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Validation of the Hebrew Version of the MacNew Heart Disease Health-related Quality of Life Questionnaire in Patients Undergoing Coronary Artery Bypass Surgery

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Abstract

Background: The MacNew questionnaire is a disease-specific health-related quality of life (HRQL) measure designed for patients with heart disease. We aimed to assess the psychometric property of the MacNew questionnaire in Hebrew-speaking patients undergoing coronary artery bypass grafting (CABG) surgery.

Methods: The study sample comprised of 775 Hebrew-speaking patients undergoing CABG surgery. Patients were assessed twice: before CABG surgery and 12-months thereafter. They completed the MacNew, the Short Form-36 Health Survey (SF-36), the Hospital Anxiety and Depression Scale, and a questionnaire on demographic and lifestyle habits.

Results: 775 patients completed the questionnaires at study entry, 599 (77%) of whom also provided data after 12 months. The internal consistency of the MacNew sub-scales was high (alpha coefficients: 0.88-0.94). There were moderate to high correlations between sub-scales of the MacNew and similar domains of the SF-36 (0.66-0.80). The MacNew scales discriminated between men and women, patients with and without congestive heart failure and between individuals with clinically significant symptoms of depression or anxiety and all other patients. The original three-factor structure was generally supported as most loadings met the 0.40 threshold on the expected factor. Patients attending cardiac rehabilitation programs after CABG surgery showed greater improvement in all the MacNew scales, particularly in physical functioning, compared to patients who had not participated in cardiac rehabilitation programmes.

Conclusions: The Hebrew version of MacNew was found to be a reliable and valid HRQL tool which is sensitive to change in patients undergoing CABG surgery. This instrument offers clinicians and researchers a useful tool for understanding the impact of heart disease and its treatment from the patient's perspective.

Keywords: Psychometric properties; Patient reported outcome; Disease-specific HRQL; Coronary artery disease; Multicenter study

Introduction

The recognition of the patient's perspective in monitoring healthcare outcomes represents an important development in health care in the past few decades [1]. Traditional outcomes of treatment for coronary heart disease (CHD), e.g. objective physiological tests, give little information about the impact of both illness and its treatment on the patients from their perspective [2].

The need to better understand the impact of disease from the patient's perspective has led to the development of instruments to quantify patients' perception of their health. A widely used patient-related outcome in health care has been the measure of health-related quality of life (HRQL). A wide range of HRQL instruments have been developed, some of which are generic, addressing multiple aspects of quality of life across a range of different patient or disease groups [3], while others are disease-specific focusing on the specific attributes of a particular disease. The advantage of disease specific instruments is that they are more clinically sensitive and responsive to change than generic HRQL instruments [4].

One generic instrument commonly used in research and clinical evaluation in populations with CHD is the 36-Item Short Form Health Survey (SF-36) [5] - a self-administered instrument comprising 36 items covering eight domains and two component scores, a physical and mental component.

A modified version of the original interview-administered Quality of Life after Myocardial Infarction instrument [6] - the MacNew Heart Disease Health-related Quality of Life questionnaire - is now available as a self-administered instrument [7]. The MacNew is designed to evaluate how daily activities, presented as physical limitation and emotional and social functioning sub-scales and a global scale, are affected by coronary artery disease (CAD) and its treatment [2].

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The present study aims to assess the psychometric property of the Hebrew version of the MacNew scale in 775 patients undergoing coronary artery bypass grafting (CABG) surgery. Previous studies using the MacNew scale have included individuals undergoing CABG surgery among other patients [8-10] but did not focus on assessing its psychometric properties.

Methods

Study design

This study is ancillary to a multicenter prospective study conducted in five cardiothoracic departments across Israel in 2004-2006. The primary study is described in detail elsewhere [11]. In summary, it aimed to assess the effect of an educational intervention on participation rate in cardiac rehabilitation (CR) programmes of patients after coronary artery bypass grafting (CABG) surgery and to assess the effect of CR participation on clinical and psychological outcomes as well as quality of life one year after surgery. The primary study included an intervention designed to improve uptake of CR and a control arm. In both arms, we approached consecutive patients scheduled for CABG surgery. Patients who signed informed consent were interviewed before surgery (baseline) and one-year post surgery (follow-up). The interviews were carried out by trained research interviewers.

We excluded patients from the primary study if they had severe co-morbidities for which CR was contra-indicated [e.g. congestive heart failure (CHF) stage IV]; institutionalized patients; and patients with severe cognitive impairment (e.g. general stroke with severe disability); patients who did not understand any of the study languages: Hebrew, English, Russian, and Arabic; and patients with poor accessibility to a CR facility, i.e., residing farther than 30 km from a rehabilitation centre. For standardization, we interviewed all patients during their pre-surgery hospitalization. Patients who could not be interviewed prior to surgery (e.g. due to emergency operation) were not included since their mental or cognitive state could have been affected by general anaesthesia or CABG surgery.

The study obtained approval from the Institutional Review Board (IRB) of the Sheba Medical Center (number 2374).

Participants

Of the 2811 patients scheduled for CABG surgery in the five cardiothoracic wards, 1548 patients were eligible to participate of whom 1024 (66%) were enrolled in the primary study. Of these 1024 patients, 775 (76%) Hebrew-speaking patients participated in the present study and their data from the interview before CABG surgery were used for validation of the MacNew scale. The data of 599 patients who completed the MacNew at baseline and follow-up were used in some analyses as described below.

Measures

Participants completed a sociodemographic questionnaire, the MacNew, the SF-36, and the Hospital Anxiety and Depression Scale (HADS) [12] at baseline; physical activity level was determined from the following question: "Do you engage in sport or physical activity regularly?" Overall, 599 patients completed the questionnaires a second time at follow-up. Data from the second assessment were used to examine responsiveness of these scales (see analytical strategy below).

[A] Information on sociodemographic factors including age, gender, marital status, level of education, employment status, income level (categorized in relation to the national average household income), and religiosity (conventionally divided into four broad categories in the Israeli Jewish population: secular Jews, religious practicing Jews, traditional Jews, and others), lifestyle and behavioral parameters (e.g. tobacco use), and data on co-morbidities were collected through a face-to-face interview.

Clinical data and CHF status were determined from the patient's medical chart. Patients who had a diagnosis of CHF in their letter of discharge from hospital following surgery or had an ejection fraction as recorded in an echocardiogram test of <35% or both were classified as having CHF. BMI calculation was based on height and weight as measured during the interview before surgery.

[B] The MacNew is a self-administered heart disease HRQL questionnaire consisting of 27 items which fall into three domains: physical limitations (13 items), emotional function (14 items), and social function (13 items) sub-scale making up a global scale. The time frame for the MacNew is the previous two weeks. Each of the items is rated on a 7-point scale, from 1 (poor HRQL) to 7 (good HRQL). For each domain, a score is calculated as the mean score of the items comprising this domain. Missing responses do not contribute to the score and item 27, ‚sexual intercourse', may be excluded without altering the domain score as each domain score is calculated as the mean of the responses in that domain. If more than 50% of the items for a domain are missing, the score for that domain is not calculated. The instrument also has a global HRQL score, which can be calculated as the mean over all scored items [2].

The MacNew scale has been validated in many languages [13-15] and among heart disease patient groups [7,16,17]. The MacNew was translated into Hebrew using recommended forward and backward translation for linguistic equivalence [18].

[C] The SF-36 [5] is a generic self-administered HRQL questionnaire that consists of 36 items. It includes eight sub-scales: physical functioning, role physical, bodily pain, vitality, general health, mental health, role emotional and social functioning which converges into two summary measures, a physical component and a mental component measure. The Hebrew version of the SF-36 demonstrated good reliability and validity in previous research [19]. The SF-36 is used here as the 'gold standard' instrument against which the MacNew scale is validated.

[D] The HADS [12] consists of 14 items, 7 measuring symptoms of anxiety and 7 measuring symptoms of depression. The score of each sub-scale can range from 0-21 where higher score indicates higher symptoms of depression. A score of 8 or above on the depression and anxiety sub-scales is considered to be of clinical importance and may indicate possible depressive or anxiety disorder, respectively [12].

Statistical analysis

We used frequencies, means and standard deviations (SD) to describe the clinical, sociodemographic and behavioral characteristics.

Internal consistency was assessed by Cronbach's alpha coefficient. To examine construct validity, we carried out a principal component analysis (PCA) with varimax rotation to assess how the scale fits into a three-factor solution as observed for the original English-language version. To assess convergent validity, we examined the correlations between the MacNew Global and domain scores and the SF-36 components scores. Discriminant validity was assessed using independent group t-test or Fisher exact test, depending on the type of a variable, to examine differences in mean score on the MacNew

between: (a) patients undergoing CABG surgery with CHF (with and without valve replacement) and all other patients, men and women; (b) patients with clinically significant symptoms of depression versus all others; (c) patients with clinically significant anxiety symptoms versus all others. In addition, we presented the effect size estimations because, in contrast with t-test or Fisher exact test, the effect size does not depend on the sample size.

To assess responsiveness i.e. the instrument's ability to detect change, we assessed change in mean score over time on the MacNew sub-scales and global scale in patients who attended CR compared to patients who had not attended CR in the year following surgery. Cardiac rehabilitation in Israel can range between one and several months when the average is three months. Only patients who completed the MacNew at baseline and at follow-up were included in this analysis.

Statistical analyses were performed using SAS statistical software version 9.2.

Results

Patient characteristics

The sociodemographic, behavioral and clinical characteristics of the study sample according to the patient gender are displayed in Table 1. The majority of patients were men; they were approximately five years younger than women. A greater proportion of women completed fewer than 11 years of schooling. The majority of them were not employed at the time of surgery while almost half of the men were in some form of employment. Most women had never smoked while the majority of men were past or current smokers. A greater proportion of men reported that they engaged in regular physical exercise. CHF was more prevalent in women while diabetes was similar in both.

MacNew internal consistency and mean scores

The internal consistency of the sub-scales and global scale was excellent as indicated by the Croncach's alpha coefficient: (social function: α=0.88; emotional functioning: α=0.91; physical limitation: α=0.91; global scale: α=0.94). The MacNew mean score for the group was 5.75 (±1.05) on social function, 5.58 (±0.90) on the emotional functioning, and 5.37 (±1.07) on the physical limitation sub-scales and 5.51 (±0.92) on the global scale.

Convergent validity

The correlations between the MacNew global scale and the three sub-scales and the two SF-36 physical and mental component summary scores were moderate to high (all Ps<0.0001). The physical limitation sub-scale of the MacNew correlated highly with the physical component summary score of the SF-36 (r=0.80) while the social (r=0.67) and emotional (r=0.66) functioning sub-scales correlated moderately with SF-36 physical component summary. The correlations between each of the MacNew scales and the emotional component summary score of the SF-36 were similar; MacNew global (r=0.79), physical limitation (r=0.77) emotional functioning (r=0.76) and social function (r=0.73) sub-scales. The correlation between the social function sub-scale of the MacNew and the SF-36 social functioning sub-scale was moderate (r=0.66).

Discriminant validity

Table 2 presents the mean score for the MacNew scales in CABG patients varying on four variables: gender, depression, anxiety and CHF status. The results show that the MacNew sub-scales and global score discriminate between each of the patient groups. Men had higher HRQL mean scores than women on each MacNew scale. Patients undergoing CABG surgery with CHF had lower HRQL mean scores on each of the MacNew scales. Similarly, CABG patients with HADS depression or anxiety symptoms had lower score on all the MacNew scales compared to patients without symptoms.

Construct validity

To assess how well the MacNew scale fits into a three-factor solution as observed with the original English-language, we carried out a principal component analysis (PCA) with varimax rotation. Table 3 summarizes the factor loading of each of the 27 items of the MacNew on each of the three factors as proposed by Valenti et al. [7]. The results showed that the original three-factor structure was generally supported. Most loadings met the 0.40 threshold on the expected factor. An exception to that were three items from the

Patients characteristics	Men (N=612)	Women N=163)	P value
	n (%)	n (%)	
Age in years (mean ± SD)	64.4 (± 10.5)	69.5 (± 10.1)	<0.0001
Marital status			
Single	18 (2.9)	5 (3.1)	<0.0001
Married or co-habiting	520 (85.1)	82 (50.3)	
Divorced/separated	36 (5.9)	14 (8.6)	
Widowed	37 (6.1)	62 (38.0)	
Religiosity[a]			
Secular	306 (50.0)	69 (42.3)	0.04
Traditional	19 (32.0)	70 (42.9)	
Religious	96 (15.7)	23 (14.1)	
Other	14 (2.3)	1 (0.6)	
Level of education			
Up to 10 years of schooling	195 (32.2)	75 (46.0)	0.004
11-12 years of schooling	181 (29.9)	43 (26.4)	
More than 12 years	229 (37.9)	45 (27.6)	
Employment			
Full-time employment	201 (32.8)	20 (12.3)	<0.0001
Part-time employment	78 (12.8)	10 (6.1)	
Not employed	333 (54.4)	133 (81.6)	
Income			
Above average	141 (23.9)	8 (5.1)	<0.0001
Average	190 (32.1)	23 (14.7)	
Below average	260 (44.0)	126 (80.2)	
Behavioural and lifestyle characteristics			
Smoking			
Never	179 (29.3)	98 (60.1)	<0.0001
Past[b]	288 (47.1)	46 (28.2)	
Current	144 (23.6)	19 (11.7)	
N (%) of physically active[c]	251 (41.2)	50 (30.9)	0.02
BMI kg/m²			
≥19<25	189 (30.8)	52 (31.7)	0.06
≥25<30	283 (46.1)	61 (37.2)	
≥30	142 (23.1)	51 (31.1)	
Clinical characteristics			
N (%) Diabetes	255 (41.7)	74 (45.4)	0.5
N (%) Congestive heart failure	83 (13.5)	33 (20.1)	0.04

[a]Religiosity in the Israeli Jewish population is conventionally divided into: secular Jews, religious practicing Jews, traditional Jews, and others.
[b]Past smokers: patients who stopped smoking for at least 6 months before assessment.
[c]Physically active: a positive response to the question: "Do you engage in sport or physical activity regularly?"

Table 1: Characteristics of the study sample (N=775) by gender.

	Gender			Depression			Anxiety			CHF		
	Men	Women	P	No	Yes	P	No	Yes	P	No	Yes	P
MacNew domains	n=612	n=161		n=648	n=125		n=597	n=179		n=670	n=103	
Emotional function	5.6 (± 0.9)	5.3 (± 0.9)	0.0002	5.8 (± 0.7)	4.4 (± 0.9)	<0.0001	5.9 (± 0.7)	4.5 (± 0.9)	<0.0001	5.6 (± 0.9)	5.4 (± 1.0)	0.03
Physical limitation	5.5 (± 1.1)	5.0 (± 1.0)	<0.0001	5.6 (± 0.9)	4.2 (± 1.0)	<0.0001	5.6 (± 0.9)	4.5 (± 1.1)	<0.0001	5.4 (± 1.1)	5.1 (± 1.1)	0.003
Social function	5.8 (± 1.1)	5.5 (± 1.0)	0.01	6.0 (± 0.9)	4.5 (± 1.1)	<0.0001	6.0 (± 0.9)	4.8 (± 1.1)	<0.0001	5.8 (± 1.0)	5.5 (± 1.1)	0.01
Global	5.6 (± 0.9)	5.2 (± 0.9)	<0.0001	5.7 (± 0.7)	4.3 (± 0.9)	<0.0001	5.8 (± 0.7)	4.6 (± 0.9)	<0.0001	5.5 (± 0.9)	5.3 (± 1.0)	0.008

Table 2: Discriminant validity of MacNew global score and sub-scales by gender, depression, anxiety and CHF status, Mean (± SD).

		The MacNew domains					
		Emotional function		Physical limitation		Social function	
	MacNew items	Hebrew	Original	Hebrew	Original	Hebrew	Original
1.	Frustrated	**0.63**	**0.79**				
2.	Worthless	**0.61**	**0.74**			**0.47**	**0.42**
3.	Confident	**0.54**	**0.61**				
4.	Down in the dumps	**0.66**	**0.86**				
5.	Relaxed	**0.63**	**0.79**				
6.	Worn out	**0.52**	**0.59**	**0.48**	**0.52**		
7.	Happy with personal life	**0.63**	**0.73**				
8.	Restless	**0.61**	**0.81**				
9.	Short of breath			**0.64**	**0.73**		
10.	Tearful	**0.55**	**0.72**				
11.	More dependent					**0.61**	**0.62**
12.	Social activities	0.30	**0.40**	**0.41**	**0.46**	**0.59**	**0.52**
13.	Others/less confident in you	0.23	**0.45**			**0.63**	**0.66**
14.	Chest pain			**0.54**	**0.72**		
15.	Lack of self-confident	**0.59**	**0.67**			**0.46**	**0.47**
16.	Aching legs			**0.61**	**0.44**		
17.	Sports/exercise limited			**0.73**	**0.60**	**0.43**	**0.61**
18.	Frightened	**0.62**	**0.63**				
19.	Dizzy/ light-headed			**0.62**	**0.61**		
20.	Restricted or limited			**0.55**	**0.64**	**0.62**	**0.62**
21.	Unsure about exercise			0.39	**0.47**	**0.47**	**0.48**
22.	Overprotective family					**0.67**	**0.69**
23.	Burden on others	0.39	**0.44**			**0.66**	**0.66**
24.	Excluded			0.12	**0.43**	**0.62**	**0.74**
25.	Unable to socialize			0.38	**0.46**	**0.66**	**0.68**
26.	Physically restricted			**0.69**	**0.60**	**0.47**	**0.65**
27.	Sexual activities			-0.01	N/R		
	Variance explained	18.0%	28.1%	14.8%	17.2%	20.4%	21.4%

Bolded and underlined: items belonging to a respective factor as suggested in the original MacNew which meet the 0.4 threshold in the Hebrew version.
Standard font: items belonging to a respective factor which *do not* meet the 0.4 threshold suggested in the original MacNew.
N/R=Not reported.

Table 3: Construct validity using factor analysis of the Hebrew version of the MacNew scale in patients undergoing CABG surgery (N=775). Item loading on the three MacNew domains in the Hebrew MacNew and as reported for the original English MacNew.

emotional function sub-scale for which the loadings were lower: 'Social activities' (0.30), 'Others less confident in you' (0.23) and 'Burden on others' (0.39); and four items from the physical limitation sub-scale: 'Unsure about exercise' (0.39), 'Excluded' (0.12), 'Unable to socialize' (0.38), and 'Sexual activities' (-0.01). The item 'Sexual activities' loaded on the social factor (0.48) rather than on the physical scale. The factor representing social function explained 20.4% of the variance whereas the emotional function and the physical limitation sub-scales explained 18.0% and 14.8% of the variance, respectively. The total explained variance by the MacNew was 53%.

Responsiveness

Responsiveness was examined by comparing the mean change of the MacNew scores over 12-month period in CABG patients who provided both baseline and follow-up data. Of the 775 patients who completed the baseline assessment, 599 (77%) completed the MacNew questionnaire a second time at follow-up. We examined change in mean score from baseline to follow-up for all patients and also by CR status (Table 4). The 12-month mean change score from baseline to follow-up in the group as whole ranged from -0.07 (emotional function sub-scale) to +0.3 (physical limitation sub-scale) and was significant only for the physical limitation sub-scale ($p<0.0001$). In the group of patients who had not attended CR, the mean 12-month change scores showed improvement in physical limitation (+0.2, $p=0.0004$) and a deterioration in the emotional sub-scale (-0.2, $p=0.0004$); there was no change in either the global (-0.03, $p=0.62$) or social function (-0.1, $p=0.13$) scores. Patients who had participated in CR showed improvement in the global scale (+0.3, $p=0.011$), in the physical limitation (+0.5, $p<0.0001$) and in social function (+0.3, $p=0.0054$) sub-scales but there was no convincing evidence of improvement in

	Mean change score			P†
	Total sample N=599	**No CRP participation N=394**	**CRP participants N=205**	
MacNew Global	0.08 (± 1.1) p=0.08*	-0.03 (± 1.1) p=0.62*	0.3 (± 1.1) p=0.011*	0.001
Emotional function	-0.07 (± 1.1) p=0.17*	-0.2 (± 1.2) p=0.0004*	0.1 (± 1.1) p=0.07*	0.002
Physical limitation	0.3 (± 1.4) p<0.0001*	0.2 (± 1.2) p=0.0004*	0.5 (± 1.2) p<0.0001*	0.006
Social function	0.04 (± 1.2) p=0.46*	-0.1 (± 1.4) p=0.13*	0.3 (± 1.3) p=0.0054*	0.0003

*P value for comparing mean change score from study entry to 12-month follow-up.
†P value for comparing mean change score over 12 months between patients who participated in CRP versus patients who had not participated in CRP.

Table 4: Mean change score from study entry to 12-month follow-up on the MacNew scale in the total sample and by cardiac rehabilitation (CR) participation status.

the emotional sub-scale (+0.1, p=0.27). Comparing the changes in MacNew scores in those who had and had not participated in CR, there was evidence of greater improvement in mean score among CR participants on each sub-scale (global scale, p=0.001; emotional function, p=0.002; physical limitation, p=0.006; and social function, p=0.0003, sub-scales).

Discussion

We report the psychometric properties of the Hebrew version of the MacNew HRQL scale in 775 patients who underwent CABG surgery. Our study is in accordance with the criteria for reviewing instruments as formulated by the Scientific Advisory Committee of the Medical Outcomes Trust [18]. The MacNew scale showed high internal consistency among Hebrew speaking CABG patients. The Cronbach's alpha for items belonging to the three sub-scales as well as for the total scale ranged from 0.88 to 0.94, indicating a high degree of homogeneity of items within each domain and within the scale as a whole. These results are consistent with the findings from the original MacNew scale in English (Cronbach's alpha: 0.93-0.95) [7]. In the present study, patients' mean score on the MacNew emotional function, physical limitation and social function sub-scales were 5.6, 5.4, and 5.8, respectively, similar to the findings from the study reporting the psychometric properties of the original MacNew in English as assessed in patients after acute myocardial infarction (AMI), i.e. 5.3, 5.3, and 5.6 for the MacNew emotional function, physical limitation and social function scales, respectively [7].

The results showed that the MacNew sub-scale and global scores discriminate well between all patient groups. Comparing the mean scores for the MacNew scales between CABG patients with CHF and those without CHF showed that the former group had significantly lower mean sub-scale and global HRQL scores compared to the latter group as hypothesized. Furthermore, the MacNew scales discriminated well between men and women and between patients with a clinical indication of depression and anxiety. As anticipated, men and patients without symptoms of anxiety or depression had significantly better HRQL scores than women and those with anxiety or depression symptoms. These findings are in keeping with previous published data in which the MacNew scale discriminated between cardiac patients varying on gender, depression, anxiety, and CHF [16,20-22]. We also have reported in an earlier study that the Hebrew version of MacNew discriminated between cardiac outpatients with and without CHF [23].

Our data show that there were moderate to high correlations between similar domains on the MacNew and the SF-36. However, moderate correlations were also found between dissimilar domains of the MacNew and the SF-36, in particular, the MacNew physical limitation sub-scale correlated highly with the mental component of the SF-36. Nevertheless, the correlations between similar domains were overall stronger than correlations between dissimilar domains. These findings have been observed in previous studies [15,21]. Hofer et al. [15] suggested this may be related to the way the MacNew probes were originally developed with the focus on the patient's perceptions of the difficulties with physical activities rather than performance per se as in the SF-36.

Taking the same approach as Valenti et al. did in the original factor structure [7] in which a factor loading of ≥0.40 was used to allocate items to a domain, 26 of 27 items of the Hebrew MacNew loaded onto the expected factor. The item loadings on the expected factors in the present study were similar though slightly smaller than the item loadings reported for the original MacNew. In addition, for several items, e.g. 'Social activities', the loadings on the expected factor were lower than ≥0.40. Interestingly, item 27 (sexual intercourse) showed low loading on the (expected) physical factor i.e. -0.01. This item, however, loaded on the social function factor (0.48), suggesting that sexual functioning contributes to these patients' social well being. This finding has been observed in other studies, for example, with the Portuguese version of MacNew [21] and in a study validating the English version of the MacNew scale in patients with angina and ischemic heart failure [17] but not in other [22,24]. In the present study, the factor named social functioning explained 20.4% of the variance whereas the emotional and the physical functioning scales explained 18.0% and 14.8% of the variance, respectively. Our data are generally in line with findings from the original MacNew although Valenti et al. [7] found that the emotional sub-scale accounted for most of the variance (28.1%). Nevertheless, the 18.0% of the variance explained in the emotional sub-scale in the present study is similar to other previous reports [17].

We examined the MacNew sensitivity to change over time as recommended [18] comparing the change in the 12-month MacNew mean score of CABG patients who attended CR and those who had not attended CR. We confirmed our hypothesis that the magnitude of change would be greater in individuals attending CR. Indeed, the mean change score from baseline to 12-month follow-up for the group attending CR was significantly greater for the MacNew emotional function, physical limitation, social function sub-scales and global scale than the change observed for CABG patients not attending CR. It has been proposed that the minimal importance difference for the MacNew is 0.5 point on the 7-point scoring scale [25]. In the present study, although patients attending CR had higher mean scores on all of the MacNew scales, only the 0.5 mean changes on the physical limitation sub-scale met the minimal importance difference criterion. Previous studies using the MacNew scale among individuals undergoing CABG surgery [8-10] have all reported higher mean scores on the MacNew global and sub-scales among patients undergoing CR. Assessing health-related quality of life among 487 cardiac patients (including individuals after CABG surgery) two years after CR, Hofer and co-investigators documented an improvement of +0.2 in the emotional, +0.3 in the physical and +0.5 in the social sub-scales and +0.3 in the global score, findings consistent with the present study [9].

A limitation of this study relates to the primary study, which

was restricted to patients who met inclusion criteria of mobility and geographical proximity to a CR facility. Of the 2811 patients who undergone CABG surgery at the study period, only 1548 (55%) were eligible for the primary study. This most likely excluded patients with more severe medical conditions and the less advantaged patients with poor access to CR facilities.

In conclusion, the Hebrew version of the MacNew questionnaire was found to be a reliable and valid HRQL tool which is sensitive to change, particularly change in physical functioning, in patients undergoing CABG surgery. Taken in conjunction with our earlier publication [23], this instrument offers clinicians and researchers a useful tool for understanding the impact of heart disease and its treatment from the patient's perspective.

Author's Note

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Conflict of Interest

None declared.

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