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# Psychological aspects of heart failure – beyond depression, anxiety and quality of life

The progression of heart failure (HF), similarly to other chronic and/or terminal diseases, affects the psychological status of the patients, with consequences for general well-being. The changes in psychological features can be measured and quantified using numerous psychological questionnaires, which do not establish any diagnosis of pathology, although they may be important for the effectiveness of applied treatment of patients with HF. In this paper, we summarize and discuss available evidence on psychological phenomena occurring in the course of HF, such as: 'Type D' personality, anxiety, psychological distress, coping strategies, sense of coherence, affectivity, sense of self-efficacy, sense of control and health perception, along with the presentation of available and validated measures of psychological features.

KEY WORDS
depression; anxiety; heart failure; psychological aspects

# BACKGROUND

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Heart failure (HF) represents one of the most common chronic cardiovascular diseases, with increasing prevalence and particularly poor prognosis (McMurray et al., 2012). Similarly to other chronic diseases, HF is associated with poor quality of life, originating mainly from the experiencing of numerous everyday limitations. Heart failure symptoms (e.g. cough, exertional dyspnoea, leg swelling, wheezing, shortness of breath when lying flat) as well as the complex management of HF patients strictly related to the necessity of changes in health-related habits (e.g. control of cholesterol and salt intake, regular exercise, body weight control, fluid restriction, giving up smoking) and pharmacological interventions may markedly limit the everyday social functioning of these patients (McMurray et al., 2012; Roger, 2010).

Health psychology suggests that psychological features of an individual are crucial determinants of his or her coping with any difficult situations, including those related to health status and in terms of the attitude towards healthcare professionals and following vs. questioning their recommendations (Lewko et al., 2008).

Surprisingly, evidence on psychological issues among HF patients is significantly less detailed as compared e.g. with patients with cancer, where even the branch of health psychology called psycho-oncology has been established with its own society and a flagship scientific journal. Psychological reactions towards cancer have been comprehensively studied and fully described, including identification of the main stages of the psychological changes occurring in the course of disease in most patients [i.e. anger, followed by bargaining, depression and finally acceptance (Kübler-Ross, 1969)]. Importantly, as a consequence, numerous strategies of psychological support for both in- and outpatients with cancer have been developed, which formed the standardised physician-psychologist cooperation as an integral element of hospice services and palliative care programmes (Lee, Fitzgerald, Downey, & Moore, 2012).

There are several similarities regarding cancer and HF, including the bad quality of life, poor prognosis, and unpredictable outcomes. Patients with HF, similarly to cancer patients, are conscious about the nearness of their death and, at the same time, uncertain about when it is going to happen. It is very likely that there may be some analogies in the psychological condition between patients with HF and those with cancer (Stewart, MacIntyre, Hole, Capewell, & McMurray, 2001), although this opinion has not been commonly acknowledged by health care professionals and the whole society (Remme et al., 2005; Cleland et al., 2002; Strömberg & Jaarsma, 2008).

Among psychological reactions to the occurrence of HF, mainly depression, anxiety and quality of life have been studied (Hecker, Norvell, & Hills, 1989; Majani et al., 1999; Drohomirecka, Jankowska, Banasiak, & Ponikowski, 2008).

However, it can be hypothesized that overt depression and/or anxiety diagnosed in a patient with HF may constitute an advanced and pathological stage of subtle (perhaps even adaptive) changes within his/her psychological features, which occurred along with the development and progression of HF and should not be a priori considered as pathological. In fact, the majority of psychological phenomena, even those which can be quantified using the professional questionnaires, do not contribute to the diagnosis of any pathology. This fact may be one of the reasons why physicians usually neglect the changes in psychological features (which frequently are very subtle). Similarly, it can be presumed that the degree with which the symptoms of somatic disease affect an individual's quality of life strongly depends on the individual's psychological characteristics (e.g. Gutteling, Duivenvoorden, Busschbach, de Man, & Darlington, 2010). Thus those characteristics should be investigated in order to prevent the patient from having a poor quality of life which aggravates the course of chronic somatic illness.

In this review, we summarize and discuss available evidence on various psychological phenomena occurring in the course of HF, based on examples of studies, with the special emphasis on the available methods enabling these features to be tested. The Table 1 provides an overview of all cited studies, with the detailed description od studied groups of patients as well as the major outcomes and applied psychological measures. In other words, we aimed to create a guide to psychological issues and their validated measures which could be applied by physicians as an important input to the multidisciplinary care for patients with HF, which is recommended by the current medical guidelines (McMurray et al., 2012).

We have focused on psychological features that may occur in the course of HF; hence we have purposely omitted those features considered as the so-called 'psychological background' promoting the development of cardiovascular disease (e.g. 'type A' behaviour) (Friedman & Rosenman, 1960).

# PSYCHOLOGICAL FEATURES INVESTIGATED IN PATIENTS WITH HEART FAILURE

Among psychological features that have been investigated in patients with HF, some can be considered as linked to overt psychiatric disorders or may constitute prognosticators of psychiatric disorders (e.g. depression and anxiety disorder; Kapfhammer, 2011), such as: 'Type D' personality (Smith et al., 2007; Pelle et al., 2010b; Schiffer, Pedersen, Broers, Widdershoven, & Denollet, 2008), anxiety (Shiffer et al., 2008; Moser

et al., 2009), psychological distress (Pelle et al., 2010a; Ferketich & Binkley, 2005), and negative affectivity (Nahlén & Saboonchi, 2010). These features will be discussed separately.

The remaining psychological features are not directly associated with psychiatric pathologies, but may still be important in the general context of coping with the chronic disease, i.e.: coping strategies (Nahlén & Saboonchi, 2010; Park, Malone, Suresh, Bliss, & Rosen, 2008; De Smedt, Denig, Haaijer-Ruskamp, & Jaarsma, 2009), sense of coherence (Nahlén & Saboonchi, 2010), sense of self-efficacy (Kolbe, Schnepp, & Zegelin, 2009), sense of control (control attitudes) (Moser et al., 2009) or health perception (De Smedt et al., 2009).

## PSYCHOLOGICAL FEATURES THAT MAY BE RELATED TO PSYCHIATRIC DISORDERS

### 'TYPE D' PERSONALITY

The definition of the 'Type D' personality, also known as the 'distressed personality', is based on 2 stable personality traits, i.e.: negative affectivity and social inhibition (Smith et al., 2007; Schiffer et al., 2008). Negative affectivity is associated with the general tendency to experience negative emotions (Smith et al., 2007; Schiffer et al., 2008), and constitutes an important diagnostic element of clinical depression (Aggen, Kendler, Kubarych, & Neale, 2011). Social inhibition is related to the likeliness of restraining emotional expression in interpersonal contacts in order to avoid social disapproval (Smith et al., 2007; Schiffer et al., 2008). Those who often experience negative distress and who restrain themselves from expressing negative emotions in social interactions are described as having 'Type D' personality (Denollet et al., 1996). This type of personality has been investigated in the context of HF mainly in patients with co-existing depression and/or depressive symptoms (Smith et al., 2007; Schiffer et al., 2008).

'Type D' personality is assessed using the DS14, a 14-item questionnaire consisting of 2 separate subscales created in order to measure both elements, i.e.: Negative Affectivity and Social Inhibition (Smith et al., 2007; Schiffer et al., 2008). The patient is asked to express his answers on a 5-point Likert scale, where '0' means 'false' and '4' means 'true'.

Data on the prognostic value of 'Type D' personality assessment are equivocal (O'Dell, Masters, Spielmans, & Maisto, 2011; Coyne et al., 2011). There are premises that the 'Type D' personality is related to more severe symptoms of systolic HF (i.e. fatigue) (Smith et al., 2007) and greater neurohormonal activation (Smith et al., 2007; Pelle et al., 2010b). Smith et al. found that the presence of type D personality together with other clinical parameters (e.g. dyspnoea

or sleep problems) predicts the progression of general fatigue (but not exertional fatigue) measured using the Dutch Exertion Fatigue Scale and the Fatigue Assessment Scale during a 12-month follow-up in patients with systolic HF ($p$ = .030) (Smith et al., 2007).

Interestingly, in the study of Pelle et al. performed among 202 patients with systolic HF, those with 'Type D' personality had higher plasma N-terminal pro-brain natriuretic peptide (NT-proBNP) as compared to those without this psychological trait, including after the adjustment for demographic and clinical variables (Pelle et al., 2010b). However, the presence of 'Type D' personality was associated with neither all-cause nor cardiac mortality in univariate and multivariable models performed in 641 patients with systolic HF (74% men; mean age: 67 ±10 years) during 38 ±16 months of follow-up (Pelle et al., 2010a).

Schiffer et al. demonstrated that 'Type D' personality constitutes a significant predictor of anxiety at baseline (measured using the Anxiety Sensitivity Index) and after one year (measured using the Hamilton Anxiety Rating Scale) (Schiffer et al., 2008).

### PSYCHOLOGICAL DISTRESS

Psychological distress is defined as 'psychogenic pain, internal conflicts, and external stress that prevents a person from self-actualization and from connecting with other people' (McGraw-Hill, 2002). Self-actualization is a state in which people are: 'capable of embracing reality and facts rather than denying truth and they peacefully accept their own human nature with all its shortcomings. They are acceptant of others, and generally lack prejudice' (McGraw-Hill, 2002). This state is unattainable when an individual experiences psychological distress (McGraw-Hill, 2002).

Psychological distress constitutes 'a form of anxiety or mental suffering, severe strain resulting from exhaustion or physical discomfort' (The American Heritage Dictionary, 2004). People who experience psychological distress commonly present a distressed personality ('Type D' personality) (Pelle et al., 2010b) and suffer from depression (Neilson et al., 2010). Being distressed and having 'Type D' personality are often used as synonyms (Pedersen, van Domburg, Theuns, Jordaens, & Erdman, 2004).

For the assessment of psychological distress in patients with HF, there are two available measures: the Kessler 6-Item Scale (K6), used during the National Health Interview Survey, containing items addressing questions about *how often the patient is feeling sad, nervous, restless, hopeless, exhausted and worthless during the past month*, with 4 possible responses (from 0 – 'none of the time' to 4 – 'all of the time') (Ferketich & Binkley, 2005) and the Symptom Distress Scale (SDS), developed primarily as a can-

cer-specific 13-item tool for measuring the degree of distress with common symptoms. Subjects respond about how they have been feeling during the preceding week, using a 1 to 5 Likert-type scale (with 5 points indicating the most severe distress) (Falk, Patel, Swedberg, & Ekman, 2009).

According to Ferketich and Binkley, psychological distress (measured using K6) was reported by 10% of patients with HF, 6% of subjects after myocardial infarction, and 4% of those with coronary artery disease (Ferketich & Binkley, 2005). It is worth emphasising that only 1/3 of patients reporting the presence of psychological distress considered asking for professional psychological help (Ferketich & Binkley, 2005).

Numerous analyses have shown that psychological distress (measured using the SDS) is related to augmented fatigue ($F = 6.10$, $p < .050$) measured using the Multidimensional Fatigue Inventory (MFI-20, 20-item self-report instrument designed to measure fatigue, concerning the following dimensions: general, physical and mental fatigue, reduced motivation and reduced life activity) (Smets, Garssen, Bonke, & De Haes, 1995).

## ANXIETY

Anxiety is a psychological and physiological state characterized by somatic, emotional, cognitive and behavioural components (Seligman, Walker, & Rosenhan, 2002). The experience of anxiety is related to feelings of fear, worry, uneasiness and dread. Anxiety constitutes a healthy reaction to a stressor, which helps to deal with a particular difficult situation (Bouras & Holt, 2007). When anxiety becomes pathologically excessive, it turns into an anxiety disorder (Bouras & Holt, 2007). It is suggested that the experience of anxiety depends on the type of personality, with a positive relation to having 'Type D' personality (Schiffer et al., 2008).

Anxiety can be measured by psychologists using the State-Trait Anxiety Inventory (STAI), which includes 40 questions divided into two subscales (State and Trait Anxiety), each having 20 items, answered on the basis of a 1-4 scale, with items concerning the presence of worry, tension, apprehension, and nervousness (Spielberger, 1979). The advantage of this inventory is its capability to differentiate between anxiety as a psychological trait, which characterizes an individual throughout his/her lifetime, and temporary anxiety, interpreted as a current emotional or psychological state (Spielberger, 1979).

The most popular tool for anxiety assessment used by physicians is the Hospital Anxiety And Depression Scale (HADS) (Carrol, Kathol, Noyes, Wald, & Clamon, 1993). The word 'hospital' might suggest that its applicability is limited to the hospital environment; however, this scale has also been validated in the community settings and primary care medi-

cal practice (Falk et al., 2009). This questionnaire is composed of statements relevant to either generalised anxiety or depression and anhedonia. The 'anxiety' level is assessed using the questions: *Do you feel tense and wound up? Do you worry a lot? Do you have panic attacks? Do you feel something awful is about to happen?* Each item is measured on a 4-point (0-3) response scale (Falk et al., 2009; Carrol et al., 1993).

The Hamilton Anxiety Rating Scale (HARS) is a rating scale developed to quantify the severity of anxiety symptoms. The Hamilton Anxiety Rating Scale consists of 14 items, each defined by a series of symptoms and rated on a 5-point scale (from 0 = not present to 4 = severe) (Schiffer et al., 2008).

Frequently, anxiety appears as a component of more complex measures, e.g. it is included in the Edmonton Symptom Assessment System (ESAS) (Löfvenmark, Mattiasson, Billing, & Edner, 2009), a measure designed to assist in the assessment of pain, tiredness, nausea, depression, anxiety, drowsiness, loss of appetite, well-being, and shortness of breath, where the severity of symptoms is expressed in points (from 0 to 10) (Löfvenmark et al., 2009). There is also the 'Symptoms of Anxiety-Depression' index (SAD) measuring tension, restlessness, feeling blue and hopelessness as symptoms of anxiety (Pelle et al., 2010a). Other questionnaires used in medical settings, which contain items on anxiety, include the Brief Symptom Inventory (Moser et al., 2009) and the Beck Depression Inventory (BDI) (Jankowska et al., 2010).

Anxiety occurs in 8-16% of HF patients (Schiffer et al., 2008; Haworth et al., 2005), and it is suggested that it is often under-recognised by cardiologists in this group of patients (Schiffer et al., 2008; Grace, Abbey, Irvine, Shnek, & Stewart, 2004). Importantly, anxiety in HF influences all domains of quality of life ($p < .001$) (Höfer et al., 2008), in particular health-related quality of life ($p < .050$) (Höfer et al., 2008). Moser et al. found that patients with systolic HF ($n = 146$) had the highest level of anxiety (assessed using subscales measuring anxiety of the Brief Symptom Inventory or the Multiple Adjective Affect Checklist) as compared to other groups of patients, i.e. 3396 subjects with coronary artery disease and 513 subjects after acute myocardial infarction (Moser et al., 2009). In patients with HF, augmented anxiety (STAI), considered as a psychological trait, was most prominent in an advanced NYHA class ($F = 6.70$, $p = .010$) (Majani et al., 1999), and in patients with end-stage HF anxiety (STAI) was related to derangements within the physical limitation domain of global health status (ESAS) (Opasich et al., 2008).

There is equivocal evidence on the links between anxiety and mortality and/or morbidity in HF. The results of one meta-analysis suggest a link between augmented anxiety and increased mortality in HF (Olafiranye, Jean-Louis, Zizi, Nunes, & Vincent, 2011), but other authors did not confirm this association (e.g. Pelle, Gidron, Szabó, & Denollet, 2008).

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## AFFECTIVITY

'Affect' means a state of mood, which may assume 2 dimensions: positive and negative. Chronic experience of low, negative mood is characteristic for depression (Nahlén & Saboonchi, 2010; Jiang et al., 2004). Changes in the relation between positive versus negative affect can be measured using the Positive Affect Negative Affect Schedule (PANAS), which consists of 20 words describing feelings and emotions (Crawford & Henry, 2004). The patient is asked to rate each word describing the particular emotional feeling regarding the frequency of experiencing such a feeling (from '1 – not at all' to '5 – extremely') during a few weeks prior to the assessment (Nahlén & Saboonchi, 2010).

Nahlén and Saboonchi (2010) found that in patients with HF the advantage of positive affectivity was being more prone to exhibit coping strategies based on 'problem focusing' and with social support (both $p < .010$), whereas the advantage of negative affectivity was related to 'avoidant' coping ($p < .010$) (Nahlén & Saboonchi, 2010).

## PSYCHOLOGICAL FEATURES NOT RELATED DIRECTLY TO PSYCHIATRIC DISORDERS

The experience of chronic disease (especially when this is a terminal condition) is always related to numerous kinds of emotional and psychological stressors (Lewko et al., 2008). As there is no universal advantageous pattern of psychological reaction to a particular stressor, all reactions can only be classified as more or less appropriate (but never as pathological or abnormal) in the context of a particular situation (Sapolsky, 1998). There are psychological features, such as coping strategies with underlying psychological predispositions, which may be related to the patient's general well-being, his/her quality of life, an adequate level of self-esteem and high motivation to cope with the disease, which are discussed below in detail in the context of HF. It is very important to be aware of the variability within such features as well as of their relations to clinical outcomes observed among patients with HF.

## COPING STRATEGIES

Coping strategies are defined as cognitive and behavioural efforts, developed in order to manage with specific external and/or internal demands exceeding the potential of an individual (Lazarus & Folkman, 1984). In other words, they are the specific ways in which people respond to stressful situations (Lazarus & Folkman, 1984; Murberg & Bru, 2001), including

chronic diseases, when the coping process is crucial for the effectiveness of a treatment (Nahlén & Saboonchi, 2010; Lazarus & Folkman, 1984).

There are a lot of scales developed for measuring coping strategies. Coping can be assessed with 'COPE', an inventory composed of 60 items comprising 15 subscales investigating: active coping, restraint, denial, alcohol/drug use, mental disengagement, religious coping, social instrumental support, social emotional support, suppressing competing activities, humour, behavioural disengagement, positive reinterpretation and growth, acceptance, venting, and planning (Nahlén & Saboonchi, 2010). There is also a shorter version of COPE called Brief COPE, with 28 items measuring 14 strategies (active coping, planning, positive reframing, acceptance, humour, religion, social emotional support, social instrumental support, self-distraction, denial, venting of emotions, substance use, behavioural disengagement and self-blame) (Nahlén & Saboonchi, 2010).

Park et al. reported that among patients with HF the use of specific strategies of coping (COPE) is related to their subjective sense of the significance of life, assessed using the Perceived Personal Meaning Scale (PPMS), where participants are asked to rate 5 items describing the meaning of life (Park et al., 2008). An increase in PPMS score occurring over time was related to coping based on acceptance and positive reinterpretation ($p < .050$) as well as to religious coping ($p < .001$) (Park et al., 2008). Nahlén and Saboonchi (2010) found no differences in coping strategies (Brief COPE) between patients in NYHA class II and III, and almost no gender differences, except that men had significantly higher scores for 'coping related to substance use' as compared to women ($p < .010$). Strategies based on active coping, positive reframing, problem-focused coping and coping based on social and emotional support were accompanied by positive affect. Strategies based on venting, behavioural disengagement, substance use, self-blaming and avoidant coping were related to negative affect (Nahlén & Saboonchi, 2010).

Importantly, in patients with HF there are relations between particular coping strategies and the occurrence of depression (Allman, Berry, & Nasir, 2009). Positive strategies of coping (e.g. active coping, acceptance) were more frequent and accompanied by less severe depressive symptoms, whereas maladaptive coping (e.g. denial) were more frequently reported among depressed patients with HF (Allman et al., 2009).

## SENSE OF COHERENCE

Sense of coherence is defined as 'an internal resource towards coping with stress and demands in life' (Antonovsky, 1987).

Table 1

*Studies on psychological aspects of heart failure*

| | | | |
|---|---|---|---|
| Health status (illness severity) | | | SCHFI |
| Fatigue | | MFI-20* | |
| Cognitive function | | | MMSE |
| Affect, depression, depressive symptoms | HADS* | HADS* | III |
| Stress | | | |
| Self care | | | II |
| Perceived social support and loneliness | I* | | |
| Perception of control | | | |
| Satisfaction | | | |
| Sense of self efficacy | | | |
| Sense of coherence | | | |
| Quality of life | MLWHFQ* | | |
| Coping | | | |
| Psychological distress and exhaustion | MVEQ* | SDS | |
| Personality (fears, phobias, depressive-obsessive-compulsive behaviours) | | | |
| Anxiety | HADS* | HADS* | |
| Type D personality | DS14 | | |
| Major results | – there were no relations between psychological variables and mortality; – severe anxiety predicted more frequent readmissions; – vital exhaustion and anxiety determined lower health-related quality of life | – emotional distress was positively related to the experience of fatigue | – cognitive function, self-care maintenance and management did not predict HF self-care; – depression (higher scores indicating depressive symptoms) was related to poor self-care management |
| FU length (months) | 33 ±13 | | |
| Study schedule (cross sectional – C / longitudinal – L) | L | C | C |
| Study population | HF n = 100 (82% men) age: 57 ±14 years | HF n = 112 (60% men) age: 11% – below 65 years; 89% – 65 years or older | HF n = 50 (76% men) age: 73 ±11 years |

Table 1
*(Table 1 continued)*

| | | | | |
|---|---|---|---|---|
| Health status (illness severity) | | | | |
| Fatigue | | | | |
| Cognitive function | | | | |
| Affect, depression, depressive symptoms | VII | HADS | BDI | 9 (a) |
| Stress | VI | | | |
| Self care | | | | |
| Perceived social support and loneliness | V | VIII | | |
| Perception of control | | | | |
| Satisfaction | | | | |
| Sense of self efficacy | IV | | | |
| Sense of coherence | | | | |
| Quality of life | | | | |
| Coping | | | | |
| Psychological distress and exhaustion | | | | |
| Personality (fears, phobias, depressive-obsessive-compulsive behaviours) | | | | |
| Anxiety | | HADS | IX (a, b) | SAD |
| Type D personality | | DS14 | DS14 | DS14 |
| Major results | – lower baseline self-efficacy (adjusted for demographics, medical history, medication use, and psychosocial factors) predicted HF hospitalizations; the effect did not persist after adjustment for baseline cardiac function | – cardiac disease did not explain differences in patients' distress; – in patients with 'Type D' personality indices of anxiety and depression were augmented | – patients with 'Type D' personality (independent from having depressive symptoms) were more prone to develop clinically significant anxiety after 1 year | – having 'Type D' personality, elevated anxiety and depressive symptoms were associated with augmented mortality |
| FU length (months) | 52 | | 12 | 38 ±16 |
| Study schedule (cross sectional – C / longitudinal – L) | L | C | L | L |
| Study population | CAD n = 1024 (82% men) age = 67 ±11 years; HF, n = 124 | patients with ICD n = 182 (81% men) age: 62 ±13 years and their partners n = 144 (13% men) age: 60 ±12 years | HF n = 149 (79% men) age: 66 ±8.6 years | HF n = 641 (74% men) age: 67 ±10 years |

*Heart failure – psychological aspects*

*(Table 1 continues)*

Table 1
(Table 1 continued)

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| | Study 1 | Study 2 | Study 3 | Study 4 |
|---|---|---|---|---|
| Health status (illness severity) | XI (a, b) | | | |
| Fatigue | | XII (a, b) | | |
| Cognitive function | | | | |
| Affect, depression, depressive symptoms | | BDI | | |
| Stress | | | | |
| Self care | | | | |
| Perceived social support and loneliness | | | | |
| Perception of control | | | PPMS | |
| Satisfaction | | | | XIV |
| Sense of self efficacy | | | | |
| Sense of coherence | | | | |
| Quality of life | SF-36 | | SF-36 | |
| Coping | X | | COPE | |
| Psychological distress and exhaustion | | | | |
| Personality (fears, phobias, depressive-obsessive-compulsive behaviours) | | | | XIII |
| Anxiety | | | | STAI |
| Type D personality | | DS14 | | |
| Major results | – patients who experienced adverse effects had reduced general health perception, but they did not report decrease of the dosage of a medication or discontinuation of the therapy; 71% of them discussed their symptoms with a healthcare professional | – having 'Type D' personality together with other clinical parameters predicted an increase of general fatigue | – more adequate coping (based on e.g. acceptance/ positive reinterpretation and religion) was related to: stronger sense of meaning in life, and its increase over time – meaning in life was positively related to mental and physical components of quality of life | – higher level anxiety as a stable trait of an individual was characteristic for patients in higher NYHA classes |
| FU length (months) | | 12 | 6 | |
| Study schedule (cross sectional – C / longitudinal – L) | C | L | L | C |
| Study population | HF n = 670 (63% men) age: 70 ±12 years | HF n = 137 (73% men) age: ≤ 80 years | HF n = 202 (95% men) age: 66 (range: 44-85 years) | HF n = 152 (100% men) age: 50 ±9 years |

Table 1
(Table 1 continued)

**Heart failure – psychological aspects**

| | Col 1 | Col 2 | Col 3 |
|---|---|---|---|
| Health status (illness severity) | | | |
| Fatigue | | | |
| Cognitive function | | | |
| Affect, depression, depressive symptoms | HADS | XV | XVIII |
| Stress | | | |
| Self care | | | |
| Perceived social support and loneliness | | | |
| Perception of control | | XVI | |
| Satisfaction | | | |
| Sense of self efficacy | | | |
| Sense of coherence | | | |
| Quality of life | | Mac New and SF-36 | XVII |
| Coping | | | Brief COPE |
| Psychological distress and exhaustion | | | |
| Personality (fears, phobias, depressive-obsessive-compulsive behaviours) | | | |
| Anxiety | HADS | XV | |
| Type D personality | | | |
| Major results | – anxious patients and depressed patients reported lower quality of life | – patients with HF were characterised by the highest indicator of anxiety as compared to other groups of cardiac patients; – patients with lower levels of anxiety and depression had a higher level of perceived control | – more adequate coping strategies and higher sense of coherence were related to the patients' positive mood and greater frequency of emotional well-being |
| FU length (months) | | | |
| Study schedule (cross sectional – C / longitudinal – L) | C | C | C |
| Study population | HF n = 89 (84% men) age: 62 ±12 years | CAD, n = 3396 (69% men, age: 67 ±11 years) acute MI, n = 513 (67% men, age: 62 ±13 years) HF, n = 146 (55% men, age: 68 ±13 years) | HF n = 80 (73% men) age: 72 ±11 years |

Table 1
(Table 1 continued)

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| | | | |
|---|---|---|---|
| Health status (illness severity) | ESAS and KCCQ | XXII | Self-report |
| Fatigue | | | |
| Cognitive function | | | |
| Affect, depression, depressive symptoms | | | |
| Stress | | | |
| Self care | | | |
| Perceived social support and loneliness | | | |
| Perception of control | | | |
| Satisfaction | | | |
| Sense of self efficacy | | XXI | |
| Sense of coherence | | | |
| Quality of life | | | |
| Coping | | | |
| Psychological distress and exhaustion | | | K6 (NHIS) |
| Personality (fears, phobias, depressive-obsessive-compulsive behaviours) | | | |
| Anxiety | STAI | | |
| Type D personality | | | |
| Major results | – higher anxiety was related to derangements within the physical limitation domain of global health status in patients with end-stage heart failure | – an increase of self-efficacy (as a result of watching a modelling video) was associated with better exercise tolerance | psychological distress was found as a significant comorbidity of cardiovascular disease |
| FU length (months) | | | |
| Study schedule (cross sectional – C / longitudinal – L) | C | C | C |
| Study population | end-stage HF n = 46 | HF n = 20 (75% men, 50% in a control group) age: 64 ±12 years | total sample: 17 541 (42% men); CAD alone: n = 302; CAD & 1 other condition: n = 911; HF alone: n = 154; HF & 1 other condition: n = 383 |

Table 1
*(Table 1 continued)*

| Study population | Study schedule (cross sectional – C / longitudinal – L) | FU length (months) | Major results | | Heart failure – psychological aspects |
|---|---|---|---|---|---|
| | | | | SF-36 (the first question!) | Health status (illness severity) |
| | | | | | Fatigue |
| | | | | | Cognitive function |
| | | | | | Affect, depression, depressive symptoms |
| | | | | | Stress |
| | | | | | Self care |
| | | | | | Perceived social support and loneliness |
| | | | | | Perception of control |
| | | | | | Satisfaction |
| | | | | | Sense of self efficacy |
| | | | | | Sense of coherence |
| | | | | | Quality of life |
| | | | | | Coping |
| | | | | | Psychological distress and exhaustion |
| | | | | | Personality (fears, phobias, depressive-obsessive-compulsive behaviours) |
| | | | | | Anxiety |
| HF, n = 202 (79% men), age: 67 ±9 years | C | | there was no direct relation between having type D personality and the severity of HF or mortality | DS14 | Type D personality |
| "possible HF", n = 448 (52% men), age: 73 ±6 years | L | 120 | the answer that Global Perceived Health is "poor" predicted cardiovascular mortality | | |

*Note.* HF – heart failure; ICD – implantable cardioverter-defibrillator; STAI – State-Trait Anxiety Inventory; ESAS – Edmonton Symptom Assessment System; KCCQ – Kansas City Cardiomyopathy Questionnaire; HADS – Hospital Anxiety and Depression Scale; MVEQ – Maastricht Vital Exhaustion Questionnaire; MLWHFQ – Minnesota Living With Heart Failure Questionnaire; K6 – Kessler 6-Item Scale; NHIS – National Health Interview Survey; SDS – Symptom Distress Scale; MFI-20 – Multidimensional Fatigue Inventory; COPE – The COPE inventory; SF-36 – 'short form', 36 items from General Health Survey used in Medical Outcomes Study; PPMS – Perceived Personal Meaning Scale; MMSE – Mini Mental State Examination; ISSI – The Interview Schedule for Social Interaction; MAC NEW – The MacNew; HRQL – Health-Related Quality of Life; MSPSS – Multidimensional Scale of Perceived Social Support; CSS – Crisis Support Scale; SCHFI – the Self-Care of Heart Failure Index

Numbers: I – Enriched Social Support Instrument; II – Self-Care of Heart Failure Index; III – Cardiac Depression Scale; IV – Sullivan's validated 5-item summative "Maintain function" scale; V – Question: "Do you have as much contact as you would like with someone you feel close to, someone in whom you can trust and confide (yes/no)?"; VI – Perceived Stress Scale; VII – Patient Health Questionnaire-9; VIII – Positive Affect Negative Affect Schedule; IX – (a) 'Symptoms of Anxiety-Depression' index and (b) Anxiety Rating Scale; X – Question about actions which they had undertaken in response to the experienced adverse effects: doing nothing; discussing it with the doctor; decreasing the dose of the medication; discontinuing the medication; or other actions; XI – (a) filter question ('Do you experience any adverse effect of your medication? (yes/no)'; (b) structured questionnaire regarding adverse effects; XII – (a) Dutch exertion Fatigue scale and (b) Fatigue Assessment Scale; XIII – Cognitive Behavioural Assessment (STAI, Eysenck Personality Questionnaire, Maudsley Obsessive-Compulsive Questionnaire); XIV – The Satisfaction Profile; XV – Anxiety/depression subscales of Brief Symptom Inventory or Multiple Adjective Affect Checklist; XVI – The Control Attitudes Scale-Revised; XVII – Sense of Coherence scale; XVIII – Positive Affect Negative Affect Schedule; XIX – 1 single-item question: "Does it happen that you experience loneliness?"; "Yes, always", "Yes, often", "No, seldom", "No, never"; XX – Charlson Comorbidity Index; XXI – Self-Efficacy Scale (measure repeated after 7 days of an intervention); XXII – Exercise tolerance (Peak oxygen uptake)

Sense of coherence is measured using the Sense of Coherence Scale, which in its shorter version includes 13 items assessing comprehensibility, manageability and meaningfulness (with 7 possible answers from 1 = 'never' to 7 = 'very often') (Eriksson & Lindström, 2006).

So far, sense of coherence has been reported only in 80 patients with systolic HF in a study by Nahlén and Saboonchi (2010), who found 2 weak but significant negative correlations between sense of coherence and a coping strategy based on venting ($r = −.35$, $p < .010$) and a coping strategy linked to self-blaming ($r = −.40$, $p < .010$) (Nahlén & Saboonchi, 2010).

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## SELF-EFFICACY

Sense of 'self-efficacy' concerns the individual's confidence of his/her ability to perform certain health behaviours related to significant, effective, positive outcomes. This construct affects health-promoting behaviours and management of chronic diseases (Maddison, Prapavessis, Armstrong, & Hill, 2008). Typically, patients suffering from chronic diseases have decreased self-efficacy which can lead to helplessness (Molloy et al., 2012).

There is a common measure of self-efficacy, called the General Self-Efficacy Scale, a 10-item psychometric scale designed to assess optimistic self-beliefs, which are helpful in coping with a variety of difficult demands in life (Bosscher & Smit, 1998).

Maddison et al. (2008) carried out an experiment using the 'modelling DVD': a film created in order to improve self-efficacy. The film was presented to 10 of 20 patients with HF. Patients to whom the film was presented had higher self-efficacy, accompanied by better exercise capacity (i.e. higher peak oxygen consumption) as compared to those who did not take part in watching the film (Maddison et al., 2008).

## CONTROL ATTITUDE

Beliefs regarding the individual's capability to manage with negative events and to change them into positive experiences are described as perceived control. The perception of individual control (personal influence on life) is strongly related to the sense of self efficacy (Bosscher & Smit, 1998), whereas a lack of perceived control can be experienced as helplessness. Moser et al. (2009) tried to measure the sense of control and proposed a scale designed by themselves.

In the study of Moser et al., where the authors performed the first psychometric evaluation of the revised version of the scale measuring control attitudes (the Control Attitudes Scale-Revised), patients with systolic HF had the lowest sense of control and the highest level of anxiety as compared to patients

with coronary artery disease and those with previous myocardial infarction (Moser et al., 2009).

## HEALTH PERCEPTION

Health perception has often been investigated in end-stage chronic diseases (Karademas, Tsagaraki, & Lambrou, 2009). Health perception is linked to the individual's recognition of his/her health status (Johansson, Broström, Dahlström, & Alehagen, 2008). Health perception can be assessed using 36 items from the General Health Survey (RAND-36), also known as the short form of the General Health Survey (SF-36) (De Smedt et al., 2009), a self-reported scale measuring health status.

Health perception was identified by De Smedt et al. as an independent predictor of perceiving adverse effects of administered treatment in 670 patients with systolic HF (De Smedt et al., 2009). The adverse effects of medication were measured using the 'filter question' (Do you experience any adverse effect of your medication? yes/no)'. Those who answered 'yes' were given a list of potential unpleasant symptoms (nausea, dizziness, problems with sleep, headache, rash, itching, impotence, cough, cold extremities, constipation) and could provide any other side effects which they had experienced (De Smedt et al., 2009). Patients were also asked about the methods of coping with noticed adverse effects. In general, patients with HF who noted adverse effects were characterised by a lower general health perception as compared to those without adverse effects ($p = .001$). Importantly, both groups did not differ regarding the clinical profile (i.e. similar level of HF severity assessed using objective measures such as left ventricular ejection fraction, similar length of duration of HF, similar number and types of co-morbidities and administered medications) (De Smedt et al., 2009).

Johansson et al. (2008) suggested that an answer to a single simple question, regarding an individual's health perception, could provide a reliable prognostic indicator of cardiovascular mortality (Johansson et al., 2008). The question was taken from RAND-36 (SF-36) and was: *In general, would you say your health is...?* Answering required the selection of one word (an adjective) describing the current health status (e.g. "poor" or "good"). Over 10 years, 448 elderly subjects (65-82 year old) recruited from medical records in a primary health-care centre were examined in this way (Johansson et al., 2008). Among patients who reported symptoms characteristic for HF (e.g. fatigue, shortness of breath, peripheral oedema) and who were also diagnosed (by echocardiography evaluation) their baseline answers (i.e. *In general I would say my health is poor*) significantly predicted cardiovascular mortality ($p < .001$) (Johansson et al., 2008).

## CONCLUSIONS

In the context of the contemporary, holistic definition of health proposed and supported by the WHO (see: WHO documents, or e.g. Chuengsatiansup, 2003) and also according to the current guidelines for the management of HF (published by the European Society of Cardiology; McMurray et al., 2012), underlying the necessity for implementing a multidisciplinary approach towards patients with HF, it is important to obtain complete knowledge about illness status, including both somatic and psychological elements. Therefore, reliable research on psychological processes accompanying HF is needed.

In the current paper we summed up existing evidence based on measures which could and should be applied in interdisciplinary studies on psychological issues in HF. Based on the aforementioned and discussed studies on psychological phenomena in patients with HF, we have to confirm that available evidence (except for papers on depression and anxiety) is scarce in this field. The most frequently studied psychological features in this group of patients are anxiety and 'Type D' personality (e.g. Pelle et al., 2008; Smith et al., 2007; Schiffer et al., 2008). It is probably due to the relations with depressive symptoms (Falk et al., 2009).

The lack of studies on psychological aspects of HF might be related to the fact that cardiologists do not cooperate with psychologists as closely as oncologists do. Healthcare professionals are trained to obtain and interpret typical clinical parameters (e.g. laboratory measures), which are highly objective, can be quantified, and are rather independent of the patient's will of disclosing or concealing some feelings, emotions or problems. On the other hand, psychological features are more subjective and discrete in their nature, which requires an appropriate methodological approach. Even validated psychological measures may be difficult for a medical doctor to apply and interpret, especially when there is a lack of trust between the patient and the physician.

Moreover, the actual individual experience of any kind of psychological burden is highly relative, and numerous factors have to be taken into account in any analyses in this field (i.e. the patient's marital status, related to social support, his or her attitude towards religion, the extent of changes in lifestyle made by the patient after the diagnosis of HF was established and their short- and long-term consequences, and economic status related to having or not having alternatives in case of the necessity of changing his/her job due to the disease). All these additional variables, which should and can be easily controlled, are strongly related to the patient's personality and the general set of characteristic traits, including temperamental and behavioural phenomena, which are important in the context of coping with HF. That is

why psychological knowledge is essential for performing any analyses of psychological phenomena in the field of chronic cardiovascular diseases. Such analyses are needed, as it has been shown that the psychological reaction towards the chronic disease, including the patient's willingness to accept the diagnosis, and/or to introduce any changes in his/her lifestyle, affects the level of adherence towards the physician's recommendations and subsequently modifies the outcome of applied therapy and influences the final prognosis (Majani et al., 1999).

The comprehensive examination of psychological features in patients with HF may be challenging for both physicians and psychologists. We are aware that physicians are not prepared and trained to solve psychological problems accompanying the somatic disorders of their patients. However, we believe that physicians could accept those psychological measures that are based on clear definitions and can be interpreted unequivocally.

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