

## The Work and Social Adjustment Scale: a simple measure of impairment in functioning

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**Background** Patients' perspectives concerning impaired functioning provide important information.

**Aims** To evaluate the reliability and validity of the Work and Social Adjustment Scale (WSAS).

**Method** Data from two studies were analysed. Reliability analyses included internal scale consistency, test–retest and parallel forms. Convergent and criterion validities were examined with respect to disorder severity.

**Results** Cronbach's  $\alpha$  measure of internal scale consistency ranged from 0.70 to 0.94. Test–retest correlation was 0.73. Interactive voice response administrations of the WSAS gave correlations of 0.81 and 0.86 with clinician interviews. Correlations of WSAS with severity of depression and obsessive–compulsive disorder symptoms were 0.76 and 0.61, respectively. The scores were sensitive to patient differences in disorder severity and treatment-related change.

**Conclusions** The WSAS is a simple, reliable and valid measure of impaired functioning. It is a sensitive and useful outcome measure offering the potential for readily interpretable comparisons across studies and disorders.

**Declaration of interest** The copyright in WSAS is owned by I. M. M. Financial support from Pfizer, Inc. (see Acknowledgements).

Mental disorders are defined by DSM–IV (American Psychiatric Association, 1994) as clinically significant behavioural or psychological syndromes associated with painful symptoms and/or impairment in one or more important areas of functioning. Traditionally, more attention has been paid to symptoms than to impairment. However, interest is now increasing in patients' perspectives of functional impairment and in valid, reliable assessment of this construct. Patients and treatment providers often agree more on symptoms and physical functioning than on social and work-related impairment (Saintfort *et al*, 1996), giving rise to numerous generic and disease-specific instruments (e.g. Endicott *et al*, 1993; Ware, 1993; Frisch *et al*, 1998). The Work and Social Adjustment Scale (WSAS) is a self-report scale of functional impairment attributable to an identified problem (Marks, 1986; see Appendix). This simple, five-item scale has been used to study the treatment of depression and anxiety, but no information about its properties has been previously published.

### METHOD

Reliability and validity data derived from use of the WSAS in two treatment outcome studies involving over 500 patients were analysed. Written, informed consent was obtained from all participants in both studies in accordance with required federal and institutional guidelines. In both studies, the WSAS items were presented over the telephone using digitised voice recordings. Patients responded by pressing keys on their touch-tone telephone keypads. Such interactive voice response (IVR) systems have become increasingly used in clinical research and treatment in recent years (Mundt, 1997).

### Depression study

The first study was a 7-month longitudinal study of patients being treated for depression (Mundt *et al*, 2001). The WSAS was completed by 380 patients at the start of treatment with antidepressant medication and up to three times subsequently, at intended follow-up intervals of 4, 12 and 30 weeks. Follow-up assessments were obtained from 217 patients 21–66 days after starting treatment (mean 29.3, s.d. 5.5 days), from 208 of them 70–118 days later (mean 86.2, s.d. 5.9 days) and from 189 patients 174–248 days later (mean 211.8, s.d. 7.7 days).

### OCD study

The second study was a randomised, controlled trial of computer-assisted behaviour therapy for obsessive–compulsive disorder (OCD) (Greist *et al*, 2002). The WSAS was administered at an initial study screening ( $n=197$ ) and on four subsequent occasions (at treatment randomisation and at 2, 6 and 10 weeks later). The WSAS was completed by 190 participants 6–26 days after screening (treatment randomisation; mean 14.8, s.d. 2.5 days); 174 completed the WSAS 22–41 days after screening (mean 29.9, s.d. 3.5 days), 164 did so 35–70 days after screening (mean 57.4, s.d. 5.4 days) and 150 subjects did so 69–98 days after screening (mean 85.9, s.d. 5.5 days).

### RESULTS

Data analyses reported below were performed by J.C.M. using the Statistical Package for the Social Sciences (version 10.0, SPSS, Chicago, USA).

### Scale reliability

Cronbach's  $\alpha$  measure of internal consistency, which may be conceptualised as the mean of all possible split-half correlations (Cortina, 1993), was used to assess the internal consistency of the WSAS. Table 1 provides conservative estimates of the internal consistency of the items comprising the WSAS, presenting the distribution of  $\alpha$  across different follow-up points in both studies. Rather than aggregating ratings both between and within subjects, each participant contributed a single set of ratings to each estimate. Alpha coefficients of 0.75 or greater are conventionally regarded as evidence of acceptable internal

**Table 1** Internal consistency of scale responses over time for two studies using the Work and Social Adjustment Scale

Targeted follow-up interval	n	Cronbach's $\alpha$
<b>Depression</b>		
Baseline	380	0.807
Week 4	217	0.890
Week 12	208	0.913
Week 30	189	0.942
<b>OCD study</b>		
Screening	197	0.789
Treatment randomisation	190	0.824
Week 2	174	0.847
Week 6	164	0.863
Week 10	150	0.882

OCD, obsessive-compulsive disorder.

scale consistency (Cortina, 1993). A monotonic rise in internal consistency over time suggests that reliability increased. All nine principal component analyses (varimax rotation) of the data subsets listed in Table 1 extracted a single factor with eigenvalues ranging from 2.73 to 4.05 (54.6% to 81.0% of the total variance). Individual item factor loadings ranged from 0.66 to 0.93.

#### Test-retest

Test-retest reliability was examined using data from the OCD study. A mean of 2 weeks elapsed between the WSAS rating at screening and that at randomisation; no treatment was given during this interval. The mean change on the Yale-Brown Obsessive Compulsive Scale (Y-BOCS; Goodman *et al*, 1989) between screening and treatment randomisation was less than 0.1 point. The test-retest correlation for the total WSAS score was 0.73, and the correlations for each item separately were 0.75, 0.70, 0.72, 0.71 and 0.70.

#### Alternative forms

In addition, the OCD study obtained WSAS ratings by both IVR and a trained clinician from 90 participants at treatment randomisation, and from 72 of these after 10 weeks of treatment. Clinician and IVR scores gave a correlation of 0.81 ( $P < 0.001$ ) at the start of treatment and 0.86 ( $P < 0.001$ ) after 10 weeks of treatment. The mean WSAS scores obtained by the IVR system were 20.7 (s.d. 8.0) at the start of treatment and 16.6 (s.d. 9.1) at the end. Mean clinician WSAS

scores were 21.0 (s.d. 8.0) at the start and 16.3 (s.d. 8.6) at the end. Change in scores for both modes of administration were significantly correlated ( $r = 0.61$ ,  $P < 0.001$ ), and reflected significant clinical improvement during study participation: the mean IVR score change was 4.0, s.d. 7.5 (paired  $t = 4.44$ , d.f. = 69,  $P < 0.001$ ); the mean clinician score change was 4.6, s.d. 6.8 (paired  $t = 5.7$ , d.f. = 69,  $P < 0.001$ ).

#### Scale validity

##### Convergence with disorder severity

Measurement reliability establishes the reproducibility of stable ratings, permitting meaningful data collection and analysis, but it is not sufficient to permit interpretation of the data or valid conclusions to be drawn. The WSAS is designed to measure functional impairment attributable to an identified problem or disorder. In the depression study, an abbreviated eight-item Hamilton Rating Scale for Depression (HRSD; Hamilton, 1960) administered by IVR was converted to a 17-item HRSD equivalence score and used to measure depression severity (Mundt *et al*, 1998). Across 994 conjoint administrations, the correlation between the HRSD and WSAS was 0.76 ( $P < 0.001$ ). Correlations across the four assessment points of the study were 0.63 ( $P < 0.001$ ), 0.73 ( $P < 0.001$ ), 0.77 ( $P < 0.001$ ) and 0.75 ( $P < 0.001$ ) respectively. In the OCD study, an IVR-administered Y-BOCS was used to assess severity. Across all 875 conjoint administrations, the correlation of Y-BOCS and WSAS scores was 0.61 ( $P < 0.001$ ). Over the five assessment periods of the study the correlations were 0.45 ( $P < 0.001$ ), 0.48 ( $P < 0.001$ ), 0.56 ( $P < 0.001$ ), 0.69 ( $P < 0.001$ ) and 0.69 ( $P < 0.001$ ) respectively. In both studies, correlation between symptom severity and WSAS increased over time – probably reflecting truncated distributions and diminished variances of symptom severity scores at baseline.

##### Criterion discrimination

The significant association between symptom severity and functional impairment is evidence of valid measurement properties. To examine further criterion validity of the WSAS, participants' HRSD scores in the depression study were stratified by symptom severity: an HRSD score of 18 or over was classed as moderate to severe ( $n = 422$ ), between 7 and 18 as mild to

moderate ( $n = 382$ ) and 7 or less as sub-clinical ( $n = 190$ ). The mean WSAS scores of functional impairment for these categories were 25.0 (s.d. 7.6), 15.5 (s.d. 7.5) and 6.5 (s.d. 6.9) respectively, reflecting significant differences between groups ( $F = 438$ , d.f. = 2, 991,  $P < 0.001$ ). Bonferroni-adjusted *post hoc* comparisons between all three groups indicated statistically significant differences between all three strata.

Similarly, the Y-BOC ratings of participants in the OCD study were stratified by severity: Y-BOC scores of 16 or over were classed as moderate to severe ( $n = 783$ ), between 10 and 16 as mild to moderate ( $n = 68$ ) and 10 or less as sub-clinical ( $n = 24$ ). The mean WSAS scores for these categories were 20.6 (s.d. 7.5), 10.7 (s.d. 6.4) and 5.1 (s.d. 4.0) respectively, again reflecting significant differences between groups ( $F = 103$ , d.f. = 2, 872,  $P < 0.001$ ). As in the first study, Bonferroni-adjusted *post hoc* comparisons between each of the groups were statistically significant.

##### Convergence with perceived improvement

Patients in both studies also provided global impressions of perceived clinical improvement by IVR at each follow-up. Ratings of perceived global improvement (PGI) ranged from 'very much improved' (1) to 'very much worse' (7), with a rating of 4 indicating no change. In the depression study, 365 PGI ratings of significant clinical improvement (1 or 2) were given. The mean WSAS score associated with these ratings was 10.8 (s.d. 8.8), which is significantly lower than the mean score of 22.4 (s.d. 8.5) for the 247 ratings indicating little or no improvement ( $t = 16.2$ , d.f. = 610,  $P < 0.001$ ). In the OCD study, the 117 PGI ratings of 1 or 2 had a mean WSAS score of 11.5 (s.d. 7.5), also significantly lower than the mean WSAS score of 20.2 (s.d. 7.6) for the 561 ratings of little or no improvement ( $t = 11.2$ , d.f. = 676,  $P < 0.001$ ).

## DISCUSSION

Data from these studies indicate strong psychometric properties for the Work and Social Adjustment Scale and support its broader use in clinical research. The WSAS is a simple, reliable and valid measure of self-reported functional impairment. Patients readily understand the functional

domains assessed and easily provide the numeric ratings. Scores are stable over intervals of at least 2 weeks, in the absence of intervention or treatment, and robust across different modes of administration.

### Functional impairment between disorders

Very similar results across two DSM-IV disorders for discriminating between patients categorised by symptom severity suggest that the WSAS may be a valuable measure for making comparisons between disorders. A WSAS score above 20 appears to suggest moderately severe or worse psychopathology. Scores between 10 and 20 are associated with significant functional impairment but less severe clinical symptomatology. Scores below 10 appear to be associated with subclinical populations. Whether such a pattern will generalise to other disorders remains to be tested.

### Patients' perspectives

Its simplicity, strong psychometric properties and direct applicability to a wide range of clinical problems indicate that the WSAS has greater potential for contributing to epidemiological, service utilisation and clinical trial research than has been realised to date. While disorder-specific symptoms are the observable elements defining differential diagnoses, the experiential impact of a disorder from the patient's point of view is the manner in which it impairs the ability to function day to day. As interest continues to expand in measuring and monitoring changes in patient impairment, in addition to symptoms, a common scale for making comparisons across and between different disorders and treatment alternatives would be extremely valuable.

### Alternative data collection methods

One aspect of the two studies reported above that could limit generalisability of these WSAS results is the use of IVR technology to administer the scale and collect data. This fact notwithstanding, the WSAS scores obtained by clinicians at the beginning and end of treatment for the subset of patients in the OCD study assessed by both methods were highly convergent with those obtained using IVR. In addition, 'paper and pencil' versions of the WSAS have been used as self-report questionnaires in an ongoing study of alcohol dependency

### CLINICAL IMPLICATIONS

- The Work and Social Adjustment Scale (WSAS), a short, reliable and valid measure of work and social adjustment, has high correlations between clinician and interactive voice response (IVR) self-report versions.
- The WSAS permits comparisons of functional impairment across studies and disorders.
- The IVR version of the WSAS frees clinicians from repetitive data-gathering while making results available for clinical and research use.

### LIMITATIONS

- This study only reports on WSAS use in depression and obsessive-compulsive disorder.
- These data are based only on IVR delivery of the WSAS.
- A generic query approach using WSAS items warrants investigation.

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by the first author (J.C.M.) and in another study of patients with other mood or anxiety disorders by the third author (M.K.S.); the psychometric properties of the WSAS administered in this way remain strong (Cronbach's  $\alpha \geq 0.90$ ). In a study (M.K.S.) that included 108 patients with mood and/or anxiety disorders and 22 normal control subjects, the contribution of different symptoms to impaired functioning could be discriminated using the WSAS. Further details on these three studies are available from the author upon request.

### WSAS used with other populations

Use of the WSAS to date has been limited to self-reported impairment in patients with depression, anxiety or alcohol misuse disorders. No information regarding the potential of this instrument to assess functional impairment in patients with psychotic features (such as schizophrenia or bipolar disorder) is available. With increasing recognition of the importance of functional

impairments and disabilities associated with psychotic symptomatology for treatment planning and outcome prediction, research with the WSAS in these patient populations is warranted.

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### APPENDIX

#### Work and Social Adjustment Scale

Rate each of the following questions on a 0 to 8 scale: 0 indicates no impairment at all and 8 indicates very severe impairment.

1. Because of my [disorder], my ability to work is impaired. 0 means not at all impaired and 8 means very severely impaired to the point I can't work.
2. Because of my [disorder], my home management (cleaning, tidying, shopping, cooking, looking

after home or children, paying bills) is impaired. 0 means not at all impaired and 8 means very severely impaired.

3. Because of my [disorder], my social leisure activities (with other people, such as parties, bars, clubs, outings, visits, dating, home entertainment) are impaired. 0 means not at all impaired and 8 means very severely impaired.
4. Because of my [disorder], my private leisure activities (done alone, such as reading, gardening, collecting, sewing, walking alone) are impaired. 0 means not at all impaired and 8 means very severely impaired.
5. Because of my [disorder], my ability to form and maintain close relationships with others, including those I live with, is impaired. 0 means not at all impaired and 8 means very severely impaired.

Contact Dr Marks at SSHC, 303 North End Road, London W14 9NS, UK for permission to use the WSAS in research without charge.

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