Negative health outcomes in depressed cardiac patients are associated with both low and high psychological well-being dimensions

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ABSTRACT

Literature supports the positive effects of psychological well-being (PWB) on health. However, most studies focused on the unitary construct of PWB, neglecting the different role played by distinct PWB dimensions on health-related outcomes. The aim of this research was to determine whether unbalanced (i.e., low or high) levels of PWB dimensions could differentially affect cardiac course after acute coronary syndrome (ACS), in terms of participation to secondary prevention (SP) and/or survival. The sample included 136 depressed and/or demoralized ACS patients referred for a SP program on lifestyle modification, in addition to routine cardiac visits provided by the hospital where they were admitted. Psychological assessment included validated interviews on depression and demoralization, Symptom Questionnaire and Psychological Well-Being scales. 100 patients joined the SP program, 36 did not. Logistic regression revealed that older age (B= 0.051; $p<0.05$), higher autonomy (B= 0.070; $p<0.05$) and lower personal growth (B= -0.073; $p<0.05$) levels were associated with non-participation to SP. Moreover, only among patients who did not join the program, those presenting with an impaired level of PWB "positive relations" dimension (i.e., below the 25th percentile) showed a worse cardiac prognosis (Log Rank: $\chi^2_{(1)}= 4.654$; $p= 0.031$). Negative health outcomes in depressed cardiac patients, such as non-participation to SP and worse cardiac course, are associated with both high and low levels of certain PWB dimensions. Psychotherapeutic approaches geared to a balance in PWB dimensions could represent promising new additions to SP programs.

Key words: Acute coronary syndrome; depression; demoralization; health outcomes; psychological well-being.

Introduction

Psychological well-being (PWB) represents a multi-faceted construct including subjective, social, psychological dimensions, and health-related behaviors. Literature supports psychological and physical benefits of balanced levels of well-being in behavioral and psychosomatic medicine (Pressman et al., 2019; Steptoe, 2019). However, the role of PWB on health outcomes is still disregarded by public health systems, possibly due to an underestimation of the role of specific PWB dimensions, which could differently affect physical health and explain conflicting findings (Trudel-Fitzgerald et al., 2019). Accordingly, it is necessary to ground research on a theoretically- and evidence-based multidimensional definition of PWB, in order to investigate which dimensions might influence health.

Ryff developed a model of PWB, including life span theories and research on personal development (Erikson, 1959; Ryff, 1989) and positive mental health (Jahoda, 1958), which encompasses six dimensions (positive relationships, environmental mastery, autonomy, purpose in life, personal growth, self-acceptance) contributing to the realization of own potential (Ryff, 1989). Literature showed that low PWB dimensions are associated with the risk of negative events in cardiac patients (Kim et al., 2013, 2019). However, emerging evidence suggests that also high levels of PWB could be detrimental for health, in terms of unrealistic self-confidence leading to risky behaviors (Gostoli et al., 2020).

Patients with acute coronary syndromes (ACS) represent a vulnerable population who might display very different health pathways after the cardiac event. Even though international guidelines advocate the importance to join secondary prevention (SP) programs after ACS (Piepoli et al., 2016), participation rate is far from optimal (Udell et al., 2014; Piepoli et al., 2017). Literature showed inconclusive findings on depression and anxiety associated with participation to SP (Hansen et al.,

2011; Austin et al., 2017; Pardaens et al., 2017; Zullo et al., 2017). Previous research may have overlooked the role of other psychological factors, such as the different effect of PWB dimensions. Thus, this study aimed to analyze the association between unbalanced dimensions of PWB and both participation to SP and survival in post-ACS depressed patients.

Methods

Sample

Depressed (DSM-IV; American Psychiatric Association, 1994) and/or demoralized (Diagnostic Criteria for Psychosomatic Research-DCPR; Fava et al., 1995) patients who suffered from a first episode of ACS, were included. Exclusion criteria were substance abuse/dependence, bipolar disorder, psychotic characteristics associated with major depression, risk of suicide, ongoing pharmacological or psychological treatment.

Patients were recruited at Maggiore Hospital in Bologna and Molinette Hospital in Turin (Italy), from October 2010 to July 2015. The local Ethic Committees approved the study. *Figure 1* illustrates the enrollment process. Eligible patients were asked to sign an informed consent to undergo a psychological assessment, one month post-ACS. Patients were told the importance of changing unhealthy lifestyle and were encouraged to join a SP program based on cognitive-behavioral strategies and well-being therapy (Fava, 2016), promoting healthy lifestyle. The full intervention has been described elsewhere (Rafanelli et al., 2020).

Assessment

Socio-demographic variables, medical data, traditional risk factors (smoking habit, hypertension, hypercholesterolemia, family history of cardiovascular disease, diabetes) and cardiac outcomes (re-hospitalizations for cardiac complications, new episodes of ACS, angioplasty, cardiac surgery, cardiac mortality), have been collected from clinical records.

The *Structured Clinical Interview for DSM-IV-TR* Axis I (First et al., 2002) was used to diagnose major/minor depression and dysthymia.

The *Interview based on the DCPR* (Rafanelli et al., 2003), a semi-structured measure, was administered to assess demoralization. It showed good psychometric properties (Galeazzi et al., 2004).

Clinical Interview for Depression-CID (Paykel, 1985) allows a comprehensive assessment of depressive and anxious symptomatology, and contains 36 items rated on 7-point scales with anchor points on severity, frequency and/or quality of symptoms. The higher the score, the worse the psychological condition. CID presented good validity and reliability (Guidi et al., 2011).

Symptom Questionnaire-SQ (Kellner, 1987), a 92-item self-report measure, yields 4 main scales concerning subclinical psychological distress (depression, anxiety, hostility-irritability, somatization). Answers are dichotomous and each scale may range from 0 to 23, with higher scores corresponding to greater psychological distress. SQ showed high sensitivity, predictive and concurrent validity (Benasi et al., 2020).

Psychological Well-Being scales-PWBs (Ryff & Singer, 1996), an 84-item questionnaire, evaluate Ryff's six PWB dimensions, with items rated on a 6-point scales. Each dimension may range from 14 to 84, higher scores corresponding to higher PWB. PWBs showed good internal consistency and test-retest reliability (Ryff & Singer, 1996).

Statistical Analyses

Data were analyzed by SPSS 20.0. Associations of CID, SQ and PWB scores with participation to SP were evaluated with logistic regression, controlled for age and sex.

Then, each SQ and PWB dimension was dichotomized (around 75th and 25th percentile, respectively) to identify subgroups at higher risk. Kaplan-Meier method was used to estimate survival curves of subgroups of patients based on presence/absence of depression, demoralization, high/low psychological distress, and impaired/balanced PWB, both in the whole sample and each subgroup (completers and non-participants). Significance level was set to 0.05, two-tailed.

Results

Among 288 ACS patients, 136 (M=68.4%; mean age=59.8±10.6 years) were diagnosed as depressed (minor depression=54.4%; major depression=5.9%; dysthymia=2.9%) and/or demoralized (90.4%). 100 patients joined the SP program, 36 did not. The two subgroups did not show any statistical difference in sociodemographic and medical variables.

Older age (B=0.051; *p*<0.05), higher autonomy (B=0.070; *p*<0.05) and lower personal growth (B=-0.073; *p*<0.05) were associated with non-participation to SP (*Table 1*).

Of the total sample, 25.7% showed at least one negative cardiac outcome (mean survival time=42.5±21.7 months), with no difference between completers and non-participants. Despite this, among all psychological baseline variables analyzed in the whole sample and in the 2 groups, only impaired positive relations predicted survival (Log-Rank: $\chi^2_{(1)}$=4.654; *p*=0.031), in terms of a higher frequency of cardiac events (50% *versus* 13%), exclusively in non-participants (*Figure 2*).

Discussion

This study identified different and significant effects of high and low PWB dimensions on health outcomes, such as participation to SP and survival, in ACS patients.

Participation to SP was negatively associated with autonomy, positively with personal growth. Millstein et al. (2016) found that optimism (i.e., positive future expectations) and gratitude (i.e., noticing/appreciating the positive) following ACS were linked to better adherence to health behaviors. On the contrary, Munkhaugen et al. (2016) showed that changes in positive affect were more strongly associated with adherence than optimism. Results of the present investigation could overcome these inconclusive findings suggesting possible explanations accounting for the decision to engage in healthier lifestyle. Autonomy refers to self-determination, independence, and ability to resist social pressures (Ryff, 2014). Although data on cardiac settings are lacking, McFarland and Klein (2005) found that dysthymic patients self-reporting higher autonomy early dropped-out from treatment. Underestimation of psychological and cardiac disease consequences could be also involved. Indeed, patients' beliefs about course and management of their illness played a crucial role in attendance to cardiac rehabilitation, influencing refusal and dropout (De Vos et al., 2013; Waring et al., 2016). Moreover, short hospital admissions and coronary revascularization during hospitalization may mislead patients about having their cardiac condition "cured/fixed" (Waring et al., 2016).

Personal growth refers to a feeling of continuous development and improvement, realization of own potential; it might be regarded as the result of life experiences, including traumatic events (Park et al., 1996). McFarland and Alvaro (2000) found that perception of personal improvement might reflect motivated illusions that help people coping with traumatic experiences. This could explain

why, in our study, participation was associated to greater personal growth, even after a threatening event (ACS).

Finally, only among patients who refused to join SP, those self-reporting impaired positive relations at baseline showed worse cardiac prognosis. Barth et al. (2010) highlighted that low functional support (i.e., instrumental, financial, informational, appraisal and/or emotional aid) negatively affects cardiac and all-cause mortality, independently from other cardiac risk factors. Ryff's conceptualization of positive relations is different from "functional" or "logistical" social support. People with poor relationships self-report few close, trusting relations with others, feeling isolated and frustrated (De Vos et al., 2013). Our findings suggest that emotional support affects cardiac course more significantly than other aspects of the construct. Bucholz et al. (2014) found that patients with myocardial infarction and low social support were more likely to present cardiac risk factors and unhealthy lifestyle. Moreover, since poor positive relations were predictive of survival only among ACS depressed patients who did not join the program, it is likely that long-lasting support received by the research staff (i.e., completers) could have weakened the effect of cardiovascular risk factors afterwards.

Missing data on patients' comprehension of their cardiac illness and risk factors, and the small sample size might limit the generalizability of the results. However, the present findings add evidence to the literature advocating that depression should not be regarded as the only target of health-related interventions in cardiac settings (Rafanelli et al., 2013). This represents the first study to examine different effects of PWB dimensions - beyond traditional psychological risk factors (i.e., depression) - on health outcomes, in terms of participation/non-participation to SP and prognosis. Our findings support research on the importance to adopt a personalized approach to patients at greater risk, which should include interventions on specific PWB dimensions, to enhance motivation and adherence to SP.

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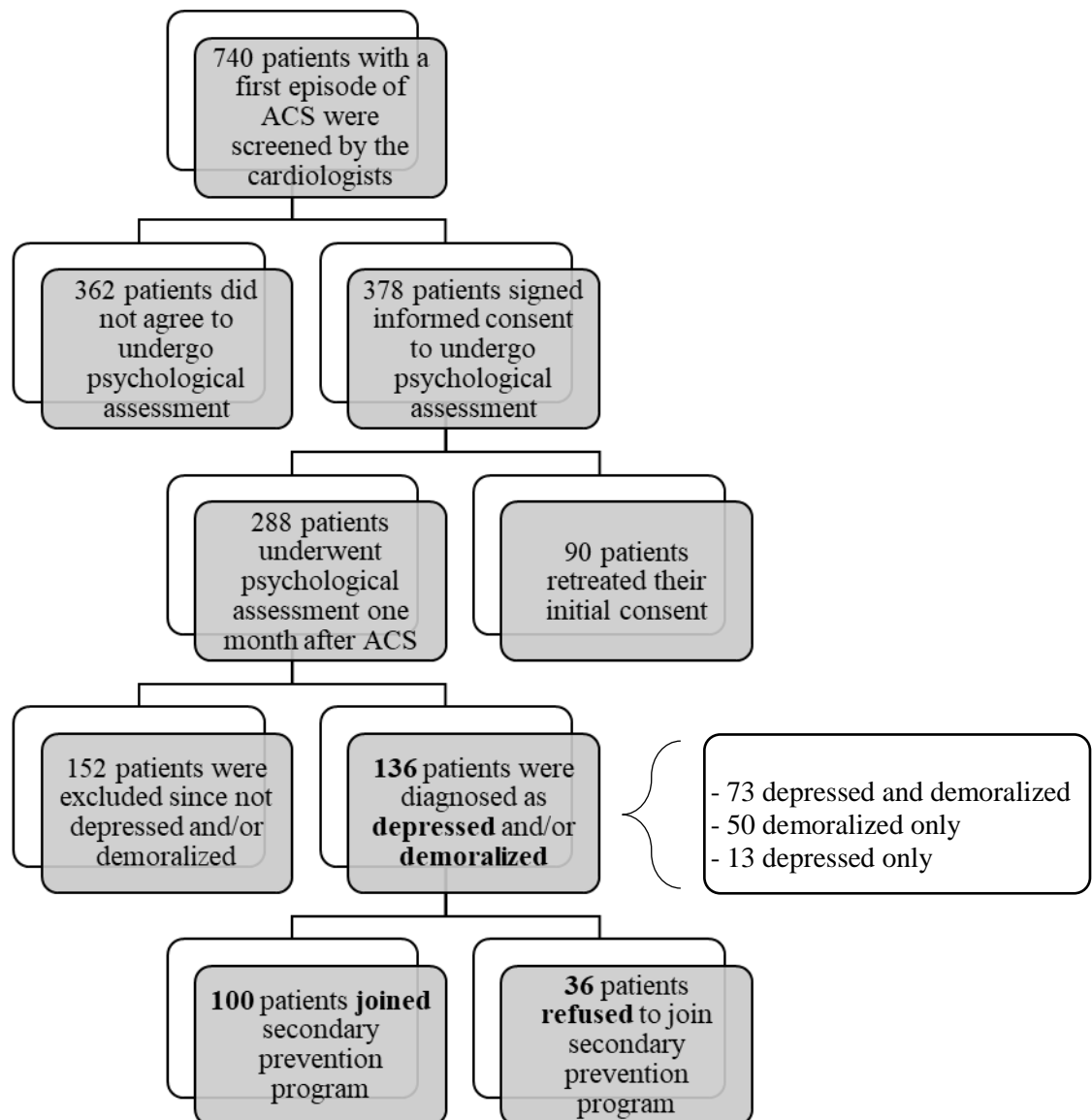
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Fig. 1 Flow-chart of patients' enrollment


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740 patients with a
first episode of
ACS were
screened by the
cardiologists
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362 patients did
not agree to
undergo
psychological
assessment
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378 patients signed
informed consent
to undergo
psychological
assessment
```

```
288 patients
underwent
psychological
assessment one
month after ACS
```

```
90 patients
retreated their
initial consent
```

```
152 patients were
excluded since not
depressed and/or
demoralized
```

```
136 patients were
diagnosed as
depressed and/or
demoralized
```

- 73 depressed and demoralized
- 50 demoralized only
- 13 depressed only

```
100 patients joined
secondary
prevention
program
```

```
36 patients
refused to join
secondary
prevention
program
```

Fig. 2 Survival curves of patients who refused to join secondary prevention program, based on the presence of impaired levels of "Positive Relations" dimension (Psychological Well-Being scales - PWBs)
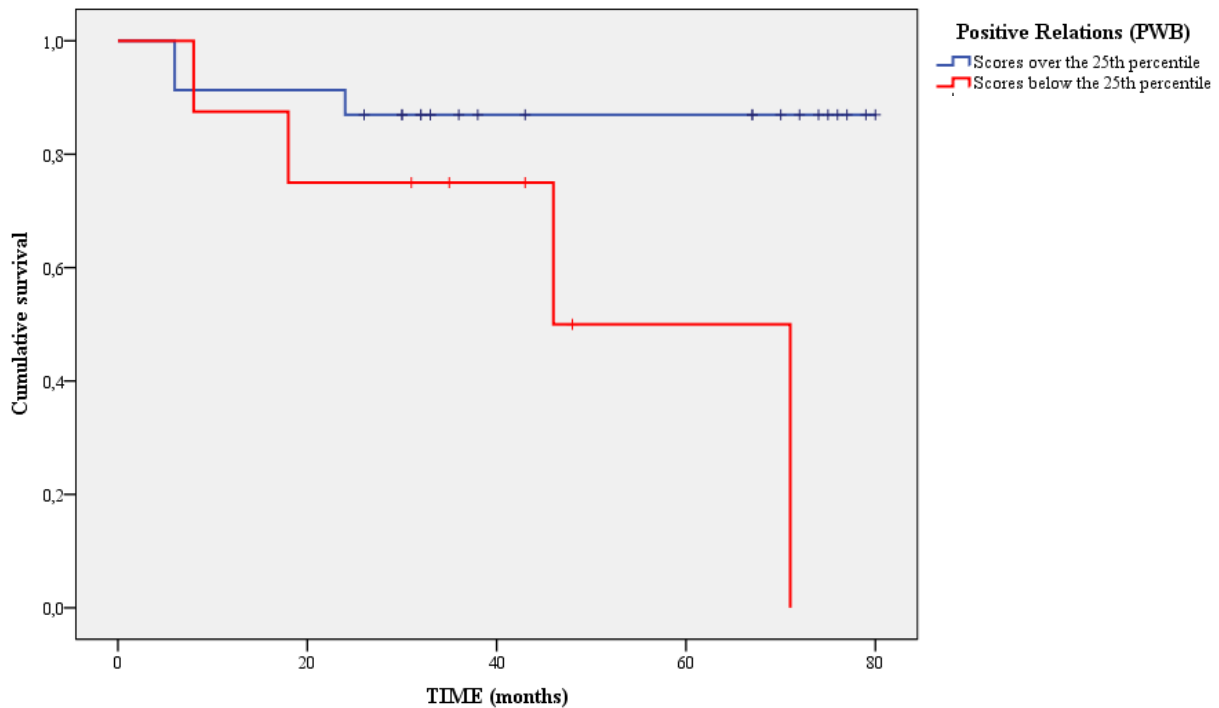
Table 1 Logistic regression predicting ACS secondary prevention program refusal from psychological subclinical distress, well-being and composite depression and anxiety score (CID), controlled for age and sex.

Omnibus test	χ^2	df	p
	26.541	13	.014

Classification accuracy	Completers	Non-participants	Overall
	95.0	24.2	77.4

Variable	B	S.E.	Wald (1)	p	Exp(B)	95%CI lower	95%CI upper
Age	.051	.025	4.219	.040	1.053	1.002	1.106
Sex	-.110	.561	.039	NS	.896	.298	2.691
Autonomy (PWBs)	.070	.030	5.511	.019	1.072	1.012	1.137
Environmental Mastery (PWBs)	.044	.037	1.407	NS	1.045	.972	1.124
Personal Growth (PWBs)	-.073	.035	4.485	.034	.929	.868	.995
Positive Relationships (PWBs)	.014	.027	.270	NS	1.014	.962	1.068
Purpose in life (PWBs)	.045	.039	1.334	NS	1.046	.969	1.129
Self-acceptance (PWBs)	-.036	.037	.951	NS	.964	.897	1.037
Anxiety (SQ)	.057	.082	.478	NS	1.059	.901	1.244
Depression (SQ)	.058	.094	.378	NS	1.060	.881	1.274
Somatization (SQ)	-.040	.054	.535	NS	.961	.864	1.069
Hostility (SQ)	.081	.069	1.404	NS	1.085	.948	1.241
Total score CID	.014	.019	.522	NS	1.014	.976	1.053

ACS: acute coronary syndromes; CI: confidence interval; CID: Clinical Interview for Depression; df: degrees of freedom NS: Not Significant; PWBs: Psychological Well-Being scales; SQ: Symptom Questionnaire