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Determinants of Employment Outcome for the People with Schizophrenia Using the WHODAS 2.0

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Abstract

Purpose Since the vocational outcomes of people with schizophrenia should be viewed in a holistic way, the second edition of the World Health Organization Disability Assessment Schedule (WHODAS 2.0) might provide an evaluation regarding employment potential. To determine whether the WHODAS 2.0 scores can be used to predict employment status, we examined the probabilistic cut-off values of the scores and analyzed the relationship between work status and demographic characteristics. *Methods* We selected 31,793 people aged between 18 and 65 with schizophrenia or schizoaffective disorder from the disability evaluation database in Taiwan and separated them into two groups based on employment status (employed and unemployed). We used logistic regression to explore the association between employment and demographic characteristics. Moreover, we conducted a receiver operating characteristic (ROC) analysis to determine the cut-off point to assist in determining employment potential based on the WHODAS 2.0 score. *Results* Among the 31,793 participants, 3367 were employed and 18,801 were unemployed. The unemployed participants accounted for a higher percentage of disability in each domain of the WHODAS. The ROC analysis revealed that the optimal cut-off point of the WHODAS score to distinguish the people who were employed and unemployed was 25.78 (area under curve = 0.80). *Conclusions* The present study indicated that work status can be determined by the total score across the six domains of the WHODAS score. Furthermore, the probability of employment may be determined initially by the cut-off point of the WHODAS score in order to economize evaluation time and prepare prevocational training for those with scores above 25.78.

Keywords International classification of functioning · Disability and (ICF) · World Health Organization Disability Assessment Schedule (WHODAS 2.0) · Schizophrenia · Vocational rehabilitation · Employment

Introduction

Schizophrenia is characterized by deficiencies in functional outcomes including employment. The decreased ability to perform basic activities involved in daily living among patients with schizophrenia makes meeting the demands of competitive employment exceedingly difficult [1, 2]. Recently, perspectives on recovery have shifted from the conventional medical model that is based on symptom reduction and relapse prevention, to a more functional approach that emphasizes participation [3, 4]. Given that work represents a social norm for most people, and is viewed as a key component of overall functioning, obtaining employment

or returning to work is considered beneficial to the recovery of people with schizophrenia [5]. Previous studies in individuals with schizophrenia have indicated that employment strengthens self-empowerment, the feeling of accomplishment, well-being, societal participation, and overall self-determination [6–8]. As a result, work not only provides financial remuneration but also enhances quality of life and overall participation in the community, socially activities, and overall quality of life [9].

Research regarding the employment of people with schizophrenia has indicated that vocational outcomes can be predicted by work history [10–13], cognitive function [13–16], social competence [9, 13, 17–19], and negative symptoms [16]. Although heterogeneous abnormalities exist, cognitive impairment has long been regarded as a symptom of schizophrenia [20, 21] that impacts one's ability to meet the contextual demands of the work environment and overall

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level of vocational functioning [22–25]. People with schizophrenia additionally experience decreased social problem solving skills and limited social interactions which has been found to be related to depreciated community and vocational functioning [26]. Furthermore, negative symptoms, especially lower motivation, have been identified as key barriers to obtaining, sustaining, or returning to work [8, 27, 28], with additional support for intrinsic motivation functioning as a mediator between cognition, social skills, and overall psychosocial functioning.

Research related to the employment of individuals with schizophrenia has indicated that efforts to facilitate vocational development focusing on a single factor are largely inadequate as they are unable to capture the multiple factors, both physical and mental, that contribute to positive employment outcomes. As multiple factors impact employment outcomes, researchers and clinicians will need to utilize a framework that can account for these multiple factors. The International Classification of Functioning, Disability and Health (ICF), is a comprehensive framework that allows for the integration of multiple factors and views individuals with schizophrenia in a holistic manner while providing a comprehensive framework for the prediction of employment [29, 30]. To help facilitate the application of the ICF framework, the World Health Organization (WHO) has developed World Health Organization Disability Assessment Schedule (WHODAS 2.0) which comprises the following six domains: (1) cognition; (2) mobility; (3) self-care; (4) getting along; (5) life activities; and (6) participation. Cornelius et al. [31] used the WHODAS to operationalize functional improvement to analyze the association between the six domain areas and future work status. Furthermore, the Diagnostic and Statistical Manual of Mental Disorders, Fifth Edition (DSM-5) task force considers the WHODAS to be the best current assessment of disability for clinical use and recommended that clinicians and researchers utilize the WHODAS to measure functional impairment instead of the Global Assessment of Functioning Scale [32].

In 2012, the government of Taiwan enacted an amendment of the People with Disabilities Rights Protection Act to authorize the formation of a Taiwanese ICF taskforce responsible for the development and evaluation of a standardized assessment for people with disabilities and new eligibility criteria for the consideration of subsidy [33, 34]. Moreover, to obtain a more thorough understanding of the activity and participation limitations of people with disabilities, the Taiwanese ICF taskforce developed the WHODAS 2.0 Chinese version [35]. Since the establishment of the ICF disability evaluation process, the number of individuals identified by the government as disabled on account of mental illness has been greater than other types of chronic health conditions [36, 37]. In this study, we applied the ICF framework and used the WHODAS 2.0 to examine the factors that impact employment outcomes for individuals with schizophrenia living in Taiwan. In this study we were primarily interested in addressing the following research questions:

1) Are there significant differences in key demographic factors between employed and unemployed individuals with schizophrenia?
2) Can the WHODAS 2.0 total score be used to discriminate between employed and unemployed individuals with schizophrenia?
3) What factors predict work status in a group of individuals with schizophrenia?

Materials and Methods

The present study was a cross-sectional study utilizing secondary data that was approved by the Research Ethics Committee of Hualien Tzu Chi Hospital, Buddhist Tzu Chi Medical Foundation (IRB102-178) and authorized by Ministry of Health and Welfare. The disability evaluation database was collected from July, 2012 to November, 2013 from the Disability Eligibility Determination System of Taiwan and included the demographic data, ICD-9 codes, and functional activity and participation scores of people with disabilities who were assessed by the Chinese version of the WHODAS 2.0 [36]. Participant identify was protected by scrambling their personal ID numbers to render them unrecognizable.

Participants

During the study period a total of 337,660 people applied for disability evaluations. We selected 31,793 participants who received a diagnosis of schizophrenic disorders [ICD-9 code 295]. Based on the following criteria, 9525 of these participants were excluded: (1) not within the legal age labor force (age < 18 or > 65, n = 1743), (2) age data were missing (n = 28), (3) WHODAS 2.0 data were incomplete (n = 6250), (4) no employment information (n = 1123), (5) the disability level was greater than zero or was missing (n = 22), and [38] the participant's had comorbidity with other disabilities (n = 459). After applying the above exclusion criteria, we were left with a total of 22,168 participants separating into two groups by employment status (employed participants [EM, n = 3367], unemployed participants [UN-EM, n = 18,801] (Fig. 1). The employment status is defined by working either full time or part time with salary level meeting the regulation set by the labor department of Taiwan.

Measures

The Chinese version of the WHODAS 2.0 is an interviewer-administered version with good validity and reliability [36].

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┌─────────────────────────────────────────┐
│ Subjects applied for disability evaluation │
│ with schizophrenia and schizoaffective    │
│ disorder (n=31,793)                        │
└─────────────────────────────────────────┘
             │
             │      ┌──────────────────────────────────────────┐
             │─────▶│ Cases excluded (n=9,625)                   │
             │      │ Age < 18 or > 65 (n= 1,743)                │
             ▼      │ Age missing (n= 28)                        │
                    │ Incomplete WHODAS data (n=6,250)           │
                    │ No employed information (n= 1,123)         │
                    │ Level of disabilities = 0 or missing (n=22)│
                    │ Comorbid other disabilities (n=459)        │
                    └──────────────────────────────────────────┘
┌─────────────────────────────────────────┐
│ Schizophrenia (n=22,168)                  │
└─────────────────────────────────────────┘
         ╱                    ╲
┌──────────────────┐   ┌──────────────────┐
│ Employed         │   │ Unemployed       │
│ (n=3,367)        │   │ (n=18,801)       │
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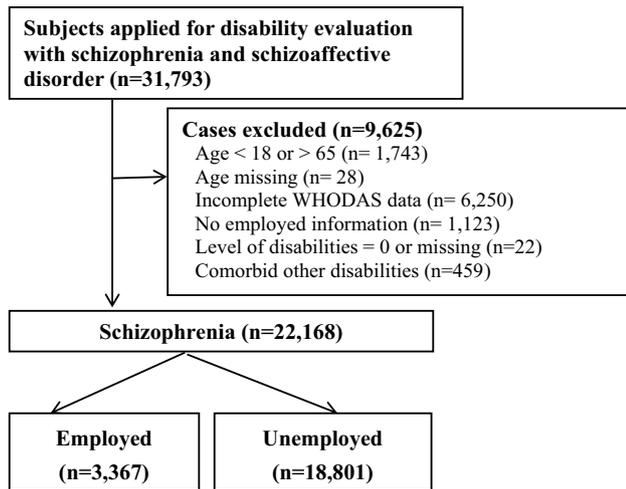
Fig. 1 The selection and exclusion process of participants

The WHODAS 2.0 is a multidimensional instrument developed for measuring functional activity and participation that consists of 36 items and the following six domains

Cognition (Understanding and communicating—6 items), *Mobility* (Getting around—5 items), *Self-care* (4 items), *Getting along* (5 items), *Life activities* (household and school or work—8 items), and *Participation* (8 items). Respondents are asked to respond to each of the 36 items based on a recall period of the preceding 30 days using a 5-point scale ranging from 0 (no disability) to 4 (extreme disability or cannot do). The WHODAS 2.0 provides a domain and an overall summary score ranging from 0 to 100, with higher scores reflecting greater disability. Participants who are not currently working or studying answer 32 items, while those who are working or studying respond to the entire group of items [36].

Statistical Analysis

To examine our first research question we described the demographic data by mean, standard deviation, and percentage. From the demographic data, we used Chi-Square tests to detect differences between the two groups in terms of gender, educational attainment, place of residence (dwelling in the community or an institution), urbanization level of the place of residence, and severity of impairment. We also used independent t-tests to examine mean differences in age while differences in functional scores between the employed and unemployed groups were examined using the Mann–Whitney U test due to skewness in the data. The analyses were conducted by using SPSS 19.0 statistical software.

To examine the second research question, we conducted a receiver operating characteristic (ROC) analysis to determine an appropriate cut-off point to discriminate between the employment statuses of individuals. An ROC curve was created by plotting the range of sensitivity and specificity pairs for each participant's WHODAS 2.0 score, with employment status (employed versus unemployed) as the classifier variable. A global assessment of the WHODAS 2.0 score was given by the area under the ROC curve. This area provided an estimate of WHODAS 2.0 scores as referral criteria for predicting the possibility of returning to work.

To examine the third research question, we used logistic regression analysis to examine the association between employment status and gender, age, educational attainment, place of residence, urbanization level of the place of residence, and severity of impairment.

Results

For the first research question, the age of the unemployed group was significantly greater than that of the employed group (p < 0.001) (Table 1) with the percentage of unemployed female participants significantly higher than that of the male participants (p < 0.001). The number of participants whose educational level were above primary level and the percentage of people who resided in the community were significantly higher in the employed group than the unemployed group (p < 0.001). The percentage of the urbanized participants was significantly higher in the employed group than that in the unemployed group (p < 0.001) and participants with mild impairment had significantly higher employment rate than those with moderate, severe, and extreme impairment (p < 0.001). Individuals in the unemployed group additionally reported significantly higher impairment across all domains of the WHODAS 2.0 than employed participants (Table 2).

With regard to the second research question we found that a score of 26 (25.78) on the WHODAS 2.0 was the best score for predicting the risk of being classified as unemployed. The ROC analysis indicated that the optimal cut-off point of WHODAS 2.0 score to classify participants on employment status was 25.78. It could classify 80.0% of the participants who were employed versus unemployed. The sensitivity was 75.4%, and the specificity was 69.3% (Fig. 2).

The results of the logistic regression analysis in Table 3 revealed that participants with low WHODAS scores (< 25.78) were 6.349 [95% confidence interval (CI) 5.839–6.903] times more likely than participants with high WHODAS scores (≥ 25.78) to be actively employed. Younger participants were also more likely to be employed than older participants with those aged 18–45 years being 2.693 (OR 2.693; 95% CI 2.289–3.169), and those aged 46–55 years being 2.136 (95% CI 1.793–2.545) times more likely 56–65 year-olds to be actively employed. We also found female participants (OR 0.706, 95% CI 0.650–0.767)

Table 1 Demographic characteristics of employed and unemployed participants (n = 22,168)

Variables	Employed n = 3367		Unemployed n = 18,801		All n = 22,168		Chi square/t test p Value
	No.	%	No.	%	No.	%	
Gender							37.95*
Male	1878	55.8%	9403	50%	11,281	50.9%	
Female	1489	44.2%	9398	50%	10,887	49.1%	
Age (years)							212.59*
Mean, SD	39.88	9.01	42.82	11.07	42.37	10.83	
Education							125.87*
Elementary school (and below)	97	6.5%	1377	15.3%	1474	14%	
Junior high school	352	23.4%	2420	26.9%	2772	26.4%	
Senior high school	737	49.1%	3939	43.7%	4676	44.5%	
University (and above)	316	21%	1275	14.1%	1591	15.1%	
Residence							442.04*
Community dwelling	3222	96.00%	15,243	81.40%	18,465	83.6%	
Institution	134	4.00%	3476	18.60%	3610	116.4%	
Urbanization level							70.84*
Core city	888	26.4%	4002	21.3%	4890	22.1%	
City	934	27.7%	4929	26.2%	5863	26.4%	
Boom town	808	24.0%	4704	25.0%	5512	24.9%	
Traditional industrial & general town	599	17.8%	4236	22.5%	4835	21.8%	
Aging & rural town	138	4.1%	929	4.9%	1067	4.8%	
Severity of impairment							992.93*
Mild	1765	52.4%	4935	26.2%	6700	30.2%	
Moderate	1325	39.4%	9992	53.1%	11,317	51.1%	
Severe	260	7.7%	3361	17.9%	3621	16.3%	
Extreme	17	0.5%	513	2.7%	530	2.4%	

Employed condition includes people are hired and self-employed; unemployed condition includes volunteers, students, housekeepers, retired people, and unemployed for health issue

Severity of impairment is defined by the vocational, social and daily living functions of the client as well as the level of assistance needed

*p < 0.001

Table 2 Comparison of the functional scores among employed and unemployed participants with schizophrenia across the six domains of the WHODAS 2.0 (n = 22,168)

Variables	Employment			Unemployment			p Value*
	Mean	SD	Median	Mean	SD	Median	
Domain 1	24.07	19.30	20.00	36.56	24.85	35.00	<0.001
Domain 2	6.46	12.42	0.00	13.07	18.96	6.25	<0.001
Domain 3	4.33	9.67	0.00	10.32	16.66	0.00	<0.001
Domain 4	29.49	24.19	25.00	44.81	28.61	41.67	<0.001
Domain 5–1	20.83	23.70	10.00	38.40	31.29	40.00	<0.001
Domain 6	28.26	19.94	25.00	37.24	22.72	33.33	<0.001
Summary	20.30	14.57	17.92	38.64	17.54	36.79	<0.001

Domain 1: Cognition (Understanding and communicating—6 items), Domain 2: Mobility (Getting around—5 items), Domain 3: Self-care (4 items), Domain 4: Getting along (5 items), Domain 5–1: Life activities (household—4 items), and Domain 6: Participation (8 items)

*Nonparametric Tests: Mann–Whitney U test

to be less likely than male participants to have been actively employed. Regarding urbanization, residents of core cities were the most likely to have been actively employed. The residents of boomtowns (newly developing township) (OR
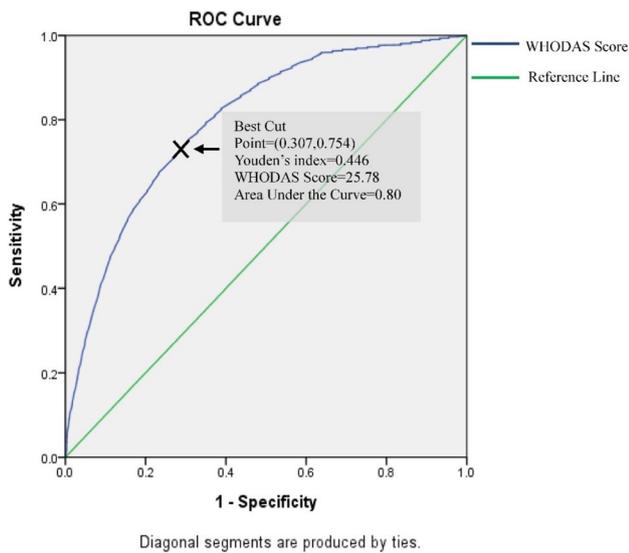
Fig. 2 ROC analysis used to determine the optimal cut-off point of the WHODAS 2.0 score

0.795, 95% CI 0.708–0.893) and traditional industrial & general towns (OR 0.748, 95% CI 0.661–0.848) were both less likely be actively employed. Moreover, participants living in institutionalized settings were substantially less likely (OR 0.211, 95% CI 0.175–0.253) than those living in the

community to be employed. Moderately (OR 0.499, 95% CI 0.458–0.544), severely (OR 0.378, 95% CI 0.326–0.438), and extremely (OR 0.270, 95% CI 0.164–0.454) impaired participants were all less likely than mildly impaired participants to be actively employed.

Discussion

This study was among a few studies to examine the determinants of employment and the relationship between disability and employment in a large group of individuals with schizophrenia living in Taiwan. Consistent with prior research regarding employment of people with disabilities, our results provide additional evidence corroborating the relationship between severity of disability and employment. Specifically, the results of our study indicate that individuals with more significant functional impairment, as measured by WHODAS 2.0 Chinese Version, in the areas of cognition, mobility, self-care, getting along, life activities, and participation reported higher rates of unemployment [39].

Our study was unique in that we operationalized disability severity using the ICF framework and individuals scores on the WHODAS 2.0. Such a conceptualization has not been fully utilized in the psychiatric literature to examine employment participation. Most previous studies

Table 3 Odds of active employment among people with schizophrenia by WHODAS 2.0 scores and demographic characteristics (n = 22,074)

Variables	Effect	Adjusted OR	95% CI	p Value
WHODAS Score	High (≥ 25.78)			
	Low (< 25.78)	6.349	5.839–6.903	< 0.001*
Age (years)	56–65			
	46–55	2.136	1.793–2.545	< 0.001*
	18–45	2.693	2.289–3.169	< 0.001*
Gender	Male			
	Female	0.706	0.650–0.767	< 0.001*
Urbanization level	Core city			
	City	0.897	0.801–1.004	0.058
	Boom town	0.795	0.708–0.893	< 0.001*
	Traditional industrial & general town	0.748	0.661–0.848	< 0.001*
	Aging & rural town	0.895	0.723–1.109	0.311
Residence	Community dwelling			
	Institution	0.211	0.175–0.253	< 0.001*
Severity of impairment	Mild			
	Moderate	0.499	0.458–0.544	< 0.001*
	Severe	0.378	0.326–0.438	< 0.001*
	Extreme	0.270	0.164–0.454	< 0.001*
Constant		0.084		< 0.001*

WHODAS Score Group Separate by ROC curve best cut point

Work states: unemployment = 0, employment = 1

*p < 0.05

that aimed to identify the relationship between disability and employment outcomes in people with schizophrenia or other psychiatric disorders had a primary focus on the influence of impairment factors, such as symptom severity and cognition [40–42]. However, the ICF has specified that symptoms are only one component of disability, and that an assessment commensurate with the task of accurately predicting employment status must be cognizant of the complete range of both symptoms and functional impairment and thus comprise all of the six domains WHODAS [43]. Unfortunately, to date, a study of this scope has rarely been adapted in psychiatric literature. Our study addressed this gap by using an ICF-based multidimensional instrument, the WHODAS 2.0, to measure disability in terms of both symptoms and functional impairment and detected a significant association between multidimensional disability and employment.

Furthermore, this study examined the discriminative ability of the WHODAS 2.0 in predicting employment. Our findings suggest that the WHODAS 2.0 score can discriminate between the probability of employment versus unemployment in people with schizophrenia with a cut-off point of 25.78 on the WHODAS 2.0. That is, individuals who scored 25.78 or lower were more likely to become employed, while individuals who scored higher than 25.78 were less likely to become employed. This cut-off score appears to have significant clinical value and can be used to guide practice and intervention implementation. The discriminative ability of the WHODAS 2.0 is high (AUC = 0.8) and thus provides a reference for the prediction of whether an individual with schizophrenia may be employable at the current time. In addition the results of this study can be used to guide interventions and target the respective functional and symptomatic domains that best increase employability.

The discriminative ability of the WHODAS 2.0 relies on its ability to consider more than only one factor associated with employment outcome. In fact, the logistic regression model in our analysis showed that beyond disability, multiple predictor variables, including age, gender, socioeconomic status, urbanization level, residence, and severity of impairment, are all associated with employment. This finding is aligned with existing literature, which suggests that various demographic, environmental, and disease-related variables are associated with the employment status of people with mental illness [44, 45]. More individual and environmental factors, such as work history [46], motivation [47], rehabilitation services [48, 49], social support [47], and stigma [45, 50] may all influence employment outcomes. Considering the contribution from all these factors and applying the theoretical framework of the ICF, it is not surprising that disability is not the only factor that contributes to employment outcomes. Study results provide support that multiple factors need to be considered when rehabilitation practitioners deliver employment services and make intervention plans for individuals with schizophrenia.

Despite the merit of our findings, there are limitations that should be considered when interpreting our study results. First, the main purpose of the disability evaluation developed in Taiwan is to deliver subsidy based on the ability and impairment of people with disabilities. Unfortunately, educational attainment is not a required field on the form. Therefore, although educational attainment may influence vocational outcome, we are unable to analyze the relationship between education and employment because of missing data. Second, the data collected from the disability evaluation may not be sufficiently reliable. The outcomes of the disability evaluation are used to determine the subsidy for people with disabilities, and therefore some participants may intend to receive a greater subsidy by making false reports about their actual capabilities or performance. Third, we excluded subjects who did not meet our criteria of study (e.g., missing WHODAS data), therefore our results may have restricted implication for the subjects who fall out of the inclusion criteria of our study. Finally, some people with schizophrenia may not have enough insight to provide accurate responses, and thus may provide inaccurate yet unbiased information.

Conclusion

The present study identified a significant relationship between disability as reflected by the complete range of both symptoms and functional impairment contained in the six domains the WHODAS 2.0 and active employment in people with schizophrenia. We also demonstrated that employment status could be discriminated using the global disability measure of these six domains. While rehabilitation practitioners may need to consider additional potential factors to deliver optimal employment services and ancillary interventions to clients, it is the hope of the authors that this tool is used in both interventions and the clinic to target the respective functional and symptomatic domains that best increase employability. Moreover, government policy should make efforts to direct resources toward providing prevocational training for people whose WHODAS 2.0 scores are above 25.78 to better prepare them to seek employment.

Compliance with Ethical Standards

Conflict of interest The authors declare no conflict of interest.

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