%	48.5%	56.4%	62.2%	
Mobility					
Moderate/Maximal/Dependent	20.6%	15.2%	20.5%	27.0%	0.03
Supervision/Touching	20.6%	42.4%	17.9%	43.2%	
Set-up/Independent	58.8%	42.4%	61.5%	29.7%	
Self-Care					
Moderate/Maximal/Dependent	5.9%	9.1%	7.7%	18.9%	0.01
Supervision/Touching	8.8%	21.2%	17.9%	29.7%	
Set-up/Independent	85.3%	69.7%	74.4%	51.4%	

Physical Health					
Fair/Poor	58.8%	78.8%	66.7%	86.5%	0.03
Excellent/Very Good/Good	41.2%	21.2%	33.3%	13.5%	
Mental Health					
Fair/Poor	20.6%	30.3%	20.5%	29.7%	
Excellent/Very Good/Good	79.4%	69.7%	79.5%	70.3%	0.46

Table 3. Relationship between demographic variables with perception of physical and mental health

	Perception of Physical Health			Perception of Mental Health		
Variable	OR	CI	p-value	OR	CI	p-value
Age (years)	0.96	[0.94, 0.99]	0.01	0.98	[0.96, 1.01]	0.34
Sex						
Male	1.24	[0.59, 2.60]	0.56	0.75	[0.35, 1.61]	0.47
Female	1.00			1.0		
Ethnicity						
Other	0.68	[0.29, 1.55]	0.36	0.55	[0.25, 1.19]	0.13
White	1.00			1.0		
Marital status						
Married	1.74	[0.81, 3.77]	0.15	0.78	[0.36, 1.72]	0.54
Divorced, widowed, never married, separated	1.00			1.0		
No. of comorbidities						
> 14	0.80	[0.38, 1.68]	0.56	0.73	[0.34, 1.57]	0.41
≤ 14	1.00			1.00		
Mobility score at discharge	1.03	[1.01, 1.05]	0.008	1.01	[0.99, 1.03]	0.23
Self-care score at discharge	1.09	[1.03, 1.16]	0.003	1.04	[0.99, 1.09]	0.08
Time from onset of diagnosis to follow-up						
> 3 months	0.93	[0.22, 1.04]	0.84	1.14	[0.54, 2.44]	0.73
≤ 3 months	1.00			1.00		
Time from discharge to follow-up						
> 3 months	1.17	[0.56, 2.45]	0.67	1.27	[0.59, 2.76]	0.53
≤ 3 months	1.00	[0.94, 0.99]	0.01	1.00	[0.96, 1.01]	0.34

CI- confidence interval, OR- odds ratio. Significance level is set at an alpha of 0.05.

Physical Health Outcomes

Due to high collinearity between mobility and self-care scores at discharge, these variables were considered separately in models for predicting good physical and mental health in acquired brain injury patients ($R = 0.86$, $p < 0.001$). For predicting good physical health with mobility scores at discharge, age at admission was the only statistically significant predictor ($p = 0.03$). Sex, ethnicity, and marital status, and number of comorbidities were tested as potential effect modifiers in the relationship between mobility scores and physical health outcomes. In the relationship between mobility scores at discharge and physical health outcomes, number of comorbidities was found to be significant ($p = 0.03$). The first model found to predict physical health outcomes in acquired brain injury patients included an association between mobility scores at discharge and number of comorbidities, and age at admission. The model predicting patient's perception of good physical health yielded; R^2 value of 0.11, ROC of 0.7244, 69.23% sensitivity and 62.5% specificity. When modeling physical health using self-care scores at discharge, there was no statistically significant association. Additionally, no other variables were included in the model due to lack of statistical significance. In final after controlling for age, the odds of perceiving a good physical health outcome are 1.89 times higher for those with less than 14 comorbidities compared to those with greater than or equal to 14 comorbidities.

Mental Health Outcomes

Mobility score at discharge was significantly associated with mental health outcomes ($p < 0.01$). Sex was found to be a significant relationship between mobility score at discharge and mental health outcome ($p < 0.01$). The first model found to predict mental health outcomes in acquired brain injury patients included an association between sex and mobility score at discharge. This model yielded an R^2 value of 0.07 and an ROC of 0.68. Univariate analysis of self-care score at discharge and mental health outcomes did not reveal a statistically significant association (Table 3). There was a significant association between self-care scores and sex ($p = 0.035$). The model that predicted mental health outcomes in acquired brain injury patients included mobility scores at discharge and sex. This model resulted in an R^2 value of 0.07 and an ROC of 0.6816, sensitivity of 63.55% and specificity of 63.89%. In the final model for perception of good mental health, the odds of perceiving a good mental health outcome is 1.86 times higher for females, compared to males.

Discussion

This study utilized perspectives of both clinicians and patients to gain a deeper understanding of the demographic, clinician-rated performance-based metrics, and medical variables related to the outcomes of acquired brain injury. The study found statistically significant associations between clinician-rated mobility and self-care discharge scores with patient-reported physical and mental health outcomes with relevant clinical and demographic variables that provide insights into the patients' perspective on clinical outcomes. The study identified statistically significant predictors of patient-reported outcomes including age and number of comorbidities for patient-perception of physical health and sex for patient-perception of mental health. Despite the growing appreciation of the importance of understanding patient-reported outcomes in the field of rehabilitative medicine, there remains limited data to showcase the relationship between patient-reported outcomes and clinician-rated performance-based measures, such as mobility and self-care, specifically in the presence of potential covariates [10].

The results confirm that functional status impacts perceived health related quality of life. In this study, 73% of individuals with acquired brain injury perceive themselves as having fair to poor physical health, in-line with clinician-reported mobility scores indicating moderate functional deficits. According to the findings, age and number of comorbidities explained some of the variation in the relationship between mobility score as a functional measure and perception of good physical health. Notably, a study aimed to understand the relationship between various predictors and QOL measures found reports of lower quality of life among older populations [19]; this current study's results suggest that reduced health-related quality of life appears to be driven by the perception of one's physical health status across age groups and most pronounced in older adults, regardless of mental health status perception. Furthermore, research investigating the relationship between self-perceptions of aging and physical functioning in older adults has found that negative self-perceptions in aging is linked to poor physical health and functional outcomes in late life [20]. In this sample, mean age of those with perceived good physical health was 5 years younger than the entire sample, which may explain poor perception among older populations with particularly vulnerability to worsening perception of physical health, particularly for those with elevated risks for co-morbidities in the most vulnerable oldest-old cohort.

Seventy-five percent of patients in this sample experienced good perception of mental health outcomes, even though clinician-rated mean mobility scores reflected moderate scores for functional status. Thus, mobility scores alone do not drive perception of mental health outcomes. Moreover, and not surprisingly, many factors contribute to perception of mental health, and in this study, despite compromised physical functioning, most of the participants reported mental health outcomes that were categorized as at least "good" across age cohorts. Elevated outcomes for

perception of good mental health in the context of physical functional deficits can be due to several factors. The 'disability paradox' may explain why those with physical difficulties report better mental health outcomes [21]. It has been found that self-rated health perception in disability may be influenced by context and individual traits and not just on functional limitations. That is individuals with significant functional difficulties may report higher levels of quality of life as it relates to mental health despite objective and subjective poor physical health. Moreover, functional difficulties and disability are not attributes of individuals, but rather a set of difficulties that one may experience in interaction with the social and physical environments [22]. Better perceptions of "mental health" outcomes over "physical health" could also be explained by contextual factors, such as family support and individual personality traits such as resilience to stressors [23]. Additionally, individuals who perceive functional consequences of their acquired brain injury commonly experience post-traumatic growth (PTG) [19]. PTG can be defined as the growth or perception leading to the experiences of positive changes after a traumatic event [24]. PTG following acquired brain injury may lead to psychological outcomes despite actual or perceived physical functional deficits [19,24]. Further, for some individuals with acquired brain injury, diminished insight into some of their deficits may be present [25,26]; poor insight may result in a discrepancy between objective level of functional impairment and higher levels of subjective mental health. Attention on physical function deficits may also overshadow attention on mental health difficulties for many.

Upon additional analysis, sex was found to be significant in the relationship between mobility score at discharge and mental health outcome ($p < 0.01$). Though univariate analysis revealed no statistically significant association between mobility scores at discharge and follow-up mental health outcomes, controlling for the interaction of sex and mobility scores revealed a statistically significant association (Table 3). For this sample, the model reported lower odds of perception of good mental health in males compared to females per each 10-unit increase in mobility score, and univariate analysis revealed 57% of those who reported good perception of mental health were female. Moreover, in this study, a greater percentage of females reported good perception of mental health when compared to men. This finding may be supported by gender roles and emotional processing theories. While being cautious about gender bias, there has been research using structural equation modelling that found that higher gender role conflict was associated with lower emotional expression [27], which in turn was associated with greater distress. Research is mixed regarding sex and association to emotional disturbance following acquired brain injury [28]. For example, some research has found that depression is more common in women than men who have a stroke [28] and others report that depression is greater in men than

women [28]. Further, while some publications show higher reported depressive symptoms among women stroke survivors than males and vice-versa, data from a Canadian registry reported no differences in QOL 6 months after discharge using the Health Utilities Index [28-30]. Dulay and colleagues [29] conducted comprehensive neuropsychological assessments on a large sample of stroke patients (n = 325) and did not find a significant correlation between sex and depression. Discrepancies across publications can be due to differences in the instruments used for measuring QOL, which vary in terms of validity and reliability [4]. Risk factors for mental health disturbance at different time points following a stroke are complex and diverse [31]. Similarly, while variation in sex differences in mental health outcomes for individuals with TBI have been identified [32,33], mental health disturbance prevalence in persons with TBI may not be gender-specific [34,35]. The understanding of baseline patient characteristics (pre-neurologic insult necessitating IRF intervention), post-neurologic injury access to clinical care and rehabilitation services, as well as social, mental health, and socioeconomic factors that may contribute to observed sex differences remain needed. While there are mixed findings in the literature, our findings point to the value of considering sex in the context of biological, psychological, and socio-cultural factors in prognosticating mental health outcomes tailored to patients with acquired brain injury.

Previous studies, including one conducted by Dupre and Lopes [36] indicated better survival rates among stroke patients who were married compared to those widowed or single, therefore we considered marital status as a potential predictor of PROs. However, the findings indicate no statistically significant differences in patient-reported physical or mental health outcomes by marital status. Further research may help understand the role of marital status in patient-reported mental health outcomes.

Limitations

There are several limitations in the study. First, the small sample size, single-hospital, and limited ethnic diversity in the participants may interfere with the generalizability of the findings. Second, the follow-up instrument was at one point in time which varied from 30 days post discharge to one year post discharge from the inpatient rehabilitation hospital. The amount of time post-discharge and life or health-related experiences between discharge and follow-up may have influenced the responses. Third, the follow-up patient reported outcomes did not have performance-based metrics at the time of follow-up. Thus, while performance-based metrics were captured and show value in predicting patient reported outcomes, the broader context of functional status and numerous variables that could impact a patient reported outcome several months status-

post ABI onset was unknown. Moreover, while meaningful associations were identified between performance-based metrics and PROs, collecting clinician-rated functional status at the time follow-up could add additional context for data interpretation. Fourth, this model did not include potentially significant predictors of PROs, such as lifestyle habits (i.e., smoking and drinking), psychiatric status, socioeconomic status (i.e., impacting access to health care following discharge), and specific comorbidity details known to possibly affect stroke patient recovery. The definition of comorbidities used in this study include complications, which may make it difficult to compare outcomes across different publications. Fourth, mobility metrics evidenced a greater spread across functional deficits, though just over half of the participants were high functioning at discharge. Similarly, self-care metrics were skewed towards high functioning patients at the time of discharge, even more so than mobility metrics. Consequently, in the final models, mobility scores were used instead of self-care scores because they explained more of the variation in physical and mental health outcomes and produced better ROC curves. As a result, the model could not capture both functional status measures simultaneously. Models were not externally validated due to small sample size and needed to be validated in larger datasets with a large distribution of performance status at the time of discharge to better generalize findings.

Conclusions

Significant predictors of patient-reported physical health outcomes included age, number of comorbidities, and mobility scores at discharge. Sex and mobility scores at discharge were found to be significant predictors of good mental health. Knowledge about the clinician-rated functional status and patient perception following inpatient rehabilitation status-post ABI can assist in proactively addressing the specific needs of and expectations related to physical and mental health during home, community, and workplace reintegration.

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Conflicts of interest

The authors declare no conflicts of interest.

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