



# Sexuality and Quality of Life in Eastern Taiwan People With Schizophrenia

Mei Hua Chung<sup>1</sup>, Jian-Kang Chao<sup>2,3</sup> ✉, Mi Chia Ma<sup>4</sup>, and Ru Wei Lin<sup>5</sup>

<sup>1</sup>Graduate Institute of Bioresources, National Pingtung University of Science & Technology, Pingtung, Taiwan

<sup>2</sup>Department of Psychiatry, Yuli Branch, Taipei Veterans General Hospital, Hualien, Taiwan

<sup>3</sup>Graduate School of Human Sexuality, Shu-Te University, Kaohsiung, Taiwan

<sup>4</sup>Department of Statistics, National Cheng Kung University, Tainan, Taiwan

<sup>5</sup>Department of Plant Industry, National Pingtung University of Science & Technology, Pingtung, Taiwan

**Objective** Patients with schizophrenia are living at the border of society and their sexuality is often neglected. The aim of the study is to explore the association among The Brief Psychiatric Rating Scale (BPRS), quality of life (QoL), Taiwanese Depression Questionnaire, and Sexual Desire Inventory in people with schizophrenia (PwS).

**Methods** This study used a cross-sectional design with 277 psychiatric inpatients. A descriptive analysis, difference analysis, and logistic regression model were presented to identify relevant variables that may affect the probability of good QoL.

**Results** The study showed that male PwS had higher scores of standard deviation (SD) than females in PwS. The study also showed that smoking, early illness onset age, and shorter illness duration demonstrated a significantly higher SD. The logistic regression analysis showed that BPRS, depression, and SD significantly affected the probability of QoL. By structural equation model, SD would be positively correlated with mental status and SD would indirectly influence QoL.

**Conclusion** Our results showed psychological and sociological factors interactions may contribute to the QoL and SD for PwS. This study also demonstrated a close relationship between SD, depression, and BPRS. These factors may predict the probability of good life quality for the PwS.

**Psychiatry Investig 2023;20(1):1-8**

**Keywords** People with schizophrenia; Sexual desire; Depression; Quality of life; Brief psychiatric rating scale.

## INTRODUCTION

Sexual life is a natural component of human behavior, people with schizophrenia (PwS) often have their sexual rights ignored, and this can become a problem. The various components of sexual functioning—libido, arousal, ejaculation, and orgasm—can all be impaired by schizophrenia in the psychological and pathophysiological aspects.<sup>1</sup> Schizophrenics can suffer from many sexual problems, such as erectile dysfunction, decreased libido or disturbances in ejaculation/orgasm,<sup>2</sup> these could be a result of the disease or the medications

they are taking. Sexual problems in PwS may be related to their symptoms, decreased initiative, and motivation due to their disease status; these problems are also induced by psychosocial factors, somatic health, and the use of psychotropic medications.<sup>3,4</sup>

In the last two decades, there has been increasing interest in QoL among PwS, as they have a severe, disabling, lifelong disorder, associated with severe social and occupational dysfunction. PwS can take medication that may induce erectile dysfunction, decreased libido, or disturbances in ejaculation/orgasm.<sup>5</sup> Olfson et al.'s study<sup>6</sup> showed that schizophrenic patients with current sexual dysfunction showed significantly poorer global QoL and less satisfaction enjoyment in their lives when compared to patients without current sexual dysfunction. Ma et al.'s study<sup>7</sup> also points out that the quality of sexual life and sexual dysfunction on PwS are associated with interactions among psychological, sociological, and biochemical-pharmacological factors.

Sexual functioning has received little attention or recogni-

**Received:** April 6, 2022 **Revised:** June 2, 2022

**Accepted:** July 5, 2022

✉ **Correspondence:** Jian-Kang Chao, MD, PhD  
Department of Psychiatry, Yuli Branch, Taipei Veterans General Hospital,  
No.91, Xinxing Rd., Yuli Town, Hualien 98142, Taiwan  
**Tel:** +886-3-8880137, **Fax:** +886-3-8882049  
**E-mail:** jiankangchao2000@yahoo.com.tw

© This is an Open Access article distributed under the terms of the Creative Commons Attribution Non-Commercial License (<https://creativecommons.org/licenses/by-nc/4.0>) which permits unrestricted non-commercial use, distribution, and reproduction in any medium, provided the original work is properly cited.

tion as an important aspect of care; however, sexuality in chronic and/or severe mental illness is not a widely researched or widely discussed topic. The main aims of our study are to assess the association among Sexual Desire Inventory (SDI), Taiwanese Depression Questionnaire (TDQ), The Brief Psychiatric Rating Scale (BPRS), and quality of life (QoL) in a sample of PwS, who was admitted to a chronic in-patient care unit.

## METHODS

### Materials and methods

The used data come from a cross-sectional survey on demographic items, SDI, BPRS, QoL, and TDQ among patients of chronic psychiatric hospital institutes in eastern Taiwan carried out in 2019. The hospital (Yuli branch, Taipei Veterans General Hospital) offers a pleasant environment. Operating as a community, it differs from other psychiatric hospitals in Taiwan. Besides the main campus, there are also day care services, recovery homes, nursing homes, and community homes. By uniting specialties in nursing, community work, clinical psychology, and occupational therapy staff improve patients' mental health. PwS who joined live in the community function as normal member of the community and operate as part of the community, so they can live in the city like normal people, who can shop, visit friends, and run night market shops. They have a normal social relationship and even opportunities for sexual relationships in Yuli town. A total of 300 participants were evaluated from a chronic psychiatric hospital institute, with 277 (response rate, 92.3%) completed questionnaires being returned.

Data were from 277 patients living in a psychiatric hospital institute in eastern Taiwan. The Institutional Review Board of the Ethics Committee of Chang Gung Medical Foundation (IRB No: 102-6114A3) has approved the proposal and was in accordance with the Declaration of Helsinki. All participants provided informed written consent.

The study was a cross-sectional design and purposive sampling was used. The participants were not limited to specific departments but had to be over 20 years old. Eligible individuals were: 1) clinically stable inpatients in the chronic psychiatric hospital institute in eastern Taiwan; 2) diagnosed with schizophrenia according to the criteria of the Diagnostic and Statistical Manual of Mental Disorders, Fourth Edition (DSM-IV, American Psychiatric Association)<sup>8</sup> assessed by administering the Structured Clinical Interview of DSM-IV;<sup>9</sup> 3) had been ill for a minimum of 5 years; 4) were 20 to 65 years of age; 5) had received at least 6 weeks of treatment with an antipsychotic; and 6) provided informed consent to participate in the study. Exclusion criteria included: 1) gonadal in-

jury; 2) they had a general medical condition or history of a surgical procedure known to cause sexual dysfunction; 3) uncontrolled psychiatric symptoms, diabetes mellitus, history of stroke, congestive heart failure, unstable cardiac condition, arrhythmia, or myocardial infarction within the last 6 months; 4) substance abuse; 5) inability to give informed consent or answer questions.

### Procedure

A self-reported questionnaire was used for data collection. There was a cover letter on the questionnaire describing the purpose of the study and stressing the confidentiality of the given information. BPRS score was assessed by two independent experienced psychiatrists. They received a short training session for BPRS, which is relatively accurate when compared to "gold standard" ratings established for the assessment of PwS.

The IRB consent form was signed by the participants before they started to fill out the questionnaire. The participants were asked to indicate their height, weight, body mass index (BMI), demographic data, QoL, TDQ, and SDI in the questionnaire. The participants were placed in a quiet room to complete the anonymous self-administered survey.

### Assessment instruments

#### Demographic questionnaire

There were 16 demographic items, including sex, age, relationship condition, educational category, religion, smoking and drinking habits, awareness of one's health condition, relation to a partner, and so forth. Data was gathered using self-reported questionnaires and in-person interviews. BMI is a statistical measurement defined as the body weight (in kilograms) divided by the square of the height (in meters) ( $\text{weight [kg]} / \text{height [m]}^2$ ). The Taiwanese Department of Health defines overweight as a person's BMI greater than 24 and obese as one's BMI greater than 27. These definitions differ from those of WHO-Asia, which defines overweight as a person's BMI greater than 23 and obese as one's BMI greater than 25.<sup>10</sup> The Taiwanese obesity definition was used in this study.

#### Sexual Desire Inventory

The Chinese version of SDI (SDI-C) was based on Spector's 14-item SDI, each item is rated 0–8,<sup>11</sup> and it was used to measure SDI in this study. Based on the factor analysis results of Lee et al.,<sup>12</sup> the 14-item scale was categorized into 3 items, namely solitary, dyadic, and mixed items. Internal consistency estimates using Cronbach's alpha revealed coefficients of 0.86 for dyadic sexual desire and 0.96 for solitary sexual de-

sire. The fit indices were  $p=0.68$  and goodness-of-fit index (GFI)=0.93 for the 3-item model.

### The Brief Psychiatric Rating Scale

The brief psychiatric symptom evaluation form is used in assessing the changes before and after treatment in patients with schizophrenic symptoms, the total score is higher if unusual behavior is more serious. Each symptom is rated 0–4 and a total of 18 symptoms are scored. The oldest foreign scale was first published in 1962.<sup>13</sup> The domestic scholars obtained licensing rights for translations into Chinese, slightly modified to comply with the actual conditions of Taiwanese.<sup>14</sup> Interrater reliability, short-term test-retest reliability, and internal consistency were excellent; intraclass correlation coefficients and Cronbach's alphas for the overall scores were all over 0.8.

All interviewers were trained systematically by the internationally registered PANSS trainer from the senior attending physician service before the commencement of patient enrollment. The inter-rater reliability of the clinical rating instruments was conducted on 15 patients with symptomatic schizophrenia. The interviewer used a scale to assess the inter-rater reliability from excellent to good for all the scales with intra-class correlations ranging from 0.89 to 0.94.

### Quality of life

The brief version of the World Health Organization QoL (WHO-QoL-BREF) questionnaire (Taiwan edition) is an abbreviated version of the 100-item WHO-QoL questionnaire. The internal consistency (Cronbach's  $\alpha$ ) coefficients ranged from 0.70 to 0.77 for the four domains (physical, psychological, social, and environmental). WHO-QoL-BREF is to assess an individual's perception in the context of their culture and value system, personal goals, standards, and concerns.<sup>15</sup> The Taiwan edition of WHO-QoL-BREF contains 28 five-point items, each item is rated 0–4. Higher WHO-QoL-BREF scores represent higher perceived QoL.

### Taiwanese Depression Questionnaire

The TDQ which was a 4-point scale with 18 items is a culturally specific depression self-rating instrument for effective screening of depression symptoms in Taiwan. It had a sensitivity of 0.89 and a specificity of 0.92 at a cut-off score of 19 and had satisfactory reliability and validity (Cronbach's alpha coefficient of 0.90 and the area under the receiver operating characteristic curves of 0.92).<sup>16</sup>

### Statistical analysis

SPSS Version 17.0 statistical software (SPSS Inc., Chicago, IL, USA) was used in this study to perform descriptive analy-

sis and difference analysis. Because the data of age, educational level, QoL, depression, and SDI were not a normal distribution, hence, the comparison of means under each categorized demographic variable (e.g., gender, BMI, illness onset age, and illness duration) was examined with the Mann–Whitney U (M-W U) test or the Kruskal–Wallis H test (K-W H test). To evaluate the QoL affected by BPRS, depression, and SDI, we used the multiple logistic regression analysis to find the effect of all variables on the probability of good life quality for the PwS. Besides, we used the structural equation model (SEM) to explore the association of BPRS, TDQ, SDI, and QoL. Data analyses were conducted with SPSS for Windows version 17 and Amos. The difference among groups was considered significant if the p-value was less than 0.05.

## RESULTS

Two hundred and seventy-seven PwS were available for analysis. The mean±standard deviation (SD) for the age of all study participants was 43.82±8.43 years. The mean±SD for education was 10.97±3.00 years, for BPRS was 9.53±6.66, for QoL was 60.27±15.57, TDQ score was 9.86±10.06, and for SDI was 27.24±24.70.

We used the non-parametric M-W U test to analyze the relationship between age, educational level, QoL, depression, SDI and its items, and gender. Table 1 showed that there was a significant relationship between age, BPRS, SDI in total scale, solitary, dyadic, comparative items, and gender. Male participants were younger than female participants ( $p=0.014$ ), and male participants had higher BPRS ( $p=0.019$ ) and higher SDI and its items ( $p<0.001$ ). Table 2 showed that there was a significant relation between SDI, solitary, dyadic, and compara-

**Table 1.** The comparison of quality of life, depression, and sexual desire by gender

Variable	Female (N=83)	Male (N=194)	P
Age (yr)	45.49±7.28	43.11±8.80	0.014*
Education level (yr)	11.07±3.29	10.93±2.88	0.871
BPRS	8.35±6.86	10.04±6.53	0.019*
BMI (kg/m <sup>2</sup> )	25.65±3.98	24.88±3.98	0.252
Quality of life	59.40±15.96	60.64±15.43	0.461
Depression	10.04±9.78	9.36±10.37	0.572
Sexual desire total	14.31±17.71	32.77±25.23	<0.001*
Solitary	3.94±6.03	9.18±8.17	<0.001*
Dyadic	7.37±9.98	16.01±13.76	<0.001*
Comparative	2.83±3.62	7.53±5.70	<0.001*

Values are presented as mean±standard deviation. Using Mann–Whitney U test. \*significantly different ( $p<0.05$ ). BPRS, The Brief Psychiatric Rating Scale; BMI, body mass index

tive items with the combination of obesity and gender in the K-W H test.

In this study, we divided participants with schizophrenia into three groups of below 20 years old, 20–29 years old, and not less than 30 years old in the onset age of mental illness. Then we used the K-W H test to compare the means of educational level (or BPRS, QoL, depression, and SDI) for three

groups of illness onset age. Table 3 showed that participants with schizophrenia illness and late-onset age had significantly higher QoL scores (p=0.030), and lower depression scores (p=0.012).

Similarly, the K-W H test was performed in four groups of less than 10 years, 10–19 years, 20–29 years, and ≥30 years in the illness duration. Table 4 showed that there were signifi-

**Table 2.** The comparison of quality of life, depression, and sexual desire by the combination of gender and BMI

Variable	Female		Male		P
	BMI<27 (N=55)	BMI≥27 (N=28)	BMI<27 (N=137)	BMI≥27 (N=57)	
Age (yr)	45.60±7.30	45.29±7.35	43.71±8.81	41.67±8.68	0.133
Education level (yr)	11.44±3.08	10.36±3.62	10.95±2.82	10.89±3.05	0.197
BPRS	8.24±7.28	8.57±6.08	9.72±6.57	10.82±6.41	0.072
Quality of life	59.31±16.87	59.57±14.28	61.94±16.31	57.53±12.66	0.130
Depression	9.62±9.38	10.86± 9.45	8.78±9.34	12.19±12.27	0.303
Sexual desire total	12.49±16.58	17.89±19.58	31.30±25.71	36.30±23.89	<0.001*
Solitary	3.47±5.90	4.86±6.46	8.69±8.13	10.35±8.30	<0.001*
Dyadic	6.49±9.15	9.11±11.43	15.15±13.93	18.07±13.23	<0.001*
Comparative	2.44±3.46	3.61±3.86	7.42±5.91	7.81±5.22	<0.001*

Values are presented as mean±standard deviation. Using Kruskal-Wallis H test. \*significantly different (p<0.05). BPRS, The Brief Psychiatric Rating Scale

**Table 3.** The comparison of quality of life, depression, and sexual desire by illness onset age

Variable	<20 yr (N=85)	20–29 yr (N=145)	≥30 yr (N=47)	p
Age (yr)	39.62±8.17	44.24±7.68	50.13±6.82	<0.001*
Education level (yr)	10.91±2.80	10.89±3.06	11.36±3.21	0.549
BPRS	10.25±6.57	9.50±6.85	8.36±6.19	0.271
Quality of life	57.52±15.30	60.53±15.29	64.45±16.22	0.030*
Depression	11.88±10.13	9.39±10.11	7.64±9.33	0.012*
Sexual desire total	27.95±25.18	28.60±25.67	21.74±20.03	0.368
Solitary	7.65±8.12	8.12±8.29	5.94±6.61	0.418
Dyadic	14.00±14.09	14.05±13.68	10.43±10.33	0.473
Comparative	6.20±5.83	6.34±5.74	5.32±4.65	0.726

Values are presented as mean±standard deviation. Using Kruskal-Wallis H test. \*significantly different (p<0.05). BPRS, The Brief Psychiatric Rating Scale

**Table 4.** The comparison of quality of life, depression, and sexual desire by illness duration

Variable	<10 yr (N=27)	10–19 yr (N=90)	20–29 yr (N=119)	≥30 yr (N=41)	p
Education level (yr)	11.44±2.98	10.64±2.87	10.97±2.96	11.39±3.43	0.450
BPRS	7.41±6.63	10.46±6.43	9.55±6.83	8.88±6.52	0.100
Quality of life	60.00±17.29	57.99±15.72	61.87±14.91	58.20±15.48	0.249
Depression	7.30±8.75	11.53±11.518	9.32±9.37	9.44±9.12	0.253
Sexual desire	31.00±22.76	33.76±25.87	22.37±22.82	24.59±25.77	0.005*
Solitary	8.00±7.57	9.24±8.82	6.66±7.30	6.51±7.89	0.091
Dyadic	16.15±12.40	16.90±14.13	10.52±11.98	12.39±14.17	0.002*
Comparative	7.62±6.36	7.62±5.96	5.66±5.45	5.18±5.78	0.008*

Values are presented as mean±standard deviation. Using Kruskal-Wallis H test. \*significantly different (p<0.05). BPRS, The Brief Psychiatric Rating Scale

cant relationships between illness duration and SDI total score ( $p=0.005$ ), dyadic item ( $p=0.002$ ), and comparative item ( $p=0.008$ ). There was no significant difference between the four groups in the educational level, BPRS, QoL, depression score, and SDI (solitary item).

The results of multiple logistic regression analysis indicated significant odds ratios (ORs) for BPRS (OR=0.918, 95% confidence interval [CI]=0.878–0.960,  $p<0.001$ ), depression (OR=0.952, 95% CI=0.923–0.982,  $p=0.002$ ), SDI (OR=1.013, 95% CI=1.002–1.024,  $p=0.018$ ), respectively. Depression and BPRS had negatively correlated with the probability of good QoL. Sexual desire had positively correlated with the probability of good QoL (Table 5).

Finally, we used the SEM to explore the association of BPRS, TDQ, SDI, and QoL. BPRS was divided into five items: anxiety, inactive, disorder, activating, and hostile; TDQ was divided into three items: thinking, physiology, and psychology. SDI was divided into three items: dyadic, solitary, and comparative. QoL was divided into four items: environment, social relations, psychological level, and physiological level.

In Figure 1, the overall fit assessment indicator of the SEM model was 1.671 with a GFI of 0.937, adjusted GFI of 0.912, and approximated root mean square error of 0.049, which all reached the standards ( $/df<5$ ,  $GFI\geq 0.9$ , adjusted  $GFI>0.9$ , approximated root means square error $<0.05$ ).

By Amos, the structural reliabilities of the four dimensions—namely, BPRS, depression, SD, and QoL—were 0.779, 0.760, 0.870, and 0.858, respectively, and the average extracted variances were 0.548, 0.718, 0.811, and 0.720. Structural reliabilities of all dimensions were more than 0.7 and extracted variances were also all greater than 0.5. Hence, this model had a reliable fit for the internal structure. Figure 1 showed that 73% of BPRS can be interpreted by mental status, and 60% of depression can be interpreted by mental status. The influence of each dimension was explained as follows. 1) Influence of SD on mental status: sexual desire has a significant, proportional, and direct influence on mental status. 2) Influence of SD on QoL: sexual desire has no direct relation to QoL; however, via mental status, it has an indirect influence. 3) Influence of mental status on QoL: Mental status has a significant, inversely proportional, and direct influence on QoL.

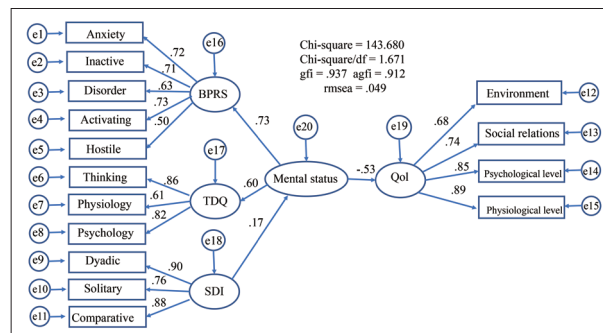
The path coefficient estimates and  $t$  values of standardized model are as follows: SD to mental status: 0.17 ( $t=2.059$ ,  $p<0.05$ ), and mental status to QoL: -0.53 ( $t=-4.212$ ,  $p<0.001$ ). The overall model structure can be simplified as shown in Figure 2.

The influences among variables can be grouped into direct effects, indirect effects, and overall effects. Overall effects which is the sum of the direct effects and indirect effects. Sexual desire has a direct effect of 0.17 on mental status and an indi-

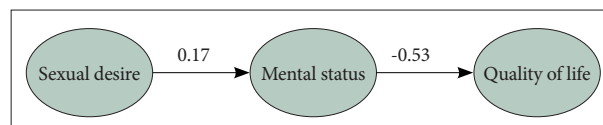
**Table 5.** The related variables affect the probability of good life quality by the multiple logistic regression

	Coefficient	SE	p	OR	95% CI
Constant	0.813	0.262			
BPRS	-0.086	0.023	<0.001*	0.918	0.878–0.960
Depression	-0.049	0.016	0.002*	0.952	0.923–0.982
Sexual desire	0.013	0.006	0.018*	1.013	1.002–1.024

The reference group is total score of life quality  $<59$ . \*significantly different ( $p<0.05$ ). BPRS, The Brief Psychiatric Rating Scale; SE, standard error; OR, odds ratio; CI, confidence interval



**Figure 1.** Standardized estimates. BPRS, Brief Psychiatric Rating Scale; TDQ, Taiwanese Depression Questionnaire; SDI, sexual desire inventory; GFI, goodness-of-fit Index; AGFI, adjusted goodness-of-fit index; RMSEA, root mean square error of approximation; QoL, quality of life.



**Figure 2.** Structural diagram.

rect effect of 0; mental status has a direct effect of -0.53 to QoL and an indirect effect of 0; the SD has an indirect effect, with an indirect effect coefficient of -0.0901, which is found by multiplying the two direct effects  $0.17 \times (-0.53)$ . Hence, mental status has a bigger overall effect coefficient on QoL than that of SD.

## DISCUSSION

Sexual life is an important aspect of human functions, but physicians and psychiatrists often may fail to discuss with patients their sexual health, and sexual problems were underestimated in psychotic patients. The illness itself can interfere with normal expression of sexuality though, sexual problems can result from a wide variety of psychological and physical causes, so treatments for PwS that aim to go beyond the narrow focus of reducing symptoms and, rather, focus on QoL issues will necessarily include consideration of patients' functioning and dysfunction into treatment planning and provi-



sion of care.<sup>2,17</sup>

In studies by Aizenberg et al.,<sup>18</sup> the PwS reported significant increases in SD reduction compared to unaffected controls, while SD was less frequent in patients using psychotropic medications as well as in those not using psychotropic medications. Derogatis and Burnett's study<sup>19</sup> results showed that the prevalence of sexual dysfunction among all women is estimated to be between 25% and 63%, and is high relative to men. In men, a high BPRS general psychopathology score was associated with an increased risk of sexual dysfunction. Studies have shown that a majority of untreated PwS have a reduced desire for sex, more in females as compared to males, in 2003 Macdonald et al.'s<sup>20</sup> Nithsdale schizophrenia surveys results showed that among patients with schizophrenia, 82% of males and 96% of females reported at least one sexual dysfunction. Parish also points out a low desire in women is an extremely common problem (37.7%), and low desire causes personal distress.<sup>21</sup> Some studies also found that the sexuality of female PwS was more impaired. Kockott and Pfeiffer<sup>22</sup> and Ben Mahmoud et al.<sup>23</sup> study showed decreased desire and arousal in women with schizophrenia. Our study results showed that women were fewer than men in the SDI among PwS; this result was similar to that of Ben's report. This study also showed that the female group older than the male group had a BPRS lower than the male group (Table 1).

In male PwS their sexual activity is often limited to masturbation, due to negative symptoms that limit their ability to maintain relationships. Seeman's study<sup>24</sup> also points out multiple factors that influence sexual function in PwS, including the effects of psychiatric symptoms, age, depressive symptoms, institutionalization, and psychotropic medication. Several proposed mechanisms for antipsychotic-induced loss of libido exist like dopamine (DA) antagonism can induce to impairment of motivation and reward cycle and therefore decreased libido. Van Sant et al.<sup>25</sup> also points out elevated prolactin-induced antidopaminergic activity is associated with hyperprolactinemia and decreased libido. In our study, showed no difference in QoL, BPRS, and depression. But SD and its items were significant between the combination of gender and obese PwS (Table 2). Nackers et al.'s reports<sup>26</sup> showed that women's overall BMI change across 13.8 years of follow-up was not associated with overall changes in sexual functioning, SD. Some studies had similar reports that women's sexual functioning and frequency of intercourse have not been associated with obesity, defined by a BMI  $\geq 30$  kg/m<sup>2</sup>.<sup>2,27,28</sup>

Patients with schizophrenia may influence sexual behavior in men and women in different ways.<sup>29</sup> This may be related to the differences in the age of onset of schizophrenia. Women often develop schizophrenia later in their life, which may be due to the effects of sex hormones.<sup>30</sup> Immonen et al.'s<sup>31</sup> sys-

tematic review and meta-analysis study showed that there is a statistically significant association between lower age of onset and frequent hospitalizations, negative symptoms, frequent relapses, poorer social/occupational functioning, and poorer global outcome. Smith's reports<sup>32</sup> also point out the prevalence of major depressive disorder for 18–29-year-olds is threefold higher than that of 60-year-olds, and the prevalence in women is 1.5–3-fold higher than men. Our study had similar results and results showed that early-onset PwS had a higher depressive symptoms score and lower QoL score (Table 3).

Research showed that institutionalized patients, both males, and females with chronic schizophrenia presented decreased interest in sexual activity, decreased frequency of intercourse, and a decrease in satisfaction from sexual interactions.<sup>33</sup> Psychiatric symptoms, institutionalization, and psychotropic medication contribute to frequently occurring impairments in sexual functioning and QoL. Some studied results also showed that PwS are chronic and relapsing and have been correlated with impaired cognitive function as well as interpersonal skills. These disorders also affect the sexual function and social function in patients.<sup>34,35</sup> A study by Kandrakonda et al.<sup>36</sup> shows that sexual dysfunction is very common in patients receiving long-term treatment with antipsychotics, and it is associated with a great impact on a substantial proportion of patients. Our study showed results that long-term illness duration (over 20 years) patients had lower SD total scores, dyadic items, and similar items than short-term illness duration (less than 20 years) patients. Patients with schizophrenia for over twenty years had longer institutionalization and longer-term use of psychotropic medication, which contribute to recurring impairments in SD (Table 4).

Low or decreased SD can cause personal distress. Some studies report that severity of illness was found to be negatively correlated with overall QoL,<sup>37,38</sup> the mental illness itself can interfere with normal expression of sexual thought. The author believes that an excess of DA may cause an increase in mesolimbic activity which results in delusions, hallucinations, and other psychotic symptoms, so an increase in DA level may induce psychotic symptoms exacerbated. Then DA is generally considered to be the major neurotransmitter of sexual arousal and sexual desire, and it also has facilitative effects on sexual motivation, mating competence, and genital reflexes, but Law et al.'s<sup>39</sup> study points out that patients with first-episode schizophrenia have poorer QoL in the period of untreated psychosis than their counterparts in the community. This also shows that mental status affects QoL. Psychiatric symptoms, institutionalization, depression, and psychotropic medication contribute to frequently occurring impairments in sexual functioning and QoL. Our study also showed that the QoL had a strong correlation with BPRS, depression and SD.

## Limitations

In this study, we did not make an initial assessment of participants' sexual dysfunction before treatment, and the participants were free to take any medications including any antipsychotic agents during the study. Therefore, the side effects the participants experienced might have been influenced by the medications they were taking; this requires us to be cautious in our interpretations. Second, the data may be biased, as the questionnaire was self-reported, with 7.7% of participants not responding to the survey. However, an attempt was made to minimize this bias by ensuring privacy during the completion of the questionnaire and using the anonymous self-administered survey. And third, a bias introduced by under-reporting is possible as sexual problems is a sensitive issue and may be considered socially unacceptable in mainly Chinese cultural settings.<sup>40</sup>

In conclusion, sexuality is a key function of human beings, sexuality, sexual relationships and sexual functioning are all important QoL issues for PwS. Quality of life has been recognized as an important outcome of schizophrenia treatment. This study confirms the strong association of QoL with the severity of psychiatric symptoms, depression and SD. Clinicians often do not ask and underestimate the rates of sexual problems, as well as their negative impact on the lives of the PwS. Some clinicians may have limited knowledge of the issue.<sup>41</sup> Therefore, there is a need among clinicians for increased sexual health knowledge, awareness and recognition of the sexual side effects of psychotropic medications on patients, especially those who are socially disadvantaged. Psychiatrists also should take depressive and sexual histories as a routine practice when prescribing psychotropic drugs and prominent psychopathological distress.

## Availability of Data and Material

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

## Conflicts of Interest

The authors have no potential conflicts of interest to disclose.

## Author Contributions

Conceptualization: Mei Hua Chung, Mi Chia Ma, Jian Kang Chao. Data curation: Mei Hua Chung, Mi Chia Ma, Jian Kang Chao. Formal analysis: Mi Chia Ma, Jian Kang Chao. Funding acquisition: Jian Kang Chao. Investigation: Mei Hua Chung, Jian Kang Chao. Methodology: Mei Hua Chung, Mi Chia Ma, Jian Kang Chao. Project administration: Mei Hua Chung, Jian Kang Chao. Resources: Mei Hua Chung, Jian Kang Chao. Software: Mi Chia Ma, Jian Kang Chao. Supervision: Mi Chia Ma, Ru Wei Lin, Jian Kang Chao. Validation: Mi Chia Ma, Ru Wei Lin, Jian Kang Chao. Visualization: Mi Chia Ma, Jian Kang Chao. Writing—original draft: Jian Kang Chao. Writing—review & editing: all authors.

## ORCID iDs

Mei Hua Chung <https://orcid.org/0000-0003-0910-0502>  
Jian-Kang Chao <https://orcid.org/0000-0002-5900-0027>

Mi Chia Ma <https://orcid.org/0000-0003-1949-3004>  
Ru Wei Lin <https://orcid.org/0000-0003-0852-4274>

## Funding Statement

None

## Acknowledgments

Special thanks are extended to all of the participants, and our colleague. The authors would like to thank student assistance from Tzu Chi University of Technology, as well as my daughter Sandra Chao for editorial assistance.

## REFERENCES

1. Baggaley M. aSexual dysfunction in schizophrenia: focus on recent evidence. *Hum Psychopharmacol* 2008;23:201-209.
2. Bushong ME, Nakonezny PA, Byerly MJ. Subjective quality of life and sexual dysfunction in outpatients with schizophrenia or schizoaffective disorder. *J Sex Marital Ther* 2013;39:336-346.
3. Marques TR, Smith S, Bonaccorso S, Gaughran F, Kolliakou A, Dazzan P, et al. Sexual dysfunction in people with prodromal or first-episode psychosis. *Br J Psychiatry* 2012;201:131-136.
4. Malik P, Kemmler G, Hummer M, Riecher-Roessler A, Kahn RS, Fleischhacker WW, et al. Sexual dysfunction in first-episode schizophrenia patients: results from European first episode schizophrenia trial. *J Clin Psychopharmacol* 2011;31:274-280.
5. Bobes J, Garcia-Portilla MP. Quality of life in schizophrenia. In: Katschnig H, Freeman H, Sartorius N, editors. *Quality of Life in Mental Disorders*. Chichester: John Wiley & Sons Ltd, 2005, p.153-168.
6. Olfson M, Uttaro T, Carson WH, Tafesse E. Male sexual dysfunction and quality of life in schizophrenia. *J Clin Psychiatry* 2005;66:331-338.
7. Ma MC, Chao JK, Hung JY, Sung SC, Chao IC. Sexual activity, sexual dysfunction, and sexual life quality among psychiatric hospital inpatients with schizophrenia. *J Sex Med* 2018;15:324-333.
8. American Psychiatric Association. *Diagnostic and statistical manual of mental disorders (DSM-IV)*, 4th ed, Text Revision. Washington, DC: American Psychiatric Press; 2000.
9. First MB, Spitzer RL, Gibbon M, Williams JB. *Structured clinical interview for DSM-IV Axis I disorders, clinician version (SCID-CV)*. Washington, DC: American Psychiatric Press Inc; 1996.
10. Chu, NE. Prevalence of obesity in Taiwan. *Obes Rev* 2005;6:271-274.
11. Spector IP, Carey MP, Steinberg L. The sexual desire inventory: development, factor structure, and evidence of reliability. *J Sex Marital Ther* 1996;22:175-190.
12. Lee HH, Chu YH, Ruan FF, Tzeng DS, Lung FW. Confirmatory factor analysis of the sexual desire inventory in patient with schizophrenia. *Taiwanese J Psychiatry* 2007;21:176-184.
13. Overall JE, Gorham DR. The brief psychiatric rating scale. *Psychological Reports* 1962;10:799-812.
14. Phillips MR, Xiong W, Wang RW, Gao YH, Wang XQ, Zhang NP. Reliability and validity of the Chinese versions of the scales for assessment of positive and negative symptoms. *Acta Psychiatr Scand* 1991;84:364-370.
15. Yao G, Chung CW, Yu CF, Wang JD. Development and verification of validity and reliability of the WHOQOL-BREF Taiwan version. *J Formos Med Assoc* 2002; 101:342-351.
16. Lee Y, Yang MJ, Lai TJ, Chiu NM, Chau TT. Development of the Taiwanese depression questionnaire. *Chang Gung Med J* 2000;23:688-694.
17. Östman M, Björkman AC. Schizophrenia and relationships: the effect of mental illness on sexuality. *Clin Schizophr Relat Psychoses* 2013; 7:20-24.
18. Aizenberg D, Zemishlany Z, Dorfman-Etrog P, Weizman A. Sexual dysfunction in male schizophrenic patients. *J Clin Psychiatry* 1995;56:137-141.

19. Derogatis LR, Burnett AL. The epidemiology of sexual dysfunctions. *J Sex Med* 2008;5:289-300.
20. Macdonald S, Halliday J, MacEwan T, Sharkey V, Farrington S, Wall S, et al. Nithsdale schizophrenia surveys 24: sexual dysfunction. case-control study. *Br J Psychiatry* 2003;182:50-56.
21. Parish SJ, Hahn SR. Hypoactive sexual desire disorder: a review of epidemiology, biopsychology, diagnosis, and treatment. *Sex Med Rev* 2016;4:103-120.
22. Kockott G, Pfeiffer W. Sexual disorders in nonacute psychiatric outpatients. *Compr Psy* 1996;37:56-61.
23. Ben Mahmoud S, Zouari L, Dammak M, Ben Thabet J, Zouari N, Maâlej M. Évaluation de la sexualité d'une série de 61 sujets atteints de psychose chronique. *Sexologies* 2013;22:90-96.
24. Seeman MV. Loss of libido in a woman with schizophrenia. *Am J Psychiatry* 2013;170:471-475.
25. Van Sant SP, Ahmed AO, Buckley PF. Schizophrenia, Sexuality, and Recovery. *JEMH* 2012;7 Available at: [https://www.jemh.ca/issues/v7/documents/JEMH\\_Vol7SchizophreniaSexualityandRecovery.pdf](https://www.jemh.ca/issues/v7/documents/JEMH_Vol7SchizophreniaSexualityandRecovery.pdf). Accessed March 18, 2022.
26. Nackers LM, Appelhans BM, Segawa E, Janssen I, Dugan SA, Kravitz HM. Associations between body mass index and sexual functioning in midlife women: the study of women's health across the nation. *Meno-pause* 2015;22:1175-1181.
27. Bajos N, Wellings K, Laborde C, Moreau C; CSF Group. Sexuality and obesity, a gender perspective: results from French national random probability survey of sexual behaviours. *BMJ* 2010;340:c2573.
28. Smith AM, Patrick K, Heywood W, Pitts MK, Richters J, Shelley JM, et al. Body mass index, sexual difficulties and sexual satisfaction among people in regular heterosexual relationships: a population-based study. *Intern Med J* 2012;42:641-651.
29. Verhulst J, Schneidman B. Schizophrenia and sexual functioning. *Hosp Community Psychiatry* 1981;32:259-262.
30. Abel KM, Drake R, Goldstein JM. Sex differences in schizophrenia. *Int Rev Psychiatry* 2010;22:417-428.
31. Immonen J, Jääskeläinen E, Korpela H, Miettunen J. Age at onset and the outcomes of schizophrenia: a systematic review and meta-analysis. *Early Intervention in Psychiatry* 2017;11:453-460.
32. Smith K. Schizophrenia and depression: understanding the symptoms, risks, & treatment considerations. Available at: <https://www.psychom.net/schizophrenia-and-depression>. Accessed March 18, 2022.
33. Lyketsos GC, Sakka P, Maillis A. The sexual adjustment of chronic schizophrenics: a preliminary study. *Br J Psychiatry* 1983;143:376-382.
34. Huang YM, Kao CY, Hsu JH, Yu CH. Analyses of the quality of life among patients with schizophrenia. *Taiwanese J Psychiatry (Taipei)* 2011; 25:158-166.
35. Kurtz MM, Gerraty RT. A meta-analytic investigation of neurocognitive deficits in bipolar illness: profile and effects of clinical state. *Neuropsychology* 2009;23:551-562.
36. Kandrakonda S, Jally MR, Reddy SRK, Miryala G. Prevalence of sexual dysfunction in patients with mental illness receiving psychotropic medication. *Archives of Mental Health* 2014;15:235-239.
37. Gaur V, Jagawat T, Gupta S, Khan PA, Souza MD, Sharan A. Quality of life in outpatient schizophrenics: correlation with illness severity and psychopathology. *Delhi Psychiatry Journal* 2015;18:95-101.
38. Chino B, Nemoto T, Fujii C, Mizuno M. Subjective assessments of the quality of life, well-being and self-efficacy in patients with schizophrenia. *Psychiatry Clin Neurosci* 2009;63:521-528.
39. Law CW, Chen EY, Cheung EF, Chan RC, Wong JG, Lam CL, et al. Impact of untreated psychosis on quality of life in patients with first-episode schizophrenia. *Qual Life Res* 2005;14:1803-1811.
40. Gao E, Lou C, Liu Y. Assessment on accuracy of the data concerning first sexual behavior in Shanghai, China. *Reproduction and Contraception* 2003;10:421-435.
41. Dossenbach M, Hodge A, Anders M, Molnár B, Peciukaitiene D, Krupka-Matuszczyk I, et al. Prevalence of sexual dysfunction in patients with schizophrenia: international variation and underestimation. *Int J Neuropsychopharmacol* 2005;8:195-201.