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.

Keywords: 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 morbidity 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 of this 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 Sahlgrens' Hospital and Östra Hospital in Göteborg, Sweden, between November 1981 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-ups 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 in the hospital.

Questionnaires

The impact of disease in terms of emotional distress and disability was assessed using the Nottingham Health Profile.
The NHP has been extensively tested for reliability and validity in Britain (19, 20, 42). The NHP in two parts. Part I has 38 yrs no questions which reflect the patient's degree of discomfort or distress within the dimensions of energy, sleep, personal, relationship, and social isolation. The higher the score in a dimension the greater the severity of the problem (0 indicates no problem at all in 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, housework, hobbies, family life, sex life, social life, and hobbies. 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 deepening problems with 4 graded Likert scales: 0 (no problem), 1 (a few times a week), 2 (about once a week), 3 (several times a week), and 4 (all the time). The scores are then added up to create a total score.

Depression was evaluated using the Zung Self-Rating Depression Scale (47). The scale contains 20 items using a 4-graded scale: 1 (very much), 2 (much), 3 (moderately), and 4 (very little). The higher the score, the greater the severity of depression.

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 frequency related to quality of life was assessed using 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 Metropol Trial have also been given (44). The frequency of health-related activity restrictions was obvious as regards hobbies, holidays, housework, 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).

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 10, 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 score had a mean value of 83.8 ± 15.3. The intercorrelation between state and trait anxiety was r = 0.86 and between the two measures of depressed mood r = 0.58.
(NHP). The NHP has been extensively tested for reliability and validity in Britain and Sweden (19, 20, 42). The NHP 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 problems, specific health problems, 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 indicates that all problems in that dimension have been affirmed) (22, 31). Part II contains 7 yes-no questions which reflect 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).

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The Sleep Dysfunction Scale involves assessing the frequency of sleep problems with 6-gridded Likert scales; 0 being equivalent to no problems with sleep, and 5 indicating that the respondent had sleep 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 a 4-gridded scale, scored 1 to 4 with 1 denoting a low degree of impairment and 4 implying serious depression. The Zung scale 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, 27).

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 10 items denoting hopelessness as well as meaningfulness. The response format is 6-gridded 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-gridded. 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 and to detect the relationship between stress and coronary heart disease (13).

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

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).

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-
Comparing different psychosocial questionnaires for myocardial infarction

Discussion

A large-scale longitudinal study on psychosocial risk factors in coronary heart disease provided a good opportunity to investigate the relationships 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 questionnaires, enough usable data was obtained to carry out a thorough analysis.

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

<table>
<thead>
<tr>
<th>Measure</th>
<th>Health locus of control</th>
<th>r-values</th>
<th>p-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>NHP emotions</td>
<td>0.07</td>
<td>n.s.</td>
<td></td>
</tr>
<tr>
<td>Sleep</td>
<td>0.01</td>
<td>n.s.</td>
<td></td>
</tr>
<tr>
<td>MACL tension</td>
<td>0.11</td>
<td>n.s.</td>
<td></td>
</tr>
<tr>
<td>Pleasure</td>
<td>0.19</td>
<td>n.s.</td>
<td></td>
</tr>
<tr>
<td>Disenfranchisement</td>
<td>0.10</td>
<td>n.s.</td>
<td></td>
</tr>
<tr>
<td>State anxiety</td>
<td>0.16</td>
<td>n.s.</td>
<td></td>
</tr>
<tr>
<td>Trait anxiety</td>
<td>0.13</td>
<td>n.s.</td>
<td></td>
</tr>
<tr>
<td>Depression (Zung)</td>
<td>0.14</td>
<td>n.s.</td>
<td></td>
</tr>
<tr>
<td>Hopelessness (Beck)</td>
<td>0.14</td>
<td>n.s.</td>
<td></td>
</tr>
<tr>
<td>Sleep dysfunction</td>
<td>0.13</td>
<td>n.s.</td>
<td></td>
</tr>
</tbody>
</table>

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

<table>
<thead>
<tr>
<th>MACL Dimension</th>
<th>MI patients mean ± sd</th>
<th>Controls mean ± sd</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tension</td>
<td>2.88 ± 0.73</td>
<td>2.96 ± 0.67</td>
</tr>
<tr>
<td>Unpleasureness</td>
<td>2.94 ± 0.67</td>
<td>3.11 ± 0.56</td>
</tr>
<tr>
<td>Deselection</td>
<td>2.69 ± 0.63</td>
<td>3.06 ± 0.56</td>
</tr>
</tbody>
</table>

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

<table>
<thead>
<tr>
<th>Dimension</th>
<th>NHP emotions</th>
<th>NHP sleep</th>
<th>MACL tension</th>
<th>MACL unpleasure</th>
<th>MACL disenfranchisement</th>
<th>MACL depression (Zung)</th>
<th>MACL hopelessness (Beck)</th>
<th>MACL sleep dysfunction</th>
</tr>
</thead>
<tbody>
<tr>
<td>State anxiety</td>
<td>0.76</td>
<td>0.46</td>
<td>0.83</td>
<td>0.86</td>
<td>0.71</td>
<td>0.63</td>
<td>0.64</td>
<td>0.44</td>
</tr>
<tr>
<td>Trait anxiety</td>
<td>0.72</td>
<td>0.47</td>
<td>0.73</td>
<td>0.74</td>
<td>0.63</td>
<td>0.59</td>
<td>0.64</td>
<td>0.44</td>
</tr>
<tr>
<td>Depression (Zung)</td>
<td>0.63</td>
<td>0.23</td>
<td>0.65</td>
<td>0.67</td>
<td>0.61</td>
<td>0.64</td>
<td>0.64</td>
<td>0.44</td>
</tr>
<tr>
<td>Hopelessness (Beck)</td>
<td>0.52</td>
<td>0.32</td>
<td>0.52</td>
<td>0.59</td>
<td>0.64</td>
<td>0.64</td>
<td>0.64</td>
<td>0.44</td>
</tr>
<tr>
<td>Sleep dysfunction</td>
<td>0.46</td>
<td>0.61</td>
<td>0.41</td>
<td>0.44</td>
<td>0.37</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

*All intercorrelations were significant p < 0.001.
Comparing different psychosocial questionnaires for myocardial infarction

**Nottingham Health Profile, part I**

![Graph showing mean scores (out of 100) for 5 years and 1 month after MI.](image)

**Nottingham Health Profile, part II**

![Bar chart showing percentage of health-related problems in MI patients 1 month after MI.](image)

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<tr>
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</tr>
<tr>
<td>Sleep dysfunction</td>
<td>0.13</td>
</tr>
<tr>
<td>Health:</td>
<td></td>
</tr>
<tr>
<td>Perceived health</td>
<td>0.03</td>
</tr>
<tr>
<td>NHP energy</td>
<td>0.05</td>
</tr>
<tr>
<td>Pain</td>
<td>0.06</td>
</tr>
<tr>
<td>Social life</td>
<td>0.00</td>
</tr>
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<table>
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<th>MACL tension</th>
<th>MACL unpleasantness</th>
<th>MACL disenchantment</th>
</tr>
</thead>
<tbody>
<tr>
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<td>0.46</td>
<td>0.83</td>
<td>0.86</td>
<td>0.71</td>
</tr>
<tr>
<td>Trait anxiety</td>
<td>0.72</td>
<td>0.47</td>
<td>0.73</td>
<td>0.84</td>
<td>0.63</td>
</tr>
<tr>
<td>Depression (Zung)</td>
<td>0.63</td>
<td>0.53</td>
<td>0.65</td>
<td>0.87</td>
<td>0.64</td>
</tr>
<tr>
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<td>0.52</td>
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<td>0.52</td>
<td>0.59</td>
<td>0.64</td>
</tr>
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<td>Sleep dysfunction scale</td>
<td>0.46</td>
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<td>0.44</td>
<td>0.37</td>
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*All intercorrelations were significant p < 0.001.

**Discussion**

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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 and is experienced by a number of obvious physical 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 relationship 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 expressed 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 indicator 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 (27).

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 psychological questionnaires in this study. Even though MacLaid (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 psychological 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 MACI and the NHP as "gold standards" has been shown in that they discriminate between different populations (33, 46). 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 MACI and the NHP were 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 Clin Psychol.

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 psychological 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 further evaluation.

REFERENCES

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REFERENCES

29. Mayou, R., Foster, A. & Williamson, B.: Psychosocial

ABSTRACT. As part of a large epidemiologic study concerning 494 diabetic patients undergoing dialysis throughout France – the so-called (Uremidiab) study – we collected data with the aim of describing objective as well as subjective aspects of quality of survival. Questionnaires were completed from medical records and from direct interviews by trained collectors. The data included: (a) medical status and impairments; (b) functional status with the Barthel index for basic activities of daily living; (c) subjective aspects through self-estimation of fatigue, pain, care burden, quality of life and working capacity. Only 21% of the patients had type 1 diabetes and more than 71% were currently insulin-treated. Among the various long-term complications registered, visual impairment was a prominent feature: 25% of the patients were blind and the best eye vision scored 0.5 or more for only 20%. The differences found between the two types of diabetes are discussed. As a result of these impairments, functional status was poor even when considering basic activities, with a mean Barthel index (BI) of 80 ± 19. Type 2 patients and those patients undergoing continuous ambulatory peritoneal dialysis and significantly lower BI. The results are discussed in the light of the literature. Compared with a group of 121 non-dialyzed diabetics, patients scored higher for fatigue and pain, but not for care burden and quality of life.

Key words: diabetes, dialysis, handicap assessment.

Although end-stage renal failure is a major cause of death among diabetic patients (1) the length of survival has been improved by techniques of renal replacement. Hence questions have been raised about the quality of survival of chronic dialysis patients (10), questions which could be of particular concern for diabetic patients. We conducted a large study – the so-called Uremidiab study – among diabetic patients treated in dialysis centers throughout mainland France. The main goals were: (a) to estimate the prevalence of diabetes in dialysis patients; (b) to get detailed information about the type of diabetes and the natural history of nephropathy (the results of this two-phased study will be published elsewhere) (11); (c) to describe objective and subjective aspects of quality of survival. For the purpose, data was collected on disabilities and handicaps. The present paper deals with this third part of the study.

METHODS

Sample design. In the first phase, among a total of 245 existing centers in mainland France, 190 (81%) dialysis centers gave information about prevalence: 844 diabetic patients were undergoing dialysis among 12,903 dialysis patients, i.e. a prevalence rate of 6.5%. In the second phase, all 65 dialysis centers with more than 3 diabetic patients simultaneously treated were selected. Although the sample was not strictly representative, this selection was necessary for efficiency reasons: indeed in the second phase, each patient of the selected centers was directly visited throughout France. Therefore a total of 946 diabetic undergoing dialysis were fully interviewed.

Data sources. To ensure the quality of the data, 7 residents, responsible for collection, underwent a 3-day training session. The data had to be collected from a standardized questionnaire. This questionnaire was modified and definitively adopted after a test interview by one of the collectors involving 4 local patients. After the patient’s informed consent, medical data was collected anonymously from the medical records. Disability assessment as well as socio-familial and employment status were obtained from the patients and/or from the principal caregivers. Subjective indicators were completed from the patient’s responses.

For variables, three categories of variables were analyzed concerning: 1) the description of impairments related to diabetes, end-stage renal (ERSD), long-term complications and care burden, 2) the objective aspects of handicap; and 3) the subjective aspects of perceived illness and quality of life.

Impairments. In addition to the basic data on patients and their medical history, data was collected concerning: type, duration and treatment of diabetes; type and duration of dialysis; prevalence, duration and treatment of nephropathy; current monocular vision ≤ 5 meters; prevalence of leucithic limb disease; prevalence and location of amputations; prevalence of coronary heart disease; stroke, diabetic foot and symptomatology.