Quality of Life Research (2005) 14: 749–757

Health-related quality of life in women and men one year after acute myocardial infarction

Eva Brink[1], Gunne Grankvist[2], Björn W. Karlson[3] & Lillemor R.-M. Hallberg[4]
[1]*Department of Nursing, Health and Culture (E-mail: eva.brink@htu.se);* [2]*Department for Studies of the Individual and Society, University of Trollhättan/Uddevalla;* [3]*Division of Cardiology, Sahlgrenska University Hospital, Göteborg;* [4]*School of Social and Health Sciences, Halmstad University, Sweden*

Accepted in revised form 27 May 2004

Abstract

The purpose of the present study was, first, to detect possible changes in health-related quality of life (HRQL) over time and, second, to predict HRQL at 1 year based on measures made 1 week and 5 months after a first-time acute myocardial infarction. There was an improvement in HRQL at 1 year, as measured by the questionnaire 36-item Medical Outcomes Study Short-Form (SF-36), for both men and women as compared with the assessment 5 months after the acute myocardial infarction. However, the pattern was somewhat different for women and men. Women mainly reported increased scores on scales reflecting better mental health, whereas men, on the whole, demonstrated higher scores in the physical health domain. Depression (HAD) and fatigue were identified as early predictors of lower HRQL at the 1-year follow-up. Our conclusion is that early assessment of fatigue and depression is worthwhile, as they may indicate decreased HRQL in men and women 1 year after first-time myocardial infarction.

Key words: Depression, Fatigue, Health-related quality of life, Myocardial infarction

Introduction

In recent years, there has been an increasing interest in quality of life assessment in health and medical research, and several scales of psychological health and physical health status with functioning have been developed. However, one problem is that quality of life is defined in various ways. There has been a continuous debate about the meaning of the concept and what should be measured. Quality of life is not an observable or easily measured unit. Instead several different indicators are suggested, for example personal well-being, satisfaction with life, existential view, needs fullfilment and expectations fullfilment variables [1]. The concept quality of life is made more concrete by the specifying concept 'health-related quality of life' (HRQL). It seems to be useful to define health both in terms of how individuals feel (distress and well-being) and in terms of how they evaluate their health and prospects for the future. The principal components of HRQL are physical and mental health [2]. The assessment can be done with either generic or disease-specific questionnaires [3, 4]. In the present study, HRQL was measured using a generic instrument, the 36-item Medical Outcomes Study Short-Form (SF-36), which allows comparison of scores between the present group of myocardial infarction patients and a Swedish normative group [5].

Myocardial infarction survivors' quality of life is reported as being reduced after the acute heart attack period [6]. Brown et al. [7], found that both men and women scored lower on HRQL 4 years after an acute myocardial infarction as compared with community normative scores. In an earlier paper [8], we explored HRQL 5 months after an acute myocardial infarction. Lower scores, imply-

ing poorer HRQL both for the physical and for the mental components, were seen in these patients as compared with Swedish normative data. Regarding sex differences in the post-myocardial infarction process at 5 months, women reported poorer physical health than did men. Women had significantly lower scores for the subscales physical function, bodily pain and social function. A better understanding of these sex differences could be achieved by use of follow-up measurements that gives information of changes in HRQL over time.

The purpose of the present study was, first, to detect possible changes in HRQL over time and, second, to predict HRQL at 1 year based on measures made 1 week and 5 months after the acute myocardial infarction. Our hypothesis was that depression and fatigue in the early post-myocardial infarction process would predict HRQL at 1 year. Recognizing such predictor variables would be worthwhile, as they identify men and women with possible decreased HRQL 1 year after first-time myocardial infarction, an important illumination in secondary prevention of coronary heart disease.

Method

Participants

The convenience sample included consecutive patients admitted to the coronary care unit at a Swedish rural hospital, during the period October 1998–September 1999, with diagnosis of first-time acute myocardial infarction. During their stay in hospital (usually 4–6 days), the patients were asked to participate in a longitudinal study on health and quality of life. Of the 144 men and women invited, 134 answered a short questionnaire (background data and the Hospital Anxiety and Depression Scale (HAD). After 5 months, 114 remaining participants (37 women and 77 men) answered mail-back questionnaires (7 patients had died and 13 had declined further participation). One year after the initial myocardial infarction 2 additional patients had died and 14 others declined further participation. Thus 98 patients in total (response rate 74%; 33 women and 65 men) answered the 1-year questionnaires. The mean (SD) age of women and men was 71.4 ± 8.7 and 64.6 ± 9.8 years, respectively, ($p < 0.02$).

Questionnaires

The Short Form 36 (SF-36)

The SF-36 Health Survey is a generic HRQL questionnaire. It consists of 36 items, grouped in eight subscales: physical functioning (PF), role limitations due to physical problems (RP), bodily pain (BP), general health (GH), vitality (VT), social functioning (SF), role limitations due to emotional problems (RE), and mental health (MH). Response alternatives for each scale range from 0 (worst health) to 100 (best health). The SF-36 also provides a summary of physical measures, the physical component score (PCS), and mental measures, the mental component score (MCS) [9]. The scales have been shown to reflect changes in HRQL due to changes in disease severity while being clinically valid for discriminating levels of severity within a medical diagnosis [2]. Evidence suggests sounds applicability of the Swedish version. Reliability was found to be good and Cronbach's alpha was 0.79–0.91 for the eight subscales [10].

The Hospital Depression Scale (HAD)

The original HAD scale comprises two subscales, one for anxiety and one for depression. In this study, only the depression scale was used (7 questions). Items were scored on a 4-point scale from normal (0) to severe depression (3). The scale has a summary cut-off score ($\geqslant 8$) for possible or probable depression [11]. The HAD scale was developed for measuring mental distress in patients with physical illness and has been found to be a useful instrument with high reliability – Cronbach's alpha between 0.80 and 0.93 [12].

Fatigue

In a psychometric evaluation of the scale Somatic Health Complaints (SHC), the subscale Fatigue was identified. Cronbach's alpha for the subscale Fatigue in a myocardial infarction patient group was 0.82 [13]. Each item was answered using a six-graded response scale, ranging from never experienced (1) to always experienced (6). Fatigue deals with weakness, lack of energy, general fatigue and dizziness [13].

Analyses

We analyzed data on sex differences in all measurements. In comparing the present myocardial infarction patients' (women and men) scores on SF-36 with the Swedish normative scores, we used SF-36 values for normal Swedish women $\geqslant$65 years and men 50–65 years [5]. Descriptive statistics comprised mean scores, standard deviations, confidence intervals and correlations. In mean score differences analyses *t* tests were used. We conducted two regression analyses in prediction of HRQL at 1 year. First, we predicted the SF-36 physical component score (PCS) using the independent variables depression at 1 week and depression and fatigue at 5 months, controlling for age. Second, in prediction of the mental component score (MCS), we used the same independent variables, as outlined above. The level of significance was set at 5%.

Results

Health-related quality of life

An improvement in HRQL, at 1 year as measured by the SF-36, was noted for both men and women when compared with the assessment at 5 months after acute myocardial infarction. The pattern was somewhat different for men and women. While women mainly reported increased scores on scales reflecting better mental health, men demonstrated increased scores in the physical health domain (Table 1, Figure 1a and b).

Women scored significantly lower on the physical component (PCS) one year after the acute myocardial infarction than did men ($p < 0.01$). In our analyses of SF-36 subscale differences, women reported significantly lower on PF ($p < 0.001$), RP ($p < 0.01$), BP ($p < 0.01$) and SF ($p < 0.01$) (Figure 2).

Table 1. Mean scores (SD) for SF-36 subscales, depression (HAD) and fatigue at five months and one year after myocardial infarction

	Normative scores Mean (SD)	Five months Mean (SD)	One year Mean (SD)	Comparisons five months-one year *p*
Women				
Physical function (PF)	66.3 (27.2)	51.6 (21.8)	57.0 (25.6)	n.s.
Role-physical (RP)	59.8 (43.3)	25.8 (40.3)	34.8 (42.6)	n.s.
Bodily pain (BP)	65.7 (29.1)	61.7 (26.5)	66.9 (30.4)	n.s.
General health (GH)	63.0 (24.7)	60.6 (23.4)	59.8 (23.1)	n.s.
Vitality (VT)	64.2 (27.1)	51.7 (23.0)	59.1 (23.1)	<0.05
Social function (SF)	82.9 (24.3)	72.0 (24.6)	72.8 (25.3)	n.s.
Role-emotional (RE)	72.8 (39.9)	35.4 (44.8)	56.1 (43.5)	<0.05
Mental health (MH)	77.3 (22.3)	70.8 (20.8)	78.0 (20.0)	<0.05
Physical health (PCS)	41.9 (11.8)	36.9 (9.4)	37.5 (11.6)	n.s.
Mental health (MCS)	50.0 (11.7)	43.0 (11.2)	47.7 (12.2)	<0.05
Depression (HAD)		4.1 (3.2)	2.8 (2.8)	<0.01
Fatigue		2.7 (1.0)	2.6 (1.1)	n.s.
Men				
Physical function (PF)	84.4 (20.6)	68.4 (22.6)	75.9 (22.2)	<0.001
Role-physical (RP)	78.1 (35.6)	43.5 (45.6)	57.2 (41.6)	<0.05
Bodily pain (BP)	70.7 (27.3)	71.9 (25.6)	79.2 (24.1)	<0.05
General health (GH)	71.0 (23.6)	61.4 (20.2)	62.8 (22.1)	n.s.
Vitality (VT)	68.7 (24.7)	58.5 (22.9)	61.2 (25.6)	n.s.
Social function (SF)	88.5 (20.8)	84.8 (22.4)	83.5 (21.5)	n.s.
Role-emotion (RE)	85.5 (29.3)	54.9 (45.4)	71.5 (38.4)	<0.01
Mental health (MH)	81.9 (18.8)	79.6 (19.7)	79.6 (19.7)	n.s.
Physical health (PCS)	47.7 (10.1)	42.0 (10.3)	44.6 (10.3)	<0.05
Mental health (MCS)	51.0 (10.0)	46.5 (10.7)	48.4 (10.6)	n.s.
Depression (HAD)		3.8 (3.8)	3.4 (3.5)	n.s.
Fatigue		2.5 (1.1)	2.5 (1.1)	n.s.

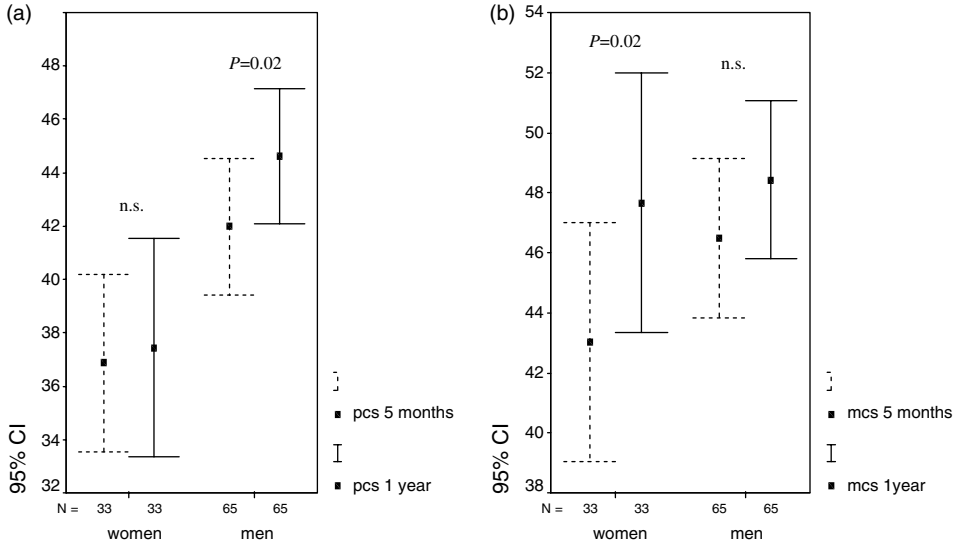

Figure 1. (a) Changes in SF-36 physical component score (PCS). (b) Changes in SF-36 mental component score (MCS).

According to comparisons with normative data [5], women scored lower on four of the SF-36 subscales: PF ($p < 0.05$), RP ($p < 0.01$), SF ($p < 0.05$), and RE ($p < 0.05$). Men reported lower scores on three subscales compared with normative data: PF ($p < 0.01$), RP ($p < 0.01$), and VT ($p < 0.05$) (Figure 3a and b).

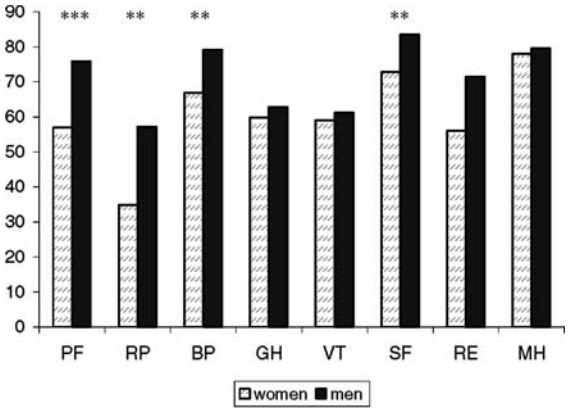

Figure 2. Comparisons of SF-36 subscale mean scores between women and men one year after myocardial infarction. PF = physical functioning; RP = role limitations due to physical problems; BP = bodily pain; GH = general health; VT = vitality; SF = social functioning; RE = role limitations due to emotional problems; MH = mental health. $^{**}p < 0.01$ $^{***}p < 0.001$.

Fatigue and depression

Thirteen percent of all respondents scored possible/probable depression on the depression scale (HAD) 1 year after myocardial infarction. There were no gender differences regarding fatigue and depression at this point in time. However, women had improved in that they reported less depression than they had 5 months after the heart attack (Table1). The pattern in reported depression over time is shown in Figure 4.

Hierarchical prediction of health-related quality of life at one year

Two hierarchical regression analyses were used to identify predictors of the physical component (PCS) and the mental component (MCS) in SF-36 1 year after myocardial infarction. In the first step, the independent variables depression (HAD) at 1 week and age were entered into the model. Depression measured at 5 months was included in the next step and, finally, fatigue was entered. The total model accounted for much of the variation in PCS (Table 2) and MCS (Table 3) in both men and women.

Women

As shown in Table 2, depression (HAD) measured at 1 week after an acute myocardial infarction

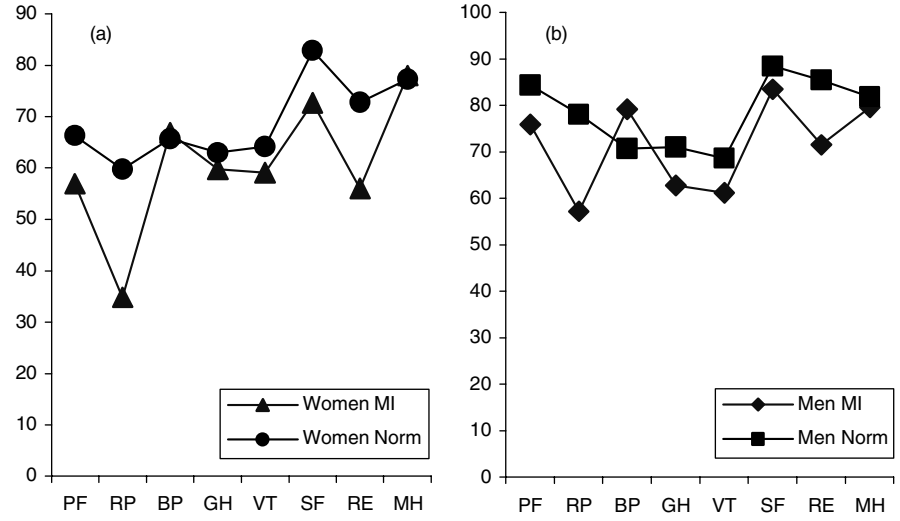

Figure 3. (a) Mean SF-36 subscale scores for women with myocardial infarction compared with normative scores for women aged ⩾65 years.(b) Mean SF-36 scores for men with myocardial infarction compared with normative scores for men aged <65 years.

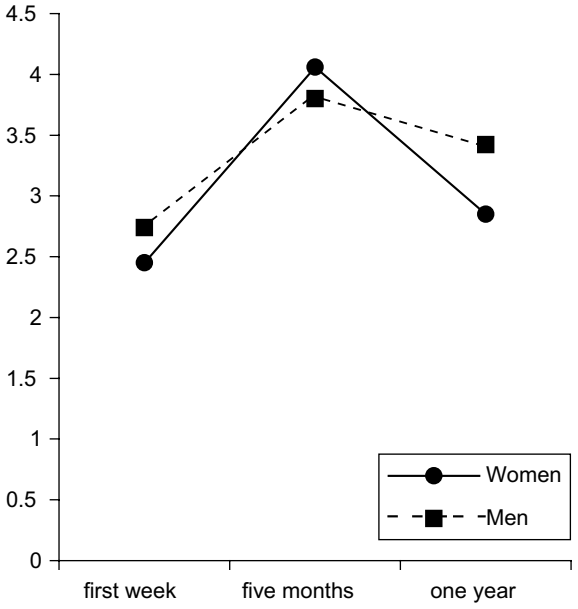

Figure 4. Depression mean scores measured by the Hospital Anxiety and Depression Scale (HAD) at 1 week, 5 months, and 1 year after first-time myocardial infarction (higher values indicate depression).

predicted women's physical health (PCS) at one year. Including depression (HAD) at 5 months in the model increased the explained variance. In Table 3, it is shown that women's scores on the depression scale at 5 months (HAD) contributed to the amount of explained variation in MCS at the one-year follow-up (Table 3). Adding fatigue at 5 months as a predictor variable did not strengthen the multivariate model's explanation of either PCS or MCS.

Men

Depression (HAD) measured at 1 week after an acute myocardial infarction did not explain a significant amount of variance in men's physical health (PCS) at 1 year. However, depression (HAD) in step two and fatigue in step three of the hierarchical analysis explained a great deal of the variance in PCS (Table 2). Conversely, depression (HAD) at 1 week was a predictor of men's mental health (MCS) 1 year after myocardial infarction (Table 3).

Discussion

In this study, we found that HRQL in first-time myocardial infarction patients was improved 1 year after the acute heart attack as compared with 5 months after, but it was also shown that some function and well-being scale scores had not reached normative levels (PF, RP, and VT in men; PF, RP, SF, and RE in women). This means that HRQL

Table 2. Predictors of physical summary scores (PCS[a]), controlling for age

	Women		Men	
	r	β_{stand}	*r*	β_{stand}
Step1				
HAD depress[b]	−0.45**	−0.36	−0.16	−0.18
Age	−0.42**	−0.31	−0.20	−0.22
	$R^2 = 0.29$, $F(2,30) = 6.2$, $p < 0.01$		$R^2 = 0.07$, $F(2,62) = 2.5$, $p > 0.05$	
	R^2adj = 0.24		R^2adj = 0.04	
Step 2				
HAD depress[b]	−0.45**	−0.27	−0.16	0.16
Age	−0.42**	−0.28	−0.20	−0.20
HAD depress[c]	−0.49**	−0.38	−0.46**	−0.56
	$\Delta R^2 = 0.13$, $\Delta F(1,29) = 6.8$, $p < 0.05$		$\Delta R^2 = 0.20$, $\Delta F(1,61) = 16.3$, $p < 0.001$	
	$R^2 = 0.43$, $F(3,29) = 7.2$, $p < 0.01$		$R^2 = 0.27$, $F(3,61) = 7.5$, $p < 0.001$	
	R^2adj = 0.37		R^2adj = 0.23	
Step 3				
HAD depress[b]	−0.45**	−0.27	−0.16	0.09
Age	−0.42**	−0.28	−0.20	−0.13
HAD depress[c]	−0.49**	−0.35	−0.46**	−0.13
Fatigue[c]	−0.34	−0.05	−0.69**	−0.63
	$\Delta R^2 = 0.00$, $\Delta F(1,28) = 0.08$, $p > 0.05$		$\Delta R^2 = 0.23$, $\Delta F(1,60) = 28.1$, $p < 0.001$	
	$R^2 = 0.43$, $F(4,28) = 5.2$, $p < 0.01$		$R^2 = 0.50$, $F(4,60) = 15.1$, $p < 0.001$	
	R^2adj = 0.44		R^2adj = 0.47	

[a] Measurement one year after the acute heart attack.
[b] Measurement five days after the acute heart attack.
[c] Measurement five months after the acute heart attack.
*$p < 0.05$; **$p < 0.01$.

may be at reduced levels 1 year after first-time myocardial infarction in both women and men.

Women scored lower in physical health (SF-36) as compared with men 1 year after myocardial infarction. Men's improved physical health as compared with the measurement at 5 months was not seen in women. A question deserving further investigation is why women do not show the same pattern of improvement as do men. Can this be explained in terms of women's higher age or are any other factors involved? There were, however, no gender differences in the SF-36 scales reflecting mental health at 1 year.

Our results are consistent with those of other studies showing that women report significantly worse health than do men after myocardial infarction [14–17]. One explanation for the sex differences in HRQL in our sample may be that women were older when stricken with first-time myocardial infarction (mean difference of 6.8 years). In general, women report more health problems than do men [18]. A subject of discussion is whether sex differences in symptom reporting reflect real differences in physical morbidity or differences in how symptoms are perceived, interpreted and acted upon. Pennebaker [19] found that women are more likely than men to rely on external cues in defining their symptoms. According to Charmaz [20], men, as compared with women, are more concerned with recapturing their past identities when stricken with illness. Therefore another possible explanation is that men struggle *against* illness by, for example, reporting fewer symptoms. Women's reports of poorer health may reflect a struggle *with* illness, entailing an adaptation to the changed health status that includes more symptom reporting.

The predictor variables in this study were depression (HAD) measured at 1 week and at 5 months and fatigue measured at 5 months after first-time myocardial infarction. This choice was based on previous knowledge and the intention

Table 3. Predictors of mental summary scores (MCS[a]), controlling for age

	Women		Men	
	r	β_{stand}	*r*	β_{stand}
Step 1				
HAD depress[b]	−0.31	−0.37	−0.44**	−0.42
Age	0.08	0.19	0.27*	0.23
	$R^2 = 0.13$, $F(2,30) = 2.2$, $p > 0.05$		$R^2 = 0.25$, $F(2,62) = 10.1$ $p < 0.001$	
	R^2adj = 0.07		R^2adj = 0.22	
Step 2				
HAD depress[b]	−0.31	−0.24	−0.44**	−0.26
Age	0.08	0.24	0.27*	0.24
HAD depress[c]	−0.59**	−0.57	−0.42**	−0.25
	$\Delta R^2 = 0.30$, $\Delta F(1,29) = 15.2$, $p < 0.01$		$\Delta R^2 = 0.04$, $\Delta F(1,61) = 0\ 3.4$, $p > 0.05$	
	$R^2 = 0.43$, $F(3,29) = 7.3$, $p < 0.01$		$R^2 = 0.29$, $F(3,61) = 8.1$, $p < 0.001$	
	R^2adj = 0.37		R^2adj = 0.25	
Step 3				
HAD depress[b]	−0.31	−0.20	−0.44**	−0.29
Age	0.08	0.22	0.27*	0.27
HAD depress[c]	−0.59	−0.42	−0.42**	−0.09
Fatigue[c]	−0.55**	−0.25	−0.35**	−0.24
	$\Delta R^2 = 0.04$, $\Delta F(1,28) = 2.1$, $p > 0.05$		$\Delta R^2 = 0.03$, $\Delta F(1,60) = 3.0$, $p > 0.05$	
	$R^2 = 0.47$, $F(4,28) = 6.2$, $p < 0.01$		$R^2 = 0.32$, $F(4,60) = 7.0$, $p < 0.001$	
	R^2adj = 0.39		R^2adj = 0.27	

[a] Measurement one year after the acute heart attack.
[b] Measurement five days after the acute heart attack.
[c] Measurement five months after the acute heart attack.
*$p < 0.05$; **$p < 0.01$.

was to cover important determinants of life consequences. Previous studies have demonstrated substantial rates of depression during the first year after myocardial infarction [21]. Lane et al. [22] found that depression predicted quality of life 12 months after myocardial infarction. According to Martin and Thompson [23], the HAD scales are useful in assessing post-myocardial infarction distress. In an earlier investigation we found that fatigue was a common health problem in myocardial infarction patients [8]. There has been a discussion on whether depression and fatigue (or vital exhaustion) are different expressions of the same phenomenon or whether they are in fact different conceptual identities [24]. One principle in regression analyses is to select predictor variables that are highly correlated with the criterion variable, but weakly inter-correlated [25]. Our data showed that the variables depression and fatigue were correlated with HRQL. This is logical, as SF-36 measures mental health and vitality. We also found that depression and fatigue were correlated but not identical, which means that the predictor variables we had chosen accounted for different explained variance.

One limitation of our study is the small sample size, which decreases the statistical power [25]. For example, some non-significant tendencies in comparisons between SF-36 scores at 5 months and 1 year after myocardial infarction could have reached significant levels if we had used larger samples. Also, we have no pre-infarction levels on the study participants. Our conclusion that HRQL has decreased in this group after 1 year would be erroneous if patients had low pre-infarction levels. Previous studies have shown that psychological states, for example depression and vital exhaustion, are of importance to the aetiology of coronary heart disease [26, 27]. Thus, recovery goals should perhaps involve improving decreased health due to acute myocardial infarction rather than reaching normative levels.

One of the goals for health care professionals is to improve patients' daily functioning and enhance their well-being. The present findings can be useful at the level of secondary prevention of coronary heart disease. Multiple regression explanation showed that depression (HAD) measured at 1 week and at 5 months provided the best prediction of women's HRQL 1 year after the acute myocardial infarction. Men's HRQL was associated with depression (HAD) at 5 months and fatigue at 5 months. Our conclusion is that the predictive variables presented here are useful in assessment of the life consequences of first-time myocardial infarction. It is important to develop our understanding of the gender differences indicated in the present study. Of particular value would be larger longitudinal studies including early assessment of fatigue and depression (HAD) as indicators of decreased HRQL.

References

1. Fayers PM, Machin D. Quality of Life. Assessment, Analysis and Interpretation. Chichester: John Wiley & Sons Ltd, 2000.
2. Ware JE, Gandek B. Overview of the SF-36 health survey and the international quality of life assessment (IQOLA) project. J Clin Epidemiol 1998; 51: 903–912.
3. Holcik J, Koupilova I. Defining and assessing health-related quality of life. Centr Eur J Public Health 1999; 7: 207–209.
4. Dempster M, Donnelly M. Measuring the health related quality of life of people with ischaemic heart disease. Heart 2000; 83: 641–644.
5. Sullivan M, Karlsson J, Taft C. SF-36 Hälsoenkät: Svensk Manual och tolkningsguide, Tillägg Appendix 1 (Swedish manual and interpretation guide, Appendix 1). Göteborg: Sahlgrenska University Hospital, 1997.
6. Plevier CM, Mooy JM, Marang-Van de Mheen PJ, Stouthard MEA, Visser MC, Grobbee DE, Gunning-Schepers LJ. Persistent impaired functioning in survivors of a myocardial infarction? Qual Life Res 2001; 10: 123–132.
7. Brown N, Melville M, Gray D, et al. Quality of life four years after acute myocardial infarction: short form 36 scores compared with a normal population. Heart 1999; 81: 352–358.
8. Brink E, Karlson BW, Hallberg LR-M. Health experiences of first-time myocardial infarction: factors influencing women's and men's health-related quality of life after five months. Psychol Health Med 2002; 7: 5–16.
9. Ware JE, Kosinski M, Keller SD. SF-36 Physical and Mental Health Summary Scales – A User's Manual. Boston, MA: New England Medical Center, 1994.
10. Sullivan M, Karlsson J, Ware JE. The Swedish SF-36 Health Survey: I. Evaluation of data quality, scaling assumptions, reliability, and construct validity across general populations in Sweden. Soc Sci Med 1995; 41: 1349–1358.
11. Zigmond AS, Snaith RP. The Hospital Anxiety and Depression scale. Acta Psych Scand 1983; 67: 361–370.
12. Herrmann C. International experiences with the hospital anxiety and depression scale – a review of validation data and clinical results. J Psychosom Res 1997; 42: 17–41.
13. Brink E, Cliffordsson C, Karlson B. Dimensions of the scale Somatic Health Complaints in a sample of myocardial infarction patients (to be published).
14. McGee HM, Johnston M, Pollard P, Hevey D. Does myocardial infarction have a greater impact on women than on men? Testing hypotheses about effects of gender role models and responsibilities. Eur Rev Appl Psychol 2000; 50: 333–340.
15. Shumaker SA, Brooks MM, Schron EB, et al. Gender differences in health-related quality of life among post-myocardial infarction patients: Brief report. Wom Health 1997; 3: 53–60.
16. Westin L, Carlsson R, Erhardt L, Cantor-Graae E, McNeil T. Differences in quality of life in men and women with iscemic heart disease. Scand Cardiovasc J 1999; 33: 160–165.
17. Wiklund I, Herlitz J, Johansson S, Bengtson A, Karlson BW, Persson NG. Subjective symptoms and well-being differ in woman and men after myocardial infarction. Eur Heart J 1993; 14: 1315–1319.
18. Gijsbers van Wijk CMT, Kolk AM. Sex differences in physical symptoms: the contribution of symptom perception theory. Soc Sci Med 1997; 45: 231–246.
19. Pennebaker JW. Psychological factors influencing the reporting of physical symptoms. In Stone I, Turkkan J (eds), The Science of Self-Report. Mahwah NJ: Lawrence Erlbaum, 2000; 299–315.
20. Charmaz K. The body, identity, and self: Adapting to impairment. Sociol Quart 1995; 36: 657–680.
21. Frasure-Smith N, Lespérance F, Juneau M, Talajic M, Bourassa MG. Gender, depression, and one-year prognosis after myocardial infarction. Psychosom Med 1999; 61: 26–37.
22. Lane D, Carroll D, Ring C, Beevers DG, Gregory YH. Mortality and quality of life 12 months after myocardial infarction: effects of depression and anxiety. Psychosom Med 2001; 63: 221–230.
23. Martin CR, Thompson DR. A psychometric evaluation of the hospital anxiety and depression scale in coronary care patients following acute myocardial infarction. Psychol Health Med 2000; 5: 193–201.
24. Wojciechowski FL, Strik JJ, Falger P, Lousberg R, Honig A. The relationship between depressive and vital exhaustion symptomatology post-myocardial infarction. Acta Psych Scand 2000; 102: 359–365.
25. Pedhazur EJ. Multiple Regression in Behavioral Research. Explanation and Prediction. Orlando: Harcourt Brace College Publishers, 1997.

26. Appels A. Why do imminent victims of a cardiac event feel so tired. Int J Clin Practice, 1997; 51: 447–450.
27. Rozanski A, Blumenthal JA, Kaplan J. Impact of psychological factors on the pathogenesis of cardiovascular disease and implications for therapy. Circulation 1999; 27: 2192–2217.
28. Berzon RA. Understanding and using health-related quality of life instruments within clinical research studies. In Staquet MJ, Hays RD, Fayers PM (eds), Quality of Life Assessment in Clinical Trials. Methods and practice. Oxford: University Press, 1999: 3–15.

Address for correspondence: Eva Brink, Department of Nursing, Health and Culture, University of Trollhättan/Uddevalla, Box 1236, SE 462 28 Vänersborg, Sweden
Phone: +46-521264226; E-mail: eva.brink@htu.se