Quality of Life and Population Health in Behavioral Health Care: A Retrospective, Cross-Sectional Study

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ABSTRACT

Objectives: The goal of this study was to determine whether a single-item quality of life (QOL) measure could serve as a useful population health–level metric within the Quadruple Aim framework in a publicly funded behavioral health system.

Design: This was a retrospective, cross-sectional study that examined the correlation between the single-item QOL measure and several other key measures of the social determinants of health and a composite measure of acute service utilization for all patients receiving mental health and substance use services in a community behavioral health system.

Methods: Data were collected for 4488 patients who had at least 1 assessment between October 1, 2020, and September 30, 2021. Data on social determinants of health were obtained through patient self-report; acute service use data were obtained from electronic health records.

Results: Statistical analyses revealed results in the expected direction for all relationships tested. Patients with higher QOL were more likely to report "Good" or better self-rated physical health, be employed, have a private residence, and report recent positive social interactions, and were less likely to have received acute services in the previous 90 days.

Conclusion: A single-item QOL measure shows promise as a general, minimally burdensome whole-system metric that can function as a target for population health management efforts in a large behavioral health system. Future research should explore whether this QOL measure is sensitive to change over time and examine its temporal relationship with other key outcome metrics.

Keywords: Quadruple Aim, single-item measures, social determinants of health, acute service utilization metrics.

The Triple Aim for health care—improving the individual experience of care, increasing the health of populations, and reducing the costs of care—was first proposed in 2008.[1] More recently, some have advocated for an expanded focus to include a fourth aim: the quality of staff work life.[2] Since this seminal paper was published, many health care systems have endeavored to adopt and implement the Quadruple Aim[3,4]; however, the concepts representing each of the aims are not universally defined,[3] nor are the measures needed to populate the Quadruple Aim always available within the health system in question.[5]

Although several assessment models and frameworks that provide guidance to stakeholders have been developed,[6,7] it is ultimately up to organizations themselves to determine which measures they should deploy to best represent the different quadrants of the Quadruple Aim.[6] Evidence suggests, however, that quality measurement, and the administrative time required to conduct it, can be both financially and emotionally burdensome to providers and health systems.[8-10] Thus, it is incumbent on organizations to select a set of measures that are not only meaningful but as parsimonious as possible.[6,11,12]

Quality of life (QOL) is a potential candidate to assess the aim of population health. Brief health-related QOL questions have long been used in epidemiological surveys, such as the Behavioral Risk Factor Surveillance System survey.[13] Such questions are also a key component of community health frameworks, such as the County Health Rankings developed by the University of Wisconsin Population Health Institute.[14] Furthermore, Humana recently revealed that increasing the number

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of physical and mental health "Healthy Days" (which are among the Centers for Disease Control and Prevention's Health-Related Quality of Life questions[15]) among the members enrolled in their insurance plan would become a major goal for the organization.[16,17] Many of these measures, while brief, focus on QOL as a function of health, often as a self-rated construct (from "Poor" to "Excellent") or in the form of days of poor physical or mental health in the past 30 days,[15] rather than evaluating QOL itself; however, several authors have pointed out that health status and QOL are related but distinct concepts.[18,19]

Brief single-item assessments focused specifically on QOL have been developed and implemented within nonclinical[20] and clinical populations, including individuals with cancer,[21] adults with disabilities,[22] individuals with cystic fibrosis,[23] and children with epilepsy.[24] Despite the long history of QOL assessment in behavioral health treatment,[25] single-item measures have not been widely implemented in this population.

Milwaukee County Behavioral Health Services (BHS), a publicly funded, county-based behavioral health care system in Milwaukee, Wisconsin, provides inpatient and ambulatory treatment, psychiatric emergency care, withdrawal management, care management, crisis services, and other support services to individuals in Milwaukee County. In 2018 the community services arm of BHS began implementing a single QOL question from the World Health Organization's WHOQOL-BREF[26]: On a 5-point rating scale of "Very Poor" to "Very Good," "How would you rate your overall quality of life right now?" Previous research by Atroszko and colleagues,[20] which used a similar approach with the same item from the WHOQOL-BREF, reported correlations in the expected direction of the single-item QOL measure with perceived stress, depression, anxiety, loneliness, and daily hours of sleep. This study's sample, however, comprised opportunistically recruited college students, not a clinical population. Further, the researchers did not examine the relationship of QOL with acute service utilization or other measures of the social determinants of health, such as housing, employment, or social connectedness.

The following study was designed to extend these results by focusing on a clinical population—individuals with mental health or substance use issues—being served in a large, publicly funded behavioral health system in Milwaukee, Wisconsin. The objective of this study was to determine whether a single-item QOL measure could be used as a brief, parsimonious measure of overall population health by examining its relationship with other key outcome measures for patients receiving services from BHS. This study was reviewed and approved by BHS's Institutional Review Board.

Methods

All patients engaged in nonacute community services are offered a standardized assessment that includes, among other measures, items related to QOL, housing status, employment status, self-rated physical health, and social connectedness. This assessment is administered at intake, discharge, and every 6 months while patients are enrolled in services. Patients who received at least 1 assessment between October 1, 2020, and September 30, 2021, were included in the analyses. Patients receiving crisis, inpatient, or withdrawal management services alone (ie, did not receive any other community-based services) were not offered the standard assessment and thus were not included in the analyses. If patients had more than 1 assessment during this time period, QOL data from the last assessment were used. Data on housing (private residence status, defined as adults living alone or with others without supervision in a house or apartment), employment status, self-rated physical health, and social connectedness (measured by asking people whether they have had positive interactions with family or friends in the past 30 days) were extracted from the same timepoint as well.

Also included in the analyses were rates of acute service utilization, in which any patient with at least 1 visit to BHS's psychiatric emergency department, withdrawal management facility, or psychiatric inpatient facility in the 90 days prior to the date of the assessment received a code of "Yes," and any patient who did not receive any of these services received a code of "No." Chi-square analyses were conducted to determine the relationship between QOL rankings ("Very Poor," "Poor," "Neither Good nor Poor," "Good," and "Very Good") and housing, employment, self-rated physical health, social connectedness, and 90-day acute service use. All acute service

utilization data were obtained from BHS's electronic health records system. All data used in the study were stored on a secure, password-protected server. All analyses were conducted with SPSS software (SPSS 28; IBM).

Results

Data were available for 4488 patients who received an assessment between October 1, 2020, and September 30, 2021 (total numbers per item vary because some items had missing data; see supplementary **eTables 1-3** online for sample size per item). Demographics of the patient sample are listed in **Table 1**; the demographics of the patients who were missing data for specific outcomes are presented in eTables 1-3. Statistical analyses revealed results in the expected direction for all relationships tested (**Table 2**). As patients' self-reported QOL improved, so did the likelihood of higher rates of self-reported "Good" or better physical health, which was 576% higher among individuals who reported "Very Good" QOL relative to those who reported "Very Poor" QOL. Similarly, when compared with individuals with "Very Poor" QOL, individuals who reported "Very Good" QOL were 21.91% more likely to report having a private residence, 126.7% more likely to report being employed, and 29.17% more likely to report having had positive social interactions with family and friends in the past 30 days. There was an inverse relationship between QOL and the likelihood that a patient had received at least 1 admission for an acute service in the previous 90 days, such that patients who reported "Very Good" QOL were 86.34% less likely to have had an admission compared to patients with "Very Poor" QOL (2.8% vs 20.5%, respectively). The relationships among the criterion variables used in this study are presented in **Table 3**.

Table 1. **Demographics of Patient Sample**

Demographic variable	All patients (N=4488)
Age, mean (SD), y	45.18 (13.25)
Sex, No. (%)	
Male	2526 (56.3)
Female	1959 (43.6)
Other/unknown	3 (0.06)
Race, No. (%)	
Black	2219 (49.4)
White	1995 (44.5)
Asian American	78 (1.7)
Native American/American Indian	45 (1.0)
Other	16 (0.35)
Declined/unavailable	135 (3.0)

Table 2. **Relationship Between Quality of Life Scores and Key Outcomes**

Variable	Self-rated quality of life[a]					X^2	*P* value
	Very poor	Poor	Neither	Good	Very good		
≥"Good" self-rated physical health (N=4294)	13.4% (n=67)	21.0% (n=372)	34.8% (n=1358)	74.4% (n=2221)	90.6% (n=276)	932.588	<.001
With private residence (N=4420)	67.1% (n=73)	75.1% (n=381)	79.8% (n=1426)	84.0% (n=2255)	81.8% (n=285)	32.775	<.001
Employed (N=4310)	12.0% (n=75)	8.8% (n=373)	14.2% (n=1397)	19.5% (n=2189)	27.2% (n=276)	55.839	<.001
Positive interactions w/ family or friends in past 30 days (N=4488)	74.4% (n=78)	75.9% (n=390)	80.8% (n=1467)	90.4% (n=2268)	96.1% (n=285)	136.474	<.001
Any acute service use in past 90 days (N=4488)	20.5% (n=78)	14.1% (n=390)	10.2% (n=1467)	6.3% (n=2268)	2.8% (n=285)	63.594	<.001

[a]The numbers in these columns represent the number of clients at each quality of life (QOL) rating, and the percentages are the proportion of clients at each QOL rating who met/endorsed the outcome criteria.

Table 3. **Relationships Among Key Outcomes**

Variable	Employment status[a]		X^2	*P* value
	Not employed	Employed		
With private residence (N=4252)	80.0% (n=3520)	89.2% (n=732)	34.019	<.001
≥"Good" self-rated physical health (N=4139)	54.9% (n=3426)	71.9% (n=713)	70.322	<.001
Positive interactions w/ family or friends in past 30 days (N=4310)	85.2% (n=3569)	92.8% (n=741)	30.541	<.001
Any acute service use past 90 days (N=4310)	9.1% (n=3569)	3.1% (n=741)	29.784	<.001

Variable	Private residence[a]		X^2	*P* value
	No private residence	Private residence		
≥"Good" self-rated physical health (N=4248)	54.2% (n=771)	58.2% (n=3477)	4.004	.045
Positive interactions w/ family or friends in past 30 days (N=4420)	78.4% (n=819)	88.3% (n=3601)	55.739	<.001
Any acute service use in past 90 days (N=4420)	17.3% (n=819)	5.9% (n=3601)	119.638	<.001

Variable	Self-rated physical health[a]		X^2	*P* value
	<"Good"	≥"Good"		
Positive interactions w/ family or friends in past 30 days (N=4294)	83.5% (n=1832)	88.8% (n=2462)	25.998	<.001
Any acute service use in past 90 days (N=4294)	8.8% (n=1832)	7.2% (n=2462)	3.703	.054

Variable	Positive interactions w/ family or friends in past 30 days[a]		X^2	*P* value
	No	Yes		
Any acute service use in past 90 days (N=4488)	11.7% (n=623)	7.7% (n=3865)	11.361	<.001

[a]The numbers in these columns represent the number of clients who met/endorsed the outcome options listed in the column heads, and the percentages are the proportion of these clients who met/endorsed the outcome criteria listed in the corresponding row headings.

Discussion

The results of this preliminary analysis suggest that self-rated QOL is related to key health, social determinants of health, and acute service utilization metrics. These data are important for several reasons. First, because QOL is a diagnostically agnostic measure, it is a cross-cutting measure to use with clinically diverse populations receiving an array of different services. Second, at 1 item, the QOL measure is extremely brief and therefore minimally onerous to implement for both patients and administratively

overburdened providers. Third, its correlation with other key metrics suggests that it can function as a broad population health measure for health care organizations because individuals with higher QOL will also likely have better outcomes in other key areas. This suggests that it has the potential to broadly represent the overall status of a population of patients, thus functioning as a type of "whole system" measure, which the Institute for Healthcare Improvement describes as "a small set of measures that reflect a health system's overall performance on core dimensions of quality guided by the Triple Aim."[7] These whole system measures can help focus an organization's strategic initiatives and efforts on the issues that matter most to the patients and community it serves.

The relationship of QOL to acute service utilization deserves special mention. As an administrative measure, utilization is not susceptible to the same response bias as the other self-reported variables. Furthermore, acute services are costly to health systems, and hospital readmissions are associated with payment reductions in the Centers for Medicare and Medicaid Services (CMS) Hospital Readmissions Reduction Program for hospitals that fail to meet certain performance targets.[27] Thus, because of its alignment with federal mandates, improved QOL (and potentially concomitant decreases in acute service use) may have significant financial implications for health systems as well.

This study was limited by several factors. First, it was focused on a population receiving publicly funded behavioral health services with strict eligibility requirements, one of which stipulated that individuals must be at 200% or less of the Federal Poverty Level; therefore, the results might not be applicable to health systems with a more clinically or socioeconomically diverse patient population. Second, because these data are cross-sectional, it was not possible to determine whether QOL improved over time or whether changes in QOL covaried longitudinally with the other metrics under observation. For example, if patients' QOL improved from the first to last assessment, did their employment or residential status improve as well, or were these patients more likely to be employed at their first assessment? Furthermore, if there was covariance, did changes in employment, housing status, and so on precede changes in QOL or vice versa? Multiple longitudinal observations would help to address these questions and will be the focus of future analyses.

Conclusion

This preliminary study suggests that a single-item QOL measure may be a valuable population health–level metric for health systems. It requires little administrative effort on the part of either the clinician or patient. It is also agnostic with regard to clinical issue or treatment approach and can therefore admit of a range of diagnoses or patient-specific, idiosyncratic recovery goals. It is correlated with other key health, social determinants of health, and acute service utilization indicators and can therefore serve as a "whole system" measure because of its ability to broadly represent improvements in an entire population. Furthermore, QOL is patient-centered in that data are obtained through patient self-report, which is a high priority for CMS and other health care organizations.[28] In summary, a single-item QOL measure holds promise for health care organizations looking to implement the Quadruple Aim and assess the health of the populations they serve in a manner that is simple, efficient, and patient-centered.

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