

Exploring the Factor Structure and Psychometric Properties of the World Health Organization Disability Assessment Schedule (WHODAS 2.0) in Schizophrenic Patients

Parsa Waqar Abbasi

Abstract

Background: Disability is a significant common health problem, affecting almost 15% of the worldwide population. Among the several forms of disability, those stemming from psychological problems often encounter heightened discrimination and prejudice. WHODAS 2.0 stands as a comprehensive and pragmatic measure for examining health and disability in multiple life domains. The primary endeavors of this study are to translate and adapt the WHODAS 2.0 instrument and further investigate its reliability and validity, specifically focusing on confirming its original factor structure in Pakistani patients diagnosed with schizophrenia.

Method: A purposive sampling technique and a cross-sectional research design were used in the present study. It consisted of two studies: (1) a preliminary study, and (2) a main study. In the preliminary study, the standard translation method was used to translate and adapt the WHODAS 2.0 scale and evaluate its cross-cultural validation in a university student sample. In contrast, the main study was conducted to examine the construct validity of the Urdu version of the WHODAS 2.0 scale in schizophrenic patients. For this purpose, one hundred diagnosed schizophrenia patients with an age between 20 and 60 ($M = 31$, $SD = 8.02$) years were incorporated into the department of psychiatrists at various hospitals in Rawalpindi and Islamabad, Pakistan, from August to October 2022.

Results: The results of the confirmatory factor analysis (CFA) confirmed the construct validity of the Urdu version of WHODAS 2.0 in Pakistani schizophrenic patients. The study established internal consistency, alpha-Cronbach reliability, test-retest reliability, and construct validity in schizophrenic patients. These findings robustly confirmed the suitability of the Urdu version of WHODAS 2.0 for clinical practice in the Pakistani context.

Conclusions: WHODAS 2.0 has the potential to be a valid and reliable instrument to examine disability and health in multiple life domains in schizophrenic patients. Mental health professionals can use the WHODAS in routine examinations to comprehend functional impairments in schizophrenia patients that further guide the development of treatment plans.

Keywords: World health organization disability assessment schedule, psychometric properties, cross-cultural validation, schizophrenia patients, confirmatory factor analysis

1. MS scholar, Department of Psychology, Foundation University School of Science and Technology, Pakistan.

Correspondence concerning this article should be addressed to Parsa Waqar Abbasi, Department of Psychology, Foundation University School of Science and Technology, Pakistan. Email: parsawabbasi@outlook.com.

This scholarly work, made accessible through an Open Access framework, operates under the auspices of a Creative Commons Attribution 4.0 International License. This license facilitates broad utilization, provided that due credit is accorded to the original authors and the source is duly acknowledged. Moreover, adherence to the guidelines set forth by the Committee on Publication Ethics (COPE) ensures the integrity of the publication process. For further details regarding the licencing terms, please refer to the following link: <http://creativecommons.org/licenses/by/4.0/>.

Background

Schizophrenia is one of the most prevalent mental health challenges globally, resulting in substantial deficits across numerous domains of functioning, including personal, social, cognitive, and occupational spheres (Abbasi & Aqeel, 2023; Abdelkrim et al., 2023; Anona et al., 2024; Feyaerts & Sass, 2024; Koopmans et al., 2020; Ma et al., 2024; Nisar et al., 2020; Velligan & Rao, 2023). While, potentially, all Diagnostic and Statistical Manual of Mental Disorders, 5th Edition (DSM-5), diagnoses can be involved, most of the patients who qualify as severely mentally ill have been diagnosed with schizophrenia or another psychotic or major mood disorder (Abdelkrim et al., 2023; Fisher & Roget, 2014). The prevalence of severe mental illness in the USA is about 5% in adults. While a multitude of diagnoses outlined in the Diagnostic and Statistical Manual of Mental Disorders, 5th Edition (DSM-5) can possibly be involved, it is mainly people diagnosed with schizophrenia disorder and other psychotic disorders who include the majority of severely mentally ill patients. Interestingly, the prevalence of severe mental disorders has been rapidly increasing in young adults, especially in the United States, where it is approximately 5%. On the other hand, its prevalence continues to increase day by day in lower-middle-income countries, especially in Pakistan. Disability arising from such situations represents a noteworthy mental and physical health challenge (Abbasi & Aqeel, 2023; Abida et al., 2023; Aqeel, Nisar, et al., 2021; Aqeel et al., 2022; Khan et al., 2020; Manzoor et al., 2022; Nawaz et al., 2020; Noorullah et al., 2024; Peters & Aqeel, 2020; Shoaib et al., 2023; Tariq et al., 2023). Patients often seek healthcare services not exclusively due to their disease, but because their condition hampers their capability to function as they did before. When a condition significantly impedes the daily activities of an individual, healthcare and mental health professionals categorize it as clinically substantial, shaping their evaluation and development based on disability-related knowledge (Manzoor et al., 2022). The public health initiatives programme has developed and progressed beyond mere humanity concerns, now including disability metrics to start priorities, examine or monitor consequences, and examine healthcare system efficacy (Koopmans et al., 2020; Manzoor et al., 2022; Üstün et al., 2010).

The concept of disability, as explained by the International Classification of Functioning, Disability, and Health, involves deficiencies, activity restrictions, as well as participation limitations (Bhatti et al., 2023; Castro et al., 2023; Gul et al., 2022; Orsi et al., 2024; Shuja et al., 2022; Üstün et al., 2010). It represents the adverse consequences stemming from the interaction between a person with a health condition and their situational factors, comprising environmental and personal elements (Castro et al., 2023; Emerson, 2012; Lora et al., 2012; Nowak et al., 2016, 2017; Orsi et al., 2024; Tandon et al., 2008). Disability appears as a substantial health problem, impacting approximately 15% of the international populace (Aqeel, et al., 2021; Aqeel & Ahmed, 2018; Emerson, 2012; Koumpouros et al., 2018; Naeem et al., 2023; Nisar et al., 2020; Shuja et al., 2021). People don't often seek healthcare services because of the occurrence of a disease. Whenever their capacity to execute previously daily tasks has diminished (Koumpouros et al., 2018; Sabé et al., 2024).

Mental health problems encounter the most distinct discrimination and prejudice among all categories of disabilities. They are often considered self-inflicted settings and something that could have been alleviated if the affected people had used more effort. This discrimination and bias permeate daily social and personal interactions, demonstrating reduced funding for support facilities and the relative innovation of accessible treatments (Smart et al., 2021; Sophie et al., 2022). Remarkably, severe mental diseases exhibit the highest prevalence of unemployment among all kinds of disabilities, rising to as high as 90% (Beyene et al., 2021; Khattak, 2023; Noor et al., 2016; Peter et al., 2017; Peters & Aqeel, 2020).

Schizophrenia is a severe, chronic, and disabling mental illness that considerably affects different aspects of life, such as personal, familial, social, occupational, and educational functioning (Abbasi & Aqeel, 2023; Beyene et al., 2021; Fatima et al., 2022; Javed et al., 2024). According to the World Health Organization, it ranks as the fourth-leading cause of disability worldwide (Aqeel & Ahmed, 2018; Beyene et al., 2021; Bhatti et al., 2023; Khan & Aqeel, 2022; Naeem et al., 2021, 2023; Nisar et al., 2020). Disability curtailing from schizophrenia interferes with self-care, mental health management, or access to medical care, thereby exacerbating physical and mental health challenges and perpetuating a vicious cycle of disability (Beyene et al., 2021; Javed et al., 2024).

Despite extensive efforts in psychological and pharmaceutical management, schizophrenia continues to manifest in a lack of self-care, difficulties in daily routine activities, deficit performance in familial roles and responsibilities, social withdrawal, and occupational inability (Beyene et al., 2021; Fakorede et al., 2020; Javed et al., 2024; Sequeira et al., 2024). Emotional dysregulation, cognitive deficiency, social dysfunction, occupational problems, and reduced quality of life are other major aspects of disability generally perceived in schizophrenia (Aqeel et al., 2018, 2020, 2022; Nisar, et al., 2021; Black et al., 2024; Correll & Schooler, 2020; Gul et al., 2022; Munawar et al., 2021; Noor et al., 2016; Shuja et al., 2020). Given its severity, debilitating impact, or chronic nature, disability resulting from schizophrenia is a substantial public health concern. It affects not only the person themselves but also their society and families at a large level (Beyene et al., 2019).

The World Health Organization (2010) developed a standardized WHO Disability Assessment Schedule Scale (WHODAS 2.0) to measure health and disability in diverse cultures. This standard instrument examines health and disability in six major areas, such as understanding and communication, self-care, daily activities, mobility, interpersonal relationships, and contribution to society (Üstün et al., 2010). Unlike disease-specific measures, WHODAS 2.0 facilitates and supports comparisons of disability in various conditions and assists in the development and examination of health interventions. Its reliability and validity have also been developed in different cultural settings, and it has displayed sensitivity to changes over time (Üstün et al., 2010).

Although WHODAS 2.0 has also been translated into many international languages such as Arabic (Badr & Abd El Aziz, 2007), Chinese (Wang et al., 2013), Greek

(Koumpouros et al., 2018), Lusoga (Bachani et al., 2016), Nigerian Igbo (Igweni-Chidobe et al., 2020), Polish (Ćwirlej-Sozańska et al., 2020), Portuguese (Silveira et al., 2013), Malayalam (Thomas et al., 2014), and Ukrainian (Tymruk-Skoropad et al., 2023). Psychometric validation has not been carried out for the Urdu translation and language. This gap is noteworthy, considering Urdu's status as the national language of Pakistan and its extensive usage globally, encompassing approximately 5% of the international population (Abdelkrim et al., 2023). Therefore, the present research aims to address this gap and validate the factor structure of the Urdu version of the WHODAS 2.0 in the Pakistani schizophrenic population.

Method

Research design

The present investigation adopts a cross-sectional research methodology that is executed in two separate phases. (1) The preliminary (pilot) phase employed the standard back-translation method to translate and establish the cross-language validation of WHODAS 2.0 within the Pakistani context (Anderson & Brislin, 1976; Hambleton, 1996; Tinsley & Brislin, 1977). (2) Subsequently, the main study sought to examine and confirm the factorial validity and Cronbach's alpha reliability of the WHODAS 2.0 via confirmatory factor analysis (CFA) and Pearson correlation analysis for schizophrenic patients. The primary aim of this study was to explore the validity and reliability of the Urdu version of WHODAS 2.0, with a particular focus on confirming its covert factor structure in the Pakistani schizophrenic population.

Sample

This study was performed in two distinct phases: (1) a pilot study and (2) a main study. In the pilot study phase, a cohort of 30 graduate students enrolled at the Department of Psychology, Foundation University Science and Technology, Pakistan, in August 2022. These participants were proficient in both English and Urdu, being bilingual, and were thus deemed suitable for the cross-language validation of WHODAS 2.0. This study aimed to translate and establish the cross-language validation of WHODAS 2.0 in the Pakistani context. The main study was further conducted after establishing the internal consistency and test reliability of WHODAS 2.0 for bilingual students in the pilot phase.

The main study used purposive sampling techniques and cross-sectional methodology to recruit one hundred diagnosed schizophrenia patients, comprising 35 men and 65 women. They were recruited from different psychiatrist departments of the hospitals in Rawalpindi and Islamabad, Pakistan, in January 2023. The age range of the participants fell between 20 and 60 years, with a mean age of 31.0 years and a standard deviation of 8. The inclusion criteria were set so that only diagnosed patients with mild severity levels were included in the present study. The main aim of this study was to explore the validity and reliability of the Urdu version of WHODAS 2.0, with a particular focus on confirming its covert factor structure in the Pakistani schizophrenic population.

Instrument

The World Health Organisation Disability Assessment Schedule (WHODAS 2.0) was developed by Ustun et al. (2010) and is used to determine disability and

health in the clinical population. It had three versions, each comprising three distinct modes of application. This instrument have 36-item, which is further consisted the 12-item in first version, and 24 items is included in other two versions. Each version can be administered by self-report, interview, or proxy (Üstün et al., 2010).

The 12-item first self-administered version was employed in this study. According to Ustun et al. (2010), this abbreviated version captures nearly 85% of the variability found in the full version. Respondents provide ratings on a scale ranging from "none" (1) to "extreme or cannot do" (5) in various domains of functioning. It also encompasses six primary domains: cognition, mobility, self-care, social interactions (getting along), life activities, and participation (Üstün et al., 2010).

Translation and Adaptation of the WHODAS 2.0

The translation, adaptation, and cross-culture validation process of WHODAS 2.0 comprised rigorous methodology conducted in five stages: (1) forward translation, (2) committee review, (3) back translation, further (4) committee review, and (5) cross-language validation. The main aim was to develop a theoretically and empirically robust Urdu version of the WHODAS for the Pakistani population that was both culturally and linguistically equally appropriate. The primary focus was placed on completing conceptual and cross-cultural equivalence in comparison to merely linguistic and literal equivalence.

Stage 1: Forward Translation: Three bilingual experts, all possessing Master of Science degrees in psychology and extensive research and clinical experience, were enlisted for forward translations from English (the source language) to Urdu (the target language). They were trained to place more emphasis on conceptual translation as compared to literal translation, which also ensures conciseness and clarity that are understandable to the general population. Cultural sensitivity was paramount, with terms deemed offensive to the culture avoided.

Stage 2: Committee Review: A committee consists of three bilingual professionals convened to inspect the forward translations. They examined the accuracy of translations and language equivalence, considering grammar, phrasing, contextual suitability, and item conceptual meaning. The most appropriate translated items were selected, and inappropriate items were discarded through the consensus of experts.

Stage 3: Back Translation: Three different bilingual professionals who also hold MS or PhD degrees in psychology and relevant experience were involved in back translations. They were instructed and provided the Urdu-translated versions of the WHODAS 2.0 scale without access to the original English version of WHODAS 2.0. This step is intended to identify and recognize any ambiguities or discrepancies between the Urdu and English languages.

Stage 4: The committee approach: It was also after following and reviewing the back translation version, the original committee members continued. They compared and analyzed each translated item with the original scale, selecting those that conserved the same sense and meaning while also being culturally and language-sufficient.

Stage 5: Cross-Language Validation: Recognizing disparities and discrepancies in linguistic resource availability during cross-language validation was performed to ensure the proficiency of the translated version. This validation process was carried out in two studies: (1) the pilot study and (2) the main study.

Procedure

This study obtained approval from the Institutional Ethical Review Board of the Psychology Department at Foundation University School of Science and Technology (FUSST), Pakistan, and followed the guidelines of the American Psychological Association to perform this study. This study is comprised of two phases: (1) a pilot study and (2) a main study. In the pilot study, thirty participants were recruited from FUSST with fluency in both Urdu and English for the purpose of cross-cultural validation of WHODAS 2.0 in Pakistani culture. They were further allocated into two groups, each encompassing fifteen participants. Both groups were administered the English-translated and the original Urdu versions of the WHODAS 2.0 scale to confirm cross-language validation. This data collection process was repeated with the same members after a fifteen-day interval. This back-standard method was used to examine the psychometric properties of both the English and Urdu versions of WHODAS 2.0 for cross-cultural validation.

In the main study, one hundred diagnosed schizophrenic patients were recruited at the psychiatrist departments of different hospitals in Rawalpindi and Islamabad, Pakistan. The inclusion criteria were set for those patients who had mild schizophrenic symptoms who were recruited for this study. The volunteers' participants were provided with both verbal and written informed consent. The permission was obtained from higher authorities. To perform this study. After getting permission, the instrument was handed over to participants, which contained all the necessary information about the patients. Upon reviewing the explanatory statement, participants signed informed consent forms. Confidentiality of data was rigorously upheld, and participant identities remained anonymous throughout.

Data Analysis

Firstly, missing values were dealt with using the imputation method. Further, inter-item total correlation, test-retest reliability, and confirmatory factor analysis (CFA) were performed to establish the internal consistency and factorial validity of the WHODAS-U for the schizophrenic population (Dunkley et al., 2006). CFA analysis was used to examine factorial validity through the goodness-of-fit (GFI) index for both the implicit and unique structures of the WHODAS-U. CFA was performed through structural equation modelling (SEM) software, using a robust correction method using maximum likelihood to address distributional issues in the dataset. Moreover, criteria for examining the fit index of the CFA models to the dataset encompassed a GFI or comparative fit index (CFI) >0.90 and a root mean square error of approximation (RMSEA) <0.08 , with CFI and GFI coefficient values ranging between 0 and 1. Additionally, chi-square χ^2 statistic parameters were also included based on previous research examine the stability and performance of WHODAS-U (Bentler & Bonett, 1980; Hu & Bentler, 1999).

Results

Pilot study

The pilot study results are reported in Table 1, demonstrating the results of the cross-language validation for the Urdu version of the WHODAS with its total score. The results of Cronbach's alpha coefficient for the total scale demonstrated a commendable value of 0.823, which demonstrated strong internal consistency of the Urdu version of the WHODAS. Additionally, the Pearson correlation coefficient shows a positive correlation between the total scores ($r = 0.94$), suggesting excellent and appropriate test-retest reliability for the student population.

Main study

Table 2 represents the item total correlation for the 12 items encompassing WHODAS 2.0-U. The analysis revealed a highly significant positive association, showing that nearly all items within the WHODAS 2.0-U displayed a significant positive association with the total score for the schizophrenic population. These results emphasized the scale's robust internal consistency and suitability for Pakistani culture. Furthermore, the Cronbach's α coefficient for the total scale was calculated at 0.90, suggesting the high and appropriate reliability of Urdu version of WHODAS 2.0.

Confirmatory factor analysis (CFA)

In table 3, CFA was performed to examine the underlying factor structure of the translated Urdu version of the WHODAS 2.0 for schizophrenic patients. A second-order model was selected to encapsulate the underlying factorial structure of the WHODAS 2.0 scale. This model revealed a suitable global fit index for the Pakistani schizophrenic population. The results also explained that the model indices support and align well with the original factor structures of the WHODAS-U which highlighting its robust construct validity in schizophrenia patients. Moreover, Modification indices were used to examine and improve the model fit in present study ($\chi^2 = 57.00$; $df=20$, $\chi^2 / df = 2.85$; CFI=.86; IFI=.85; TLI=.81), RMSEA=.08, 90 % CI= (.04, .07), ECVI=5.1, 90 % CI (4.71, 5.55).

Additionally, Table 4 demonstrated that there were no negative estimates found in the WHODAS 2.0-U items. Factor loadings of all items revealed signify and robust the strength of associations among items in terms of shared variance and construct. Moreover, the six vital factors of the scale revealed high relationships with the primary disability factor, with estimates ranging between 0.93 and 1.13. All items revealed factor loadings from 0.26 to 0.96, all of which were determined to be highly significant for schizophrenic population.

Table 1

Pearson product-moment correlation coefficient, mean and standard deviation (SD), range values associated with the test-retest administration of the Urdu version of WHODAS 2.0 and English version of WHODAS 2.0 (N = 30).

WHODAS	Test (E)	Retest (U)	Correlation Coefficient	p-value
WHO Disability Assessment Schedule (Maximum score:60)				
Mean	31.29	31.13	.94	.000
SD	8.08	8.06		
Range	12-60			

Note. * p < .05; ** p < .01; *** p < .001.

Table 2

Item total correlation for WHODAS-U for schizophrenic population (N = 100)

WHODAS-U	r
1	.59**
2	.88**
3	.49**
4	.79**
5	.61**
6	.84**
7	.85**
8	.63**
9	.34**
10	.70**
11	.77**
12	.79**

Note. * p < .05; ** p < .01; *** p < .001.

Table 3

Confirmatory factor fit indices (N = 100)

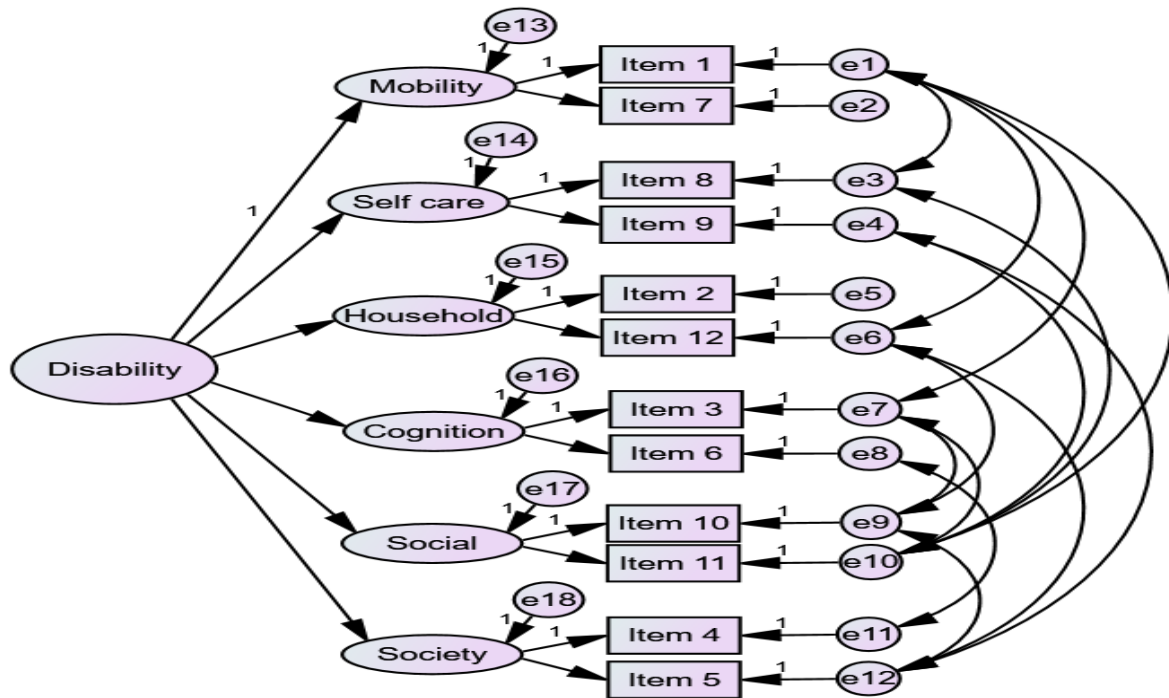
Scale and factor	χ^2	df	χ^2/df	CFI	IFI	TLI	RMSEA	RMSEA 90% CI	ECVI	ECVI 90% CI
WHODAS-U (12 items)	53.18	35	1.52	.98	.98	.96	.07	(.03,.11)	1.35	(1.2,1.58)

Note. WHODAS-U = WHO Disability Assessment Schedule Urdu Version; CFI = Conformity fit index; IFI = Incremental fit index; TLI = Tucker Lewis index; RMSEA = Root-mean-square error of approximation; CI = Confidence interval; ECVI = Expected cross-validation index.

Table 4*Factor loadings of CFA for WHODAS-U along its subscales for schizophrenic patients (N=100)*

Scale	Items	Factors		
		B	SE	β
Mobility	-	1.0	-	.94***
WHODAS	1	1.0	-	.45***
WHODAS	7	2.48	.53	.96***
Self-care	-	.81	.20	1.13***
WHODAS	8	1.0	-	.42***
WHODAS	9	.76	.29	.26*
Life activities	-	2.4	.53	1.01***
WHODAS	2	1.0	-	.94***
WHODAS	12	.95	.08	.82***
Cognition	-	.53	.16	.94**
WHODAS	3	1.0	-	.31***
WHODAS	6	.39	1.30	.92*
Getting along with people	-	1.29	.33	.93***
WHODAS	10	1.0	-	.66***
WHODAS	11	1.2	.19	.75***
Participation in society	-	1.96	.45	.93***
WHODAS	4	1.0	-	.85***
WHODAS	5	.56	.12	.48***

Note. * $p < .05$; ** $p < .01$; *** $p < .001$.

Figure 1. Confirmatory factor analysis for the WHODAS-U for schizophrenic patients (N=100)

Discussion

The present study's findings provide strong support for the reliability and validity of the Urdu-translated version of the WHODAS-U as a standard measure for examining disability in Pakistani schizophrenia patients. This study's results have also exhibited that the WHODAS-U reveals robust internal consistency, test-retest reliability, alpha Cronbach reliability, and construct validity when applied to diagnosed schizophrenia patients. The significance of this study lies in its groundbreaking role as the opening cross-cultural validation of WHODAS-U in the Pakistani population. This study confirmed internal consistency, test-retest reliability, and construct validity with previous research findings, confirming the enduring psychometric properties and integrity of the WHODAS-U in different cultural circumstances (Abbasi & Aqeel, 2023; Abdelkrim et al., 2023; Anona et al., 2024; Feyaerts & Sass, 2024; Khan et al., 2020; Manzoor et al., 2022; Nawaz et al., 2020; Peters & Aqeel, 2020; Velligan & Rao, 2023).

Moreover, this study used confirmatory factor analysis (CFA) to confirm factorial validity through the second-order structure of the WHODAS-U, which provides additional evidence and robust support for its construct validity in the Pakistani population. The model's fit, with a single second-order subscale of disability and six original factors as first-order factors, is aligned with earlier studies, further providing support for the generalizability of the instrument's structure (Abdelkrim et al., 2023; Fisher & Roget, 2014; Lynskey et al., 2015; Sakinyte & Holmberg, 2023).

Furthermore, the robust item-total correlations and high alpha Cronbach reliability for the WHODAS-U recommend that each item significantly contributes meaningfully to the entire measurement of disability and exhibits high internal consistency, which also supports its reliability and validity for the schizophrenic population. These results exhibited that the Urdu version of the WHODAS-U scale is also a reliable and valid instrument for use in Pakistani schizophrenic patients, expanding the range of diagnostic instruments available for clinicians and researchers in the Pakistani context.

Limitation

This study has a lot of limitations that should be highlighted for further studies. Firstly, the limited cultural diversity in the sample could limit the generalizability of the results for diverse samples and contexts or demographic groups in Pakistan. Secondly, the use of the short version of WHODAS 2.0 could also have limited the comprehensiveness of disability measurement. Finally, future studies should be conducted to address and explain these restrictions with a larger and more diverse group that characterizes the complete spectrum of the Pakistani population. Moreover, cross-cultural validation and translation would perform the whole 36-item version of the WHODAS scale, providing support for its usefulness and applicability for usage in Pakistani clinical settings.

**Received: November 30, 2022 Accepted: 23 April 2024:
24 April 2024, published online**

Implications

Furthermore, this study's results recommended practical implications in clinical and educational settings for mental health professionals, policymakers, research scholars, and community stakeholders in Pakistan. Clinicians and mental health professionals can use the Urdu version of the WHODAS-U in routine examinations to comprehend functional impairments in schizophrenia patients that further guide the development of treatment plans. Research scholars could use this validated instrument to study disability-related problems, enabling cross-study comparisons and guiding policy development or intervention development.

Conclusion

This study provides robust evidence for the psychometric properties of the Urdu version of the WHODAS-U in measuring disability in Pakistani schizophrenia patients. The results also support the use of these instruments in clinical practice, education, and research settings. This study's results have also exhibited that the WHODAS-U reveals robust internal consistency, test-retest reliability, alpha Cronbach reliability, and construct validity when applied to diagnosed schizophrenia patients. Conversely, the study's limitations recommend the dire need for further study to confirm the generalizability issue and comprehensiveness of this instrument in a diverse Pakistani population. Moreover, future research should emphasize increasing sample diversity as well as validating the complete version of the WHODAS-U instrument to improve its usefulness in examining disability within the Pakistani clinical setting. Overall, this study contributes valuable insights to the field of mental health examination and the development of interventions in Pakistan.

Ethical Consideration

The study was approved by Department of Psychology, Foundation University School of Science and Technology, Pakistan. Consent Form was taken before taking data and participants were asked to take voluntary participation.

Acknowledgement

The author thanks to Department of Psychology, Foundation University School of Science and Technology, Pakistan.

Availability of data and materials

The data sets used and analyzed during the current study are available from the corresponding author on reasonable request.

Authors' contributions/Author details

Parsa Waqar Abbasi performed this study under the guidelines of Muhammad Aqeel.

Corresponding author

Correspondence to: Abbasi, W. P
parsawabbasi@outlook.com

References

- Abbasi, P. W., & Aqeel, M. (2023). Assessing the Feasibility of Metacognitive Training for Patients with Schizophrenia in Pakistan: A Randomized Controlled Trial. *Nature-Nurture Journal of Psychology*, 3(1), 1–8. <https://doi.org/https://doi.org/10.53107/nnjp.v3i1.43>
- Abdelkrim, S., Othmane, M. A., & Meriem, M. (2023). Schizophrenia from prehistory to the Diagnostic and Statistical Manual of Mental Disorders 05 Text Revised. *Asjp.Cerist.Dz*, 9(1), 700–718. <https://www.asjp.cerist.dz/en/downArticle/536/9/1/226844>
- Abida, H., Chaman, A., & Qureshi, A. B. (2023). Effect of Emotion Induction on the Cognitive Functioning of Graduate and Undergraduate Students: A Double-Blind, Parallel-Group, Randomized Controlled Trial. *Nature-Nurture Journal of Psychology*, 1(3), 1–10. <https://doi.org/DOI: 10.53107/nnjp.v3i1.31>
- Anderson, R. B. W., & Brislin, R. W. (1976). Translation: applications and research. In (No Title). <https://lccn.loc.gov/75040295>
- Anona, K., Olaomi, O., Udegbe, E., Uwumiro, F., Tuaka, E. B., Okafor, N., Adeyinka, A., Obijuru, C., Okpujie, V., Bojerenu, M., & Opeyemi, M. (2024). Co-occurrence of bipolar disorder and personality disorders in the United States: Prevalence, suicidality, and the impact of substance abuse. *Journal of Affective Disorders*, 345(1), 1–7. <https://doi.org/10.1016/j.jad.2023.10.087>
- Aqeel, M., & Ahmed, A. (2018). Translation, adaptation and cross language validation of Tinnitus Handicap Inventory in Urdu. *Journal of Audiology and Otology*, 22(1), 13–19. <https://doi.org/10.7874/jao.2017.00108>
- Aqeel, M., Arbab, K. B., & Akhtar, T. (2018). Psychological problems and its association to other symptoms in menopausal transition. *Pakistan Journal of Psychological Research*, 33(2), 507–519.
- Aqeel, M., Nisar, H. H., Rehna, T., & Ahmed, A. (2021). Self-harm behaviour, psychopathological distress and suicidal ideation in normal and deliberate self-harm outpatient's adults. *Journal of the Pakistan Medical Association*, 71(9), 2143–2147. <https://doi.org/10.47391/JPMA.03-379>
- Aqeel, M., Rehna, T., & Sarfraz, R. (2021). The association among perception of osteoarthritis with adverse pain anxiety, symptoms of depression, positive and negative affects in patients with knee osteoarthritis: A cross sectional study. *Journal of the Pakistan Medical Association*, 71(2 B), 645–650. <https://doi.org/10.47391/JPMA.862>
- Aqeel, M., Rehna, T., Shuja, K. H., & Abbas, J. (2022). Comparison of Students' Mental Wellbeing, Anxiety, Depression, and Quality of Life During COVID-19's Full and Partial (Smart) Lockdowns: A Follow-Up Study at a 5-Month Interval. *Frontiers in Psychiatry*, 13. <https://doi.org/10.3389/fpsy.2022.835585>
- Aqeel, M., Shuja, K. H., Abbas, J., Rehna, T., & Ziapour, A. (2020). The Influence of Illness Perception, Anxiety and Depression Disorders on Students Mental Health during COVID-19 Outbreak in Pakistan: A Web-Based Cross-Sectional Survey. *International Journal of Human Rights in Healthcare*. <https://doi.org/10.21203/rs.3.rs-30128/v1>
- Bachani, A. M., Galiwango, E., Kadobera, D., Bentley, J. A., Bishai, D., Wegener, S., Zia, N., & Hyder, A. A. (2016). Characterizing disability at the Iganga-Mayuge demographic surveillance system (IM-DSS), Uganda. *Disability and Rehabilitation*, 38(13), 1291–1299.
- Badr, H. E., & Abd El Aziz, H. M. (2007). Role of Gender in Coping Capabilities among Young Visually Disabled Students. *The Journal of the Egyptian Public Health Association*, 82(5–6), 365–377.
- Bentler, P. M., & Bonett, D. G. (1980). Significance tests and goodness of fit in the analysis of covariance structures. *Psychological Bulletin*, 88(3), 588.
- Beyene, A. S., Chojenta, C., Roba, H. S., Melka, A. S., & Loxton, D. (2019). Gender-based violence among female youths in educational institutions of Sub-Saharan Africa: a systematic review and meta-analysis. *Systematic Reviews*, 8(1), 1–14.
- Beyene, G. M., Legas, G., Azale, T., Abera, M., & Asnakew, S. (2021). The magnitude of disability in patients with schizophrenia in North West Ethiopia: A multicenter hospital-based cross-sectional study. *Heliyon*, 7(5), 1–10. <https://doi.org/10.1016/j.heliyon.2021.e07053>
- Bhatti, M. M., Shuja, K. H., Aqeel, M., Bokhari, Z., Gulzar, S. N., Fatima, T., & Sama, M. (2023). Psychometric development and validation of victim gaslighting questionnaire (VGQ): across female sample from Pakistan. *International Journal of Human Rights in Healthcare*, 16(1), 4–18.
- Black, T., Jenkins, B. W., Laprairie, R. B., & Howland, J. G. (2024). Therapeutic Potential of Gamma Entrainment Using Sensory Stimulation for Cognitive Symptoms Associated with Schizophrenia. *Neuroscience & Biobehavioral Reviews*, 105681.
- Castro, M. N., Bocaccio, H., De Pino, G., Sánchez, S. M., Wainsztein, A. E., Drucaroff, L., Costanzo, E. Y., Crossley, N. A., Villarreal, M. F., & Guinjoan, S. M. (2023). Abnormal brain network community structure related to psychological stress in schizophrenia. *Schizophrenia Research*, 254(1), 42–53. <https://doi.org/10.1016/j.schres.2023.02.007>
- Correll, C. U., & Schooler, N. R. (2020). Negative symptoms in schizophrenia: a review and clinical guide for recognition, assessment, and treatment. *Neuropsychiatric Disease and Treatment*, 12(1), 519–534.
- Ćwirlej-Sozańska, A., Sozański, B., Kotarski, H., Wilmowska-Pietruszyńska, A., & Wiśniowska-Szurlej, A. (2020). Psychometric properties and validation of the polish version of the 12-item WHODAS 2.0. *BMC Public Health*, 20(1), 1–10.
- Dunkley, D. M., Blankstein, K. R., Zuroff, D. C., Lecce, S., & Hui, D. (2006). Self-critical and personal standards factors of perfectionism located within the five-factor model of personality. *Personality and Individual Differences*, 40(3), 409–420.
- Emerson, E. (2012). The World Report on Disability. *Journal of Applied Research in Intellectual Disabilities*, 25(6), 495–496. <https://doi.org/10.1111/j.1468-3148.2012.00693.x>
- Fakorede, O. O., Ogunwale, A., & Akinhanmi, A. O. (2020). Disability among patients with schizophrenia: A hospital-based study. *International Journal of Social Psychiatry*, 66(2), 179–187.
- Fatima, S. H., Aqeel, M., Anwar, A., & Tariq, M. (2022). Body image perception as predictor of positive and negative self-concept scale for young adults (BIPS). *International Journal of Human Rights in Healthcare*, 15(3), 227–244.
- Feyaerts, J., & Sass, L. (2024). Self-Disorder in Schizophrenia: A Revised View (1. Comprehensive Review–Dualities of Self-and World-Experience). *Schizophrenia Bulletin*, 50(2), 460–471.
- Fisher, G., & Roget, N. (2014). Diagnostic and Statistical Manual

- of Mental Disorders. *Encyclopedia of Substance Abuse Prevention, Treatment, & Recovery*. <https://doi.org/10.4135/9781412964500.n104>
- Gul, M., Aqeel, M., & Sehrish, S. (2022). A parallel-group, double-blind, randomized controlled feasibility trial in Pakistan for treatment of self-stigma and shame in substance use disorders through acceptance and commitment therapy. *Nature-Nurture Journal of Psychology*, 1(2), 1–10. <https://doi.org/10.53107/nnjp.v2i1.60.g20>
- Hambleton, R. K. (1996). Guidelines for adapting educational and psychological tests: A progress report. *European Journal of Psychological Assessment*, 10(3), 229–244. <http://search.ebscohost.com/login.aspx?direct=true&db=psyh&AN=1995-39303-001&lang=es&site=ehost-live>
- Hu, L. T., & Bentler, P. M. (1999). Cutoff criteria for fit indexes in covariance structure analysis: Conventional criteria versus new alternatives. *Structural Equation Modeling*, 6(1), 1–55. <https://doi.org/10.1080/10705519909540118>
- Igwesi-Chidobe, C. N., Kitchen, S., Sorinola, I. O., & Godfrey, E. L. (2020). World Health Organisation Disability Assessment Schedule (WHODAS 2.0): development and validation of the Nigerian Igbo version in patients with chronic low back pain. *BMC Musculoskeletal Disorders*, 21(1), 1–14.
- Javed, N., Binny, B., Sequeira, D. V., Mathew, V. K., & Pandiyan, K. (2024). Prescription Pattern of Antipsychotics in Patients with Schizophrenia: An Observational Study at a Tertiary Care Hospital in Rural Karnataka. *Journal of Psychiatry Spectrum*, 3(1), 36–40.
- Khan, S., & Aqeel, M. (2022). The Association of Maladaptive Coping Strategies with Adverse Parenting Styles and Symptoms of Mood Swings, Stress, Anxiety, and Depression in Patients with Conversion Disorder: A Cross-Sectional Study. *Nature-Nurture Journal of Psychology*, 2(2), 11–222. <https://doi.org/https://doi.org/10.53107/nnjp.v2i2.25>
- Khan, T. A., Hussain, S., Ikram, A., Mahmood, S., Riaz, H., Jamil, A., Amin, A., Haider, Y. G., Sandhu, M., Mushtaq, A., Barbui, C., Johnson, C. F., & Godman, B. (2020). Prevalence and treatment of neurological and psychiatric disorders among tertiary hospitals in Pakistan; findings and implications. *Hospital Practice*, 48(3), 145–160. <https://doi.org/10.1080/21548331.2020.1762366>
- Khattak, S. (2023). Assessing the Feasibility of Metacognitive Training for Patients with Depression in Pakistan: A Randomized Controlled Trial. *Nature-Nurture Journal of Psychology*, 3(1), 31–39. <https://doi.org/https://doi.org/10.53107/nnjp.v3i1.45>
- Koopmans, A. B., van Hoeken, D., Clarke, D. E., Vinkers, D. J., van Harten, P. N., & Hoek, H. W. (2020). Proxy WHO Disability Assessment Schedule 2.0 Is Clinically Useful for Assessing Psychosocial Functioning in Severe Mental Illness. *Frontiers in Psychiatry*, 11(3), 520950. <https://doi.org/10.3389/fpsy.2020.00303>
- Koumpourous, Y., Papageorgiou, E., Sakellari, E., Prapas, X., Perifanou, D., & Lagiou, A. (2018). Adaptation and psychometric properties evaluation of the Greek version of WHODAS 2.0. pilot application in Greek elderly population. *Health Services and Outcomes Research Methodology*, 18(1), 63–74. <https://doi.org/10.1007/s10742-017-0176-x>
- Lora, A., Kohn, R., Levav, I., McBain, R., Morris, J., & Saxena, S. (2012). Service availability and utilization and treatment gap for schizophrenic disorders: A survey in 50 low- and middle-income countries. *Bulletin of the World Health Organization*, 90(1), 47–54. <https://doi.org/10.2471/BLT.11.089284>
- Lynskey, M. T., Kimber, J., & Strang, J. (2015). Drug-related mortality in psychiatric patients. *The Lancet Psychiatry*, 2(9), 767–769.
- Ma, B. H., Chen, G., Badji, S., & Petrie, D. (2024). Mapping the 12-item World Health Organization disability assessment schedule 2.0 (WHODAS 2.0) onto the assessment of quality of life (AQoL)-4D utilities. *Quality of Life Research*, 33(2), 411–422. <https://doi.org/10.1007/s11136-023-03532-9>
- Manzoor, A., Hameed, A., & Munir, H. (2022). Ecological Validation of WHODAS 2.0 for Disability Assessment in Pakistan. *Global Educational Studies Review*, VII(II), 340–349. [https://doi.org/10.31703/gesr.2022\(vii-ii\).32](https://doi.org/10.31703/gesr.2022(vii-ii).32)
- Munawar, K., Aqeel, M., Rehna, T., Shuja, K. H., Bakrin, F. S., & Choudhry, F. R. (2021). Validity and Reliability of the Urdu Version of the McLean Screening Instrument for Borderline Personality Disorder. *Frontiers in Psychology*, 12(1), 533526. <https://doi.org/https://doi.org/10.3389/fpsyg.2021.533526>
- Naeem, B., Aqeel, M., & de Almeida Santos, Z. (2021). Marital Conflict, Self-Silencing, Dissociation, and Depression in Married Madrassa and Non-Madrassa Women: A Multilevel Mediating Model. *Nature-Nurture Journal of Psychology*, 1(2), 1–11.
- Naeem, B., Aqeel, M., Maqsood, A., Yousaf, I., & Ehsan, S. (2023). Psychometric properties of the revised Urdu version dyadic adjustment scale for evaluating marital relationship quality between madrassa and Non-Madrassa married women. *International Journal of Human Rights in Healthcare*, 16(1), 34–53. <https://doi.org/10.1108/IJHRH-01-2020-0004>
- Nawaz, R., Gul, S., Amin, R., Huma, T., & Al Mughairbi, F. (2020). Overview of schizophrenia research and treatment in Pakistan. *Heliyon*, 6(11), 1–10. <https://doi.org/10.1016/j.heliyon.2020.e05545>
- Nisar, H., Aqeel, M., & Ahmad, A. (2020). Indigenous need arise to protect human from self-harm behavior in Pakistan: translation and validation of inventory of statements about self-injury. *International Journal of Human Rights in Healthcare*, 13(5), 421–433. <https://doi.org/10.1108/IJHRH-10-2019-0080>
- Noor, R., Gul, S., Khan, E. A., Shahzad, N., & Aqeel, M. (2016). The impact of coping strategies on psychological adjustment across male and female spinal cord injured patients. *J. Appl. Environ. Biol. Sci*, 6(2S), 137–143.
- Noorullah, A., Asad, N., Pirani, S., Iqbal, S., & Khan, M. M. (2024). Mental Health Care in Pakistan. In *Access to Mental Health Care in South Asia: Current Status, Potential Challenges, and Ways Out* (pp. 113–135). Springer.
- Nowak, I., Sabariego, C., Świtaj, P., & Anczewska, M. (2016). Disability and recovery in schizophrenia: A systematic review of cognitive behavioral therapy interventions. *BMC Psychiatry*, 16(1), 1–15. <https://doi.org/10.1186/s12888-016-0912-8>
- Nowak, I., Waszkiewicz, J., Świtaj, P., Sokół-Szawłowska, M., & Anczewska, M. (2017). A Qualitative Study of the Subjective Appraisal of Recovery Among People with Lived Experience of Schizophrenia in Poland. *Psychiatric Quarterly*, 88(3), 435–446. <https://doi.org/10.1007/s11126-016-9459-6>
- Orsi, J. A., de Oliveira, W. F., Andrade, M. C. R., Vera San Juan, N., Villares, C. C., Bressan, R. A., & Gadelha, A. (2024). Experiences of Persons with Schizophrenia Participating in a Recovery-Oriented NGO Project in Brazil. *Journal of Psychosocial Rehabilitation and Mental Health*, 12(1), 1–11. <https://doi.org/10.1007/s40737-024-00394-3>

- Peter, S., Aqeel, M., Akhtar, T., Ahmed, A., & Farooq, K. (2017). The moderating role of pregnancy status among coping strategies, depression, anxiety and stress across Pakistani married women. *Foundation University Journal of Psychology*, 2(5), 67–93.
- Peters, S., & Aqeel, M. (2020). Chapter Nine the Role of Coping Strategies in Developing Depression, Anxiety and Stress among Pregnant and Non-Pregnant. *Psychosocial Explorations of Gender in Society*, 1(1), 124.
- Sabé, M., Kohler, R., Perez, N., Sauvain-Sabé, M., Sentissi, O., Jermann, F., Prada, P., Perroud, N., & Böge, K. (2024). Mindfulness-based interventions for patients with schizophrenia spectrum disorders: A systematic review of the literature. *Schizophrenia Research*, 264(2), 191–203. <https://doi.org/10.1016/j.schres.2023.12.011>
- Sakinyte, K., & Holmberg, C. (2023). Psychometric and clinical evaluation of schizophrenia remission criteria in outpatients with psychotic disorders. *BMC Psychiatry*, 23(1), 207.
- Sequeira, D. V., Binny, B., Javed, N., Mathew, V. K., & Pandiyan, K. (2024). Assessing Quality of Life: A Comparative Study among Patients with Schizophrenia, Bipolar Affective Disorder, and Healthy Control in a South Indian Tertiary Care Setting. *International Neuropsychiatric Disease Journal*, 21(1), 7–13.
- Shoaib, M., Iqbal, M., Waqas, U. J., Ahmed, S. M., Sangeet, F., Raza, F. A., Shahab, A., Fatima, K., Siddiqui, M., & Nadeem, A. (2023). Concurrent Obsessive-Compulsive Symptoms in Patients With Schizophrenia: A Retrospective Study From a Tertiary Care Centre in Sindh, Pakistan. *Cureus*, 15(4), 1–10. <https://doi.org/10.7759/cureus.37583>
- Shuja, K. H., Aqeel, M., & Jaffar, A. (2022). Criminal Recidivism in Pakistan: A Grounded Theory of Social & Environmental Causes and Psychological Consequences. *Nature-Nurture Journal of Psychology*, 2(2), 41–53.
- Shuja, K. H., Aqeel, M., & Sarfaraz, R. (2021). Chronic pain management a fundamental human right: adaptation and examination of psychometric properties of pain anxiety symptoms scale among osteoporosis sample from Pakistan. *International Journal of Human Rights in Healthcare*, 14(1), 42–57. <https://doi.org/10.1108/IJHRH-07-2020-0057>
- Shuja, K. H., Shahidullah, Aqeel, M., Khan, E. A., & Abbas, J. (2020). Letter to highlight the effects of isolation on elderly during COVID-19 outbreak. In *International Journal of Geriatric Psychiatry* (Vol. 35, Issue 12, pp. 1477–1478). <https://doi.org/10.1002/gps.5423>
- Silveira, C., Parpinelli, M. A., Pacagnella, R. C., de Camargo, R. S., Costa, M. L., Zanardi, D. M., Ferreira, E. C., Santos, J. P., Hanson, L., & Cecatti, J. G. (2013). Cross-cultural adaptation of the world health organization disability assessment schedule (WHODAS 2.0) into Portuguese. *Revista Da Associação Médica Brasileira (English Edition)*, 59(3), 234–240.
- Smart, S. E., Keępińska, A. P., Murray, R. M., & Maccabe, J. H. (2021). Predictors of treatment resistant schizophrenia: A systematic review of prospective observational studies. *Psychological Medicine*, 51(1), 44–53. <https://doi.org/10.1017/S0033291719002083>
- Smart, Sophie E, Agbedjro, D., Pardiñas, A. F., Ajnakina, O., Alameda, L., Andreassen, O. A., Barnes, T. R. E., Berardi, D., Camporesi, S., & Cleusix, M. (2022). Clinical predictors of antipsychotic treatment resistance: Development and internal validation of a prognostic prediction model by the STRATA-G consortium. *Schizophrenia Research*, 250, 1–9.
- Tandon, R., Belmaker, R. H., Gattaz, W. F., Lopez-Ibor, J. J., Okasha, A., Singh, B., Stein, D. J., Olie, J. P., Fleischhacker, W. W., & Moeller, H. J. (2008). World Psychiatric Association Pharmacopsychiatry Section statement on comparative effectiveness of antipsychotics in the treatment of schizophrenia. *Schizophrenia Research*, 100(1–3), 20–38. <https://doi.org/10.1016/j.schres.2007.11.033>
- Tariq, A., Aqeel, M., & Wong, M. (2023). Feasibility Evaluation of the Listen Protect Connect (LPC) Intervention for School Students in Pakistan: A Cluster Randomized Controlled Trial. *Nature-Nurture Journal of Psychology*, 3(1), 9–18. <https://doi.org/https://doi.org/10.53107/nnjp.v3i1.46>
- Thomas, C., Narahari, S. R., Bose, K. S., Vivekananda, K., Nwe, S., West, D. P., Kwasny, M., & Kundu, R. V. (2014). Comparison of three quality of life instruments in lymphatic filariasis: DLQI, WHODAS 2.0, and LFSQQ. *PLOS Neglected Tropical Diseases*, 8(2), e2716.
- Tinsley, R. L., & Brislin, R. W. (1977). Translation: Applications and Research. *The Modern Language Journal*, 61(5/6), 302. <https://doi.org/10.2307/325729>
- Tymruk-Skoropad, K., Muzyka, O., & Pavlova, I. (2023). Measuring health and disability of Ukrainian cadets—translation and cross-cultural adaptation of the WHODAS 2.0. *Physiotherapy Quarterly*, 31(4), 1–20.
- Üstün, T. B., Chatterji, S., Kostanjsek, N., Rehm, J., Kennedy, C., Epping-Jordan, J., Saxena, S., von Korf, M., & Pull, C. (2010). Developing the world health organization disability assessment schedule 2.0. *Bulletin of the World Health Organization*, 88(11), 815–823. <https://doi.org/10.2471/BLT.09.067231>
- Velligan, D. I., & Rao, S. (2023). The Epidemiology and Global Burden of Schizophrenia. *Journal of Clinical Psychiatry*, 84(1), 45094. <https://doi.org/10.4088/JCP.MS21078COM5>
- Wang, L. E., Zhou, J., & Jin, H. (2013). Reliability and validity of the Chinese version of WHO Disability Assessment Schedule 2.0 in mental disability assessment. *Zhongguo Xin Li Wei Sheng Za Zhi*, 27(2), 121–125.

Publisher's Note

The Nature-Nurture publishing group remains neutral with regard to jurisdictional claims in published maps and institutional affiliations.