



## Ecological Validation of WHODAS 2.0 for Disability Assessment in Pakistan

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**Abstract:** Disability is a complicated term to define, especially in a country like Pakistan, where the definition of disability is still debatable. The existing service delivery models, including disability assessment, are based on the medical model. The objective of the study was to use the standardized instrument WHO Disability Assessment Schedule (WHODAS-2.0) and establish its ecological validity for disability assessment in Pakistan. Data was collected from 371 out-of-school children with disabilities from three districts of Punjab by using the purposive sampling technique. An innovative method was used to establish ecological validity by taking 45 randomly selected cases among samples, and these cases were presented to a panel of nine experts/raters. The findings of the study concluded a correlation between raters' total score and total sample score, which was found positively strong and significant as  $r = .819$ ,  $p = < .001$ , and it indicated that the use of the WHODAS 2.0 version is ecologically fit for the use of disability assessment.

**Key Words:** Disability Assessment, Out of school children, Ecological validity

### Introduction

Children with disabilities are among the most vulnerable group in society. Cognitive, language, sensory, and motor disabilities involve a wide range of issues that children may face in cognition, language, social-emotional, behavioural, and mobility (Howes et al., 2018). Without assessment, these issues severely limit children's ability to attain their developmental potential, both intellectually and socially. However, disability assessment is a great challenge for many developing countries, accompanied by the shortage of data on disability. Another decisive fact is that the incidence of disability among children in

developing countries is higher than in developed countries (Marlow, Servili, & Tomlinson, 2019).

Pakistan has ratified several international treaties, including the United Nations UN-Conventions on the Persons with Disabilities, 2006 UNCRPD, that demands stakeholders to shield the rights of persons with disabilities with dignity. It also focuses on ensuring the provision of identification, assessment and intervention services to persons with disabilities. Although many concerted efforts have been made so far to make appropriate procedures for the disability assessment that further leads towards the provision of many essential rehabilitation services but in Pakistan,

most children might never receive age-related assessment during the early years that are critical. It is also miserable to mention that there are no screening services available for newborns in countries having low economic status. ([Aly, Taj, & Ibrahim, 2010](#)). The countries achieving higher access to disability certification and service provision have shifted from the medical model of assessment to the notion of the integrated model of the WHO's International Classification of Functioning, Disability, and Health (ICF). It highlights that the interaction between contextual or environmental factors and handicapping conditions is important to define the ability or limitation of a person. The protocol used under this classification is World Health Organization Disability Assessment Schedule WHODAS 2.0. The scale is hands-on and generic to measure disability and health conditions among cross-cultural populations. It is in practice to identify between disabilities that might be the result of various diseases. It measures the functional level of disability in six domains of life activities, i.e., Cognition, Mobility, Self-care, Getting along, Life activities and Participation. It is a 36-item version with excellent psychometric properties having cross-cultural comparability. This study was conducted to establish the ecological validity of WHODAS 2.0 after translating it into the Urdu language, which is the national and most widely used language in the country. The main objective of establishing ecological validity was to make the translated version of WHODAS 2.0 culturally and geographically acceptable for its use in disability assessment.

### Review of Literature

Researches indicate that if newborns are diagnosed within three months of birth and receive interventions during six months, they will have better language, speech, and cognitive development in comparison to those who are not diagnosed or receive intervention at early ages. ([Hadders-Algra, 2021](#); [Olusanya et al., 2021](#); [Smythe, Zuurmond, Tann, Gladstone, & Kuper, 2021](#)). Parents need to be informed well in time to get the appropriate

benefits of early detection and intervention. However, the majority of the parents neglect or could not get a chance to receive services for the early identification, intervention and related services for their at-risk children. Resultantly, the children at risk reach their potential level for having a disability and become a burden on families even for their independent moves ([Von Der Embse, Kilgus, Eklund, Ake, & Levi-Neilsen, 2018](#)). Further, these missed opportunities create a long-term effect on the psychological, emotional and educational performance to maintain a reasonable social life. Assessment of disability and labelling can lead to stigmatization, stress, and extra costs in managing rehabilitation and adjustment. The ultimate result of this delay turns into exclusion and marginalization ([Colizzi, Lasalvia, & Ruggeri, 2020](#)).

### Disability as an Evolving Concept

Disability is a complex phenomenon to describe in terms of definition as it can occur at any stage; by birth, by accident or by circumstances. It can intensify over time or improve in some situations. Because of its complexity, there is no single standardized "operational" definition of disability across different programs (WHO, 2002). According to a recent study, Pinilla-Roncanio (2015) believes that disability can be defined by three distinct models. The first one is the individual model of disability. According to this model, disability is due to some impairment in a person, which limits his/her activities to participate in the labour market. The person is incapable of performing and fulfilling the criteria for being an active member of society. The service-providing agencies consider their responsibility to help them sympathetically may be through some charity (Barnes & Mercer, 2010). The second model was developed to understand disability as a socially constructed phenomenon (Oliver & Baren, 2012). It imposes a burden on society to improve its infrastructures and attitudes for the productive participation of persons with disabilities.

The third model is a biosocial model or ICF model (WHO, 2001). This model was proposed

by the International Classification of Functioning (ICF) by the World Health Organization (WHO). According to this model, the disability is a function of handicapping conditions and the nature of the environment that interacts. Disability can be overcome by improving any one or both factors. Due to this complexity in definitions, there are different approaches to understanding the experience of disability. The traditional biomedical approach sees disability as a disease, defect or deviation that needs correction. A charity is required to raise extra funds for this purpose. It views, in some cases, disability as a curse which needs sympathy and medical rehabilitation. However, the latest movements on social and human rights stress their full participation in society on an equal basis as their basic human right.

United Nations Convention on the Rights of Persons with Disabilities 2006 notes as follows:

“Persons with disabilities include those who have long-term physical, mental, intellectual or sensory impairments which in interaction with various barriers may hinder their full and effective participation in society on an equal basis with others” (UNCRPD, 2006, p. 4).

It means a person using even a wheelchair might face difficulty if there is no elevator to climb to the first floor. UNCRPD's definition is based on social and human rights approaches. It considers persons with disabilities as a part of human diversity. Article 24 of the convention states education is a right of every child with a disability, and state parties are responsible for providing inclusive education based on equal educational opportunities for all.

Children with disabilities are frequently identified as marginalized and excluded from education, health care and employment opportunities all over the world (Abualghaib, Groce, Simeu, Carew, & Mont, 2019). The situation is similar in Pakistan with reference to persons with disabilities. Exclusion in education is similar to social exclusion in the country (Manzoor & Hameed, 2019). The Sustainable Development Goals SDGs and United Nations (UN) worldwide approach for

women, children, and adults focus on ensuring everyone's health and well-being, as well as providing enabling conditions for education (Yelamos, Carty, & Clardy, 2019).

## Theoretical Framework

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The theoretical framework of the study is grounded in the International Classification of Functioning (ICF). During the last two decades, there has been a change in defining disability. A new international classification system, the International Classification of Functioning, Disability and Health, was introduced by WHO. The emphasis of the International Classification of Functioning (ICF) is on functional status rather than diagnoses. This classification not only focuses on traditional diagnoses of specific disabilities but on all people in general. It is also known as a bio-psychological tool (WHO, 2003). The ICF supports Universal Design as a central concept that encourages performance than limitations experienced through disability.

ICF provides detailed information about human functioning and restrictions created by the environment. According to Perenboom and Chorus (2003), ICF organizes information into two main components first component deals with functioning and the second component covers contextual factors.

Further, the functioning component is divided into "Activity" and "Participation". The activity is taken as a capacity and participation as the performance of an individual. The components of contextual factors are divided into "environmental factor" and "personal factor". Along with other uses, i.e. education, policy and program, support services and clinical practice, ICF is also used for the purpose of measurement and statistical information (WHO, 2003).

After the challenging task of defining disability and establishing ICF, there was a need to develop a standardized tool for cross-cultural measurement of disability and health. For this purpose, which developed the World Health Organization Disability Assessment Schedule (WHODAS 2.0) for the measurement

of functioning and disability in different domains of life, i.e., cognition, mobility, self-care, getting along, life activities (work and school); participation in society.

### WHODAS 2.0 for Disability Assessment

Traditional assessment of childhood disability involves screening with concise and valid questionnaires similar to Ten Questions Screening Tool (Durkin et al., 1995b). It is equally practised to identify all children having or no disability. It also measures development stages as a standardized tool for assessment among children with the help of a multidisciplinary team. The quick screening tools are trustworthy only for screening purposes. The majority of these tools are not designed to make an assessment of the functional level of a child. Even mostly recommended standard assessment instruments ask for copyright. These tools also demand extensive training for administration and scoring purposes. Due to all these high standards, such tools are not accessible for low resource setups. (Hamdani, Huma, Wissow, Rahman, & Gladstone, 2020).

For standardized and uniform measurement (WHO, 2001) and ICF (International Classification of Functioning, Disability, and Health), develop a standardized tool, WHO Disability Assessment Schedule (WHODAS-2.0). WHODAS-2.0 has no copyright-specific tool and is easily accessible

to use in cross-cultural settings for many health disorders. It has also been used to develop and monitor tailored treatment programs, as well as to assess the efficacy and cost-effectiveness of interventions (Rajeziessfahani et al., 2019).

### The objective of the Study

The main objective of the study was to define and measure disability in children. Many types of research demonstrate that WHODAS-2.0 is a simple, consistent, and valid tool for measuring functional disability among children. It is in use among child health programs in order to collect data at the individual level and for the purpose of comparing programs on the basis of culture, service provision and sustainability targets. (Federici, Bracalenti, Meloni, & Luciano, 2017; Kostanjsek, 2011; Yen et al., 2014).

The instrument was designed to measure functional disability across cultures. The selected instrument has already been piloted in 19 countries and translated into 27 languages. It is widely used in the world for measuring all kinds of disabilities, including mental, neurological and health impairments. It can also be used in multiple ways, i.e., interviewer-administrated, self-administered and proxy-administrated. The scale holds strong psychometric properties that provide a global disability score in all six domains. The distribution of a total of 36 items in six domains is available in following table 1.

**Table 1.** Name of domains/factors and given statements in WHODAS

Sr. No.	Name of Domain/Factor	No of Statements/Items
1	Domain 1. Cognition	6 (from D1.1 to D 1.6)
2	Domain 2. Mobil	5 (From D2.1 to D 2.5)
3	Domain 3. Self-Care	4 (From D3.1 to D 3.4)
4	Domain 4. Getting along	5 (From D4.1 to D 4.5)
5	Domain 5. Participation in society	8 (From D5.1 to D 5.8)
6	Domain 6. Life activities	8 (From D6.1 to D 6.8)

### Ecological Validity of the Instrument

Ecological validity is a term that was initially coined by Egon Brunswick (1956). These early efforts of Brunswick were the result of exchange in discussion between him and Lewin

during the 1940s (Schmuckler, 2017). The issue emerged from the debate regarding the use of instruments in research and its impact on the environmental settings. Brunswick was of the view that researchers mostly use techniques

having a narrow spanning of the phenomena that are not representative of a large population. Brunswick suggested focusing more on the situations and the appropriate selection of samples that must be representative of that situation. So, this dimension of ecological validity emerged with the concern of the environment or setting to be investigated. Another eminent proponent of a similar issue was Bronfenbrenner, who presented a classical definition of ecological validity. According to him, the environment of the subjects of any scientific investigation must contain similar properties that are supposed or assumed by the researcher (Bronfenbrenner, 1977). It reveals that ecological validity refers to the extent to which the social and cultural context of any study should be maintained. This discussion continued for years and was in use for various tasks in research. Although there is no clear consensus on a specific definition for this term, however, several studies note ecological validity as the extent to which research findings are generalizable to settings and situations in which the phenomenon that you are studying would naturally occur. (Schmuckler, 2001, Sansone, C., Morf, C. C., Painter, A. T ,2004, Diehl. M, Wahl. H, Freund .A, 2017).

## Research Design

Keeping in view the above discussion, it was assumed that establishing concurrent and face validity of the instrument, i.e., WHODAS 2.0, is not enough to fulfil the requirements of generalizability, especially when it is adapted and translated into the Urdu version. For this purpose, an innovative approach was used as different methods have been in practice that researchers used and tried to improve the ecological validity (Schmukler, 2001). The study was descriptive and quantitative method was used.

## Sample of the Study

371 out-of-school children with disabilities were selected from eight rural and urban union councils of four tehsils of three districts of Punjab, i.e., Lahore, Sheikhpura and Kasur. The purposive sampling technique was used to select the sample. Purposive sampling is used when the researcher does not have access to the entire group for data collection (Wirmsa & Jurs, 2009). Three-point criteria were developed for this purpose i.e.

1. The family must be a permanent residents of the union council.
2. Family having one or more out-of-school children with disabilities of age 5-17 years.
3. Family willing to participate in research through written consent.

Data was collected by using version (36 items) of WHODAS 2.0, and results were compiled by using a complex scoring method. In a complex scoring method, multiple levels of difficulty are assigned for each domain. Each item contains a separate code according to the level of severity. The process of complex scoring is done by following three steps:

Summing all the item scores in each domain.  
Summing the scores of all six domains

Converting the scores into metrics ranging from 0 to 100 (where 0 = No Disability and 100 = Full Disability)

The results of complex scoring can be used for comparative analysis across subpopulations or populations. Since this study intended to do further analysis, it was decided to use a complex scoring method. The reliability of the instrument was calculated by using Cronbach's alpha.

**Table 2.** Factor-wise reliability analysis of the WHODAS Scale

Sr. No	Factor	Statement No. included in the Factor	No of Statements	Cronbach Alpha
1	Cognition	D1.1 to D 1.6	6	.93
2	Mobility	D2.1 to D 2.5	5	.96

3	Self-Care	D3.1 to D 3.4	4	.90
4	Getting Along	D4.1 to D 4.5	5	.91
5	Life Activities	D5.1 to D 5.8	8	.95
6	Participation	D6.1 to D 6.8	8	.93

After collecting initial data by using WHODAS 2.0, the ecological validity was established by using an innovative method and a panel of nine experts was designed for this purpose. The criteria for the selection of expert were based on these conditions: a professional who has been directly practising the assessment for persons with disabilities for at least 10 years, has the basic qualification of the field and most importantly, belongs to the same place and environment from which sample of the study was selected. It was also defined to include practitioners from various fields, i.e., education, health & medicine and rehabilitation.

### Data Analysis

At first, 45 cases from collected data were randomly selected by using SPSS version 21. Secondly, among these 45 cases, 15 cases with

the lowest total score, 15 with the highest scores and 15 with middle scores of the instrument were selected for the equal representation of the selected sample. Thirdly, after introducing the objective of the study and the WHODAS 2.0 36 version instrument, these 45 selected cases were presented to experts one by one, and they were asked to rate each domain of the WHODAS 2.0 instrument on a pre-self-designed response sheet.

The presented cases included images of original instrument sheets showing responses of samples collected by trained data collectors. A scale was given on the response sheet on which raters (experts) were requested to indicate their opinion on a scale of 0 to 4 in all domains according to the following where 0 is "No Disability," 1 is "Mild", 2 "Moderate", 3 "Severe" and 4 is "Profound".

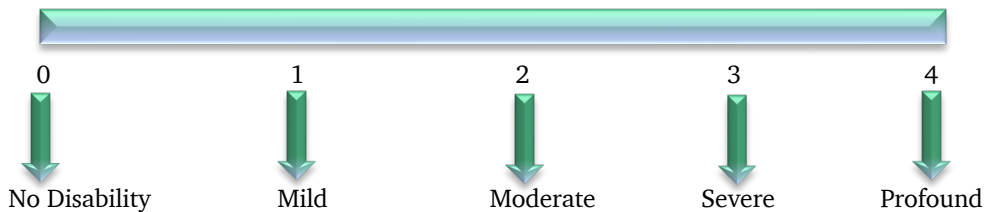


Figure 1:

All the raters were unaware of the domain scores calculated through original data to ensure freedom of opinion and to avoid any biases in rating.

The data was entered and analyzed by using SPSS version 21. Initially, Cronbach alpha was run to measure the internal consistency and reliability of the data collected through experts. For this purpose, Cronbach

alpha was run individually on each domain scores of each rater and the total score of each domain collected through the sample of the study.

### Findings of the study

Following were the findings of the study:

**Table 3.** Cronbach's Alpha reliability statistics of domain 1 Cognition based on raters and sample score

Sr. No	Raters Name	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Cronbach's Alpha if Item Deleted
1	ZP	34.87	372.43	.917	.785
2	KU	34.53	384.57	.889	.793
3	LK	35.02	376.84	.776	.790
4	QA	34.42	382.977	.867	.792
5	BB	34.69	380.992	.840	.791
6	AR	34.89	373.556	.855	.787
7	NC	34.69	379.94	.904	.790
8	FA	34.51	383.57	.875	.793
9	IH	34.87	372.43	.917	.785
10	Sample score	23.31	148.35	.781	.978

Cronbach's Alpha = .814, n = 10

Table 3 shows the reliability of each rater and sample score on the cognition domain of the WHODAS 2.0 scale. The results also indicate that the reliability of the sample score is the

weakest of all. The possible reason for this difference could be that the sample score contains ratings from 361 respondents. The overall reliability of the domain is .814.

**Table 4.** Cronbach's Alpha reliability statistics of domain 1 Cognition based on rater's score

Sr. No	Raters Name	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Cronbach's Alpha if Item Deleted
1	ZP	20.87	114.664	.935	.974
2	KU	20.53	120.482	.951	.974
3	LK	21.02	119.840	.702	.985
4	QA	20.42	119.568	.925	.975
5	BB	20.69	117.401	.929	.975
6	AR	20.89	113.465	.928	.975
7	NC	20.69	118.265	.947	.974
8	FA	20.51	119.483	.950	.974
9	IH	20.87	114.664	.935	.974

Cronbach's Alpha = .978, n = 9

Table 4 shows the reliability of each rater on the cognition domain of the WHODAS 2.0 scale. The results also indicate that the

reliability of all rater's scores is improved when the last item, "Sample Score," was deleted. The overall reliability of the domain is now .978.

**Table 5.** Pearson Correlation between raters' total score and sample total score

	R total	Sample total
Rater's Total Score		
N	45	.819*
Sample Total Score	.819	20.53
N	45	361

Table 5 shows the Pearson Correlation between the rater's total score and sample total score. The results indicate that there is a positive correlation between these two variables as correlation coefficient value  $r = .819$ . This positive correlation shows that there is a strong association between the ratings of panel experts (raters) and the responses of the sample. So, it can be interpreted that the experts have similar opinions in measuring disability on the basis of 6 domains used in the WHODAS 2.0 36 version item.

### Conclusions

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The analysis of the data concludes a correlation between raters' total score and total sample score, which was found positively strong and significant as  $r = .819$ ,  $p = < .001$ . The high

reliability and positive correlation among raters' scores and sample score indicated that use of WHODAS 2.0 version is ecologically fit for the generalizability in the population.

The finding of the study shows that WHODAS.

2.0 36 has a simple, reliable, and effective tool for measuring the functional level of children with disability living with limited resources. It has the ability to collect data on an individual basis as well as on an institutional level at different developmental stages, in different cultures and delivery systems in a responsible and sustainable manner. The American Psychological Association (APA) recommends clinicians use WHODAS-2.0 as the most appropriate measure of disability due to its reliability ([Gspandl, Peirson, Nahhas, Skale, & Lehrer, 2018](#))

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