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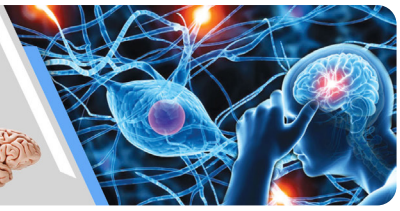

Health-Related Quality of Life and Associations on Socio-Demographic and Clinical Factors in Schizophrenia Based on the QLICD-SC Scale: A Cross-Sectional Study

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Abstract

Background: Literature on factors that influence schizophrenia patients' quality of life is confined to socio-demographic elements and clinical factors have not been verified. The current study aimed to examine the health-related quality of life and its associated factors of schizophrenics by using the scale Quality of Life Instruments for Chronic Diseases-Schizophrenia (V2.0)(QLICD-SC)), which is modular and sensitive.

Methods: 163 people who met the diagnostic criteria for schizophrenia of the International Classification of Diseases(10th Revision) and were hospitalized at the Affiliated Hospital of Guangdong Medical University from May 2014 to December 2015 were recruited. Patients' clinical objective indexes, including blood routine, urine routine, blood biochemical examination, blood gas analysis were collected by reviewing the medical records. Patients were administered the QLICD-SC (V2.0), a quality of life measurement scale for schizophrenia. Simple correlation analysis was used to explore the correlation between the QLICD-SC (V2.0) scores and various clinical objective indicators, and multiple linear regression was used to further screen for correlates.

Results: There were 163 participants, ranging in age from 16 to 69, with a 30.67±11.44 average age. The majority of them were men(57.1%), had a high school diploma (77.9%), and were married (65.6%). According to multiple linear regression, the variables of physical function included in the model were serum phosphorus and urine white blood cell (B=-28.628, -33.797, P<0.01). The variables included in the model of social function were education and nitrituria (B=5.708, -18.563, P<0.05). The variables included in the model of special module were gender and hematocrit (B=38.184, 4.147, P<0.05). No variable was included in psychological function and total scale score.

Conclusion: Some clinical indicators such as serum phosphorus, urine white blood cell, nitrituria, and hematocrit as well as socio-demographic factors including education and gender may affect the quality of life for schizophrenic people.

Keywords: Quality of life; Schizophrenia; Associations; Socio-demographic factors; Clinical indicators

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List of abbreviations

- Schizophrenia (SCZ)
- Health-Related Quality of Life (HRQOL)
- Quality of Life Instruments for Chronic Diseases-Schizophrenia (V2.0)(QLICD-SC)
- physical function (PHD)
- psychological function (PSD)
- social function(SOD)
- special module(SPD)
- total scale score(TOT)

Introduction

Schizophrenia (SCZ) is a kind of severe mental disorder with hallucinations and delusions as the main clinical manifestations. The disease may shorten patients' life expectancy by about 15 years because it will increase their chances of suicide by 10% [1, 2]. At present, about 1% of people worldwide suffer from schizophrenic disorder [3], while the China Mental Health Survey (CMHS) shows that the incidence of schizophrenic disorder in the Chinese population is 0.61%. Although the figure is not extremely high, China's 1.4 billion population indicates that many people suffer from mental disorders [4]. Worse still, SCZ is a long course of disease with a high recurrence rate, resulting in long-term drug treatment but is slow-acting and often produces side effects [5]. During this long-term treatment process, doctors will be able to manage therapeutic regimens more effectively, according to the factors that affect the patient's Quality of life. Therefore, it highlights the importance of enhancing the Quality of life(QOL) also called Health-Related Quality of Life (HRQOL) for SCZ people in China. The World Health Organisation (WHO) (1998) defines HRQOL: The survival experiences of people in various cultures and value systems regarding their objectives, standards, and priorities [6]. HRQOL provides important information about people's emotional and social experiences that cannot be obtained by conventional evaluation [7]. At present, HRQOL is an increasingly important field in health and medicine [8], and multi-dimensional science scales are very helpful in understanding it, such as the quality of life scale (QOLS) [9], generic quality of life inventory—74 (GQOLI-74) [10], 36 Health Survey (SF-36) and the WHO Quality of Life Scale Brief Version (WHOQOL-BREF) [11]. But these generic scales are not specific and insensitive enough and fail to reflect the HRQOL of patients comprehensively [12]. For instance, using SF-36 to compare the HRQOL in SCZ and multiple sclerosis revealed that both groups' impairment was similar [13]. Apart from that, some modular and systematic scales are available, such as the Schizophrenia quality of life scale(SQLS), which is consisted of psychological aspects, motivation, and energy as well as symptoms and side effects but without social domain [14]. However, prejudice and discrimination by society may pose burdens to mental and physical health affecting patients' HRQOL. Additionally, the 18-item Schizophrenia Quality of Life Questionnaire (S-QoL18), which has eight aspects and is shorter for more broad use in clinical practice [15], needs to have its sensitivity to change confirmed. Most importantly, the scales above are foreign versions whose validation may be affected if used in China directly. For this purpose, we have developed Quality of Life Instruments for Chronic Diseases-Schizophrenia (V2.0)(QLICD-SC) [16], which includes general modules and a specific module. The items in general modules are the same making the score can be compared with other chronic diseases. And the specific module for SCZ patients makes the scale more sensitive. Most importantly, the items are chosen based on Chinese background integrating Chinese culture. Therefore, it is more suitable for Chinese people.

Recent studies have shown that gender, working status, monthly salary and other factors have a significant impact on the quality of life of patients with schizophrenia [17, 18, 19]. However, focusing on socio-demographic elements alone is far from enough. Moreover, clinical objective indicators may influence HRQOL. It was reported that the level of inflammatory cytokines in peripheral blood of patients with SCZ was significantly increased [20, 21]. SCZ patients with a higher level of high-sensitivity C-reactive protein(hs-CRP), an inflammatory marker of hepatic origin, reported poorer sleep quality and more intense negative symptoms, which impacted HRQOL [22, 23]. Besides, immune-related factors (IRFs), such as CD30 and BAFF, have been found to dramatically increase in SCZ patients during remission when their HRQOL is greater than during an acute episode [24]. Instead, in the patient's serum, the levels of TNF- α (TNF- α) and IL-6 (IL-6) increased in the acute phase and returned to normal in the remission phase [25, 26]. Studies have shown that about two-thirds of SCZ patients have dyslipidemia with total cholesterol, triglyceride and low density lipoprotein cholesterol (LDL-C)increased, high density lipoprotein cholesterol (HDL-C) decreased [27]. All of the above studies have suggested that clinical indicators of SCZ patients are closely related to their condition and HRQOL, and the macroscopic HRQOL performance may be associated with microscopic laboratory indicators. However, few studies combine objective clinical indicators with HRQOL to evaluate the treatment effect of SCZ. Therefore, this study combined blood routine, blood biochemical tests, urine routine, and blood gas analysis to analyse the correlation between HRQOL and clinical objective indicators in patients with schizophrenia, in the hope of identifying specific indicators as targets for intervention to improve HRQOL of schizophrenics.

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Methods

Study design and setting

A Cross-sectional Study was conducted with persons who fit the criteria from the Affiliated Hospital of Guangdong Medical University in Zhanjiang, China, between May 2014 and December 2015. Zhanjiang is a coastal city in Guangdong Province, which is situated in the south of China.

Participants

All schizophrenia in-patients at this hospital who met the criteria throughout the survey period were selected to participate in the study. Inclusion criteria: (1) Patients were given a schizophrenia diagnosis according to the International Classification of Diseases, tenth edition (ICD-10) diagnostic criteria. (2) Patients with a conscious state; (3) Primary school education or above, able to complete the questionnaire independently; Exclusion criteria: (1) patients suffering from mental disorders due to brain organic disease or somatic diseases; (2) patients suffering from mental disorders due to the use of psychoactive substances or patients who have used psychoactive drugs; (3) patients suffering from mental derangement or acute psychotic episodes; (4) critical and uncooperative patients. 163 patients in total satisfied the inclusion criteria but not the exclusion criteria. All subjects signed the informed consent form. This study was approved by the Ethics Committee of the Affiliated Hospital of Guangdong Medical University (Approval No.: PJ2013037).

Instruments and Variables

QLICD-SC (V2.0) used as a survey tool in the present study is the schizophrenia scale in the Quality of Life Instruments for Chronic Diseases, whose split-half reliability is 0.920 and Cronbach α is 0.910, indicating that it has good internal consistency, reliability, and an ability to reflect the real feeling of patients correctly. The standardized response mean(SRM) of QLICD-SC(V2.0) is higher than 0.20, indicating good scale responsiveness[28]. The QLICD-SC (V2.0) consists of a general module (QLICD-GM) and a schizophrenia-specific module involving 13 items, in which QLICD-GM includes physiological function (9 items), psychological function (11 items), social function (8 items), in total, 3 domains, 9 sides, and 28 items. The whole scale has 41 items, each of which is a five-level hierarchical item. In terms of the scoring method, the sum of the scores of the corresponding items in each domain/side is the original score of the domain/side, and the sum of the original scores in each domain is the original score of the total table, which will be transformed into the standard score (SS) by extremum difference analysis, that is, SS = (RS min) × 100/R [16] to facilitate comparison. SS is the standardized score, RS is the raw score, Min is the minimum score, and R is the range of scores.

The general information questionnaire was used to collect the basic information of patients, including age, nation, gender, marriage stage, occupation, education, family economic status, medical insurance, and medical history, including course of the disease, treatment method, treatment effect, and treatment compliance.

Objective clinical indicators such as routine blood, urine, blood biochemistry, and blood gas analysis were extracted from their medical records.

Survey Methods

Only schizophrenic patients who could read and interpret the questionnaires were allowed to participate in the study. The investigators (a well-trained medical student) introduced the survey and the questionnaires to the patients on the second day of their hospitalization and received their informed consent from those who accepted to participate in the study and met the inclusion criteria. During their 15-minute interview with an investigator, these participants were requested to complete the QLICD-SC (V2.0) and the general information questionnaire. Investigators reviewed the answers right away to make sure they were completed. The investigators then compared the basic personal information in the questionnaire with the medical record system information to ensure correctness. The medical history in the questionnaire was filled in by doctors.

Statistical Analysis

Epidata 3.1 was used to input the initial data, while SPSS 26.0 was used to conduct the statistical analysis. First, the statistical description was applied to analyse the distribution of basic characteristics, among which count information was expressed as [n (%)], and measurement information was expressed in(`x ±s). Then, Pearson correlation analysis was used to explore the correlation between clinical indicators and QLICD-SC (V2.0) scores, with statistically significant variables and sociodemographic indicators in the correlation analysis as independent variables and total QLICD-SC (V2.0) scores as well as domain scores as dependent variables, and multiple linear regression analysis (backward method) was conducted to screen for factors affecting QOL in SCZ patients with the inclusion standard (p-in) is 0.05 and the exclusion standard (p-out) is 0.10.

In the process of data collection, some socio-demographic factors were missed due to the research patients' failure or reluctance to provide information. The lack of clinical objective indicators may be because these patients were not required to measure certain items, or researchers failed to record the items in time, and they were absent at random. Indicators with an excessive amount of missing data were removed.

Quality Control

The present study measured patients' HRQOL using the QLICD-SC (V2.0), a specificity scale for schizophrenia,

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to prevent some biases and guarantee high quality. The researchers briefly introduced the survey to patients and delivered the scale after obtaining the patients' agreement. They were expected to supervise and assist nearby, whilst explaining the content of the scale if necessary. Then, they rechecked the data immediately and used proper methods to analyse it.

Results

Sample Characteristics

The sample characteristics of 163 patients with schizophrenia are presented in Table 1. The patients were aged 11 to 69 years old, with a 30.67±11.44 average age. All the patients were Han Chinese. The majority of them were men (57.1%), had a high school diploma (77.9%) and married (65.6%). A few patients (38.7%) were in poor economic and financial conditions.

HRQOL scores of patients with schizophrenia

See Table 2 for each domain and total score of the patients' HRQOL. The physical function(PHD) amounted to 61.09±11.80; the psychological function(PSD) was 48.02±14.30; the social function(SOD) was 63.21±15.08; the specific module(SPD) was 33.01±20.55, and the total score(TOT) of the scale was 49.09±10.26.

Correlations between HRQOL domain scores and clinical indicators and socio-demographic factors

With the increase of eosinophil, patients' score in PHD increased (r=0.216, P<0.05), but with the increase of serum phosphorus and urine white blood cell, it decreased(r=-0.284,-0.495, P<0.01). Apolipoprotein A1 was positively associated with PSD (r=0.188, P<0.05). Red blood cell and hematocrit were positively associated with SOD (r=0.215, 0.237, P<0.05) and nitrituria was negatively correlated with it(r=-0.360, P<0.05). Higher serum creatinine and percentage of monocyte were both associated with lower SPD score(r=-0.230, -0.205, P<0.05), while total bile acid was positively correlated with it (r=0.192, P<0.05). A higher percentage of monocyte was negatively correlated with TOT (r=-0.215, P<0.05). (see Table 3).

Table 1: Socio-demographic characteristics of the sample (n=163)

Items	Case load (n)	Constituent ratio (%)	Items	Case load (n)	Constituent ratio (%)
gender			**degree of education**		
male	93	57.1	primary school	12	7.4
female	70	42.9	junior high school	67	41.1
nation			high school or technical secondary school	60	36.8
han nationality	163	100	junior college	15	9.2
others	0	0	bachelor degree or above	7	4.3
marriage status			missing	2	1.2
married	107	65.6	**clinical diagnosis**		
others	54	33.1	schizophrenia	131	80.4
missing	2	1.2	schizophrenia and pharyngitis	14	8.6
occupation			schizophrenia and other	13	8
worker	41	25.2	missing	5	3.1
farmer	25	15.3	**medical form**		
teacher	6	3.7	social medical insurance (urban and worker health insurance)	30	18.4
cadre	5	3.1	cooperative medical care	115	70.6
private ownership	10	6.1	self-supporting	10	6.1
student	33	20.2	missing	8	4.9
other	40	24.5	**treatment**		
missing	3	1.8	anti-psychotic	14	8.6
family economic status			anti-psychotic+antidepressant	7	4.3
poor	63	38.7	anti-psychotic+other	70	42.9
medium	70	42.9	anti-psychotic+antidepressant+others	21	12.9
good	21	12.9	others	6	3.7
missing	9	5.5	missing	45	27.7

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Table 2: QLICD-SC (V2.0) domains and total score (standardized score) in schizophrenic patients

Domain	(mean±SD)	Minimum	Maximum
physical function (PHD)	61.09±11.80	19.44	97.22
psychological function (PSD)	48.02±14.30	18.18	90.91
social function(SOD)	63.21±15.08	21.88	96.88
special module(SPD)	33.01±20.55	0	96.15
total scale score(TOT)	49.09±10.26	22.56	83.54

Table 3: Simple correlation analysis between scores of quality of life and clinical indicators (r value)

Clinical indicators	*r* value					Clinical indicators	*r* value				
	PHD	PSD	SOD	SPD	TOT		PHD	PSD	SOD	SPD	TOT
MONO%	0.065	-0.202	0.007	-0.230*	-0.215*	Na	0.070	-0.178	0.065	-0.004	-0.057
EOS	0.216*	-0.009	0.067	0.106	0.141	Ca	0.022	-0.001	-0.040	-0.083	-0.059
RBC	0.136	-0.139	0.215*	-0.083	-0.012	K	0.104	0.038	0.072	0.038	0.086
HCT	0.179	-0.035	0.237*	0.049	0.133	CO2	-0.011	-0.069	0.040	-0.062	-0.055
P	-0.284**	-0.131	-0.130	-0.025	-0.176	UA	0.093	-0.108	0.100	-0.142	-0.079
SCR	0.070	-0.114	0.097	-0.205*	-0.128	BUN	-0.083	-0.012	0.110	-0.139	-0.082
TBA	-0.138	0.021	-0.070	0.192*	0.076	GGT	-0.011	-0.010	0.139	-0.088	-0.022
ApoA-I	-0.108	0.188*	-0.156	0.158	0.100	CHE	0.001	-0.032	0.030	-0.076	-0.052
NIT	-0.252	-0.141	-0.360*	0.255	-0.032	LDH	0.046	-0.092	0.016	-0.012	-0.027
urine WBC	-0.495**	0.137	0.084	-0.242	-0.201	ALP	-0.080	-0.092	-0.064	-0.005	-0.077
WBC	0.028	0.024	-0.004	0.099	0.078	ALT	-0.072	-0.013	-0.034	-0.006	-0.036
NEUT	-0.016	-0.061	0.005	0.085	0.031	AST	-0.049	-0.073	-0.049	0.015	-0.045
BASO	-0.057	-0.044	-0.120	0.115	0.012	α-HBDH	0.064	-0.140	0.046	-0.072	-0.07
LYMPH	0.003	0.053	-0.105	0.062	0.031	TBIL	0.052	0.022	0.175	0.033	0.093
MONO	0.056	-0.201	-0.033	-0.046	-0.105	DBIL	0.052	0.051	0.136	0.098	0.134
LYM%	-0.017	-0.010	-0.083	-0.080	-0.085	IDBIL	0.047	0.006	0.176	-0.002	0.063
NEUT%	-0.012	-0.022	0.137	0.049	0.061	TP	-0.039	0.002	0.000	-0.046	-0.038
EOS%	-0.042	-0.149	-0.063	0.050	-0.053	ALB	0.032	-0.110	0.146	-0.057	-0.029
BAS%	-0.059	-0.026	-0.027	0.027	-0.014	GLB	-0.078	0.087	-0.106	0.020	-0.003
MCV	0.068	0.102	-0.041	0.157	0.145	APOB	0.146	0.050	-0.023	-0.026	0.033
HGB	0.151	-0.043	0.170	0.027	0.089	PRO	-0.221	0.187	0.252	-0.074	0.026
MCH	-0.048	0.042	0.042	0.083	0.071	GLU	-0.090	-0.280	-0.257	-0.045	-0.208
MCHC	0.060	0.035	-0.017	0.123	0.104	KET	0.182	0.134	0.004	0.109	0.157
RDW	-0.023	-0.052	-0.070	-0.164	-0.150	BIL	0.131	0.154	0.101	-0.059	0.069
PLT	-0.086	0.012	-0.049	-0.038	-0.055	PH	0.030	0.246	-0.100	0.311	0.264
PDW	-0.037	0.035	-0.078	0.091	0.040						
MPV	-0.034	0.045	0.026	-0.112	-0.055						
PCT	-0.099	-0.030	-0.015	-0.143	-0.131						

Note: *P< 0. 05, **P<0.01

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(physical function: PHD; psychological function: PSD; social function: SOD; special module: SPD; total scale score: TOT; percentage of monocyte: MONO%; eosinophil: EOS; red blood cell: RBC; nitrituria: NIT; urine white blood cell: urine WBC; apolipoprotein A1: ApoA-I; serum phosphorus: P; serum creatinine: SCR; total bile acid: TBA; specific gravity: SG; hematocrit: HCT; white blood cell: WBC; neutrophilicgranulocyte: NEUT; basophil: BASO; lymphocyte: LYMPH; monocyte: MONO; percentage of lymphocyte: LYM%; percentage of neutrophilicgranulocyte: NEUT%; percentage of eosinophils: EOS%; percentage of basophil: BAS%; mean corpusular volume: MCV; hemoglobin: HGB; mean corpusular hemoglobin: MCH; mean corpusular hemoglobin concerntration: MCHC; red blood cell volume distribution width: RDW; platelet count: PLT; platelet distribution width: PDW; mean platelet volume: MPV; plateletocrit: PCT; serum sodium: Na; serum calcium: Ca; serum potassium: K; carbon dioxide: CO2; blood uric acid: UA; urea: BUN; glutamyl transpeptidase: GGT; cholinesterase: CHE; lactate dehydrogenase: LDH; alkaline phosphatase: ALP; alanine aminotransferase: ALT; aspartate transaminase: AST; α-hydroxybutyrate dehydrogenase: α-HBDH; total bilirubin: TBIL; direct bilirubin: DBIL; indirect bilirubin: IBIL; total protein: TP; serum albumin: ALB; serum globulin: GLB; apoliprotein B: APOB; urinary protein: PRO; glucose in urine: GLU; ketone: KET; urine occult blood: UOB; urine bilirubin: BIL; urinary ph value: PH)

Results of multiple linear regression analysis

Socio-demographic factors (gender, marriage status, family economic status, age, education) and 10 clinical indicators screened in the correlation analysis were entered as independent variables, and the HRQOL scores of PHD, PSD, SOD, SPD, and TOT were taken as dependent variables for multiple linear regression analysis. These factors were quantified (recoded) before multiple linear regression (see table 4 for detail). Table 5 showed the outcomes of the multiple linear regression. The variables of PHD included in the model were serum phosphorus and urine white blood cell, and the determination coefficient R^2 was 0.546(B=-28.628, -33.797, P<0.01). Meanwhile, the variables included in the model of SOD were education and nitrituria(R^2=0.410, B=5.708, -18.563, P<0.05). The variables included in the model of SPD were gender and hematocrit(R^2=0.363, B=38.184, 4.147, P<0.05). No variable was included in PSD and TOT.

Table 4: The variable assignment of multiple linear regression

Variables	Description/recoding
gender(X1)	male = 1, female = 2
marriage status(X2)	married = 1, others = 2
family economic status(X3)	poor = 1 medium = 2, Good = 3
age(X4)	numerical, take the actual value
degree of education(X5)	primary school = 1, junior high school = 2, high school or technical secondary school=3, junior college=4,bachelor degree or above=5
percentage of monocyte(X6)	measured value
eosinophil(X7)	measured value
red blood cell(X8)	measured value
hematocrit(X9)	measured value
total bile acid(X10)	measured value
serum creatinine(X11)	measured value
serum phosphorus(X12)	measured value
apolipoprotein A1(X13)	measured value
nitrituria(X14)	measured value
urine white blood cell(X15)	measured value

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Table 5: Factors influencing quality of life scores in schizophrenia screened by multiple linear regression analysis

Domains	*F*	*P*	Factors	*B*	Std. Error	Standardized *B*	*t*	*P*
PHD	5.056	0.003	constants	137.17	21.599		6.351	0
			serum phosphorus	-28.628	9.329	-0.524	-3.069	0.006
			urine white blood cell	-33.797	10.219	-0.493	-3.307	0.003
SOD	5.337	0.006	constants	81.741	14.403		5.675	0
			education	5.708	2.509	0.394	2.275	0.033
			nitrituria	-18.563	8.918	-0.356	-2.081	0.049
SPD	4.368	0.014	constants	-219.845	83.813		-2.623	0.015
			gender	38.184	12.117	0.793	3.151	0.004
			hematocrit	4.147	1.597	0.656	2.597	0.016

Discussion

The QLICD-SC (V2.0) used in the present study is a schizophrenia scale in the Quality of Life Instruments for Chronic Diseases, including a common module QLICD-GM (general module) and a schizophrenia specific module, which is more practical for studying the HRQOL of schizophrenics. We found that scores of SCZ patients ranked highest in SOD, which may be because patients who feel loved and accepted by their families are easier to reintegrate into society [29]. Additionally, since more than half of the subjects in the study were married, they received better social support from their spouses and scored higher as a result. PHD score was slightly lower, followed by PSD and SPD. PHD primarily reflects the patients' basic physiological conditions, such as appetite, sleep, and independent living ability. But some common clinical manifestations, such as delusions, hallucinations, etc., have a significant impact on the patient's life and increase the patient's sensitivity to mental stress, especially those negative life events[30,31]. As a result, people with SCZ had lower physical and psychological functioning scores. SPD ranked the worst probably because delusions and hallucinations make patients feel that they are being watched or seduced, or can hear or see things that others cannot. Meanwhile, because of alexithymia, patients cannot express their emotions correctly, making them fail to be understood and sympathized with others [32, 33]. All these feelings fit in items in SPD, making it score the lowest.

According to multiple linear regression, influencing factors in PHD included serum phosphorus and urine white blood cell. Education and nitrituria affect the score of SOD. The influencing elements included in SPD were gender and hematocrit. Regarding PHD, serum phosphorus and urine white blood cell were factors. Numerous studies stressed that phosphorus levels correlate with the severity of psychiatric disorders [34, 35,36]. For instance, schizophrenia patients have reduced amounts of phosphorus, according to Jamilian(2012) and Baj (2020) [34, 35]. In Chen's (2017) experiment, phosphorus levels rose after 3.8 weeks of antipsychotic medication therapy, indicating higher HRQOL [36]. But this study's finding revealed a negative association between phosphorus and HRQOL ratings may be because high-level phosphorus in the body leads to phosphorus and calcium antagonism, and the blood calcium reduces, resulting in osteoporosis, which also affects HRQOL. Stubbs B's(2014) study proved that the bone loss of schizophrenics occurred earlier, causing the prevalence of osteoporosis to be higher than in healthy people [37]. Therefore, monitoring phosphorus content in the blood helps clinicians understand patients' HRQOL, although the mechanism is still unclear and not entirely consistent [38]. Apart from that, higher white blood cell and nitrituria are related to lower scores in PHD and SOD respectively, probably because SCZ is associated with an increased prevalence of infections such as urinary tract infection, of which white blood cell and nitrituria are signs and which impair the physical and occupational health of SCZ patients [39,40]. In addition, education has a positive predictive effect on SOD. Higher levels of education, i.e., undergraduate versus those with lower education, i.e., primary school, were associated with higher scores of it. The potential cause is that with the use of antipsychotic drugs, SCZ patients have a higher risk of cardiovascular disease, but knowledgeable patients are more likely to have the awareness of prevention, such as physical exercise, nutritional intake, and smoking cessation [41], which helps them stay away from other diseases as well as maintain labor capacity and undertake their social responsibility.

Multiple linear regression showed that gender was significantly associated with scores on SPD. Female gender

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was associated with higher HRQOL. There are gender disparities in the condition of people with schizophrenia, according to several research [42,43], which may be related to the avenues to deal with stress. Men often blame themselves and try to escape psychological stress. They are less likely than female patients to express their concerns and ask for help, suggesting that males are more embarrassed to be identified as SCZ sufferers[44]. Additionally, research revealed that females had fewer positive symptoms as evaluated by the Positive and Negative Syndrome Scale (PANSS) and scored lower on activities of daily living (ADL) scales, which signified higher daily living abilities [45]. The cause might be connected to the higher medical compliance of women [46]. This paper has the limitation that it is cross-sectional in design. Therefore, the effect of the treatment intervention cannot be analysed. Thus, longitudinal investigations are expected to. In addition, the subjects were all hospital patients with regional limitations. Future studies should widen the scope of the investigation to include other variables. The coefficient of determination R^2 for each model was not high enough, suggesting that our selection of clinical indicators for measurement has certain limitations. Further analysis should be made on the factors affecting the HRQOL of schizophrenic patients.

Conclusion

By using QLICD-SC (V2.0), some indicators such as education, gender, hematocrit influencing the HRQOL of schizophrenic people were screened out which generated fresh insight into clinical treatment. In conclusion, the present study evident that socio-demographic factors and clinical indicators play a crucial role in the HRQOL of patients.

Declarations

Ethics approval and consent to participate

The study protocol and the informed consent form were approved by the IRB (institutional review board) of the affiliated hospital of Guangdong Medical University (PJ2012052, YJYS2019010). The respondents were voluntary and provided written consent for participation. All methods were carried out in accordance with relevant guidelines and regulations.

Consent for publication

Not applicable.

Availability of data and materials

The datasets used and/or analyzed during the current study are available from the corresponding author on reasonable request.

Competing interests

The authors declare that they have no competing interests.

Authors' contributions

CHW designed the study. JDX performed the data collection. SYR performed data analyses and drafted the manuscript. CHW and YXL revised the manuscript deeply. All authors contributed to interpreting the data, and have read and approved the final manuscript.

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Declarations of interest

The authors declare that they have no conflicts of interest.

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