

A COMPARISON OF DIFFERENT PSYCHOSOCIAL QUESTIONNAIRES IN PATIENTS WITH MYOCARDIAL INFARCTION

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ABSTRACT. In a consecutive study of 140 patients investigated one month after myocardial infarction (MI), a battery of American and English questionnaires was used to measure depression, anxiety, sleep problems, health locus of control and perceived health. These measures were compared with a well-documented generic questionnaire, the Nottingham Health Profile (NHP), and a similarly well-documented mood scale, the Mood Adjective Check List (MACL). There was close agreement among all measures depicting anxiety and tension. The concordance between the measures of anxiety states and depression was lower. Depression and sleep problems seem to constitute separate concepts, since they are not as highly related to the other measures of anxiety. Because psychosocial factors are important measures for the outcome after an infarction, accurate assessments of these variables are required. Further research is clearly warranted to clarify the complicated interaction between psychosocial constructs and to improve the methods used for their evaluation.

Key words: Psychosocial, assessment, health perception, depression, anxiety.

It has been suggested that there are several psychosocial factors that increase the risk of developing coronary heart disease (23). Similarly, psychosocial variables such as depression and anxiety have been found to predict mortality or morbid events after an infarction (8, 18, 43). Psychosocial disability has increasingly been acknowledged to be a greater barrier to recovery than the physiological and/or cardiac impairment in patients with myocardial infarction (MI) (10, 29, 36, 40). The magnitude and the persistence over time of psychosocial maladjustment after MI have been described in many studies (7, 11, 30, 37).

Even though similar findings are frequently recorded, comparatively little is known about how the different questionnaires commonly used to gather

information on psychosocial variables relate to each other. This may render comparisons between studies difficult. Many methods are of American or English origin, which complicates matters further. Even though some have been used in Sweden, the documentation of the Swedish versions is often poorly described.

The purpose of the present study was to investigate the relationship between questionnaires assessing psychosocial factors within the framework of a study of post MI patients.

PATIENTS AND METHODS

The patients in this study consisted of men and women, below 65 years of age, admitted to Sahlgren's Hospital and Östra Hospital in Göteborg, Sweden, between November 1985 and November 1986. They were part of a large study of consecutively registered patients with primary MI in Göteborg during the period 1 October 1985 to 31 October 1987. A special myocardial infarction register has been in operation in Göteborg since 1968 (14). Since that time defined criteria for the diagnosis of MI have been in use. The criteria of MI were a typical history of chest pain, typical pattern of serum enzyme changes, and typical ECG changes of infarction. Myocardial infarction was considered to have occurred when at least two of these three criteria were fulfilled.

On discharge from hospital all patients were referred to a special Post-MI clinic, which provided a systematic and close follow-up of MI patients (15). Identical standardized questionnaires were used to record data from the medical interviews and examinations which took place at scheduled intervals throughout convalescence. They also contained demographic data such as age, sex, marital status, educational level, work status before MI, smoking and drinking habits.

During convalescence, approximately 4 weeks after the acute event, a series of questionnaires assessing psychosocial variables was mailed to all patients. The questionnaires were answered at home and returned during the first out-patient visit to the hospital.

Questionnaires

The impact of disease in terms of emotional distress and disability was assessed using the *Nottingham Health Profile*

(NHP). The NHP has been extensively tested for reliability and validity in Britain and Sweden (19, 20, 42). The NHP is in two parts. Part I has 38 yes/no questions which reflect the patient's degree of discomfort or distress within the dimensions of energy, sleep, pain, emotional reaction, mobility, and social isolation. The higher the score in a dimension the greater the severity of the problem (0 indicates no problems at all within a dimension, while 100 signifies that all problems in that dimension have been affirmed) (22, 31). Part II contains 7 yes/no questions reflecting the frequency of health-related problems with regard to paid employment, house work, hobbies, family life, sex life, social life, and holidays. Normal or "average" mean scores and frequencies of health-related problems, distributed by age and sex are available (21). The NHP has previously been used in cardiac patients to describe the effectiveness of heart transplant programmes (32), for the long-term follow-up of post MI patients, and in patients with MI and with suspected MI in whom the diagnosis was not confirmed (44, 45, 46).

The *Mood Adjective Check List* (MACL) describes three dimensions of mood, i.e. tension/calmness, activity/passivity, and pleasure/displeasure (34), using 38 positive and negative adjectives. The MACL is well documented with regard to reliability and validity and has been used to study the relationship between somatic symptoms and mood status (33).

The *Sleep Dysfunction Scale* involves assessing the frequency of sleeping problems with 6-graded Likert scales; 0 being equivalent to no problems with sleep, and 5 indicating that the respondent had sleeping problems most nights during the past month (25). The sleep dysfunction scale has been used to evaluate the effect of by-pass surgery on the patient's quality of life (24).

Depression was evaluated using the Zung Self-Rating Depression Scale (47). The scale contains 20 items using 4-graded scales: scored 1 to 4 with 1 denoting a low degree of impairment and 4 impairment in terms of depression most of the time. The questionnaire is well validated and has a high reliability, which has been shown in many language versions including Swedish. In cardiovascular patients the Zung Depression Scale has been used to identify depression, and to determine outcome after MI (2, 37).

In addition to the Zung Depression scale, the *Hopelessness Scale* developed by Beck and colleagues, depicting hopelessness, another dimension that may indicate a depressed mood state, was used (3). The Hopelessness Scale contains 20 items denoting hopelessness as well as meaningfulness. The response format is 6-graded Likert scales where 1 denotes complete agreement and 6 complete disagreement. The Beck Scale has been used primarily in psychiatric populations (12).

Anxiety was evaluated using the State-Trait Anxiety Inventory (35). The Anxiety Inventory evaluates the present state of anxiety as well as general anxiety traits. Each of the two forms uses 20 items denoting negative as well as positive statements. The response format is 4-graded. The State Trait Anxiety Inventory has been validated and tested for reliability. The inventory has been used in cardiovascular patients to study the prognostic impact of myocardial infarction (6) and to assess the relationship between stress and coronary heart disease (13).

External locus of control was evaluated using a Swedish version of the Wallston scale, which contains 11 items scored 1 to 6 (38). Patients with an external locus of control are reported to have a less favourable prognosis, to be less inclined to change their life style, and to be less willing to participate in post-MI rehabilitation programmes (39).

Perceived health status was rated on a 7-graded Likert scale (1 = excellent health, and 7 = poor health).

The NHP and the MACL are well-documented in terms of reliability and validity and have been used in several Swedish patient populations. They were therefore used as standards against which the other questionnaires were compared.

Statistics

Standard descriptive statistics were used. The Pearson product moment correlation was used to compute the correlation between the different psychosocial measures.

The group was fairly homogeneous in terms of age. Before further analysis of the questionnaires, it was checked whether sex had any major impact. In terms of sleep disturbance, emotional distress in the NHP, and depression according to the Zung scale, females scored higher than men ($p < 0.01$). However, in view of the low number of women ($n = 21$), it was decided to analyse the responses of all patients together.

RESULTS

Between November, 1985 and October 31, 1986, 199 consecutive patients had suffered an infarction. Among these, 4 died before completing the questionnaires, while 45 (7 women and 38 men) failed to return them, in some cases for administrative reasons, e.g. because a patient was still hospitalized. Among the 45 patients who did not return their questionnaires, 23 were below 54 years of age.

In all, 140 questionnaires were available for analysis. Among the respondents were 119 men, mean age 56.4 (± 7.2) and 21 women, mean age 56.4 (± 4.9) years. Fifteen patients had suffered reinfarctions. The majority of the patients, 81%, were married (7% of these for the second time), 11% were divorced, 5% single and 2% widowed. Nine per cent had a university degree, 11% higher education, 16% secondary education, while 64% had only attended primary school. Fifty-four per cent were employed at the onset of MI, 19% were sick-listed and 27% had a disability pension. Altogether 13% affirmed that they were teetotallers.

Morbidity, clinical data, smoking habits before and after 3 months, and work status after 3 months in patients with a first MI are shown in Table I. Because the standardized infarction register only has data on first infarctions, the corresponding data for patients suffering a reinfarction were not available.

The Nottingham Health Profile

The most pronounced impact of disease was found in terms of lack of energy, sleep disturbances and emotional upset (Fig. 1). For comparison, the mean

values of 5-year post-MI survivors from a previous follow-up of more than 500 patients with a confirmed MI who participated in the Göteborg Metoprolol Trial have also been given (44).

The frequency of health-related activity restrictions was obvious as regards hobbies, holidays, house work, sex life, social life, and home life, as shown in Fig. 2. As expected, MI patients in the early phase of convalescence reported that their health status interfered with all activities. For comparison, the frequency of health-related problems in a previous study of post-MI patients who had survived 5 years have been inserted (44).

The Mood Adjective Check List

As shown in Table II, the patients described their mood state as more tense, unpleasant and passive compared with that of a reference group (33).

Intercorrelations between psychosocial questionnaires

There was generally high and significant ($p < 0.001$) concordance between the different measures of emotions and mood states (Table III).

Anxiety and depression

The mean values of state anxiety were 40.4 ± 12.9 , and for trait anxiety 38.8 ± 11.4 . Compared with the anxiety level displayed in populations of general medical and surgical patients without psychiatric complications, with mean values equal to 42.7 ± 13.8 (state) and 41.3 ± 12.6 (trait), no deviations from the normal are suggested. The mean value of the Zung scale, 57.5 ± 8.2 , was converted to standard mean index value (SDS) by dividing the raw score by 80, and multiplying by 100. The calculated SDS value, 47, suggested a subclinical depressive state but no apparent clinical depression, since values below 50 fall within the normal range. The Hopelessness scale had a mean value of 81.8 ± 15.3 . The intercorrelation between state and trait anxiety was $r = 0.86$ and between the two measures of depressed mood $r = 0.58$.

Health locus of control

The mean value of health locus of control was 44.0 ± 8.9 . In no case was there a significant correla-

Table I. Somatic variables in patients with a first MI ($n = 125$)

Variable	First MI patients	
	%	<i>n</i>
<i>Before MI</i>		
Hypertension*	27	33
Diabetes**	6	8
Chest pain on exertion	29	35
Dyspnea on exertion	24	30
Current smokers	65	78
<i>Three months after MI</i>		
Hypertension*	24	29
Diabetes**	10	12
Angina pectoris**	35	42
Ventricular arrhythmias**	6	7
NYHA II	46	51
NYHA III	11	12
Chest pain on exertion	36	44
Mean NYHA functional class (I-IV)	1.7	
Mean angina attacks/week	2.4	
Mean systolic blood pressure (mmHg)	138	
Mean diastolic blood pressure (mmHg)	83	
Mean heart rate (beats/min)	64	
Mean S-cholesterol (mmol/l)	6.8	
Current smokers	20	24
Return to work	20	25

* Systolic BP ≥ 160 mmHg and/or diastolic BP ≥ 105 mmHg.

** Assessed by physician.

Nottingham Health Profile, part I

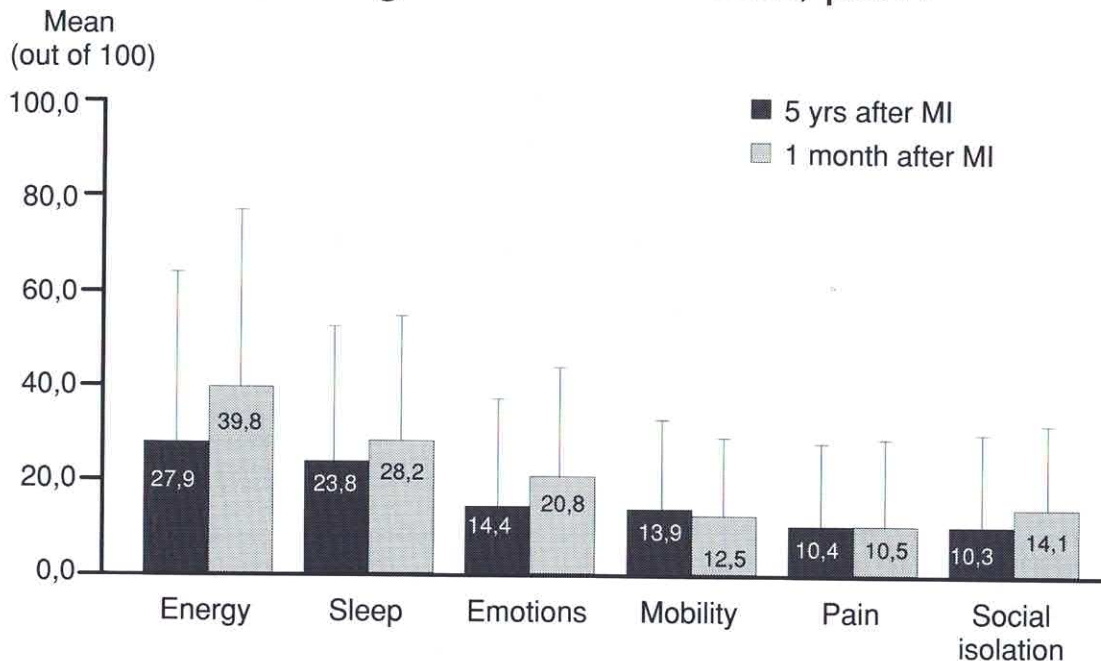


Fig. 1. The Nottingham Health Profile, part I. Mean scores (out of 100) in MI patients one month after onset of the acute event compared with a previous study of MI patients 5 years after the acute event.

Nottingham Health Profile, part II

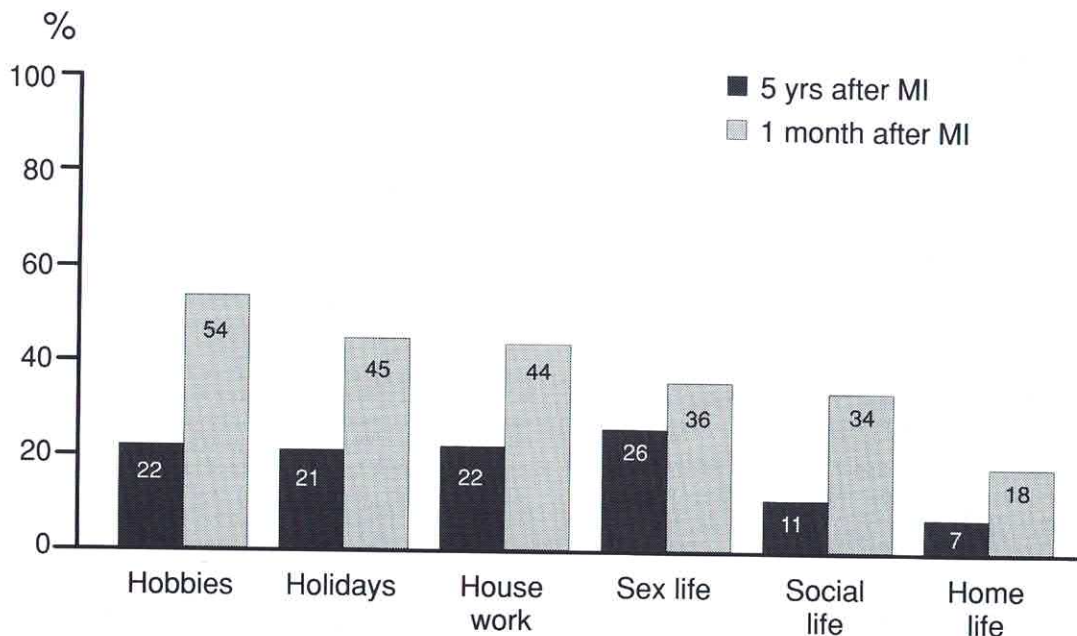


Fig. 2. The Nottingham Health Profile, part II. Frequency (%) of health-related problems in MI patients one month after onset of the acute event compared with a previous study of MI patients 5 years after the acute event.

tion ($p < 0.01$) between health locus of control and the measures of emotions and health (Table IV).

Comparison with corresponding mean values from American community residents, 35.9 ± 7.1 (32), Swedish students, 34.4 ± 7.5 , and dental patients, 40.8 ± 9.0 , suggests that the values among the MI patients were somewhat elevated (5).

Sleep dysfunction

The mean value of sleep dysfunction was 7.5 ± 5.1 , indicating comparatively few sleep problems. As expected, there was a high correlation with the sleep dimension of the NHP. The Sleep Dysfunction Scale also correlated well with all scales and scale dimensions depicting emotional distress.

Perceived health

The mean value of perceived health (rated 1–7) was 3.9 ± 1.5 , indicating a normal distribution. Seventeen per cent rated their health as excellent/very good, while 12% rated their health as poor. The correlations with perceived health suggest that the patients' own perception of their state of health is particularly influenced by anxiety, deficits in energy and activity and reduced mobility (Table V).

Table II. The Mood Adjective Check List (MACL) in MI patients compared to healthy controls

MACL Dimension	MI patients mean \pm sd	Controls mean \pm sd
Tension	2.88 ± 0.73	2.96 ± 0.67
Unpleasantness	2.94 ± 0.67	3.11 ± 0.56
Deactivation	2.69 ± 0.63	3.06 ± 0.56

Table III. Intercorrelations* between scales depicting anxiety, depression and sleep dysfunction and corresponding dimensions of the NHP and the MACL

Dimension	NHP emotions	NHP sleep	MACL tension	MACL unpleasantness	MACL deactivation
State anxiety	0.76	0.46	0.83	0.86	0.71
Trait anxiety	0.72	0.47	0.73	0.74	0.63
Depression (Zung)	0.63	0.53	0.65	0.67	0.61
Hopelessness (Beck)	0.52	0.32	0.52	0.59	0.44
Sleep dysfunction scale	0.46	0.61	0.41	0.44	0.37

* All intercorrelations were significant $p < 0.001$.

DISCUSSION

A large-scale longitudinal study on psychosocial risk factors in coronary heart disease provided a good opportunity to investigate the relationship between different psychological measures. This was done by adding two well-known questionnaires, the Nottingham Health Profile and the Mood Adjective Check List, to the specific measures of anxiety, depression and health that were administered to all consecutive patients suffering a myocardial infarction in Göteborg. Despite the fact that some patients, generally the younger ones, failed to complete and return the

Table IV. Health locus of control and the relationship to emotional status and health factors

Measure	Health locus of control	
	r-values	p-value
<i>Emotions:</i>		
NHP		
emotions	0.07	n.s.
sleep	0.01	n.s.
MACL		
tension	0.11	n.s.
unpleasantness	0.19	n.s.
deactivation	0.10	n.s.
State anxiety	0.16	n.s.
Trait anxiety	0.13	n.s.
Depression (Zung)	0.14	n.s.
Hopelessness (Beck)	0.14	n.s.
Sleep dysfunction	0.13	n.s.
<i>Health:</i>		
Perceived health	0.03	n.s.
NHP		
energy	0.05	n.s.
pain	0.06	n.s.
mobility	0.00	n.s.

questionnaires, a response rate of 76% must be considered acceptable in a survey administered by mail among post-MI patients during the early phase of convalescence.

Close agreement was found between all measures depicting anxiety and tension. This was not surprising, since anxiety affects the person suffering from it profoundly, and is characterized by a number of obvious physiological signs, whereas depressive mood states represent less overt manifestations of distress. It is essential to be able to identify the anxious and depressed patients accurately. In particular, anxiety has a detrimental effect on the readjustment process post-MI both in the short-term (10, 11, 29, 36) and in the long-term perspective (30, 40, 46). Depression and anxiety have been associated with a less favourable prognosis after MI (1).

The concordance between anxiety states and the measures of depression was lower. Depression and sleep seem to constitute separate concepts being not as highly related to the other measures as anxiety. A comparison of how the two depression scales related to the other questionnaires, showed that the Zung depression scale was generally superior to the Hopelessness Scale since it was more able to depict the

relation between depression and sleep disturbance and deactivation, two clinical aspects of depression. Moreover, according to Zung, depressed patients generally rated their perceived health as poorer compared with those who express feelings of hopelessness in the Hopelessness Scale. This is in agreement with findings suggesting that hopelessness taps a habitual level rather than a momentary state, e.g. an endogenous depression. There is consistent evidence that hopelessness is a stronger indication of suicidal intent than is depression itself (4). In contrast, the Zung scale may delineate an exogenous state of depressed mood characteristic of a crisis reaction following an infarction (19). Similarly, general hopelessness was previously found to be unrelated to prognosis in medical patients (17), while depression rated by the Zung scale was shown to be a significant predictor of post-MI conditions (37).

The results pertaining to the concept of health locus of control are difficult to interpret, since locus of control was unrelated to virtually all the other psychosocial questionnaires in this study. Even though Maeland (27) previously found a relationship between an internal locus of control and global health before MI, this relationship was not corroborated after the infarction. Hence, the clinical validity of health locus of control is somewhat doubtful.

The global health rating was significantly correlated with the dimensions of the health profile, in particular those depicting lack of energy and limitations of mobility. A poorer health rating was also associated with feelings of anxiety and depression. In the early phases of convalescence, anxiety has been strongly associated with health perceptions (41) and global health ratings (27). Moreover, perceived illness has proved to be related to outcome across a wide range of health indicators, such as return to work and use of health services, in addition to other psychosocial measures (26, 28).

It has previously been shown that perceived health, depressed mood, and pronounced anxiety states play an independent role in terms of the prognosis after an infarction (7, 16, 37, 43).

The utility of the MACL and the NHP as "gold standards" has been shown in that they discriminate between different populations (33, 44). In infarction patients the health-related problems of the 5-year survivors were more pronounced than in a normal population which further confirms the clinical validity of the NHP (44). When the MACL and the NHP were

Table V. *Perceived health and its relationship to emotional status and other health indicators*

Measure	Perceived health	
	r-values	p-value
<i>Emotions:</i>		
NHP		
emotions	0.52	0.0001
sleep	0.29	0.0005
MACL		
tension	0.40	0.0001
unpleasantness	0.52	0.0001
deactivation	0.56	0.0001
State anxiety	0.50	0.0001
Trait anxiety	0.48	0.0001
Depression (Zung)	0.39	0.0001
Hopelessness (Beck)	0.28	0.0009
Sleep dysfunction	0.32	0.0001
<i>Health indicators:</i>		
NHP		
energy	0.57	0.0001
pain	0.34	0.0001
mobility	0.45	0.0001
isolation	0.29	0.0006

used as "gold standards", it seemed as if the measures of anxiety and depression performed in an expected way. The Hopelessness Scale had consistently lower correlations with the standard scales compared with the Zung Depression Scale. Despite being a one-item scale health question, its concentration on perceived health status provided highly valid and accurate information. In contrast, the health locus of control measure was poorly related to all other measures, and the value of this scale ought to be questioned.

Because psychosocial factors are important measures of outcome after an infarction, and have also been shown to be independent predictors of the prognosis after an MI, it is important that the most accurate measure is employed for the assessment of these mood states. From a clinical point of view, the interpretation of psychosocial findings is confounded by the fact that various measures now available are often discordant. Further work is therefore required in order to clarify the complicated interaction between psychosocial constructs and to improve the methods used for their evaluation.

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