

Functional Disability in War Veterans with Post-Traumatic Stress Disorder: A Cross-Sectional WHODAS 2.0 Study at a Saudi Military Hospital

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Abstract

Objective: Post-Traumatic Stress Disorder (PTSD) is a major cause of long-term functional disability in war veterans, yet data from Arab and Gulf populations are scarce, and no published study has applied the World Health Organization Disability Assessment Schedule 2.0 (WHODAS 2.0) to Saudi Arabian war veterans. This study aimed to assess functioning in war veterans with PTSD using the WHODAS 2.0 and to identify clinical and demographic factors associated with functional impairment.

Methods: A cross-sectional study was conducted at King Salman Armed Forces Hospital, Tabuk, Saudi Arabia, involving 40 male war veterans with confirmed “pure” PTSD (no major comorbid psychiatric disorders) diagnosed by a board-certified psychiatrist according to DSM-5 criteria. Participants were enrolled by systematic sampling between 21 December 2023 and 20 March 2024. Demographic and clinical data were obtained through structured interviews and medical-record review, and functioning was assessed using the validated Arabic 36-item WHODAS 2.0. Data were analysed using descriptive statistics, the Mann–Whitney *U* test, the Kruskal–Wallis *H* test, and Spearman’s rank correlation; effect sizes (*r*) are reported alongside *P*-values.

Results: Participants showed moderate overall disability (median = 42, IQR = 28). The greatest impairment occurred in the Participation in Society domain (median = 51, IQR = 36), followed by Life Activities (median = 48, IQR = 52). Living situation was significantly associated with overall functioning ($U = 25.00$, $Z = -2.56$, $P = .01$; $r = 0.40$, large), with the small assisted-living subgroup ($n = 5$) showing greater disability than those living independently ($n = 35$); given the subgroup imbalance, this finding is exploratory. No significant associations were observed between functioning and marital status, work status, treatment modalities, medication compliance, age, education, or illness duration.

Conclusion: Saudi war veterans with PTSD experience marked functional impairment, particularly in societal participation and life activities. Living situation was the only significant correlate of overall disability. Integrating supported-housing assessment and family-based community reintegration into routine PTSD care may meaningfully reduce functional disability. Larger longitudinal multi-centre Gulf Cooperation Council studies are warranted.

Keywords: PTSD, war veterans, functional disability, WHODAS 2.0, Saudi Arabia

Introduction

Post-Traumatic Stress Disorder (PTSD) is a complex psychiatric condition characterized by debilitating symptoms that can significantly impair overall functioning and quality of life. PTSD arises following exposure to a traumatic event and encompasses a range of symptoms, such as intrusive thoughts, nightmares, hyperarousal, avoidance, and negative alterations in mood and cognition. The impact of PTSD on an individual’s overall functioning and quality of life cannot be understated, as it hinders their ability to engage in daily activities, maintain relationships, and participate in society.^{1,2}

Accurate assessment and understanding of the functional impairments associated with PTSD are essential for effective diagnosis, treatment planning, and rehabilitation.^{1,2} One such tool is the WHODAS 2.0.^{2,3} Developed by the World Health Organization, the WHODAS 2.0 provides a standardized, multidimensional assessment of disability and has been used productively in PTSD populations.^{3–5}

Studies employing the WHODAS 2.0 within PTSD populations have consistently revealed significant impairments across domains: cognition, mobility, self-care, interpersonal relationships, life activities, and societal participation.^{1–3,6,7}

However, the existing evidence base is heavily concentrated in U.S. and European veteran cohorts. Despite the substantial military presence of Gulf Cooperation Council (GCC) states and the demonstrated psychological burden of regional conflict on Saudi Arabian armed forces personnel, no published study to date has applied the WHODAS 2.0 to Arab military veterans with PTSD. This represents a meaningful gap, because cultural patterns of family-based caregiving, religiosity, stigma surrounding mental illness, and post-deployment support structures in Saudi society differ substantially from those of Western veteran populations and may shape both the expression and the perceived impact of functional disability.⁸

The present study addresses this gap by characterizing functional disability in Saudi Arabian war veterans with confirmed pure PTSD (i.e., without major psychiatric comorbidity) using the validated Arabic version of the WHODAS 2.0. Our specific aims were: (1) to quantify the magnitude and domain-pattern of functional disability in this population, and (2) to identify demographic and clinical factors associated with overall WHODAS 2.0 scores. We hypothesized that participants would exhibit moderate-to-severe disability, most pronounced in the social-functioning domains, and that living situation and treatment modality would be associated with overall disability.

Materials and Methods

Ethical Approval and Reporting Standards

The study was approved by the Research Ethics Committee of King Salman Armed Forces Hospital, North-western Region, Tabuk, Kingdom of Saudi Arabia (Ethics ID: KSAFH-REC-2023-532; date of approval: 8 November 2023). All procedures were performed in accordance with the Declaration of Helsinki and its subsequent revisions. Written informed consent was obtained from each participant prior to enrollment, including consent for chart review. The study was designed and is reported in accordance with the STROBE statement for cross-sectional observational studies.

Study Design

This cross-sectional study was conducted at King Salman Armed Forces Hospital in Tabuk to characterize the functioning of war veterans diagnosed with PTSD.

Participants

A total of 40 war veterans with PTSD were recruited for this study. The sample size was estimated using G*Power software with an effect size of 0.5, an alpha level of 0.05, and a power of 0.8. The calculations indicated a minimum sample size of 34 participants.

Inclusion Criteria

Eligible participants were male veterans aged 18–60 years who had served directly in combat and had a confirmed primary diagnosis of PTSD according to DSM-5 criteria, established by a board-certified psychiatrist on the basis of a structured clinical interview and supporting medical records.

Exclusion Criteria

To isolate the functional burden attributable to PTSD itself, only veterans with “pure” PTSD were included. Veterans were excluded if they had a current or lifetime diagnosis of any of the following: schizophrenia spectrum disorder, bipolar disorder, primary major depressive disorder (i.e., not secondary to PTSD), substance use disorder, other psychotic disorder, neurocognitive disorder, or moderate-to-severe traumatic brain injury. Veterans unable to provide informed consent or to complete the WHODAS 2.0 interview were also excluded. This conservative inclusion strategy is a methodological strength, as the high rate of psychiatric comorbidity in unselected veteran samples is a recognized confounder in PTSD-disability research.

Sampling

Participants were recruited via systematic sampling. During the data collection window (21 December 2023 – 20 March 2024), every third consecutive eligible veteran identified from the outpatient psychiatric clinic registry of King Salman Armed Forces Hospital was approached for participation. Veterans who declined or did not meet eligibility criteria were

skipped, and the next eligible third veteran was approached, until the target sample of 40 participants was reached.

Instrumentation and Data Collection

Demographic data and clinical information were collected through a structured face-to-face interview and medical-record review between 21 December 2023 and 20 March 2024. Functioning was assessed using the WHODAS 2.0, a standardized instrument that measures disability across six domains: understanding and communication, getting around, self-care, getting along with people, life activities, and participation in society.

The 36-item interviewer-administered WHODAS 2.0 was used. All interviews were conducted in Arabic using the validated Arabic-language version of the instrument distributed by the World Health Organization. All interviews were conducted by a single trained interviewer to maximize standardization, and the response framework asked participants to consider their functioning over the past 30 days.

Statistical Analysis

Data were analyzed using the Statistical Package for the Social Sciences Statistics version 30 for macOS (IBM Corp., Armonk, NY, USA). Descriptive statistics summarized demographic characteristics, treatment modalities, and WHODAS 2.0 scores. For continuous variables, medians and interquartile ranges (IQR) were calculated, since the data did not follow a normal distribution based on the Shapiro–Wilk and Kolmogorov–Smirnov test results.

Non-parametric tests were employed to examine associations between categorical variables and functioning. The Mann–Whitney U test was used for comparisons between two groups, while the Kruskal–Wallis H test was used for three or more groups. Spearman's rank correlation coefficient assessed relationships between continuous variables and WHODAS 2.0 scores. Statistical significance was set at $P < .05$ for all analyses. Effect sizes were computed for all primary comparisons (r for Mann–Whitney U, calculated as $r = |Z|/\sqrt{N}$, with conventional thresholds of 0.10 small, 0.30 medium, and 0.50 large per Cohen, 1988). Subgroup analyses involving cells with $n \leq 10$ are designated as exploratory and are interpreted with caution given the elevated risk of both Type I and Type II error.

Results

Demographic Characteristics

As shown in Table 1, the majority of participants were married (27, 67.5%), while 7 (17.5%) were never married and 6 (15.0%) were separated. Most participants (35, 87.5%) lived independently in the community, while 5 (12.5%) required assisted living. Regarding employment status, 21 (52.5%) were engaged in paid work, 15 (37.5%) were medically retired, and 4 (10.0%) were in the process of medical retirement. The age range was 22–49 years, with a median age of 32 years (IQR = 7) and a median of 12 years of education (IQR = 0). The median duration of illness was 4 years (IQR = 3.9).

Table 1. **Demographic and clinical characteristics of participants (N = 40)**

Characteristic	n (%) or Median (IQR)	Range
Marital status		
Married	27 (67.5%)	—
Never married	7 (17.5%)	—
Separated	6 (15.0%)	—
Living situation		
Independent in community	35 (87.5%)	—
Assisted living	5 (12.5%)	—
Employment status		
Paid work	21 (52.5%)	—
Medically retired	15 (37.5%)	—
In process of medical retirement	4 (10.0%)	—
Continuous variables		
Age (years)	32 (7)	22–49
Education (years)	12 (0)	—
Duration of illness (years)	4 (3.9)	—

Note. Values are n (%) for categorical variables and Median (IQR) for continuous variables. IQR: interquartile range.

Treatment Modalities

Table 2 presents the treatment modalities utilized by participants. The most common pharmacological treatments were Selective Serotonin Reuptake Inhibitors (SSRIs) prescribed to 32 (80.0%) participants, followed by antipsychotics prescribed to 22 (55.0%) participants, Noradrenergic and Specific Serotonergic Antidepressants (NaSSAs) prescribed to 15 (37.5%) participants, and Serotonin–Norepinephrine Reuptake Inhibitors (SNRIs) prescribed to 7 (17.5%) participants. A total of 2 (5.0%) participants were prescribed Tricyclic Antidepressants (TCAs), and 1 (2.5%) was prescribed mood stabilizers. Approximately one-third, or 14 (35.0%), of participants were receiving psychotherapy. Regarding medication compliance, 33 (82.5%) participants were compliant, 4 (10.0%) were non-compliant, and compliance data were unavailable for 3 (7.5%) participants as they were not on any medications.

Functioning Assessment

Table 3 summarizes the WHODAS 2.0 domain scores. The highest level of impairment was observed in the “Participation in Society” domain (median = 51, IQR = 36), followed by “Life Activities” (median = 48, IQR = 52), “Getting Along with People” (median = 44, IQR = 32), and “Understanding and Communicating” (median = 42, IQR = 41). Lower levels of impairment were found in the domains of “Getting Around” (median = 26, IQR = 35) and “Self-Care” (median = 25, IQR = 15). The overall WHODAS 2.0 score indicated a moderate level of disability (median = 42, IQR = 28).

Supplementary questions revealed that participants experienced difficulties for a median of 30 days (IQR = 27) during the past month. While participants reported no days of complete inability to carry out usual activities on average (median = 0, IQR = 13), they reduced their usual activities for a median

Table 2. **Treatment modalities and medication compliance (N = 40)**

Treatment / Status	n (%)
Pharmacological treatment	
SSRIs	32 (80.0%)
Antipsychotics	22 (55.0%)
NaSSAs	15 (37.5%)
SNRIs	7 (17.5%)
TCAs	2 (5.0%)
Mood stabilizers	1 (2.5%)
Psychotherapy	14 (35.0%)
Medication compliance	
Compliant	33 (82.5%)
Non-compliant	4 (10.0%)
Not applicable (not on medications)	3 (7.5%)

Note. SSRIs: Selective Serotonin Reuptake Inhibitors; NaSSAs: Noradrenergic and Specific Serotonergic Antidepressants; SNRIs: Serotonin–Norepinephrine Reuptake Inhibitors; TCAs: Tricyclic Antidepressants. Categories are not mutually exclusive (participants may receive multiple agents).

Table 3. **WHODAS 2.0 domain and overall disability scores (N = 40)**

WHODAS 2.0 domain	Median	IQR
Understanding and communicating	42	41
Getting around	26	35
Self-care	25	15
Getting along with people	44	32
Life activities	48	52
Participation in society	51	36
Overall WHODAS 2.0	42	28
Supplementary items (past 30 days)		
Days with health-related difficulties	30	27
Days unable to carry out usual activities	0	13
Days with reduced usual activities	5.5	28
Days reduced/missed household work	30	30
Days missed work $\geq \frac{1}{2}$ day	0	30

Note. WHODAS 2.0 domain scores range 0–100; higher scores indicate greater disability. IQR: interquartile range. Internal consistency in this sample: Cronbach's $\alpha = 0.965$, McDonald's $\omega = 0.966$.

of 5.5 days (IQR = 28). Notably, participants reported reducing or completely missing household work for a median of 30 days (IQR = 30), indicating significant impairment in this area. However, they reported no days on average of missing work for half a day or more (median = 0, IQR = 30).

Factors Associated with Functioning

Table 4 presents the analysis of factors associated with WHODAS 2.0 overall scores. Among the demographic and clinical variables examined, only living situation showed a

statistically significant association with functioning ($P = .01$), with a large effect size (Mann–Whitney $U = 25.00$, $Z = -2.56$, $r = 0.40$). Participants requiring assisted living demonstrated higher disability scores (mean rank = 33.00) compared to those living independently in the community (mean rank = 18.71); however, given the small assisted-living subgroup ($n = 5$), this finding is presented as exploratory and hypothesis-generating rather than confirmatory.

No significant associations were found between functioning and marital status, work status, or any of the treatment modalities, including specific medication classes and psychotherapy. Similarly, medication compliance was not significantly associated with functioning.

Correlation Analysis

As shown in Table 5, Spearman's rank correlation analysis revealed no significant correlations between WHODAS 2.0 overall scores and age ($\rho = .125$, $P = .444$), years of education ($\rho = .118$, $P = .467$), or duration of illness ($\rho = .027$, $P = .870$).

Scale Reliability

The internal consistency of the WHODAS 2.0 was excellent in this sample, with a Cronbach's α of 0.965 and McDonald's ω of 0.966, indicating strong scale reliability. These values are consistent with previously reported reliability estimates for the WHODAS 2.0 in clinical and veteran populations and affirm the psychometric adequacy of the instrument as used in this study.

Discussion

This study explored the functional status of war veterans with PTSD using the WHODAS 2.0 scale and identified patterns of impairment across multiple domains. To our knowledge, this is the first study to apply the WHODAS 2.0 to Arab Gulf war veterans with PTSD, and the conservative inclusion of only "pure" PTSD cases provides a relatively unconfounded estimate of PTSD-attributable functional disability in this population. The results demonstrate that individuals with PTSD

Table 4. Factors associated with overall WHODAS 2.0 disability scores ($n = 40$)

Variable	Category	<i>n</i>	Mean Rank	U / H	<i>P</i>	<i>r</i>
Marital status	Married	27	17.89	H = 4.39	.11	—
	Never married	7	24.43			
	Separated	6	27.67			
Living situation	Independent in community	35	18.71	U = 25.00	.01*	0.40
	Assisted living	5	33.00			
Work status	Paid work	21	23.62	H = 4.15	.13	—
	Medically retired	15	15.67			
	In process of medical retirement	4	22.25			
SNRI	Yes	7	20.61	U = 112.00	.92	—
	No	33	20.00			
SSRI	Yes	32	18.75	U = 114.00	.65	—
	No	8	20.94			
NaSSAs	Yes	15	22.24	U = 144.00	.23	—
	No	25	17.60			
Antipsychotic	Yes	22	20.67	U = 195.00	.95	—
	No	18	20.36			
TCA	Yes	2	19.84	U = 13.00	.14	—
	No	38	33.00			
Mood stabilizer	Yes	1	20.03	U = 1.00	.10	—
	No	39	39.00			
Psychotherapy	Yes	14	21.08	U = 167.00	.69	—
	No	26	19.43			
Medication compliance	Compliant	33	20.06	H = 0.29	.86	—
	Non-compliant	4	23.25			
	N/A (not on medications)	3	21.67			

Note. U: Mann–Whitney U test statistic; H: Kruskal–Wallis H test statistic. * $P < .05$. Effect size r calculated as $|Z|/\sqrt{N}$; thresholds (Cohen, 1988): 0.10 small, 0.30 medium, 0.50 large. The living-situation analysis is exploratory due to subgroup imbalance ($n = 5$ vs. $n = 35$) and is interpreted with caution.

Table 5. **Spearman's rank correlations between continuous variables and WHODAS 2.0 overall score**

Variable	Spearman ρ	P value	N	Sig.
Age (years)	.125	.444	40	ns
Years in school	.118	.467	40	ns
Duration of illness (years)	.027	.870	40	ns

Note. Two-tailed significance. ns: not significant. None of the continuous demographic or clinical variables showed a statistically significant correlation with overall functional disability.

experience significant functional challenges, particularly in domains such as participation in society, life activities, interpersonal relationships, and communication. The observed overall median WHODAS 2.0 score of 42 exceeds the published impairment threshold of 32 identified by Bovin et al. for discriminating veterans with PTSD-related disability in a large U.S. veteran sample ($N = 1,109$)¹ and also surpasses the threshold of 40 identified by Marx et al. as indicative of clinically significant functional impairment in veterans seeking compensation for PTSD.⁷

Cultural Context and the Saudi Setting

Several findings are best interpreted against the cultural backdrop of Saudi Arabian and Gulf society. First, in this context the extended family typically functions as the primary care unit for individuals with chronic illness, and assisted-living arrangements outside the family home are uncommon and often signal severe functional decompensation. The observation that the small subgroup of veterans requiring assisted living ($n = 5$) showed substantially higher WHODAS 2.0 scores (large effect size, $r = 0.40$) is therefore consistent with—and may be culturally amplified by—the central role of family-based care in the Saudi setting.⁹ Second, religious and social meanings attached to military service in the Kingdom may shape the way veterans report household, occupational, and social participation, potentially influencing scores on the “Participation in Society” and “Life Activities” domains. Finally, our exclusion of veterans with comorbid psychiatric conditions—a methodological strength—means that the disability burden documented here reflects PTSD itself rather than the more typical comorbid presentations described in Western cohorts.

For instance, Marx et al. demonstrated in their study that the WHODAS 2.0 was effective in capturing PTSD-related disability in veterans applying for compensation.⁷ Similarly, another study by Goldberg et al. found that veterans with PTSD had poorer health functioning scores and increased disability across all subscales of the WHODAS 2.0 ($P < .001$) compared to veterans without PTSD.⁶ In another research effort, Bovin et al. analyzed large cohorts of veterans and found that PTSD is associated with significantly higher WHODAS 2.0 disability scores, especially in social participation and life activities, compared to veterans without PTSD.¹

In the present study, the most impaired domain in the sample was participation in society. This is consistent with prior studies that have shown that veterans with PTSD often face significant social withdrawal and reduced community involvement.¹⁰ Similarly, impairment in the life activities domain, as observed in the current study, suggests substantial

disruption in managing domestic responsibilities and occupational roles. A qualitative study exploring the challenges faced by 15 spouses of Iranian veterans with PTSD reported social isolation and lack of self-care as key themes.¹¹ The present study further revealed that participants reported a median of 30 days in the past month where they reduced or completely missed household work due to health-related difficulties.

The only factor significantly associated with disability in the present study was living situation. Veterans in assisted living had higher disability rates (large effect size, $r = 0.40$), although the small assisted-living subgroup ($n = 5$) means this finding is hypothesis-generating rather than definitive. Research specifically targeting the living environment as a predictor of health outcomes remains scarce. However, this finding is consistent with the recognized importance of social and environmental support in the functioning of veterans.¹² In a longitudinal study of Iraq and Afghanistan veterans, Pearson et al. highlighted that social support strongly predicts psychosocial functioning and quality of life. Hence, it indirectly supports the current findings, which indicate that supportive living settings play a critical role in the lives of these individuals.¹³

Similarly, another study by Na et al. involving 4,069 U.S. veterans found that consistently providing social support was linked to significantly lower odds of psychiatric disorders and suicidal ideation, by 22% to 32% for each standard deviation increase in support.¹⁴ In line with the present study, Grover et al., involving UK military veterans, reported that living alone was associated with poorer mental health outcomes, whereas living with other adults and strong perceived support were tied to better psychological well-being.¹⁵ Research by Kachadourian et al. highlighted specific PTSD symptoms such as non-specific anhedonia and hyperarousal, which were strongly associated with poorer physical and mental functioning and quality of life in U.S. military veterans.¹⁶

This study found that age, years of education, illness duration, and work or marital status are not significantly associated with overall functioning, which contrasts with parts of the literature. A previous study found that younger veterans had lower disability levels than older veterans.¹ The observation that treatment type (SSRIs, antipsychotics, SNRIs, and psychotherapy) and medication compliance had no significant association with functioning is notable, shedding light on the complex relationship between symptom reduction and regaining function in PTSD. A previous study demonstrated that cognitive processing therapy can reduce the severity of disability; however, the data also suggested that functional gains often lag behind symptom improvement.¹⁷ The present study contributes to a growing body of research that underscores the need for functional assessments alongside symptom checklists in PTSD populations.^{18–21}

Limitations

Several limitations should be considered when interpreting the findings of this study. First, the cross-sectional design prevents establishing causal relationships between PTSD and functional impairment. Second, the relatively small sample size limits statistical power and generalizability to broader veteran populations and raises a high risk of Type II error for the null findings; conversely, the significant living-situation result is based on a markedly imbalanced subgroup ($n = 5$ vs. $n = 35$)

and therefore also carries a non-trivial risk of Type I error. Non-significant findings in this study should therefore not be interpreted as evidence of the absence of an association; rather, they may reflect insufficient power to detect true effects. Third, the reliance on self-reported measures may introduce recall and reporting biases. Fourth, the strict exclusion of psychiatric comorbidities, while methodologically advantageous for isolating PTSD effects, also limits the generalizability of the findings to the more typical comorbid presentations seen in routine clinical practice.

A notable methodological limitation concerns the absence of standardized PTSD severity scales, such as the CAPS-5 or PCL-5, which were not routinely administered as part of clinical care in this study setting. This precludes analyses of symptom severity and cluster-specific effects on functioning. Nevertheless, functional status remains a clinically meaningful and independently important outcome in military populations. The absence of routinely collected severity data is itself a finding of clinical-service relevance, indicating an actionable gap in current military psychiatric workflow that future quality-improvement initiatives should address.

Furthermore, in the absence of a non-PTSD or civilian comparison group, the observed WHODAS scores cannot be attributed solely to PTSD and may reflect broader medical, occupational, or social factors unique to this sample. To provide meaningful context, the findings are compared to published reference data from veteran PTSD samples.^{1,6,7} Sub-group analyses conducted in this study are explicitly exploratory and descriptive in nature and should not be interpreted as confirmatory.

Future Research

For future research, we recommend longitudinal studies to track functional changes over time and their relationship

to treatment response. Larger, more diverse samples will enhance generalizability and allow for more nuanced sub-group analyses with adequate statistical power. Incorporating objective measures of functioning alongside self-reports, as well as standardized PTSD severity instruments, will strengthen the validity and interpretability of findings. Multi-center studies across GCC military health systems would establish normative regional data and enable formal cross-cultural comparison with Western veteran cohorts. Finally, targeted interventions specifically addressing social participation and life activities should be developed and evaluated, with particular attention to family-integrated and culturally adapted models in the Saudi/Gulf context, as these domains showed the greatest impairment in our sample.

Conclusion

This study provides the first WHODAS 2.0-based characterization of functional disability in Saudi Arabian war veterans with pure PTSD. Veterans demonstrated moderate overall disability with the greatest impairment in the social-functional domains. Living situation was the only variable significantly associated with overall disability ($r = 0.40$, large effect), with assisted-living arrangements linked to higher impairment—a finding that is culturally salient in the Saudi context, where family-based caregiving is the social norm. Targeted, culturally adapted interventions focused on social participation, family reintegration, and supported community living warrant further development and evaluation.

Conflict of Interest

None. ■

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