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A Comparative Assessment of Disability Levels among Nigerian Outpatients with Schizophrenia and Type 2 Diabetes Mellitus

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Abstract

Background: Chronic illnesses are often associated with functional disability, thus compromising the ability to carry out everyday activities of daily living. The degree of disability depends on the severity and the type of illness experienced. Studies that compare the level of disability between people with chronic medical conditions and mental illnesses in North-Central Nigeria are scarce. This study aims to compare the disability levels between people with schizophrenia and Type 2 Diabetes Mellitus (T2DM) attending outpatient clinics at the Jos University Teaching Hospital, north-central Nigeria, and evaluate the factors associated with these conditions. **Methods:** It was a cross-sectional study with a total of 600 patients who were diagnosed with schizophrenia and T2DM, attending the Psychiatric and medical outpatient clinics of the Jos University Teaching Hospital, north-central Nigeria, between June 2017 and November 2017. The study assessed Psychotic and non-psychotic symptoms by applying the Brief Psychiatric Rating Scale (BPRS) among those with schizophrenia. We evaluated the level of disability by using World Health Organization Disability Assessment Schedule version 2.0 (WHODAS 2.00). **Results:** Disability was significantly higher among respondents with schizophrenia than those with T2DM. This difference occurred across all the domains except domain 2 (moving around). Marital status, living situation, occupation, and treatment adherence were significant common factors associated with disability in these conditions. In contrast, age, educational status, income level, and duration of illness were significantly

associated with disability among respondents with T2DM only. **Conclusion:** Disability and its associated factors among people with chronic diseases, if identified early and proper interventions instituted, disability can be avoided or minimized among people with chronic illnesses.

Keywords

Chronic Conditions, Disability, Comparative Assessment, WHODAS

1. Introduction

Chronic conditions are human health conditions or diseases that are persistent or otherwise long-lasting in their effects [1]. These conditions frequently cause functional disability, characterized by restriction or deterioration of an individual's expected functioning in a particular society, family, or social group [2]. Based on the World Health Organization report of 2020, about 15 percent of the world's population experience some form of disability, with the rate increase, in part due to aging populations and an increase in chronic health conditions [3]. Not only are the number of persons living with disabilities increasing, but also people with disabilities may experience adverse socioeconomic outcomes such as less education, poorer health outcomes, lower levels of employment, and higher poverty rates [4].

The degree of disability experienced by people with chronic conditions correlates with the conditions' type and the associated demographic and clinical factors [5]-[10]. However, certain chronic illnesses have been recognized as prominent causes of significant disability in the community. Cardiac diseases, arthritis, and chronic mental illness are among the most notable [11]. Mental illnesses account for nearly 31% of the world's disability [12], and schizophrenia is the most disabling mental illness [6]. Despite being a low prevalence disorder, schizophrenia ranked the 12th most disabling disorder among 310 diseases and injuries globally in 2016 [13]. Ertugrul & Ulug (2002), using WHODAS II, demonstrated that life activities, participation in society, understanding and communicating with the world, and getting along with people were the domains with a high level of disability in individuals with schizophrenia [14]. Thus, if not minimized, the breadth of the resultant disability from schizophrenia could lead to enormous health care costs and economic losses.

On the other hand, Diabetes mellitus (DM) is a chronic medical condition characterized by defects in insulin secretion and or action, resulting in sustained high blood glucose levels [15]. There are two broad types of diabetes mellitus: type 1 diabetes and type 2 diabetes. This paper focuses on type 2 diabetes accounting for about 90% of all the cases [16]. Along the years of its course, the disease develops into complications, leading to various functional impairments and disabilities [17] [18] [19] [20], with a physical disability, in particular, being

one of the most consistent. Disability in T2DM is associated with many poor outcomes, including loss of employment and productivity [21] [22] [23], yet the cost of treatment is high.

Previous studies have compared the degree of disability among patients with mental and physical illnesses [5] [7]; we could not identify any study that specifically compares the level of disability between individuals with schizophrenia and T2DM in north-central Nigeria. This study compares disability between patients with schizophrenia and T2DM attending outpatient clinics at the Jos University Teaching Hospital, north-central Nigeria. It also identifies the socio-demographic and clinical factors associated with the disability. Understanding the significant factors related to the disability is pivotal in minimizing or avoiding disability in these populations.

We hypothesized a significant difference in disability levels between patients with schizophrenia and T2DM, based on evidence from previous studies that found mental disorders to be more disabling than physical conditions [5] [7].

2. Method and Materials

2.1. Design

We conducted a cross-sectional study that compared disability levels between adults aged 18 years and above with a diagnosis of schizophrenia and T2DM who were stable and attending a clinic at the outpatients' Department of Psychiatry and Medicine of the Jos University Teaching Hospital north-central Nigeria between June and November 2017.

2.2. Setting

We conducted the study at the Psychiatric and Medical outpatient clinics of the Jos University Teaching Hospital, a federal government-owned tertiary hospital in north-central Nigeria, with a capacity of about 600 beds. It was initially a General Hospital, converted to a Teaching Hospital in 1977 to train medical students of the University of Jos. The department of psychiatry was established as a unit of the hospital in 1978. The hospital is a referral center for patients from the north-central, north-eastern, and north-western Nigeria, including Plateau, Bauchi, Nasarawa, Benue, Taraba, Kaduna, Adamawa states, and the federal capital territory.

The Department of Psychiatry operates at the old site, located at the heart of Jos city, the capital of Plateau State. It is about 13 km from the permanent site. The Psychiatric outpatient clinic, which includes: General Adult Psychiatry clinic, Psychogeriatric clinic, Child & Adolescent Clinic, Emergency, and Consultation-Liaison clinic, holds five times a week from Monday to Friday. Available statistics from the record department showed an average of 30 - 50 patients per clinic day, out of which one in four of the patients seen were likely to have a diagnosis of schizophrenia.

The comparative group was drawn from the Endocrine Unit of the Medical outpatient clinic, JUTH, located at the permanent site of the hospital at Lamingo. The Endocrine clinic runs twice weekly, with an average of 15 - 20 patients diagnosed with Type 2DM on follow-up visits per clinic day.

2.3. Participants & Sampling

Adults aged 18 years and above with a diagnosis of Schizophrenia and T2DM as confirmed by a Consultant Psychiatrist according to the International Classification of Diseases (ICD-10) [24] and Consultant Endocrinologist according to WHO diagnostic criteria [25] who at the time of this study were clinically stable, with the last hospital admission at least six months or more before the date of assessment, were eligible for the study. We excluded subjects who declined consent, had a BPRS score of ≥10, fasting blood glucose of ≥10/mml/L, had more than one principal diagnosis, and had moderate to a severe disabling general medical condition. Furthermore, were excluded participants with clear evidence that their illness had been on for less than one year from the study.

We first stratified the participants into two groups based on diagnosis and clinic location and employed a systematic random sampling technique to select eligible respondents from each group. The tradition in psychiatric and medical outpatient clinics is that folders are retrieved and arranged serially based on patients' arrival. Thus, the folders for the patients diagnosed with the conditions under study were selected and assigned a serial number in a sequence (sampling frame for the day = N). We determined the number of participants recruited per clinic day (n = 9) during our pilot study.

The sampling procedure is as follows:

Sampling interval (K) = N/n.

N = sampling frame (number of patients seen per clinic day.

n = daily sample size (number of subjects to be recruited daily) as determined during the pilot study = 9.

In psychiatric clinic, about 30 - 50 patients, out of which 1 in 4 (8 - 13), an average of 20 are likely to have a diagnosis of schizophrenia = N.

Thus, K = 20/9 = 2.

For patients with T2DM 15 - 20 with an average of 18 seen per clinic day = N.

Thus, K = 20/9 = 2.

The first participant was chosen by randomly selecting 1 or 2 (simple balloting). Subsequently, every second participant that fulfilled the inclusion criteria was selected.

We made a notation on the selected folders to prevent subsequent selection of the same patients. This recruitment process was done twice weekly in both clinics, with an average of 15 - 18 patients assessed per week in each clinic over six months, and we obtained our desired sample sizes.

We used the formula for the comparison of two groups to calculate our sample size below [26].

$$n = \frac{\left[P1(1-P1) + P2(1-P2)\right] \times C}{(P1-P2)^2}$$

n = calculated sample size per group.

C = Standard value for the corresponding levels of α and β set at 7.85 (at 95% CI and 80% power).

$P1$ = Prevalence of disability in Schizophrenia among adults based on previous study = 41% [27].

$P2$ = Average rate of disability among adults with diabetes between 1997-2011 = 29% [28].

Thus,

$$n = \frac{\left[0.41(1-0.41) + 0.29(1-0.29)\right] \times 7.85}{(0.41-0.29)^2}$$

$$n = \frac{\left[(0.41 \times 0.59) + (0.3 \times 0.7)\right] \times 7.85}{0.12^2}$$

$$n = \frac{(0.2419 + 0.2059) \times 7.85}{0.0144}$$

$$n = \frac{0.4478 \times 7.85}{0.0144}$$

$$n = 244$$

n = 244 + 24 (considering 10% dropout or attrition) = 268 which was rounded up to 300.

Thus, the sample size was 300 subjects in each group. That means a total of 600 study subjects were required.

2.4. Data Collection

Six researchers who were fluent in both English and Hausa languages collected the data using the survey instruments. The researchers were, first of all, taught how to apply the tools by a senior colleague, who is a Consultant Psychiatrist, and he is conversant with the use of the survey instruments. After that, we carried out a pilot study on 10% of each sample size (30 of each group), fulfilling the inclusion criteria who agreed to be interviewed but did not form part of the sample under investigation (through a systematic random selection, with an interval of 2). The pilot study revealed that 9 participants could be recruited from each group daily. The pilot study also assessed the survey instruments' cultural applicability, administration time and determined and addressed any dilemma that could hamper the smooth running of the proper survey.

In the main study, we approached the participants in Psychiatric and Medical outpatient clinics through a systematic sampling of their folders based on retrieval order. Those Selected had their process of clinic review enhanced before they were invited to a cubicle for data collection, ensuring that they had enough privacy. Participants, who were literate enough, filled out the questionnaires in

the presence of the researchers. At the same time, we used Hausa versions of the instruments to collect data from those who could not speak the English language.

Participants were administered the first questionnaire, the socio-demographic questionnaire, a semi-structured questionnaire designed explicitly by the researchers. The questionnaire sought socio-demographic information (age, gender, educational level, marital status, occupation, living condition, income) and clinical characteristics (duration of illness and adherence to treatment). The administration of the Brief Psychiatric Rating Scale (BPRS) follows this for those with schizophrenia. The BPRS is a widely used semi-structured instrument for assessing psychotic and non-psychotic symptoms in major Psychiatric illnesses, especially schizophrenia [29]. This instrument is valuable for documenting treatment efficacy in patients who have moderate to severe disease. The items from the BPRS form part of the diagnostic criteria for schizophrenia. Its score ranges from 1 (not present) to 7 (extremely severe) and 0 (not assessed). This instrument has been used in Nigeria to classify psychopathology into no or less prominent (relatively stable) and apparent psychopathology [30] [31] [32]. Thus, respondents who scored ten and above (prominent psychotic symptoms) were excluded from the study and replaced by eligible subjects.

Disability was assessed as the dependant variable using World Health Organization Disability Assessment Schedule version 2.0 (WHODAS 2.00). The WHODAS 2.0 is a comprehensive tool that assesses disability within the last 30 days. It emphasizes difficulties in the six domains of cognition, mobility, self-care, getting along with people, life activities, and participation, including work-related disability. The instrument has good validity, internal consistency, robust factor structure (0.91 - 0.99), and overall inter-rater reliability of 0.9882 [33]. The tool has been successfully used in Nigeria [34] [35]. We used the 36-item interviewer-administered version in this study due to its relevance in populations with low literacy. Simple scoring involves assigning values (0 = none, 1 = mild, 2 = moderate, 3 = severe, and 4 = extreme), summing recoded item scores in each domain, and converting the summary score into a metric range. In this study, we used the Andrews *et al.* Scorings [36]. Individuals with a summary score of ≤9 were assigned a low level of disability and ≥t10 as having a high level of disability.

The questionnaires were designed in English. They were translated to Hausa and back to English to maintain their consistency.

2.5. Ethical Considerations

We first obtained ethical clearance from the Health Research Ethical Committee of the Jos University Teaching Hospital. We also sought Permission from the Heads of Departments of Psychiatry and Internal Medicine. We received informed consent from the study participants after explaining the aim and objectives of the study to them, and their confidentiality was assured. It was also clear

to them that the interviews were entirely voluntary; hence, they can withdraw at any stage if they wish, without any negative implications on their treatments. We put this in writing, and those who agreed to participate in the study were required to sign or thumbprint as appropriate. Participants identified with a high level of disability had their findings discussed with the managing consultant to consider integrated rehabilitative care.

2.6. Data Analysis

The Statistical Package for Social Sciences version 20 (SPSS-20) Software package analyzed the data. The results were presented using simple descriptive analysis. T-test was used to compare mean values of numerical variables, and a chi-square test was used to investigate the difference between categorical variables and their associations. Values of $P < 0.05$ were considered statistically significant [37].

3. Results

3.1. Characteristics of Samples

Respondents with T2MD were older, with 239 of them being at least 50 years, as against a total of 54 of the respondents with schizophrenia that were at least 50 years. The majority of 313 respondents were males, comprising 55.3% with schizophrenia and 44.7% with Type2DM. A high proportion, 72.3%, and 54.0%, of the respondents with schizophrenia, lived with their parents and spouses against 21.7% and 54.0% of those with Type2DM living with their parents and spouses. Only 69 of all respondents had no formal education. The rest had formal education, out of which 92.3% and 74.3% of the respondents with schizophrenia and Type2DM had at least a secondary level of education.

For marital status, 30.0% versus 72.3% of the respondents with schizophrenia versus Type2DM were married, while 51.7% and 6% of those with schizophrenia and Type2DM were never married before.

Less than half, 42% of the respondents with schizophrenia were employed and, 56% of those with Type2DM were employed. While 169 and 97 of the respondents with schizophrenia and Type2DM had no stable monthly income, 131 as against 203 of the respondents with schizophrenia and Type2DM had a regular monthly income of at least N20,000.00.

The majority, 77% and 83% of the respondents with schizophrenia and T2DM have been having the illness for at least five years during the study, and 60% and 79.7% of those with schizophrenia and Type2DM had been compliant with their treatment. The details of the sample socio-demographic and clinical characteristics are provided in **Table 1**.

3.2. Disability among Participants with Schizophrenia and Type2DM

Respondents with schizophrenia are more likely than those with Type2DM to

Table 1. Socio-demographic characteristics, duration of illness, and adherence to treatment of participants with schizophrenia and Type2DM.

Variables		Schizophrenia n (%)	Type2DM n (%)	Total N (%)	Statistics		
					χ^2	df	p
Age (years)	<20	4 (1.3)	2 (0.7)	6 (1.0)	301.388	5	<0.001
	20 - 29	67 (22.3)	0 (0.0)	67 (11.2)			
	30 - 39	111 (37.0)	0 (0.0)	111 (18.5)			
	40 - 49	63 (21.0)	59 (19.7)	122 (2 0.3)			
	50 - 59	39 (13.0)	107 (35.7)	146 (24.3)			
	≥60	16 (5.3)	132 (44.0)	148 (24.7)			
Gender	Male	173 (55.7)	140 (44.7)	313 (52.2)	7.274	1	0.004
	Female	127 (44.3)	160 (55.3)	287 (47.8)			
Living status	Alone	10 (3.3)	18 (6.0)	28 (4.7)	77.763	3	<0.001
	Parents/relative	217 (72.3)	119 (39.7)	336 (56.0)			
	Spouse	65 (21.7)	162 (54.0)	227 (37.8)			
	Others	8 (2.7)	1 (0.3)	9 (1.5)			
Education	No formal	12 (4.0)	57 (19.0)	69 (11.5)	40.883	3	<0.001
	Primary	11 (3.7)	20 (6.7)	31 (5.2)			
	Secondary	132 (44.0)	124 (41.3)	256 (42.7)			
	Tertiary	145 (48.3)	99 (33.0)	244 (40.7)			
Marital status	Never married	155 (51.7)	6 (2.0)	161 (26.8)	245.199	3	<0.001
	Married	90 (30.0)	217 (72.3)	307 (51.2)			
	Previously married	45 (15.0)	14 (4.7)	59 (9.8)			
	Widowed	10 (3.3)	63 (21.0)	73 (12.2)			
Occupation	Professionals	14 (4.7)	56 (18.7)	70 (11.7)	30.965	2	<0.001
	Non-professionals	112 (37.3)	112 (37.3)	224 (37.3)			
	Unemployed	174 (58.0)	132 (44.0)	306 (51.0)			
Stable Income	No income	169 (57.3)	97 (32.3)	266 (44.3)	56.446	3	<0.001
	N < 20,000.00	77 (25.7)	79 (26.3)	156 (26.0)			
	N 20,000 - 49,000	49 (16.3)	83 (27.7)	132 (22.0)			
	≥50,000.00	5 (1.7)	41 (13.7)	46 (7.7)			
Duration of illness (years)	<5	69 (23.0)	48 (16.0)	117 (19.5)	6.684	2	0.035
	5 - 9	97 (32.3)	122 (40.7)	219 (36.5)			
	≥10	134 (44.7)	130 (43.3)	264 (44.0)			
Treatment adherence	Yes	180 (60.0)	239 (79.7)	419 (69.8)	27.540	1	<0.001
	No	120 (40.0)	61 (20.0)	181 (30.2)			

have a high level of disability, X2 = 10.373, p < 0.001 (Table 2).

3.3. Mean WHODAS Scores of Participants with Schizophrenia and Type2DM

The table shows that the mean WHODAS scores for respondents with Schizophrenia were higher than those with Type2DM in all the Domains (p < 0.001) except Domain 2 with P = 0.372. The details of the responses are in Table 3.

3.4. Socio-Demographic and Clinical Factors Associated with Disability among Participants with Schizophrenia

The association between the level of disability and the following socio-demographic factors were statistically significant: living condition, X^2 (3, N = 300) = 10.254, p = 0.017, marital status, X^2 (3, N = 300) = 9.402, p =0.024, and occupation, X^2 (2, N = 300) = 7.537, p = 0.023, adherence to medications, X^2 (1, N = 300) = 20.488, p ≤ 0.001. There was no statistically significant association between level of disability and other socio-demographic variables. The details of the responses are in Table 4.

Table 2. Comparison of levels of disability among participants with schizophrenia and Type2DM based on WHODAS 2.0 disability summary score.

WHODAS 2.0 Score	Level of Disability	Schizophrenia	Type2DM	Total	Statistics		
					χ^2	df	p
≥10	High	147 (57.6)	108 (42.4)	255 (100.0)	10.373	1	<0.001
0 - 9	Low	153 (44.3)	192 (55.7)	345 (100.0)			
Mean score		21.74 ± 8.756	9.87 ± 4.649	15.81 ± 9.183	t = 20.732		<0.001

Table 3. Comparison of the mean WHODAS scores of the participants with schizophrenia and Type2DM across all the domains of disability.

Domains	Schizophrenia	Type2DM	t-test	p
Mean score	**21.74 ± 8.756**	**9.87 ± 4.649**	**−20.732**	**<0.001**
D1	2.33 ± 1.922	0.66 ± 0.770	−13.997	**<0.001**
D2	0.79 ± 1.222	0.87 ± 1.155	0.893	0.372
D3	0.53 ± 0.790	0.39 ± 0.677	−2.385	**0.017**
D4	2.58 ± 2.314	0.4 ± 0.749	−15.572	**<0.001**
D5	4.78 ± 3.029	1.24 ± 1.747	−17.534	**<0.001**
D6	10.64 ± 3.454	6.35 ± 1.968	−18.691	**<0.001**

Key: D1—Understanding and communication; D2—Getting around; D3—Self-care; D4—Getting along; D5—Life activities; D6—Participation in society.

Table 4. Socio-demographic factors associated with levels of disability among participants with schizophrenia.

Variables		Type of disability			Statistics		
		Low n (%)	High n (%)	Total N (%)	χ^2	Df	P
Age (years)	<20	1 (0.7)	3 (2.0)	4 (1.3)	6.562	5	0.255
	20 - 29	38 (24.8)	29 (19.7)	67 (22.3)			
	30 - 39	53 (34.6)	58 (39.5)	111 (37.0)			
	40 - 49	30 (19.6)	33 (22.4)	63 (21.0)			
	50 - 59	25 (16.3)	14 (9.5)	39 (13.0)			
	≥60	6 (3.9)	10 (6.8)	16 (5.3)			
Gender	Male	87 (56.9)	86 (58.5)	173 (57.7)	0.083	1	0.774
	Female	66 (43.1)	61 (41.5)	127 (42.3)			
Living	Alone	4 (2.6)	6 (4.1)	10 (3.3)	10.254	3	0.017
Status	Parents/relative	100 (65.4)	117 (79.6)	217 (72.3)			
	Spouse	44 (28.8)	21 (14.3)	65 (21.7)			
	Others	5 (3.3)	3 (2.0)	8 (2.7)			
Education	No formal	3 (2.0)	9 (6.1)	12 (4.0)	4.259	3	0.235
	Primary	7 (4.6)	4 (2.7)	11 (3.7)			
	Secondary	66 (43.1)	66 (44.9)	132 (44.0)			
	Tertiary	77 (50.3)	68 (46.3)	145 (48.3)			
Marital status	Never married	70 (45.8)	85 (57.8)	155 (51.7)	9.402	3	0.024
	Married	58 (37.9)	32 (21.8)	90 (30.0)			
	Previously married	20 (13.1)	25 (17.0)	45 (15.0)			
	Widowed	5 (3.3)	5 (3.4)	10 (3.3)			
Occupation	Professionals	12 (7.8)	2 (1.4)	14 (4.7)	7.537	2	0.023
	Non-professionals	58 (37.9)	54 (36.7)	112 (37.3)			
	Unemployed	83 (54.2)	91 (61.9)	174 (58.0)			
Stable Income	No income	80 (52.3)	89 (60.5)	169 (56.3)	2.776	3	0.428
	N < 20,000.00	45 (29.4)	32 (21.8)	77 (25.7)			
	N 20 - 49,000.00	25 (16.3)	24 (16.3)	49 (16.3)			
	≥50,000.00	3 (2.0)	2 (1.4)	5 (1.7)			
Duration of illness (years)	<5	43 (28.1)	27 (18.4)	70 (23.3)	4.626	2	0.099
	5 - 9	47 (30.7)	45 (30.6)	92 (30.7)			
	≥10	63 (41.2)	75 (51.0)	138 (46.0)			
Treatment adherence	Yes	111 (72.5)	69 (46.9)	180 (60.0)	20.488	1	<0.001
	No	42 (27.5)	78 (53.1)	120 (40.0)			

3.5. Socio-Demographic and Clinical Factors Associated with Disability among Participants with T2DM

Comparison of the level of disability among participants with Type2DM reveals a statistically significant association between the level of disability and the following socio-demographic factors: age, X2 (3, N = 300) = 12.785, p =0.005, living condition, X2 (3, N = 300) = 9.171, p = 0.027, marital status, X2 (3, N = 300) = 13.077, p = 0.004, and occupation, X2 (2, N = 300) = 23.487, p < 0.001, income, X2 (3, N = 300) = 18.472, p < 0.001, duration of illness, X2 (2, N = 300) = 22.709, p ≤ 0.001 adherence to medications, X2 (1, N = 300) = 22.978, p ≤ 0.001 There was no statistically significant association between level of disability and other socio-demographic variables. The details are presented in Table 5.

Table 5. Socio-demographic factors associated with levels of disability among participants with T2DM.

Variables		Disability Type			Statistics		
		Low n (%)	High n (%)	Total N (%)	χ^2	Df	P
Age(years)	<20	2 (1.0)	0 (0.0)	2 (0.7)	12.785	3	0.005
	20 - 29	0 (0.0)	0 (0.0)	0 (0.0)			
	30 - 39	0 (0.0)	0 (0.0)	0 (0.0)			
	40 - 49	47 (24.5)	12 (11.1)	59 (19.7)			
	50 - 59	71 (37.0)	36 (33.3)	107 (35.7)			
	≥60	72 (37.5)	60 (55.6)	132 (44.0)			
Gender	Male	88 (45.8)	52 (48.1)	140 (46.7)	0.149	1	0.700
	Female	104 (54.2)	56 (51.9)	160 (53.3)			
Residential	Urban	130 (67.7)	69 (63.9)	199 (66.3)	2.223	2	0.329
	Semi-urban	50 (26.0)	27 (25.0)	77 (25.7)			
	Rural	12 (6.3)	12 (11.1)	24 (8.0)			
Living status	Alone	9 (4.7)	9 (8.3)	18 (6.0)	9.171	3	0.027
	Parents/relative	68 (35.4)	51 (47.2)	119 (39.7)			
	Spouse	115 (59.9)	47 (43.5)	160 (54.0)			
	Others	0 (0.0)	1 (0.9)	1 (0.3)			
Education	No formal	34 (17.7)	23 (21.3)	57 (19.0)	18.994	3	<0.001
	Primary	12 (6.3)	8 (7.4)	20 (6.7)			
	Secondary	66 (34.4)	58 (53.7)	124 (41.3)			
	Tertiary	80 (41.7)	19 (17.6)	99 (33.3)			
Marital status	Never married	5 (2.6)	1 (0.9)	6 (2.0)	13.077	3	0.004
	Married	150 (78.1)	67 (62.0)	217 (72.3)			
	Previously married	5 (2.6)	9 (8.3)	14 (4.7)			
	Widowed	32 (16.7)	31 (28.7)	63 (21.0)			
Occupation	Professionals	50 (26.0)	6 (5.6)	56 (18.7)	23.487	2	<0.001
	Non-professionals	73 (38.0)	39 (36.1)	112 (37.3)			
	Unemployed	69 (35.9)	63 (58.3)	132 (44.0)			

Continued

Stable Income	No income	47 (24.5)	50 (46.3)	97 (32.3)	18.472	3	<0.001
	N < 20,000.00	52 (27.1)	27 (25.0)	79 (26.3)			
	N 20,000 - 49,000.00	59 (30.7)	24 (22.2)	83 (27.7)			
	≥50,000.00	34 (17.7)	7 (6.5)	41 (13.7)			
Duration of illness (years)	<5	44 (22.9)	4 (3.7)	48 (16.0)	22.709	2	<0.001
	5 - 9	79 (41.1)	43 (39.8)	122 (40.7)			
	≥10	69 (35.9)	61 (56.5)	130 (43.3)			
Treatment adherence	Yes	169 (88.0)	70 (64.8)	239 (79.7)	22.978	1	<0.001
	No	23 (12.0)	38 (35.2)	61 (20.3)			

4. Discussion

The vast majority of patients with chronic conditions experience a functional disability. The degree/levels of disability correlate with the type and severity of the disorders experienced by individuals [5] [6]. Our study compared disability levels among individuals with Schizophrenia and T2DM based on the WHODAS score. We collected data from adults visiting the psychiatric and medical outpatient clinics of the Jos University Teaching Hospital. The total investigated adults were 600, with 300 from psychiatric and medical outpatient clinics, respectively. Patients with schizophrenia and T2DM varied significantly in all the sociodemographic and clinical characteristics measured.

Disability occurred in all respondents. However, persons with schizophrenia reported a higher level of disability than did those with T2DM on the disability summary score and on each disability domain of the WHODAS 2.0, except getting around.

Studies that specifically compare disability levels among persons with schizophrenia and T2DM are not readily available. However, in their respective studies, Ormel *et al*., 2013 [5]; Benjamin *et al*., 2006 [7]; Suliman *et al*., 2010 [38]; and Buis-Bouwman *et al*., 2006 [39] found participants with other mental disorders to be more disabling than those with physical disorders. And, studies that compared disability among mental disorders revealed that schizophrenia was consistently more disabling than other mental disorders surveyed [6] [34] [40]. Furthermore, in the National Comorbidity Survey Replication in the United States, Benjamin *et al*., 2006 [7] indicated that chronic medical conditions are likely to impair the physical performance, limiting home and work functioning; mental disorders impede social functioning and relationships. In terms of onset of disability, De Jong *et al.* (1985) [41] reported that disability in schizophrenia starts primarily in social role, occupational functioning, and interpersonal relationship, which are closely related to the domains of getting along, Life activities, and participation in society, which often contribute to the greatest severity of a

global disability. In contrast, T2DM usually develops into complications, leading to functional impairments in performing a physical task, which is closely related to the domains getting around [17] [18] [19] [20]. In support of this, our results show that the WHODAS scores for respondents with schizophrenia were significantly higher than those with Type2DM in all the Domains except the domain getting around.

Another plausible explanation for the higher level of disability found among respondents with schizophrenia than those with T2DM might have been the beliefs about the aetiology of a disease condition. Most cultures in Nigeria attribute mental illnesses rather than physical conditions to supernatural causation [42] [43] [44]. This belief implies an increased likelihood of accessing care from spiritual or traditional healers, resulting in a delay in presenting to a mental health care facility. This delay eventually leads to a longer duration of untreated psychosis, which constitutes an active morbid process, with brain damage, leading to poor outcomes and, consequently, an increased level of disability [45]. A study by Aghukwa [43] in northern Nigeria revealed that about 70% of respondents who endorsed supernatural attributions to mental illnesses sought help from mental health professionals five years or later after the onset of the disease.

Among the respondents with schizophrenia, marital status, living situation, occupation, and treatment adherence were the significant sociodemographic and clinical characteristics associated with disability.

Specifically, a high level of disability occurred among those who were unmarried as compared with those respondents who were married, which is similar to other studies conducted in Nigeria [35] [46] and Zambia [47], but in contrast to some studies that found no association between marital status and functional disability [48] [49] [50]. Being unmarried or living alone complicates schizophrenia by decreasing social support and non-adherence to treatment, leading to multiple relapses and poor functional outcomes and quality of life.

Furthermore, persons with schizophrenia often experience discrimination that limits their opportunities to enter and form lasting partnerships or live with other people [51].

Concerning occupation, our results showed that being unemployed was strongly associated with a high level of disability compared to being employed, supported by a study conducted in Taiwan [52]. In schizophrenia, life activities, participation in society, understanding and communication, and getting along with people, which constitute skills needed for a productive life, seem to be the domains where disability levels are more apparent [14] [41].

The results also show that poor treatment adherence was associated with a high level of disability, which is in keeping with previous studies conducted in Nigeria [53], and elsewhere [54] [55]. In schizophrenia, the relationship between treatment adherence and disability could be bidirectional. While individuals who do not adhere to treatment won't sustain significant clinical improvement, resulting in high levels of disability [48], those with high levels of disability will

be less stable mentally; and, consequently, adhere less to treatment. Studies have shown that disability can be minimized or avoided in people with chronic conditions who adhere to treatment [8] [9] [10]. Unfortunately, treatment adherence is far from reality in developing countries, including Nigeria and, indeed, our study population. It is often due to poor insight and belief in the supernatural causation of mental illness, financial constraints, and side effects of antipsychotics, especially the older generation antipsychotics prescribed because of their affordability.

Among the respondents with T2DM, we found a significant association between disability and all the sociodemographic and clinical factors evaluated. Thus, disability was significantly associated with age, with respondents who were 60 years and above constituting more than half of those with high levels of disability. This finding is similar to previous studies that reported high levels of disability among older adults with diabetes [56] [57] [58]. Aging and diabetes are conditions that simultaneously increase the risk of disabling conditions such as loss of muscle mass, hearing/visual impairments, peripheral vascular disease, and peripheral neuropathy [17] [18] [19] [20].

We found a higher level of disability among the unmarried and those living alone than those married. Previous studies conducted in Nigeria [59], Ethiopia [60], the USA [61], and Brazil [62] reported the same. A plausible interpretation of our results might hold that the effects of being unmarried or living alone are indicative of decreased social support and treatment adherence, especially among older people who may be experiencing sarcopenia (natural loss of muscle mass) with reduced mobility and cognitive decline to the extent that they often forget to take their oral hypoglycemics regularly. Over time, hyperglycaemia could initiate a part of a multifactorial process, eventually resulting in disability. More so, about 80% of our respondents with T2DM were 50 years and above.

In this study, indicators of low socioeconomic status such as low level of education, unemployment and, having little or no stable income were apparent among respondents with a high level of disability. Studies conducted in the UK [63] and the USA [64] reported the same. Unfortunately, diabetes is a chronic condition with a high cost of treatment. Unfortunately, our environment's economic fortune is low, and the health insurance scheme is limited to few people. A significant implication is an increased likelihood of non-adherence to treatment, resulting in difficulty controlling hyperglycaemia, which constitutes a part of a morbid process, eventually leading to disability [65] [66]. On the other hand, persons with disabilities are more likely to experience adverse socioeconomic outcomes such as low education, lower employment level, higher poverty rates, and poorer health outcomes [3] [4].

The study also revealed a higher level of disability among respondents who have had diabetes for 10 - 15 years. This finding is in tandem with the results of previous studies, which suggested that the longer the duration of diabetes, the greater the risk of disability [67]. For instance, a physical disability could result

from rapid loss of skeletal muscle strength and quality, worsening with increased duration of diabetes [68] [69].

Strength: This is the first study to compare disability levels between patients with schizophrenia and T2DM in north-central Nigeria. The fact that the results were broadly consistent with previous research supports the validity of our findings.

Additionally, we employed a scientifically sound methodology to recruit our study participants using validated instruments, BPRS, to assess Psychotic and non-psychotic symptoms among those with Schizophrenia and WHODAS to measure disability. Our findings were similar to other previous studies.

We also have some limitations: We could not demonstrate the temporal link between the disability and the chronic conditions studied as a cross-sectional study.

The cross-sectional design lacks an objective measurement to reveal all details about a respondent. Therefore, responses are subject to manipulations by respondents.

A further limitation is that these results cannot be generalized all over north-central Nigeria as it was a hospital-based study, limited to a particular hospital. At the same time, a substantial number of people living with these chronic conditions abound in the community.

5. Conclusion

This study showed that though disability occurred in both schizophrenia and T2DM, people with schizophrenia had a higher level of disability than those with T2DM. The results also highlight the significant factors associated with both conditions. Thus, functional disability and its associated factors, if identified and treated early, can be minimized or avoided in people with chronic illnesses.

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Conflicts of Interest

The authors declare no conflicts of interest.

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