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ANHEDONIA, SUICIDE IDEATION AND DEXAMETHASONE NONSUPPRESSION IN DEPRESSED PATIENTS

T. I. OEI*‡, W. M. A. VERHOEVEN*, H. G. M. WESTENBERG*, F. M. ZWART* and J. M. VAN REE†

*Department of Clinical and Biological Psychiatry, University Hospital, Utrecht, The Netherlands and †Rudolf Magnus Institute for Pharmacology, University of Utrecht, The Netherlands

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Summary—In the search for a valid analysis of a number of operationalised symptoms common to depressive behaviour, a study was performed comprising 46 patients showing depressive symptoms, according to operationalised criteria and as part of which all agreed to undergo the following tests: (a) psychiatric: Present State Examination; (b) psychological: Hamilton Rating Scale, Montgomery–Åsberg Rating Scale, State–Trait Anxiety Inventory, Beck Suicide Ideation Scale, Chapman Anhedonia Scale, Mood Scale, Sleep Quality Scale, Activities Scale, Social Support Scale, Questionnaire on Recently Experienced Events and the Paykel Life Events Interview; and (c) biochemical: Dexamethasone Suppression (DEX) Test. After gathering different depressive subgroups, based on operationalised symptoms, a dichotomy was made in the distributions of the (an)hedonia, suicide ideation and DEX-(non) suppression scores. This study may indicate that anhedonia, suicide ideation and DEX-nonsuppression are the opening to the identification of a subgroup of depressed patients. This symptom complex could not definitely be identified on the basis of existing DSM-III diagnostic entities, because of the known fact that this method of classification is not appropriate for our purposes in revealing pathophysiological processes. It is suggested, therefore, that these symptoms might prove to be the anchor-point from which to reach a better insight into the aetiology and pathogenesis (i.e. the final common pathway) of depression.

INTRODUCTION

No CONSENSUS has, as yet, been established on the concept of depression (ANDREASEN, 1982) and arguments still surround the question of nosological and syndromal criteria (VAN PRAAG, 1977). This means, in practice, that we are inevitably confronted by question marks in our approach to the treatment of psychiatric illness: are we treating syndromes, symptoms or illnesses (EDITORIAL, 1988)? Experimental manipulation of variables—including animal research models—has in recent years allowed scientists the opportunity of supplementing naturalistic observations on human depressive behaviour. AKISKAL and MCKINNEY (1975), for example, suggest that depression might be the result of feedback interaction between three sets of variables—chemical, experiental and behavioural (in other words: biological, psychological and sociological). These researchers also suggest that the diencephalon might serve as a valuable avenue for further study of the nature of depression. In the wake of renewed interest in the biopsychosocial model of human functioning, ENGEL (1977) underlined the operationalisation of symptomatic (psychological, sociological, biological) behaviour as an important instrument in the quest for a better understanding of coping mechanisms. One application involves the standardization of instruments for the observation

‡Present address: Dr. S. van Mesdagklinick, Engelse Kamp 5, 9722AX Groningen, Holland.

of general psychological phenomena and might well pave the way to answering the question: what are the optimum results we might expect to derive from each of these tests—what is their potential? (Kearns, Cruickshank, McGuigan, Riley, Shaw, & Snaith, 1982).

The monitoring of isolated clinical symptoms (like DST nonsuppression, suicide ideation and anhedonia) might provide useful insights, and some of the methods and scales in current use are indeed directed to the streamlining of these diagnostic procedures (see e.g. Beck, Kovacs, & Weissman, 1979; Chapman, Chapman, & Raulin, 1976; Carroll, Feinberg, Greden, Tarika, Albala, Haskett, James, Kronfol, Lohr, Steiner, de Vigne, & Young 1981). We also cannot ignore the possibility of both biological and psychosocial factors playing a significant role in this process, and in this connection the dexamethasone suppression (DEX) test might even prove to be of similar heuristic significance for psychiatry as the glucose tolerance test has been for internal medicine (Carroll, 1985). Kendell (1982) has suggested that the best research strategy at present probably lies in applying two or three alternative formulations (of depression, for instance). When (several) non-identical depression definitions are simultaneously in existence, one might reasonably suspect the presence of at least more than one pathogenic process. Before expanding on these processes, it is first of all necessary to comprehend (fully) the operationalised variables apparent in some depressed patients.

It was for this reason that we decided to draw the data for our study from a group of depressed patients, our aim being to spotlight a subgroup with a symptom profile, possibly of a biological and/or psychosocial nature, which could then be subjected to clinical research evaluation.

MATERIAL AND METHODS

Diagnostic procedures

Fifty-five subjects were recruited from the Department of Psychiatry of the University Hospital in Utrecht, The Netherlands. Patients suffering from significant medical problems established on the basis of a complete medical and neurological evaluation (including laboratory tests of renal, hepatic, haematologic and thyroid functions, such as endocrine diseases, weight extremes or excessive weight changes, i.e. 10 kg within 2 months, alcoholism, drug-addiction and/or organic brain syndrome), were excluded from the study. The underlying concept of depression was based upon data obtained via the Present State Examination Interview, carried out by W. V. (Wing, Cooper, & Sartorius, 1974; Bebbington, Brugha, MacCarthy, Potter, Sturt, Wykes, Katz, & McGuffin, 1988). Psychiatric diagnoses were made according to the DSM-III criteria (American Psychiatric Association, 1980), as interpreted by two psychiatrists (W. V. and T. O.), who interviewed all patients independently on successive days, and who also had full access to all available information (full medical records, family reports etc.). Six of the 55 patients had to be excluded from the study because they could not be categorised according to the DSM-III affective disorder diagnosis. Of the 49 depressed patients entering the study at the start, 46 (7 males, 39 females; mean age 46.67 years, SD 11.43) ultimately completed it. All the depressed patients included in our study were somatically healthy subjects within the age-range 18–65 years and all gave informed consent. All of them had been completely free of medication for at least two weeks prior to the start of the assessment. Because the research

protocol included the DEX-test, those patients showing signs of the medical or pharmacological preconditions specified by CARROLL *et al.* (1981), were excluded from the study. The DEX-test was performed on all hospitalised cases at least one week following admission.

Assessment of depressive symptomatology

Eleven rating scales were used to assess depressive symptomatology; four of them (a, b, c and j) were applied according to the interview method (especially j by one rater, who was 'blind' for the diagnosis or classification), and seven (d, e, f, g, h, i and k) as a self-report. The rating scales applied were: (a) the Hamilton Rating Scale for depression (HDRS), (HAMILTON, 1967); (b) the Montgomery—Åsberg Depression Rating Scale (MADRS), (MONTGOMERY & ÅSBERG, 1979; HARTONG & GOEKOOP, 1985); (c) the scale for suicide ideation (BECK *et al.*, 1979); (d) the Scale for Assessment of Anhedonia (CHAPMAN *et al.*, 1976; ROMBOUTS & VAN KUILENBURG, personal communication; (e) the State–Trait–Anxiety Inventory (STAI) (SPIELBERGER, GORSUCH, & LUSHENE, 1970; VAN DER PLOEG, 1985); (f) the Sleep Quality Scale (MULDER-HAJONIDES VAN DER MEULEN, & VAN DEN HOOFDAKKER, unpublished; (g) the Mood Scale (ZWART & SPOOREN, 1983) measuring depressed (negative) and elated (positive) mood; (h) the Activities Scale (ZWART, 1983) measuring 'intensity' and frequency of activities; (i) the Social Support Scale (GARSSEN, ZWART, OEI, & SCHREURS, unpublished; (j) the Paykel Life Events Interview (PI) (PAYKEL, 1974); (k) the Questionnaire on Recently Experienced Events (QREE) (OEI & ZWART, 1986).

Assessment of hormonal variables

The dexamethasone suppression test was performed as described by CARROLL *et al.*, (1981). Briefly, 1 mg dexamethasone was administered orally at 2300 h and blood samples were collected the following day at both 0900 and 1600 h in order to determine plasma cortisol levels. The baseline cortisol level was determined from a blood sample taken at 0900 h, prior to the start of the test procedure. A plasma cortisol level of more than 0.14 nmol/1 at any point in time following administration of the dexamethasone, was taken as the criterion for non-suppression. Determination of plasma cortisol levels was performed according to the method described by THIJSSEN, VAN DEN BERG, and ADLERCREUTZ (1980).

The statistical tests used were the Pearson correlation coefficient, Student's *t*-test, and Fisher's exact probability test, as appropriate.

RESULTS

Diagnostic (psychiatric) tests

The patients' PSE symptoms were analysed according to the CATEGO-ID computer programme (WING *et al.*, 1974); the results are presented in Fig. 1 and show that the profile configuration of the 46 depressed patients clearly conforms to that resulting from the US–UK study and the IPSS study of WING *et al.* (1974). Figure 2 shows the patient distribution according to DSM–III classification.

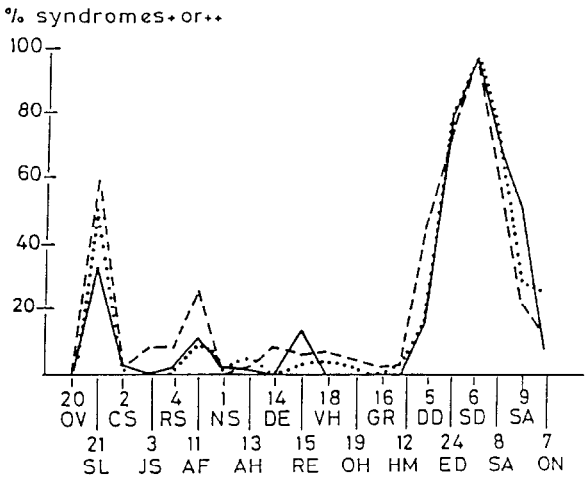

FIG. 1. PSE syndrome profile of depressed patients ($N=46$) _____
Typical depressive profile found by the US–UK study .....
and the IPSS study (Wing *et al.*, 1974). — — — —

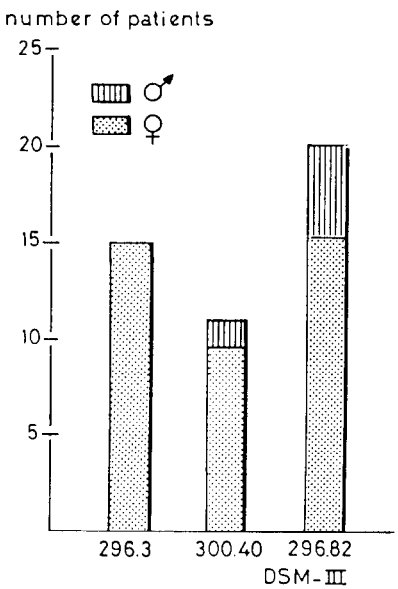

FIG. 2. The distribution of the DSM-III categories for 46 patients; 296.3, major depression, 300.40, dysthymic disorder, 296.82 atypical depression.

TABLE 1. MEAN SCORES AND STANDARD DEVIATIONS (SD) ON THE ASSESSMENT VARIABLES FOR DEPRESSED PATIENTS

Items	Mean	SD	*N*
HDRS	20.7	8.3	46
MADRS	25.8	10.6	46
Beck suicide ideation	7.3	9.2	46
Chapman anhedonia	106.4	26.3	40
State anxiety	56.4	13.5	42
Trait anxiety	57.8	11.0	41
Sleeping quality	7.3	4.1	44
Depressed mood	10.6	8.0	43
Elated mood	4.7	4.7	43
Activities pleasure	245.2	59.7	35
Activities frequency	202.8	34.5	38
Social support	36.5	8.0	42
Life events; interview	3.7	2.3	44
Life events; self-report	9.2	5.8	42

Diagnostic (psychological) tests and questionnaires

Table 1 presents the outcome of the depressive symptomatology assessment.

By inspection of the distribution of the scores of the various scales, it appeared that a dichotomy may be present on the anhedonia and suicide scoring results. Therefore, anhedonia and suicidal ideation, together with the DEX-suppression test, were considered for further analysis.

For each of these variables a dichotomy was forced by using cut-off scores: anhedonia was assumed when a Chapman-score lower than the mean value (106.4) was present; suicide ideation was taken to be present when the Beck-score was greater than 0. The criterion for non-suppression in the dexamethasone test was, as stated above, a plasma cortisol level greater than 0.14 nmol/1.

Table 2 presents the mean scores for all variables for groups based upon the three dichotomies for suicide ideation, anhedonia and DEX-nonsuppression. Depressed patients indicated higher values, in the case of HDRS, MADRS, suicidal ideation ($P < 0.01$), anxiety, sleep quality ($P < 0.05$) and depressed mood ($P < 0.01$), and lower values for anhedonia, elated mood and activities ($P < 0.01$), when either suicide ideation or anhedonia was present. The change in the scores for MADRS, suicide and sleep quality when anhedonia was present, and the change in activities when suicide ideation was present, failed to reach significant levels. There were no apparent differences in the psychological test scores when using DEX-nonsuppression as our criterion.

Correlational analyses were performed using anhedonia/suicidal ideation items of the Montgomery–Åsberg Depression Rating Scale, suicical ideation and inactivity items of the Hamilton Depression Rating Scale, and scores on the Chapman Scale for Assessment of Anhedonia and the Beck Scale for Suicide Ideation, together with cortisol levels after dexamethasone at 0900 and 1600 h.

Table 3 shows Pearson correlations between these variables. There are significant correlations between MADRS-items of anhedonia and suicide ideation; between MADRS–anhedonia and HDRS–suicide ideation; between MADRS–anhedonia and Beck suicide ideation: between MADRS–suicide ideation and HDRS–suicide ideation; MADRS–suicide

TABLE 2. MEAN SCORES OF SUBGROUPS CHARACTERIZED BY THREE CRITERIA†

		Suicidal		Anhedonic		DEX non-suppression	
		−	+	−	+	−	+
Scores	*N:*	19	27	18	22	25	20
HDRS		14.7**	25.0	16.3**	23.0	20.2	20.6
MADRS		17.7**	31.6	21.4	27.8	24.1	27.2
Beck		0.0**	12.4	5.5	8.5	5.1	9.5
Chapman		119.5**	96.7	30.9**	86.3	112.2	101.6
State anxiety		50.9*	60.2	50.8*	60.9	54.0	58.3
Trait anxiety		52.6*	61.2	52.3**	61.5	55.2	59.8
Sleep quality		5.7*	8.5	6.1	8.2	8.0	6.1
Depressed mood		5.4**	14.0	6.4**	13.7	8.6	12.3
Elated mood		7.5**	2.9	7.5**	2.7	6.0	3.3
Activities pleasure		264.9	230.4	278.5**	217.1	247.5	248.8
Activities frequency		215.5	193.5	217.5*	191.9	209.6	96.8
Social support		37.8	35.6	37.1	35.9	36.6	37.5
Life events interview		4.0	3.4	4.6	3.1	3.6	3.8
Life events self-report		9.8	8.7	10.9	8.9	9.3	9.2
Cortisol (+DEX)		9.2	11.1	11.7	9.3	9.9	10.8

†Significance of difference: * = $P < 0.05$; ** = $P < 0.01$.

TABLE 3. PEARSON CORRELATION COEFFICIENTS BETWEEN ANHEDONIA AND SUICIDE IDEATION AS REFLECTED IN DIFFERENT MEASURES

	Montg. anhed.	Chapm. hedon.	Montg. suic.	Hamil. suic.	Beck suic.	Hamil. inact.	Cortisol 0900 h	Cortisol 1600 h
Montg. anhed.								
Chapm. hedon.	−0.32							
Montg. suic.	0.70*	−0.18						
Hamil. suic.	0.64*	−0.18	0.87*					
Beck suic.	0.61*	−0.26	0.84*	0.81*				
Hamil. inact.	0.73*	−0.45*	0.67*	0.57*	0.61*			
Cortisol 0900 h	0.07	−0.01	0.12	0.14	0.21	0.09		
Cortisol 1600 h	0.21	−0.02	0.12	0.14	0.18	0.29	0.72*	
Dex-nonsuppr.	−0.19	0.21	−0.10	−0.10	−0.24	−0.27	−0.62*	−0.80

Significance of difference: * = $P < 0.05$.

ideation and Beck suicide ideation; HDRS–suicide ideation and Beck suicide ideation; between the inactivity-item of the HDRS and MADRS–anhedonia; HDRS–inactivity and Chapman anhedonia; HDRS–inactivity and MADRS suicide ideation; HDRS–inactivity and HDRS suicide ideation: HDRS–inactivity and Beck suicide ideation. Other variables did not correlate significantly in respect of DEX-nonsuppression and variables such as anxiety, weight loss, anhedonia and suicide ideation.

Table 4 presents mean scores and standard deviations on the assessment variables for major depressives ($N = 15$) and minor depressives (dysthymic disorders and atypical depressions) ($N = 31$) (WILLIAMS & SPITZER, 1982). There were significant differences with respect to HDRS-scores ($P < 0.02$), MADRS-scores ($P < 0.02$), suicide ideation scores ($P < 0.05$), activity frequency scores ($P < 0.02$) and social support scores ($P < 0.05$). The

TABLE 4. MEAN AND STANDARD DEVIATION (SD) ON THE ASSESSMENT OF VARIABLES FOR MAJOR AND MINOR (DYSTHYMICS AND ATYPICAL) DEPRESSIVES, AND THE SIGNIFICANCE OF THE DIFFERENCES. N = NUMBER OF PATIENTS; STUDENT'S t-TEST; P = PROBABILITY

Variable	Major depressives ($N=15$)		Minor depressives ($N=31$)		t	P
HDRS	24.9	8.6	18.7	7.4	2.53	0.015*
MADRS	31.0	9.9	23.3	10.1	2.45	0.019*
Beck	10.9	10.4	5.2	7.9	2.04	0.047*
Chapman	100.8	28.6	109.4	25.1	0.98	0.33
State anxiety	58.4	14.7	55.4	12.9	0.66	0.51
Trait anxiety	59.9	11.4	56.7	10.9	0.85	0.40
Sleep quality	7.5	4.2	7.3	4.2	0.17	0.86
Depressed mood	12.4	9.2	9.7	7.4	1.01	0.32
Elated mood	4.1	4.4	5.0	4.9	0.60	0.55
Activities pleasure	245.4	71.7	245.1	55.1	0.01	0.99
Activities frequency	184.8	24.9	212.2	35.4	2.48	0.018*
Social support	33.0	8.3	38.3	7.3	2.11	0.041*
Life events inventory	3.9	2.5	3.5	2.3	0.52	0.61
Life events self-report	9.8	7.0	8.9	5.4	0.40	0.69
Cortisol 0900 h	0.16	0.16	0.11	0.15	1.02	0.32
Cortisol 1600 h	0.18	0.12	0.11	0.13	1.75	0.09

Significance of difference: * = $P < 0.05$.

difference in cortisol 1600 h scores for major and minor depressives fell short of statistical significance ($P < 0.10$).

Table 5A gives an overview of depressed patients on the basis of presence of suicidal ideation and anhedonia. The data reveal that most anhedonics (15 out of 21: 71%) classify as suicidal and most hedonics (11 out of 18: 61%) as non-suicidal, with a significance level of $P = 0.042$ (Fisher's exact probability test).

Some surprising combinations were forthcoming when using the three criteria ('positive symptoms') for a simultaneous classification (Tables 5B and 5C): anhedonics with DEX-nonsuppression were undoubtedly suicidal (10 out of 11: 91%) and anhedonic/suicidal patients showed a clear tendency towards DEX-nonsuppression (10 out of 15: 67%) (Table 5B). For this table, the significance level was $P = 0.055$ (Fisher's exact probability test). Although a tendency existed for suicidal patients with DEX-nonsuppression for most to be anhedonic (10 out of 13: 77%), no significance was reached here (Table 5C: $P = 0.275$; Fisher's exact probability test).

TABLE 5. NUMBER OF DEPRESSED PATIENTS CHARACTERIZED BY ANHEDONIA, SUICIDE IDEATION AND DEX-NONSUPPRESSION

5A: CLASSIFICATION ACCORDING TO ANHEDONIA AND SUICIDE IDEATION

	Hedonic	Anhedonic	Total
Suicidal	7	15	22
Non-suicidal	11	6	17
Total	18	21	39

5B: Classification according to the three criteria

	Anhedonic + DEX-suppression	Anhedonic + DEX-nonsuppression	Total
Suicidal	5	10	15
Non-suicidal	5	1	6
Total	10	11	21

5C: Classification according to the three criteria

	Suicidal + DEX-suppression	Suicidal + DEX-nonsuppression	Total
Anhedonic	5	10	15
Hedonic	4	3	7
Total	9	13	22

When the group of 10 patients with three positive symptoms is compared with the 29 patients with less than three positive symptoms, there are no significant differences between both groups in average age (44.9 vs 46.3 years, respectively), length (167.9 vs 172.4 cm) or weight (63.1 vs 66.6 kg). The female/male ratio does not differ (10 women in the first group versus 22 in the second), and the same is true of a substantial weight loss of 3–6 kg that occurred in 2 patients in the first group compared with 7 patients in the second group.

Table 6 gives mean scores for these same two groups, one of 10 patients with a combination of three positive symptoms and a group of 29 patients devoid of this combination. Seven patients are not represented in this table because, for various reasons, they were unable to complete all necessary tests (1 had no Dexamethasone Suppression Test, 6 did not complete the Chapman Anhedonia Scale).

Table 6. Mean scores and standard deviations for two groups of patients—meeting ($N=10$) or not meeting ($N=29$) the criteria for anhedonia, suicide ideation and dexamethasone nonsuppression Student's t-test and probability P; significance $*=P<0.05$, $**=P<0.005$

Items	mean ($N=10$)	SD ($N=10$)	mean ($N=29$)	SD ($N=29$)	t	P
HDRS	23.8	7.8	18.0	7.6	2.05	0.048*
MADRS	30.7	7.7	22.2	10.4	2.40	0.021*
Beck suic. ideation	10.8	8.2	5.6	9.5	1.54	0.132
Chapman hedonia	83.1	15.2	115.7	23.6	4.06	0.000**
State anxiety	63.3	9.5	53.2	13.8	2.13	0.040*
Trait anxiety	63.5	10.1	54.2	9.6	2.57	0.014*
Sleep quality	8.1	3.2	6.7	4.2	0.94	0.355
Depressed mood	17.4	5.9	7.6	6.7	4.12	0.000**
Elated mood	1.2	2.0	6.3	4.8	3.22	0.003**
Activities pleasure	206.7	64.7	258.8	52.2	2.24	0.032*
Activities frequency	179.8	30.6	212.2	31.8	2.57	0.015*
Social support	38.1	9.2	36.5	7.0	0.57	0.573
Life events interview	3.3	2.3	4.0	2.5	0.74	0.463
Life events self-report	8.9	6.6	10.2	5.8	0.60	0.556
Cortisol 0900 h	0.23	0.18	0.10	0.13	2.52	0.016*
Cortisol 1600 h	0.22	0.08	0.11	0.13	2.49	0.017*

The group with the three positive symptoms differed significantly from the group without this combination on the variables depression ($P < 0.05$), anhedonia ($P < 0.001$), state and trait anxiety ($P < 0.05$), depressed and elated mood ($P < 0.005$), and activity (pleasure and frequency) ($P < 0.05$), and on cortisol levels after dexamethasone ($P < 0.05$).

Table 7 gives an overview of all (46) depressed patients, as regards their combination of positive symptoms, and their classification of depressive disorder (DSM–III: major, dysthymic or atypical depression).

TABLE 7. NUMBER OF DEPRESSED PATIENTS HAVING A PARTICULAR COMBINATION OF POSITIVE SYMPTOMS (SUICIDE IDEATION, ANHEDONIA AND DEXAMETHASONE NONSUPPRESSION) AND ONE OF THREE CLASSIFICATIONS OF THEIR DISORDER

Number of symptoms	Combination of the symptoms	Major depression	Dysthymic disorder	Atypical depression	Total
3	suicide ideation anhedonia dex nonsuppression	6	2	2	10
2	suicide ideation anhedonia	1	1	3	9
	suicide ideation dex nonsuppression	2	0	1	
	anhedonia dex nonsuppression	0	1	0	
1	suicide ideation	1	1	2	13
	anhedonia	0	2	3	
	dex nonsuppression	2	1	1	
0	—	1	2	4	7
unknown		2	1	4	7
total		15	11	20	46

DISCUSSION

Although the existence of anhedonia has been known for centuries, it was not until the end of the 19th century that a scientific definition was finally published (RIBOT, 1897), having been applied in psychopathological practice for some time previously. From 1897 onwards, the concept was systematically applied as a schizophrenic and neurotic phenomenon by KRAEPELIN (1919), BLEULER (1950) and MYERSON (1920) and later by MENNINGER (1938). The 1970s saw the symptoms categorised as endogenous depressive (KLEIN, 1974) and they became incorporated as 'loss of pleasure' (FREUD, 1963) into the DSM–III classification system under 'major depression with melancholia'.

Dexamethasone nonsuppression as a clinical variable seems to be nonspecific and offers, as such, interesting prospects for study as a phenomenon related to biological, psychopathological and/or (psycho)social factors (OEI, 1988). This present study points to the existence of a subgroup of depressed patients showing three (operational and evaluative) (depressive-subtype) nonspecific variables, i.e. anhedonia, suicidal ideation and dexamethasone nonsuppression.

This subgroup with three positive symptoms is not to be identified with subgroups based on any diagnostic entity from the DSM–III classification system. The reason, therefore,

stems from the well-known fact that the DSM-III system is not appropriate for revealing pathophysiological processes.

The current study, like that of Brown and Shuey (1980), presents no evidence to support the theory that degree of DEX-nonsuppression is related to (degree of) depression. The measure of suicide ideation and/or the measure of anhedonia might in fact correspond to the degree of depression.

We also feel that the present study gives added credence to the theory that nosological and functional pathological methods deserve to be fully integrated into any true evaluation of psychiatric diagnostic procedures (Van Praag & Leynse, 1965).

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