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The Zurich Study – A Prospective Epidemiological Study of Depressive, Neurotic and Psychosomatic Syndromes

I. Problem, Methodology

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Summary. The purpose and methodology of a 4-year longitudinal study based on a cohort aged 20 years are presented. A two-stage procedure was chosen; in 1978, 2201 males and 2346 females, aged 19–20, were examined. This sample was representative of the respective age group in the Canton of Zurich. From high and low-scorers (SCL-90), 292 males and 299 females were randomly selected for interview and for a prospective study. Subsequent investigations were carried out by questionnaires and by a personal interview. The instruments chiefly consisted of a semi-structured interview (SPIKE), a clinical syndrome list (SL), a 90-item symptom check list (SCL-90R), a life-event-inventory, scales measuring coping behavior and dissimulation, and an extensive sociological interview dealing with sociodemographic characteristics and social adjustment.

This paper gives an account of the methodological aspects of the study.

Key words: Epidemiology – Longitudinal study – Methodology

1. Introduction

Nature of Problems to be Investigated

Mild depression and so-called neurotic and psychosomatic syndromes are consistently referred to as mild psychic or functional disturbances. Their high prevalence in general practice (Agosti et al. 1974; Dyker 1975) and internal medicine (Shepherd et al. 1981; Cooper et al. 1970; Eastwood 1970; Kielholz 1974; Kielholz et al. 1979; Gastpar 1981) justifies the assumption that within the general population an even greater occurrence prevails. Epidemiological investigations are indispensable in order to detect untreated 'cases'. Only in this manner can the whole continuum from 'normal' to 'abnormal' or 'healthy' to 'ill' be registered. The psychiatrist meets a highly selected subgroup of the most severely ill who, in the majority, are patients unsuccessfully treated beforehand. His view cannot therefore be generalized. The same applies to research based on psychiatric patient populations.

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Numerous epidemiological studies of the prevalence of mild psychiatric disturbances in the general population already exist (Leighton 1959; Srole et al. 1962; Hagnell 1966; Srole 1975; Brown et al. 1977, Finlay-Jones and Burvill 1977; Hönmann and Schepank 1981; Bebbington et al. 1981; Sturt at al. 1981; Hinterhuber 1982; Schepank 1982). Additional studies are of interest if the data are analytically interrelated with causal or course-modifying variables. Longitudinal incidence rather than prevalence should also be investigated, but such studies (Henderson et al. 1981) virtually do not exist, with the exception of the Lundby Study (Essen-Möller 1956; Hagnell 1966; Hagnell et al. 1982 a and b). Just as conspicuous is a lack of purely descriptive and causal-analytical longitudinal studies on the etiology and course of mild psychiatric disturbances in the population. The reasons are manifold, e.g., great expenditure of time and money, difficulties in motivating probands to agree to repeated investigations over several years, inevitable distortion of the sample due to migration, refusals and other drop-outs. The crux therefore lies in such drop-outs in repeated investigations.

Despite these difficulties, it is obligatory that epidemiological research focus on longitudinal studies, because these will provide much better-founded and explicative information (cf. for instance the synoptic presentation of numerous projects by Schulsinger et al. 1981).

After several years of methodological preliminary studies, we decided to proceed with a cross-sectional and a longitudinal investigation (covering 4 years, to date) of a representative cohort homogeneous in age (20 years). The goals are manifold: classification, incidence, prevalence and recurrence of mild functional syndromes, description of the course over several years, analysis of interrelations between prevalence and recurrence, and course on the one side and causal and course-modifying variables (e.g., social data, life events) on the other. The descriptive aspect of the investigation unfortunately predominates, due to the pronounced lack of knowledge concerning classification and spontaneous course of mild psychic and psychosomatic disturbances.

2. Design of the Study

The 4-year study was started based on a two-step design. A representative cross-sectional investigation was effected, the results of which served to choose, by means of a psychiatric

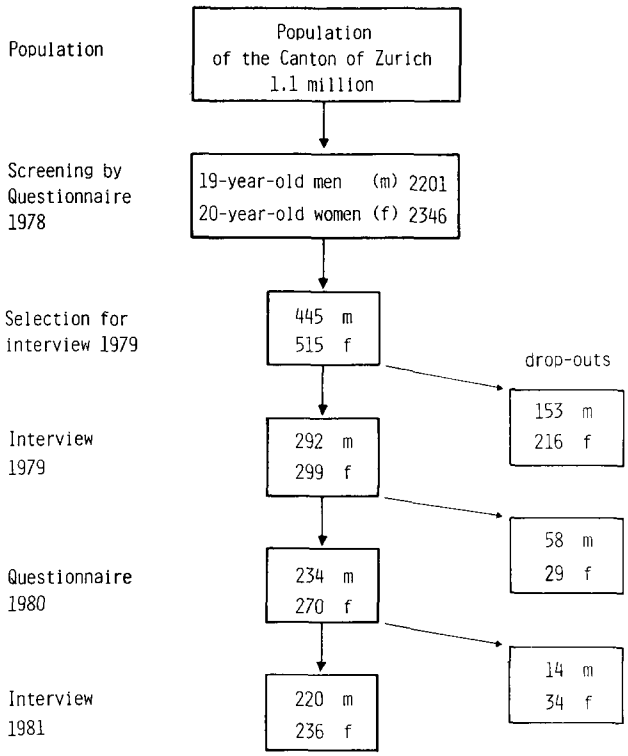

Fig. 1. Design of the study

screening, a sample intended for a longitudinal study. The probands of this sample were interviewed personally both in 1979 and in 1981 (in most of the cases at the proband's home). In the year between – 1980 – they were questioned by post. The design is shown in Fig. 1, and the individual steps are described in detail in the following paragraphs.

3. Screening

The screening was based on a representative sample of the young adults living in the Canton of Zurich in 1978, i.e., of the 19-year-old men (born in 1959) and 20-year-old women (born in 1958).

At the age of 19, each Swiss male citizen has to present himself for military conscription. We obtained permission from the authorities concerned to investigate these young men, independently of the military procedure. In groups of approximately 10 persons each, 2201 randomly selected young men filled in a questionnaire bearing on social data, and alcohol and drug consumption, and the SCL-90. For control, some sociodemographic characteristics of all the young men liable at that time for military service ($n = 6776$) were registered. The refusal quota was minimal: 0.2%.

The addresses of all women reaching majority (20 years) that year were provided by the communities. A randomly selected 50% of these young women were then contacted by post. The response quota was 75%.

No difference could be found between male and female samples with respect to social origin and size of abode. However, females with lower educational level were underrepresented, confirming the results of a study by Binder et al. (1979) indicating that persons with a lower educational level rarely participate in postal investigations.

The SCL-90R by Derogatis (1977) was used to select a group at risk. This SCL-90R, with its 90 items, represents an amplified version of the Hopkins Symptom Checklist HSCL (Derogatis et al. 1974). It has been validated by means of the General Health Questionnaire (GHQ) of Goldberg (1973) in a methodological preliminary investigation of 120 young men in 1975. The product-moment-correlation between these instruments is 0.76; the misclassifications, examined by different cut-off values of the HSCL, are between 12% and 14%.

Although the GHQ had been especially developed as a screening instrument, we preferred the multidimensional SCL-90R, which provides a more differentiated syndromal profile to describe the probands. This in turn represents an advantage for repeated measuring in a longitudinal study.

The self-rating questionnaire SCL-90R was filled in by both of the above mentioned cross-sectional samples (2201 19-year-old men and 2346 20-year-old women). Figure 2 shows a histogram of the total scores. Based on the 85 percentile value (1.57 for the males and 1.89 for the females), the last 15 percentiles were defined as 'high-scorers'. For the longitudinal study, two samples of equal size were selected, of men and women representing for two-thirds 'high-scorers' and for one-third 'low-scorers'. The high-scorers are oversampled, in order to reach a sufficient number of symptom-bearers for further analyses. This overrepresentation can be adjusted, if necessary, by weighting the distribution on the total sample. A sample constructed in such a way is especially qualified for the analysis of questions typical of case control studies, i.e., of comparisons of the two groups relating to characteristics and strain which are deemed to be relevant to the course of the disorder. Inherent, however, is the disadvantage that due to the rather small number of primarily healthy persons, such a method permits only quite limited causal search of incidence.

4. Selection and Interviewing of the Sample for the Longitudinal Investigation

The sample for the interview was selected at random, both for population at risk and general population. The size of the samples was meant to be 300 each, women and men (200 high-scorers v 100 low-scorers). Since many of those contacted (through an initial letter of information, followed by a telephone call to fix an appointment for the subsequent in-person interview) refused to cooperate, we had to address a total of 445 men and 515 women. The first refusal rate being 34% with men and 42% with women, we reached a final sample size of 292 men and 299 women; 40% of the male and 50% of the female low-scorers refused to be interviewed, while the respective rates were 31% and 36% for the high-scorers.

When comparing some sociodemographic characteristics of the acceptors and refusers, such as size of abode, educational and professional level, work, and social origin, the only finding is that a higher educational level prevails among the interviewed sample.

It is in the nature of a longitudinal study that not every proband can be interviewed repeatedly. A second personal interview was obtained in 220 men and 236 women. As to the sociodemographic characteristics, city-dwellers, and people from lower social levels (with respect to education, father's and proband's occupation) were prone to participate less readily in repeated investigations. However, this fact did not engender any significant distortion of the longitudinal sample, and the sample thus remained representative.

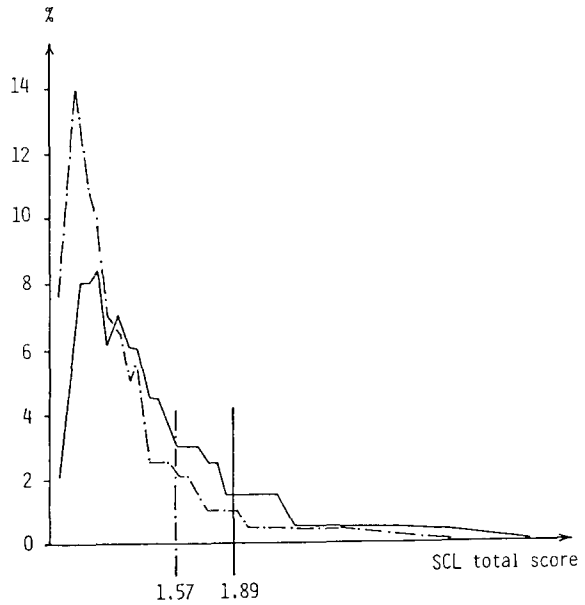

Fig. 2. Sexspecific distribution (%) of the SCL total scores with cut-offs (85 percentiles) used in the screening [— women (n=2346); –·–men (n=2201)]

A number of medical and psychological students were recruited to carry out the interviews; they received a 1-day training. To ensure control and an opportunity of discussing the interview sheets, one of the project leaders remained in continued direct contact with the interviewers during the entire interview phase.

5. Instruments

Table 1 lists the topics covered. A more detailed description of the instruments follows.

5.1. Psychiatric Interview

In such a study, the form and content of the psychiatric interview are of vital methodological importance. We first considered using one or the other of two existing standardized psychiatric interviews, but then abandoned the idea for the following reasons:

- The interview by Goldberg et al. (1970) qualified for epidemiological studies, but—not being structured—required trained psychiatrists to act as interviewers.
- We pretested the Present State Examination (Wing et al. 1974) with a sample of 27 persons, and found it unsuitable for our project because of the reasons outlined below: The interviewer had to be very well trained in eliciting psychiatric syndromes; the interview had originally been designed to assess psychoses; psychosomatic and sexual disturbances could not be adequately evaluated; the assessment of symptoms was limited to 1 month's time; it did not assess social problems and social consequences of psychopathological disturbances.

Because of this, we decided to set up our own interview (SPIKE = structured psychopathological interview and rating of the social consequences of psychic disturbances for epidemiology), although we had initially hesitated to do so.

Table 1. Investigations

[a]	1978 q	1979 i	1980 q	1981 i
SPIKE psychiatric interview		+		+
Drug consumption	+	+	+	+
Syndrome list	+		+	
SCL-90R	+	+	+	+
Sociodemographic data	+	+	+	+
Social adjustment		+	(+)	+
Life events (12 months)		+	+	+
Sociopsychological data		+		+
Dissimulation	+			
Picture-Frustration-Test				+
Attitudes and values		+		+

[a] q = questionnaire; i = interview

5.2. SPIKE

To draw up one's own psychiatric interview is problematic, for reasons of validity and reliability. Bringing students into action as interviewers represents an additional difficulty. We therefore created a very structured interview, developing along a consistent line:

The interview started with the open question: 'Have you had any bodily or psychic disturbances during the past 12 months, which have troubled you?' Irrespective of whether the answer to this initial question was affirmative or not, we went on to explicitly investigate 25 psychosomatic or neurotic syndromes, including consumption behavior (Table 2, and Appendix). Each of these syndromes was checked systematically, in each proband, in the following, hierarchical way:

1. Introductory question whether syndrome had been present during the past 12 months.

If syndrome present,

2. Duration, frequency, and last manifestation of the syndrome.

If the syndrome reaches a certain minimum duration and/or frequency,

3. Check whether the syndrome has an obvious somatic cause.

If the syndrome meets the following criteria: no obvious somatic cause ('obvious' would, for instance, be an infectious intestinal disease, anxiety justified by some real danger), presence of the aforesaid minimum duration and/or frequency of manifestations, we term it a 'relevant functional syndrome'.

In such a case, we continue in the following way:

4. List of single symptoms
5. Subjective measuring of extent of feeling worried by the presence of the syndrome (analog scale: design of a thermometer 0–100, with the extremes 'not feeling worried at all' and 'feeling enormously worried').
6. Illness behavior, especially consultation of a physician or any other specialist, self-treatment, and discussion of the syndrome with a close friend.
7. Impairment of normal role functioning by the syndrome, in the areas of work, leisure time activities, contact with friends and parents, and partner relationship.

Finally, the following was assessed for each proband:

8. Previous history: A previous history of each syndrome was assessed, asking whether any of them had manifested them-

Table 2. List of syndromes (interview)

Gastric discomfort	Anxiety
Intestinal trouble	Phobia
Respiratory trouble	Depression
Heart trouble	Compulsion
Circulatory disturbances	Exhaustion
Backache	Sleep disturbances
Difficulties in swallowing	Sexual problems
Movement disorders	Drugs
Headaches	Alcohol
Allergy	Analgesics
Hypochondriasis	Menstruation
	Suicidal ideas
In 1981, additionally: mania	
disturbed appetite	

Consult Appendix for more detailed information

selves, once, or repeatedly, any time prior to the past 12 months. (1979)

9. Previous treatment, and family history of each syndrome. (1981)

To validate the SPIKE 90 outpatients and 50 hospitalized patients were used. External criteria were the case histories compiled by the physicians, independent of our investigation. The results of these validating studies are or will be published (Illes 1981; Busslinger 1984; Pfortmüller 1983; Meier 1984).

5.3. Syndrome List (SL)

The SPIKE was only feasible within the frame of a personal interview. In the screening and postal questionnaires, an established check list of functional syndromes was used. The proband was asked if he had suffered from any persistent disturbances within the respective syndromal context during the past 12 months, and whether he had been treated or hospitalized. This SL has been validated in the frame of another study, by Tur (1981). He analyzed and checked the validity of the list by the results of 487 young men at the time of their military conscription; the medical check-up by the army physicians, who examined the subjects independently of our investigation, served as external criteria.

5.4. SCL-90R

The instrument contains 90 items with a 5-point graduation of distress from 'absent' (1) to 'extreme' (5). The items can be combined into nine symptom scales. A pretest was carried out in 1976 on 1162 young men, to proceed to a factor analysis by means of the SCL-90. The following factors could be reproduced: somatization, depression, interpersonal sensitivity, anger, obsessionality, phobia. Somewhat unclear remained the structure concerning the dimensions 'paranoid ideation', 'psychoticism' and 'anxiety'. In a subsample of 324 people, the total score of the SCL-90 was correlated with the neuroticism score of the FPI (Freiburger Persönlichkeitsinventar); r was found to be 0.46.

5.5. Sociological Interview

Parallel to the psychiatric interview, a sociological one was also carried out. The latter consisted of the following sections:

Sociodemographic Characteristics. Within the frame of the screening investigation, social origin, education, occupational status, size of abode, and marital status were assessed. The questions about the current social status were repeated at the subsequent investigations.

Social Adjustment. The interview contained a great number of questions on the interpersonal behavior patterns of those interviewed. Besides objective facts, subjective feelings, conflict and contentment were evaluated. The interview covered the following roles: work, behavior in leisure time activities, friends, partnership, and contact with parents. In contrast to the questions asked in the SPIKE on the social consequences of single psychic syndromes, these questions were more general and not related directly to any specific functional disturbances. The method was based on the scales of social adjustment (SSIAM) by Gurland et al. (1972), and the Social Adjustment Scale (SAS) by Weissman and Paykel (1974). In the aspects given below, we did not follow these scales:

- With regard to the young age of the probands, we did not assess the parental role.
- A generalized judgment of the single roles was not included.
- The assessment of the social adjustment was not a closed unity, but part of a more extensive sociological questionnaire.
- Behavior in leisure time activities and occupational situation were assessed in more detail than by the above tests. We added questions on stress-producing factors at work, occupational competences (Kluegel 1978), etc., and on the consumption of mass media.

Social adjustment was assessed at both interviews. In the postal questionnaire, in 1980, it was included in an abbreviated manner.

5.6. Life-Event-Inventory

We developed a modified life-event-inventory for our study based on Tennant and Andrews (1976, 1977). While excluding items not applicable to young people (e.g., retirement), we added some others (Holmes and Rahe 1967), which assessed the changes occurring in life habits, and others which concerned events typical of young Swiss nationals.

In the first interview, the events were spaced over three different periods of time (4 weeks, 3 months, 1 year), whereas in the postal questionnaire, and the following-up interview, they were spaced comprehensively over 1 year. We administered the inventory to first-onset schizophrenics as well as healthy people (Malzacher et al. 1981; Isele and Angst 1982; Ebnöther 1980). A standardization of the life-event-inventory was carried out on a sample of the general Swiss population by Bischofberger and Thomaier (1982).

5.7. Sociopsychological Aspects

A. Coping Behavior. 'Coping' stands for protective behavior patterns against psychic consequences of difficult life situations. An individual's social and psychological resources are essential in order to cope. The different aspects of social adjustment correspond, in our questionnaire, to the social resources which are important to 'coping'. To evaluate the psychological resources we used two sociopsychological scales, 'self-esteem' and 'mastery', developed by Pearlin and Schooler (1978). The scale 'self-esteem' reflects self-confidence and self-esteem, the scale 'mastery', personal feelings of weakness in relation to

Table 3. Depressive symptoms over three periods of manifestations in the two sexes (%)

Depressive symptoms	Time of the last manifestation before interview								
	4 weeks			1-3 months			4-12 months		
	M ($n = 65$)	F ($n = 87$)	*P*	M ($n = 38$)	F ($n = 26$)	*P*	M ($n = 27$)	F ($n = 53$)	*P*
Joylessness	77	78	NS	74	65	NS	74	58	NS
Depressivity	46	61	0.10	34	65	0.05	37	53	NS
Sadness	55	64	NS	29	73	0.001	15	60	0.0001
Sick of life	35	37	NS	18	46	0.05	74	64	NS
Loss of interest	75	67	NS	71	69	NS	70	74	NS
Loss of performance	54	49	NS	37	50	NS	59	47	NS
Feelings of inferiority	51	56	NS	21	65	0.001	22	51	0.05

one's own destiny and environment. These two sociopsychological dimensions may be considered as an important basic feature of efficient coping ability. Both scales were used in the interview of 1979 and the reinterview of 1981.

In addition, two other scales connected with 'coping' were used in 1979, namely the scale 'rigidity', i.e. lack of willingness to cope with any new situation, and the scale 'general striving for prestige' for the relevance to an individual of the praising of his performance (both scales by Geser and Zbinden, 1970).

B. Dissimulation. In the screening investigation, we used an additional scale for illness dissimulation. It had been extracted from the PD-S by von Zerssen (1976).

C. Rosenzweig Picture-Frustration-Test (Rauchfleisch 1979). This was used in the reinterview of 1981.

5.8. Attitudes and Values

The interview also contained some questions bearing on general attitudes towards illness and health as well as towards political questions.

6. Reliability and Validity

A crucial problem of any interview study is the reliability and validity of the probands' individual responses. It transpires from several methodological studies carried out by our research department that the cross-sectional data gathered on the occasion of military conscription may be considered as reliable.

In 1971, within the frame of another project, we had already investigated all 19-year-old young men of the Canton of Zurich on the occasion of their military conscription, 50% anonymously and 50% with indication of personal data (Ruppen et al. 1973). The two samples did not differ significantly in the particulars they gave on social data, consumption habits (including illegal drugs), and disturbances in health, etc. Nor could we find any differences in a personality test (Freiburger Persönlichkeitsinventar FPI, by Fahrenberg et al. 1973), not even in the scale 'frankness', or 'lying'. The consistency of the answers to questions which has been put in different ways in the course of the study (e.g. concerning consumption habits) was quite high.

In several methodological pretests destined for the study presented in this paper, the instructions for questioning the young men were deliberately varied. No significant difference in the extent of the disturbances assessed by the SCL-90R and a dissimulation scale (Binder and Angst 1981) were registered between the groups of persons that had been questioned under different conditions.

One important reliability problem is the tendency to forget about earlier events. This forgetfulness, included in the previous histories, confounds the cross-sectional investigations of incidence. The reliability of previous histories is generally low, and is quite variable (Binder and Angst 1981). For this reason, we left aside the assessment of life history data from earlier youth. 'Forgetting' is already a factor in events dating back a few months. We have observed a pronounced reduction in the frequency of remembered earlier events in the frame of another study bearing on life events (Isele and Angst 1982; Malzacher et al. 1981). Similar results were obtained on the occasion of our first interview, in which the life events investigated were divided into three different time spans. Role and importance of forgetting life events have become the focus of a scientific discussion (Brown and Harris 1982; Uhlenhuth and Haberman 1977; Jenkins et al. 1979).

Some analyses of our data confirm that the degree of forgetfulness related to depressive symptoms can vary between the two sexes. Table 3 gives the frequency of depressive symptoms in males and females separately, classified into different periods preceding the interview. No significant sex-specific differences could be found, in any of the time spans, concerning loss of interest, loss of performance, and depressivity. On the other hand, we did find some difference in recall of sadness and feelings of inferiority, with earlier manifestations: the men complain less of these symptoms. However, should depression manifest itself in the course of the preceding 4 weeks, these symptoms were often equally rated by men and women. These findings can best be explained by the hypothesis that men more selectively forget or suppress undesirable aspects of depression, whereas they well remember others, such as joylessness, loss of interest, and impairment of performance.

The validity of the assessment of social adjustment was analyzed, in our research department, in a project on social impairment of schizophrenics, within the frame of an international collaborative W.H.O. study. Parallel to this study, investigations were effected on the social impairment of chronic outpatient schizophrenics, and healthy persons (Ebnöther 1980; Fehr-Suter 1981). The results of these studies confirmed that it is possible to assess the actual impairment in social role functioning in a very valid way.

In the frame of the W.H.O. study, the interrater-reliability of our investigation method concerning social adjustment was also tested; with an average weighted kappa of 0.79 it was found to be quite satisfactory (Isele and Angst 1983).

7. Data Processing and Statistics

All data were stored at the Computing Center of the University of Zurich. The interpretation and computation of our data was effected by means of the SAS (Statistical Analysis System, SAS Institute Inc., 1979), and the SPSS (Statistical Package for Social Sciences, Nie et al. 1975; Hull and Nie 1981) for the most part. For more complicated problems, such as loglinear models (Goodman 1972), multiple classification analysis (Multiple Classification Analysis, Andrews et al. 1975), and multivariate nominal scale analyses (Multivariate Nominal Scale Analysis, Andrews and Messenger 1973) we used the BMDP, extended version of 1981 (BMDP Statistical Software), and the OSIRIS of the University of Michigan, Ann Arbor, research team. In order to group the syndromes we used a program for multidimensional scaling (Kruskal et al. 1978). This program has been further developed by Stassen (1983), of our research department.

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Appendix

SPIKE interview: List of syndromes and symptoms

Stomach

heartburn
pressure in the stomach
stomachache or spasms
feeling of fullness
nausea
vomiting
burping
diet, avoids certain food
peptic ulcer

Intestines

pain in the abdomen
abdominal spasms
constipation
diarrhea
abdominal pressure or fullness
abdominal tension
flatulence
diet

Respiration

shortness of breath
abdominal spasms
anxiety
restlessness
pressure in the chest

Heart

'stitches' in the heart region
cardiac pain
pounding of the heart (at rest)
irregular pulse, missing beats
anxiety

Circulatory system

dizziness
fainting
hypertension
hypotension
pressure in the head
fatigue
sudden perspiration

Exhaustion/Weakness

feeling exhausted
weakness
hypersensitivity
impaired performance
fatigue, increased need for sleep
trouble with concentration
poor memory

Worry about health

worried about own physical health
fear of physical illness
frequent self-scrutiny of physical symptoms
has consulted 2 or more physicians

Anxiety

anxiety attacks
panic
fear of being alone
fear of the coming day
physical symptoms [associated with anxiety
e.g., palpitations, perspiring, tremor, diarrhea, nausea, dizziness, shortness of breath, dry mouth]

Phobias/Situational anxiety

specific fear of examinations
situational anxiety
animal phobia
avoidance behavior
anxiety state if forcing him/herself into certain situations

Sleep

trouble falling asleep
waking during night
early waking
nocturnal anxiety states
somnambulism
feeling not rested in the morning

Depression

sad, depressive, gloomy
lack of appetite, weight loss, weight gain
sleeping too little or too much
loss of energy, fatigue
slowness in movement or in speech
being restless, must keep moving
loss of interest and friends, diminished sexual desire
feeling of inferiority, guilt
life is not worth living
trouble with concentration
difficulty with thinking

Manic mood
increased activity
overtalkative
travelling here and there
buying sprees

Suicidal ideation/Suicide attempt
no suicidal thoughts
persistent [thoughts about suicide]
suicide attempt

Back
backache at work
backache when standing or sitting for long periods

Motor
tic
writer's cramp
trembling attacks

Appetite
overeating, overweight
follows diet
lacks appetite, too thin
laxatives, medication to induce weight loss

Swallowing
feeling of foreign body in the throat
burping, vomiting, fullness in the stomach

Compulsions
compulsion to control
compulsion to wash
obsessive thoughts
other compulsive acts
compulsive counting
feelings of anxiety

Headache
unilateral headache
bilateral headache
photophobia
flickering before eyes
nausea
vomiting
dizziness

Allergies
hay fever
bronchial asthma
asthma attacks
skin allergies
hives
eczema
itching

Premenstrual and menstrual symptoms
pains
physical symptoms [e.g., swellings, weight gain, skin troubles]
perspiring, dizziness
psychologial symptoms [e.g., nervous, irritable, depressive, anxious]
missing period

Sexual Impairment
functional complaints [e.g., impotence, frigidity, etc.]
emotional complaints [e.g., inhibitions, guilt feeling, etc.]
other
no organic cause
organic cause

Drug abuse

Alcohol abuse

Abuse of analgesics

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