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ORIGINAL PAPER

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Assessing dimensional and categorical aspects of depression

Validation of the AMDP Depression Scale

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Abstract *Background* A new observer depression scale which is based on the descriptive operationalized classification principles of ICD-10 is introduced. The AMDP Depression Scale (AMDP-DS), a 22-item clinician-rated inventory, provides the opportunity of dimensional as well as categorical depression severity assessment. *Methods* A sample of 50 patients with depressive symptoms were assessed with the AMDP-DS by two raters in a joint rater session. A number of widely used depression scales were applied separately by an independent rater. The ICD-10 symptom checklist was used for categorical assessment of depressive disorders. *Results* The inter-rater reliability for the total score of the AMDP-DS was excellent (Intraclass coefficient: 0.97). There were high correlations with the sum scores of the other scales under study. The correlations between the ICD-10 symptom-checklist and the AMDP-DS ranged from 0.75 to 0.89 for the total sample and 0.44 to 0.51 for patients with acute depressive episode. *Limitations* The results are limited by the method of a joint rater setting and the relatively small subsample of patients with depressive episode. *Conclusions* The AMDP-DS satisfies the requirements of psychometric criteria with a sufficient degree. A new depression scale designed to cover dimensional as well as categorical aspects has successfully been developed.

Key words depression scale · severity of depression · reliability · validity · AMDP-DS

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Introduction

With the publication of chapter V (F) of the tenth revision of the International Classification of Diseases (ICD-10, WHO 1992) the use of operationalized diagnostic criteria and rules were introduced into psychiatric routine. This important change in the conceptional background led to an increased number of diagnostic categories within the affective disorders which seem to have an increasing clinical relevance (Carta et al. 2003) and the distinction into three grades of severity based on the number of relevant symptoms. To meet the concerns of the new descriptive classification principles it was necessary to develop a modern depression scale which covers the relevant symptoms pivotal for the assessment of depressive disorders. Although a self-rating inventory (Major Depression Inventory; MDI) developed to measure ICD-10 and DSM-IV diagnoses of major depression by the patients' self-reported symptoms has previously been published (Bech et al. 2001), an observer based depression scale has not been introduced yet.

A careful and critical consideration of currently available depression scales like the Montgomery-Asberg Depression Rating Scale (MADRS) (Montgomery and Asberg 1979) and the Hamilton Depression Scale (HAMD) (Hamilton 1960, 1967) which is the most widely used depression severity rating scale in the world (Williams 2001) in addition to the need to reflect the new classification principles of ICD-10 led to the development of the AMDP Depression Scale (AMDP-DS). This instrument provides the opportunity of an operationalized assessment of depressive symptomatology meeting the increased number of diagnostic categories within the whole body of affective disorders and the change of classification principles within ICD-10. By covering these aspects, the AMDP-DS offers the possibility to assess severity of depression in a dimensional as well as in a categorical way.

Development of the scale

The scale is based on the AMDP (Association for Methodology and Documentation in Psychiatry) -System (AMDP 1979, 1995) which is the most wide-spread and best known psychiatric documentation system in German-speaking countries (Stieglitz et al. 1988). It represents a uniquely rich system of phenomenological description necessary for a comprehensive assessment of psychopathological symptoms and has been evaluated several times (Guy and Ban 1982; Bobon et al. 1983; Baumann and Stieglitz 1983, 1989; Stieglitz et al. 1988). The AMDP-DS consists of 22 items mainly deriving from the core AMDP-System and is based on the same structure. The pool of items covers all relevant symptoms associated with depression in its various aspects (emotional, psychomotor function, cognitive, somatic). It contains the core and additional symptoms of the depressive episode as listed in ICD-10 as well as covering all the items used in the Hamilton Depression Scale and the Montgomery-Asberg Depression Rating Scale accounting for the high degree of acceptance of these instruments.

In contrast to the 4-point scale of the AMDP-System the AMDP-DS uses a 6-point scale with an additional category for items that cannot be judged to assess the grade of severity of each symptom. The points 1 (mild), 3 (moderate) and 5 (severe) are described extensively and in detail serving as anchor points for the rater. The points 2 and 4 provide a more accurate graduation and should be used if the symptoms described by the patient are not related clearly to one of the anchor points.

In order to improve inter-rater reliability, the AMDP-DS is accompanied by a manual and a semi-structured interview. The manual provides an operationalized description of each individual item and defines its degree of severity. The interview indicates what source of information should be used and comprises examples of how to ask for each symptom. It represents an assistance for the interviewer and ensures that different interviewers will choose similar assessment strategies. The purpose of this study was to investigate the inter-rater reliability and validity of the AMDP-DS concerning the dimensional and categorical assessment of depressive symptoms.

Methods

In the Department of Psychiatry and Psychotherapy of the University of Lübeck, 50 in- and outpatients (25 females and 25 males) with a mean age of 42 years (SD = 15.0) and a range of 25–88 years were recruited. Twenty-seven patients met the criteria of a depressive episode (1 mild, 6 moderate, 20 severe) according to ICD-10; 23 suffered from other psychiatric disorders with a high association with depressive symptoms (11 alcohol use disorder, 3 phobic or anxiety disorder, 6 obsessive-compulsive disorder, 1 post-traumatic stress disorder, 1 adjustment disorder, 1 primary insomnia) and were assessed as clinical diagnoses. They were interviewed and assessed by two raters using the AMDP-DS in a joint rater session. The interviews lasted approximately 18 minutes. Each rater took part in a training session before the beginning of the study in order to become accustomed to the new instrument. For purposes of validation, a number of scales were applied separately by an independent rater within a short period of time after the interview (maximum 24 hours). In Table 1, the raters are described in terms of age, sex, years of practice in psychiatry and experience with rating scales. HAMD-21, MADRS and the Beck Depression Inventory (BDI, Beck et al. 1961) were used to assess depression. The Clinical Global Impressions (CGI, National Institute of Mental Health 1970) served as a global rating of the severity of depression. To evaluate the opportunity of categorical assessment of depressive disorders, an algorithm was used to provide ICD-10 diagnoses on the basis of the AMDP-DS items. The results were compared with diagnoses assessed with the ICD-10 symptom-checklist for depressive episode (Janca et al. 1994).

The algorithm for the AMDP-DS is: To be counted as present according to ICD-10 the relevant symptoms (items 1–6 and 8–14, Appendix) have to be marked with at least 2 points. It is sufficient if either one of the items 3 or 4 (corresponding to ICD-10 core symptom 3), or one of the items 9, 10 or 11 (corresponding to ICD-10 additional symptom 4) are marked to be counted as present for the diagnosis of depressive episode. The grade of severity depends on the number of core symptoms present (items 1–4) and additional symptoms [5, 6, 8–14] as described in ICD-10.

Data analysis

Intraclass coefficients were used to analyze the inter-rater reliability in terms of dimensional aspects. This measure was proposed by Bartko and Carpenter (1976) for items of scales and is preferred to other correlation coefficients. A coefficient of 0.75 or higher was considered excellent (Cicchetti and Prusoff 1983). Inter-rater reliability concerning categorical aspects was calculated with the Kappa coefficient (Cohen 1960), a coefficient of 0.61 to 0.80 was considered substantial (Landis and Koch 1977). As a measure of convergent validity, Spearman correlations were calculated to investigate the relationship between sum scores of the AMDP-DS and the other depression scales, on the one hand, and global assessment of severity of depression (CGI) on the other. Concurrent validity was investigated by correlating the total score of the AMDP-DS with the severity grades of depression assessed with the ICD-10 symptom checklist. Spearman correlations were used to investigate external validity by comparing the

Table 1 Experience of the raters

Rater	Age	Sex	Years in psychiatry	Experience with rating scales
01	30	F	2.5	+
02	34	M	2	+
03	32	M	3	+
04	28	F	1	+
05	35	F	6	+
06	34	M	1	+
07	29	F	2	+
08	30	M	3	+
09	35	F	1	+
10	25	F	< 1	–
11	31	F	< 1	–
12	27	M	< 1	–
13	30	M	1.5	–
14	34	M	2.5	+
15	28	F	1	+
16	35	F	3.5	+
17	37	M	7	+

Experience with rating scales: + = had experience with scales in research/clinic; – = no experience with rating scales

severity grades of depression assessed with the algorithm and the ICD-10 symptom checklist. Finally, the mean AMDP-DS scores of depressed patients with and without somatic syndrome or without depressive episode were compared. In this case the Kruskal-Wallis-H test was used as a nonparametric measure of significance.

Results

The mean values and variances of the global scores of HAMD, MADRS, BDI, and CGI (Table 2) are comparable with other studies (Maier et al. 1988a).

Inter-rater reliability

The Intraclass coefficient (ICC) for the total score of the AMDP-DS in our sample was found to be 0.97 ($p < 0.001$). All single items have a degree of reliability that is significantly higher than agreement due to chance. The ICC for single items ranges between 0.75 ($p < 0.001$) and 0.98 ($p < 0.001$) and can be considered good to excellent. Items with a reliability coefficient above 0.90 are 2, 5, 8, 13, 15, 19 and 22. Items with a reliability coefficient below 0.80 are 11, 12 and 17 (Table 3).

Convergent validity

All three scales are highly associated. The Spearman correlations for the global scores of the scales under study are: AMDP-DS (rater 1/rater 2) x HAMD: 0.88/0.90 ($p < 0.001$); AMDP-DS x MADRS: 0.91/0.92 ($p < 0.001$); AMDP-DS x BDI: 0.88/0.88 ($p < 0.001$); HAMD x MADRS: 0.96 ($p < 0.001$); HAMD x BDI: 0.89 ($p < 0.001$); MADRS x BDI: 0.91 ($p < 0.001$). The Spearman correlations between globally assessed severity of depression (CGI) and total scores of the AMDP-DS ranged from 0.90 ($p < 0.001$) for rater 1 to 0.93 ($p < 0.001$) for rater 2. The Spearman correlations for the other scales under study with CGI ranged from 0.88 (BDI, $p < 0.001$) to 0.95 (HAMD and MADRS, $p < 0.001$). The correlations of the following items of the AMDP-DS with the globally assessed severity of depression are not significantly different from zero: 16 ($r = 0.03$; $p = 0.83$), 17 ($r = 0.07$; $p = 0.61$) and 19 ($r = 0.11$; $p = 0.44$).

Table 2 Mean, standard deviation and median for the scales under study

	AMDP DS[a] Rater 1	AMDP DS[a] Rater 2	HAMD[b]	MADRS[c]	BDI[d]	CGI[e]
n	50	50	50	50	49	50
Mean	28.3	27.9	14.0	19.4	17.2	3.5
Standard deviation	19.1	19.4	9.1	13.5	12.5	2.0
Median	28.0	24.5	12.5	18.5	17.0	3.5

[a] AMDP Depression Scale; [b] Hamilton Depression Scale; [c] Montgomery Asberg Depression Rating Scale; [d] Beck Depression Inventory; [e] Clinical Global Impressions

Table 3 Inter-rater reliability of the AMDP Depression Scale (AMDP-DS): intraclass coefficients (ICC) of single items

Items	ICC	classification
1. Depressed mood	0.86	++
2. Reduction of interest and enjoyment	0.93	++
3. Lack of drive	0.89	++
4. Increased fatiguability/felt loss of vitality	0.88	++
5. Diminished self-esteem/feeling of inadequacy	0.95	++
6. Feelings of guilt/self accusations	0.89	++
7. Hopelessness	0.89	++
8. Suicidal tendencies	0.93	++
9. Disturbances of concentration	0.86	++
10. Retarded thinking	0.89	++
11. Restricted thinking/rumination	0.76	++
12. Restlessness	0.79	++
13. Disturbances of sleep	0.91	++
14. Appetite disturbances	0.89	++
15. Reduction of sexual interest or activity	0.94	++
16. Somatic disturbances	0.82	++
17. Hypochondriasis	0.75	++
18. Anxiety	0.87	++
19. Compulsive symptoms	0.99	++
20. Psychotic symptoms	–	
21. Social withdrawal/communication	0.90	++
22. Disability to handle everyday life	0.92	++
Total	0.97	++

Consideration of ICC: ++ = excellent (all p-values < 0.001)

Concurrent validity

The Spearman correlation coefficients between the global scores of the AMDP-DS and the grades of severity assessed with the ICD-10 symptom checklist are high for the total sample ($r = 0.82/0.83$; $p < 0.001$). In the subsample of patients with a depressive episode according to ICD-10 ($n = 27$) the correlations are relatively low ($r = 0.46/0.48$) but still significantly different from zero ($p < 0.05$). To analyze if the AMDP-DS is able to discriminate between depressive episode with and without somatic syndrome, mean values of the respective groups are depicted in Table 4. The AMDP-DS score is significantly different between the diagnostic groups ($p < 0.01$).

Table 4 Validity of the AMDP-DS assessed by discriminating depressive episode with and without somatic syndrome

	AMDP DS (Rater 1)	AMDP DS (Rater 2)
No depressive episode (n = 23)		
mean (SD)	11.91 (9.62)	10.82 (8.08)
Depressive episode without somatic syndrome (n = 7)		
mean (SD)	32.28 (13.43)	33.14 (14.63)
Depressive episode with somatic syndrome (n = 20)		
mean (SD)	45.80 (11.35)	45.75 (11.57)
Significance (H-test)	p < 0.01	p < 0.01

Categorical assessment

The inter-rater reliability concerning categorical assessment is substantial (Kappa coefficient = 0.67; $p < 0.001$). The Spearman correlations between the diagnoses assessed with the ICD-10 symptom checklist and the AMDP-DS, as a measure for external validity, range from 0.75 to 0.89 ($p < 0.001$) for the total sample and 0.44 ($p < 0.05$) to 0.51 ($p < 0.01$) for the subsample of patients with acute depressive episode.

Discussion

The large number of rating scales available to clinical investigators is a problem in psychiatric research (Pichot 1972). Therefore, it is important that a new rating scale should be shown to have clear advantages over existing instruments before it is accepted for clinical or research purposes (Montgomery and Asberg 1979). Since none of the existing observer rating scales for depression were designed to be used for diagnostic purposes (Möller 2001), the aim was to develop a new depression scale consistent with the diagnostic guidelines of ICD-10 for depressive disorders. To achieve this goal, dimensional as well as categorical aspects had to be taken into account and were investigated in this study. Methodological shortcomings have to be considered when discussing the results, such as the method of joint rater setting, the relatively small subsample of patients with depressive episode and the inhomogeneity of this group.

Dimensional aspects

The global scores of the AMDP-DS show an interrater-reliability greater than 0.90, which is considered to be excellent. The reliability coefficient of 0.97 equals the best results for inter-rater reliability of other commonly used observer depression scales like the HAMD and the MADRS (Hedlund 1979; Montgomery and Asberg 1979). Each of the single items show at least good reliability which indicates that they are appropriately operationalized. This is probably due to the use of the AMDP-system for the formal construction of the scale. Even raters with only low experience in psychiatry or with rating scales can apply the AMDP-DS with a high degree of reliability after a short training period. The fact that the high reliability could be related to the evaluation in a joint-rater setting has to be considered and requires further investigation in different settings (e. g. test-retest reliability).

The AMDP-DS is highly associated with the sum scores of the concurrent depression scales under study (coefficients higher than 0.80) and with the globally assessed severity of depression (coefficients higher than 0.90). This result lends a sufficient degree of convergent validity to the global score of the new scale. Some items of the AMDP-DS show zero correlations with the globally assessed severity of depression (items 16. "Somatic Disturbances", 17. "Hypochondriasis", 19. "Obsessive-compulsive symptoms"). Similar results for the corresponding items of the HAMD were found by Maier et al. (1988b) and explained by low association with severe depression (Hypochondriasis) and relatively low frequency (obsessive-compulsive symptoms). An enhancement of validity could be achieved by removing the infrequent items from the AMDP Depression Scale. On the other hand, this would be contrary to the aim to develop a valid but comprehensive depression scale.

In terms of concurrent validity, the ICD-10 symptom checklist served as the gold standard for assessing depressive disorders. This is due to the fact that no biological variable clearly related to the severity of depression is available. The high correlations (> 0.80) in the total sample show a strong relationship between AMDP-DS and ICD-10 symptom checklist. The relatively low correlations (< 0.50) in the subsample of patients with depressive episodes ($n = 27$) can be explained by the inhomogeneity of this group (severe depression, $n = 20$; mild and moderate depression, $n = 7$) which leads to a reduction of significance for this result.

Furthermore, the clinical utility of the AMDP-DS is demonstrated by the ability to discriminate between depressive episode with and without somatic syndrome. Considering only dimensional aspects, the AMDP-DS is an instrument which corresponds to psychometric criteria in terms of reliability and validity in a degree at least similar to that of the HAMD and MADRS.

Categorical aspects

The main advantage of the AMDP-DS in comparison to other widely used observer depression scales such as HAMD or MADRS is the opportunity of a categorical assessment. By applying an algorithm, the rater obtains important information pivotal for diagnostic classification. When adding some extra information (e. g. asking the patient for the duration of the present symptoms and the number of previous episodes) all relevant aspects to provide ICD-10 diagnoses are available. The Kappa coefficient of 0.67 indicates a good inter-rater reliability for the categorical assessment and lends evidence to the high degree of precision of each item confirming the results of the dimensional investigation. The results for the total sample showed high correlations (> 0.70) and, therefore, turned out satisfactory. In the subsample of patients with an acute depressive episode according to ICD-10, the correlations are notably lower (~ 0.50) but still sufficient. One reason for the relatively low relationship can be found in the concept of the scale. The first step of many items represents the criteria for subthreshold symptoms of depression as listed for "Dysthymia" in ICD-10. The algorithm only takes items into account that were rated at least level two. If a symptom has a very low intensity or if a rater has the tendency to judge an item rather carefully the possibility might occur that the symptom is "lost" for diagnostic assessment.

Another reason lies in the low inter-rater reliability for affective disorders in ICD-10. Sartorius et al. (1993) found low levels of agreement (Kappa coefficients 0.31–0.36) for the four-character diagnostic categories of certain depressive disorders (F33.1, F33.2, F34.1) which could be improved by ignoring the mild/moderate diagnostic differences. In order to improve categorical assessment with the AMDP-DS, it should be considered to revise the concept of assessing subthreshold symptoms with the first step of many of the items thus underscoring some of the patients. Such a revision should include the redefinition of the first steps as well as the adoption of the algorithm. On the other hand, it has to be taken into account that it is of no small value to assess such symptoms providing the opportunity to apply an adequate therapy for the patient if the need arises. This is of even greater importance if considering the current high underdiagnosis of subsyndromal mood disorders in usual clinical practice (Benazzi 2003).

Conclusion

The main findings of this study are as follows: 1) A new depression scale designed to cover dimensional as well as categorical aspects has successfully been developed. 2) The AMDP-DS satisfies the requirements of reliability and validity in terms of dimensional aspects to a high degree. 3) The psychometric requirements concerning categorical aspects are also satisfactory but notably lower. The assessment of severity of depression, up to now based on observer depression scales which cover only dimensional aspects and lack the opportunity of diagnostic classification, is now possible in a combined way. The AMDP-DS is consistent with the diagnostic guidelines of depressive disorders listed in ICD-10 from the relatively mild state of dysthymia up to and including major depressive disorder with or without psychotic symptoms thus providing all the relevant symptoms for categorical assessment. It can be employed reliably in a wide field of application (e. g. primary care setting, clinical research etc.). Further studies are needed to confirm the results reported here. The sensitivity to change should be investigated in order to employ the AMDP-DS for the evaluation of antidepressant treatment.

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