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Differences in Quality of Life in Men and Women with Ischemic Heart Disease

A Prospective Controlled Study

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A study was conducted in Sweden in 1989–1992 to evaluate differences in quality of life (QL) in consecutive male and female patients after acute myocardial infarction (AMI), coronary artery by-pass grafting (CABG) and percutaneous transluminal coronary angioplasty (PTCA). Somatic and psychological dimensions of QL were assessed by self-administered questionnaire in patients one month ($n = 376$) and one year ($n = 349$) after the cardiac event. Normal controls ($n = 88$) were used for comparison. Differences between gender groups, as well as between study patients and controls in somatic and psychological dimensions of QL were studied. Patients were shown to experience poorer QL when compared with demographically similar controls, especially at the one-month assessment. Female patients had poorer QL after one month (in general health, feeling of arrythmia, anxiety, depression, self-esteem, experience of sex life) and after one year (general health, anxiety, depression) compared with male patients. In all dimensions of QL, a proportion of patients (19–45%) experienced a decrease in QL from the one-month to the one-year assessment occasion. Healthcare workers concerned with secondary prevention must be aware that QL differs between male and female patients in several dimensions after a cardiac event. These findings should be taken into account in the clinical management of patients, particularly for female patients who may need special attention.

Key words: acute myocardial infarction, coronary artery by-pass grafting, gender differences, ischemic heart disease, percutaneous transluminal coronary angioplasty, quality of life.

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The study of gender differences in patients with ischemic heart disease (IHD) is becoming increasingly important. It is already known that male and female IHD patients differ with respect to many basic clinical aspects; females have a later age of onset of cardiac disease and are more likely to present with angina pectoris rather than myocardial infarction as the first event (1, 2). Women have smaller coronary arteries, higher operative mortality after coronary bypass surgery and poorer long-term status of angina pectoris following bypass surgery (3). Furthermore, women are more likely to report disability from ischemic symptoms (4), and have been shown to experience more frequent mood disturbances after myocardial infarction (5, 6). In addition, cardiac, psychosomatic and psychological symptoms have been shown to be more common in women (7). Psychological sequelae such as anxiety and depression are also likely to affect compliance with therapeutic regimens and consequently lead to poorer physical status (8).

These observations have great relevance in light of the current focus on secondary prevention with the concomitant need for comprehensive follow-up of male and female patients (9–11). If secondary prevention programmes for IHD patients are to be successful, it is crucial to recognize that men and women may require a different approach to achieve maximal benefit.

This paper presents a substudy of a trial comparing specialized care with emphasis on risk factor management and general care after a cardiac event, i.e. acute myocardial infarction (AMI), coronary artery by-pass grafting (CABG) and percutaneous transluminal coronary angioplasty (PTCA). In an earlier study we presented results concerning quality of life (QL) in these patients (12).

In this study focusing on possible gender differences in QL, we describe QL one month and one year after the event in men and women of similar age using a self-administered questionnaire developed specifically for QL assessment in patients with IHD. The total male and female patient population from the three groups of patients was compared on several dimensions of QL, including longitudinal changes in QL during the

follow-up period. Demographically matched healthy persons were used as controls for comparisons within each gender population.

PATIENTS AND METHODS

A total of 413 patients, (316 male and 97 female) was included in a follow-up investigation of patients with IHD carried out in Malmö, southern Sweden. The inclusion criteria were: consecutive AMI patients hospitalized at the Coronary Care Unit, University Hospital, Malmö as well as consecutive CABG and PTCA patients from the University Hospital in Lund during the period 23 October 1989–30 April 1991 (12, 13).

Patients had to be residents of Malmö discharged to their homes after hospital stay. All patients under the age of 70 were included in the first year, while only those between 50 and 70 years of age were included during the rest of the study time. Diagnosis of AMI was based on standard criteria of typical chest pain, ECG changes, and elevation of cardio-specific enzymes. Allocation to a category (AMI, CABG or PTCA) was based upon the initial cardiac event and remained constant even if an intervention was subsequently performed during the follow-up period, which was one year. Patients were randomized to specialized or routine care five weeks after the index event.

Study population

Thirty (30) AMI patients who met the formal inclusion criteria did not participate in the larger study for the following reasons: 8 had severe non-cardiac disease (e.g. stroke with hemiparesis, cancer with metastasis), 3 had serious abuse problems, 2 were not Swedish-speaking, 11 did not want to participate in this follow-up because of ongoing contact with other physicians, and 6 patients declined participation for unknown reasons. Among the CABG patients 9 were in contact with other physicians and 1 patient was non-Swedish-speaking. All PTCA patients eligible for the study participated. Mean age (60.4 years) and sex ratio (74% males) among non-participating patients were similar to those of the participating patients (60.2 years and 76.5% males, respectively) (12).

All 413 patients taking part in the main follow-up study were invited to participate in the present substudy where QL was assessed one month and one year after the index event by means of a specially constructed questionnaire.

Fifteen patients were excluded from the study because of death during the one-month period between event and administration of the first questionnaire or because they were unable to respond for various reasons, e.g. blindness. Of the remaining 398 patients,

Table I. *Demographic characteristics of study sample. Male vs female age comparisons by two-tailed independent* t-*test*

Category	Number Male/Female	Mean age Male/Female	SD for age Male/Female	*p*-value
AMI	202/64	60.0/61.6	7.1/7.0	NS
CABG	75/19	59.9/59.1	6.9/9.8	NS
PTCA	11/5	55.2/61.2	6.7/5.4	NS
Total	288/88	59.8/61.5	7.0/7.7	NS

AMI = acute myocardial infarction; CABG = coronary artery by-pass grafting; PTCA = percutaneous transluminal coronary angio-plasty, SD = standard deviation.

376 were finally included after having completed the questionnaire. Demographic characteristics of this patient sample are presented in Table I. The same QL questionnaire was *re-administered to all patients* at a concluding visit *one year* after the event regardless of the type of follow-up or whether any intervention had taken place; 349 patients completed the questionnaire at the one-year assessment.

QL assessments

In order to measure QL, we constructed a multifaceted questionnaire, consisting partly of existing instruments and partly of new sections where, to our knowledge, no relevant instruments were available.

This report describes an analysis of gender differences in the following QL dimensions:

1. Physical health: *general*
2. Physical health: *heart-related* symptoms: thoracic pain, shortness of breath and perceived arrythmia
3. Mental health: anxiety, depression
4. Experience of sex life: function and enjoyment
5. Experience of social life
6. Self-esteem

Description and sources of items as well as reliability and internal consistency assessments of the questionnaire dimensions have been published previously (12). Questionnaire items were almost exclusively of Likert scale type, i.e. on a scale from 1 to 4, with 1 representing absence of problematic state, and 4 representing the greatest degree of abnormality. Patients were asked to choose the option that best described their situation during the past week. Items were grouped into QL dimensions according to the above description, and a mean score was derived for a given group of items by adding the scores for that group of items and dividing this sum by the number of items answered by the respondent. Thus, a higher score meant poorer QL in that dimension.

Control subjects

Residents of Malmö whose age and gender distribution

corresponded to that of the patients were randomly selected from a population database and invited to participate as control subjects if they reported themselves to be free from chronic illness. Eight-eight control persons (64% of eligible invited controls) participated in the study: 65 males and 23 females (74% males), mean age 59.6 years. Details about the control group and comparisons between respondent controls, non-respondent controls and index patients have been published (12). Controls received questionnaires equivalent to those used for patients, with the exception that items directly referring to AMI or CABG/PTCA intervention were excluded.

Statistical analyses

Kruskal-Wallis one-way analysis of variance (ANOVA) was used to assess differences across patient groups within each gender population. Comparisons between gender groups, between patients and controls, and within the control group for QL dimensions were performed by the two-tailed Mann-Whitney Wilcoxon Rank Sum test. The same method was used for risk factors and serum enzyme comparisons. The Fisher exact test was used to assess categorical data.

As thoracic pain is one of the most important symptoms in cardiac patients, and might partly be psychosomatic in origin (e.g. as a traumatic reaction to the initial event), *logistic regression analysis* with the QL dimension perceived thoracic pain as the dependent variable and the remaining dimensions as predictor variables was performed in male and female patients separately for both the one-month and one-year assessments. At the one-month assessment, data from all included patients ($n = 376$) were used, even if they did not complete the questionnaire at the one-year assessment. Responses from patients ($n = 349$) who did complete the questionnaire at the one-year assessment were analysed for one-year results. Statistical significance was accepted at a two-tailed p-value ≤ 0.01. Statistical analyses were performed utilizing SPSS for Windows version 6.0 (14).

Ethics

The study was approved by the Research Ethics committee of the University of Lund, Sweden.

RESULTS

Baseline values of serum cholesterol, serum triglycerides, blood glucose, glycosylated Hb (HbA$_1$ c), BMI, and systolic blood pressure were similar in the total male and the total female patient samples. Diastolic blood pressure was higher in males (81 vs 77 mmHg, $p = 0.003$). In AMI patients, infarct size as measured by maximal enzyme level did not differ between male and

female patients. 125 male and 50 female patients described themselves as current smokers, with a non-significant trend towards more female smokers (two-tailed $p = 0.03$, Fisher exact test).

Q-wave and non-q-wave infarction were equally distributed (two-tailed $p = 0.49$, Fisher exact test) and there was no difference in the use of fibrinolysis (two-tailed $p = 0.17$, Fisher exact test) in the male and female AMI patients. The number of patients with heart failure after AMI/CABG (two-tailed $p = 1.00$ and 0.69, respectively, Fisher exact test) and postoperative infarction among CABG patients (two-tailed $p = 1.00$, Fisher exact test) was similar in the gender groups.

The number of patients with diabetes mellitus or peripheral vascular disease did not differ significantly between gender groups. The use of pharmacological treatment for angina pectoris, cardiac incompensation, hypertension, diabetes mellitus and hyperlipidemia was the same in male and female patients when compared at both the onset and the end of the follow-up period. Randomization between types of follow-up was balanced between the gender groups. Of the 50 patients who underwent an intervention (CABG or PTCA) during follow-up, 44 were male and 6 were female, a non-significant trend towards male overrepresentation (two-tailed $p = 0.049$, Fisher exact test). AMI patients who underwent CABG or PTCA during the follow-up year had at one-month follow-up significantly more thoracic pain (two-tailed $p = 0.001$), breathlessness (two-tailed $p = 0.01$), lower self-esteem (two-tailed $p = 0.003$) more depression (two-tailed $p = 0.01$) less satisfying sex life (two-tailed $p = 0.01$) compared with the other AMI patients. At the follow-up after one year they did not differ significantly from the other AMI patients.

Comparisons performed across patient groups (AMI vs CABG vs PTCA) separately *within each gender* for all QL dimensions on both assessment occasions yielded only one statistically significant result: at the one-month assessment male CABG patients had less favorable experience of sex life than male AMI patients. Among female patients, the different patient groups did not differ significantly on any QL dimension. Thus, for all subsequent analyses of QL gender differences, the three patient groups were aggregated.

QL differences

Patients vs controls. It should be observed that in some tables the medians for compared categories are similar, although a statistical significant difference is reached. However, the distributions in the groups differ, as indicated by the percentile values. In *male* study patients vs *male* controls, patients were found to have more thoracic pain, more arrythmia and a less satisfactory sex life both at the one-month and one-year

follow-up. Study patients had significantly more depression, less ego-esteem, poorer general health, more shortness of breath and more anxiety than controls one month after the event but not after one year.

In *female* study patients vs *female* controls, patients were found to report more thoracic pain, more arrythmia, poorer general health and more shortness of breath at both the one-month and one-year follow-up. Patients had significantly more depression than controls one month after the event but not after one year (Table II). No statistically significant differences were found on any dimension of QL when *male and female control subjects* were compared.

Male vs female study patients

One month after the event. The results of the comparisons between all male and all female study patients at the one-month assessment are presented in Table III. Female patients had poorer QL than male patients in the dimensions of general health, feeling of arrythmia, anxiety, depression, self-esteem and experience of sex life.

One year after the event. The results of the comparisons between male and female patients at the one-year assessment are listed in Table IV. One year after the cardiac event statistically significant differences remained between gender groups; female IHD patients continued to have poorer QL than male patients in the dimensions of general health, anxiety and depression. In the dimension of self-esteem a strong non-significant trend in the same direction was found.

Table II. *Comparisons of QL assessments at one month (topmost notation) and one year (lower notation) for male patients (n = 288 and 267, respectively) vs male controls (n = 65) and female patients (n = 88 and 82, respectively) vs female controls (n = 23) by Mann-Whitney U-Wilcoxon Rank Sum test, two-tailed. Wherever statistically significant differences occur, patients have poorer QL than controls (* p ≤0.01, ** p ≤0.001)*

QL dimension	Male Patients vs controls	Female Patients vs controls
General health	**	**
	NS	**
Thoracic pain	**	**
	**	**
Feeling of arrythmia	**	**
	**	*
Feeling of breathlessness	**	*
	NS	**
Anxiety	*	NS
	NS	NS
Depression	*	*
	NS	NS
Self-esteem	**	NS
	NS	NS
Experience of social life	NS	NS
	NS	NS
Experience of sex life	**	NS
	**	NS

Table III. *Comparisons of subjective QL in male (n = 288) vs female (n = 88) patients at assessment one month after the cardiac event by two-tailed Mann-Whitney U-Wilcoxon Rank Sum test (* p ≤0.01, ** p ≤0.001). Median (10th and 90th percentile) values for QL dimensions. Wherever statistically significant differences occur, female patients have poorer QL*

QL dimension	Male patients	Female patients	*p*-value
General health	1.59 (1.24, 2.06)	1.71 (1.41, 2.29)	**
Thoracic pain	1.20 (1.00, 2.20)	1.40 (1.00, 2.42)	NS
Feeling of arrythmia	1.00 (1.00, 1.75)	1.50 (1.00, 2.00)	**
Feeling of breathlessness	1.50 (1.00, 2.50)	1.50 (1.00, 2.55)	NS
Anxiety	1.65 (1.10, 2.73)	2.05 (1.40, 3.20)	**
Depression	1.63 (1.13, 2.63)	2.13 (1.36, 2.89)	**
Self-esteem	1.60 (1.00, 2.80)	2.00 (1.20, 3.20)	**
Experience of social life	1.95 (1.40, 2.50)	1.95 (1.40, 2.50)	NS
Experience of sex life	3.00 (2.33, 4.33)	3.67 (2.33, 4.67)	*

Table IV. *Comparisons of subjective QL in male (n = 267) vs female (n = 82) patients at assessment one year after the cardiac event by two-tailed Mann-Whitney U-Wilcoxon Rank Sum test (* p ≤0.01, ** p ≤0.001). Median (10th and 90th percentile) values for QL dimensions. Wherever statistically significant differences occur, female patients have poorer QL*

QL dimension	Male patients	Female patients	*p*-value
General health	1.47 (1.12, 1.88)	1.65 (1.14, 2.24)	**
Thoracic pain	1.00 (1.00, 2.00)	1.20 (1.00, 2.20)	NS
Feeling of arrythmia	1.00 (1.00, 1.75)	1.00 (1.00, 2.00)	NS
Feeling of breathlessness	1.50 (1.00, 2.50)	1.50 (1.00, 2.50)	NS
Anxiety	1.65 (1.10, 2.61)	1.90 (1.32, 3.27)	*
Depression	1.50 (1.00, 2.50)	1.75 (1.13, 2.88)	*
Self-esteem	1.40 (1.00, 2.60)	1.60 (1.04, 3.00)	NS
Experience of social life	1.85 (1.40, 2.45)	1.83 (1.35, 2.54)	NS
Experience of sex life	3.33 (2.33, 4.67)	3.50 (2.33, 4.67)	NS

QL related to marital status. Sixty-seven percent of female patients and 89% of male patients were married or living with a partner (two-tailed $p = <0.0001$, Fisher exact test). As marital status alone could conceivably influence QL, supplementary analyses were performed on QL in single vs married patients. No statistically significant differences in QL were found when married and single patients were compared within each gender group.

Factors contributing to thoracic pain. The results of the logistic regression analyses at one-month follow-up utilizing perceived thoracic pain as the dependent variable and other QL dimensions as predictor variables were the following. In male patients, general health (odds ratio (OR) = 8.42, $p = 0.003$) and arrythmia (OR = 7.66, $p = 0.01$) reached significance as predictors, while in female patients only general health (OR = 124.87, $p = 0.01$) was significant.

At one-year follow-up the dimensions arrythmia

Table V. *Percentage of patients where QL was found to be worse at the one-year assessment compared with the one-month assessment. Male patients* n = 288 *and* 267, *respectively. Female patients* n = 88 *and* 82, *respectively*

QL dimension	Male patients %	Female patients %
General health	30	31
Thoracic pain	25	30
Feeling of arrythmia	20	19
Feeling of breathlessness	21	31
Anxiety	45	40
Depression	37	30
Self-esteem	25	20
Experience of social life	40	43
Experience of sex life	39	27

(OR = 6.65, $p = 0.005$) and shortness of breath (OR = 2.93, $p = 0.002$) predicted thoracic pain in male patients, while in female patients only shortness of breath (OR = 8.67, $p = 0.01$) was significant.

Decreased QL during follow-up. Table V shows the proportion of patients who experienced a decreased QL in a dimension when results from the one-year and one-month assessments were compared for each individual study patient. The dimensions where the largest proportion of patients (both male and female) experienced a diminished QL were anxiety and experience of social life. The largest differences between male and female patients were found in the dimensions of breathlessness and experience of sex life.

DISCUSSION

A cardiac event, whether it be an AMI or an intervention such as a CABG or a PTCA, is a critical experience for the individual, with considerable impact upon QL. An AMI is an immediate threat to the patient's life, while a CABG or PTCA may in many cases be preceded by a long period of cardiac symptoms and uncertainty about the future. Interventions are not entirely risk-free and may provoke ambiguous feelings.

While women in general may conventionally be regarded as displaying more somatic symptoms, anxiety and depressive thoughts than men, this was not the case in our normal control sample. The comparisons between normal controls and study patients show some important gender differences. In our study male patients seem to have *more* "ego infarction" (15) with more psychological consequences and a less satisfying sex life, whereas the impact on QL in female patients is primarily experienced in somatic terms. Despite similar baseline characteristics for male and female study patients, gender differences in QL following a cardiac event are evident and most pronounced in the short-term perspective, during which the initial contacts between the out-patient clinician and the patient in the follow-up period take place. Female

patients experience poorer QL compared with male patients in most dimensions assessed at one-month follow-up, and even after one year female patients reported more anxiety, depression and poorer general health than male patients.

Subjective symptoms in men and women have been compared in several previous investigations, with differing results. In a study of daily symptoms in various ages, Verbrugge (16) found that men and women suffer from the same kinds of health problems, but for women these problems occur more frequently. In their studies of the consequences of myocardial infarction, Mæland & Havik (17, 18) found that female patients reported more often being limited by chest pain and were more frequently readmitted for a suspected, but not confirmed myocardial infarction. In contrast to our findings, Mæland & Havik (17) found no sex differences in perceived global health, but these researchers apply a different assessment strategy, a scale consisting of a single item, whereas we use 17 items. In a study of myocardial infarction survivors interviewed one to two years after their infarction, Conn et al. (8) found that women reported more days of reduced activity because of an impaired state of health than men. Stern et al.'s (5) investigation of life adjustment after myocardial infarction found that women expressed more anxiety and depression than men, both in hospital and at one-year follow-up. They also report higher mortality rates for female patients.

Our findings indicate that careful symptom evaluation is especially warranted in female patients after AMI, CABG and PTCA, as they seem to have more sequelae. Moreover, it is also important during follow-up to keep in mind the possible bias against female patients in selecting candidates for revascularizsation procedures (4, 19, 20). Crisis-intervention, short-term psychotherapy or pharmacological treatment for anxiety and/or depression might be more indicated in women. Caution should, on the other hand, be exercised in interpreting somatic symptoms as manifestations of anxiety or depression, as chest pain per se was not predicted in the logistic regression analysis of the dimension thoracic pain by the assessed "psychological" dimensions of anxiety, depression or self-esteem in our sample. The observation that a sizeable number of male and female patients actually experience a decreased QL at the end of the follow-up year compared with QL at the start of follow-up both in the somatic and psychological dimensions certainly indicates that there may be room for improvement in patient management.

With regard to treatment compliance, Guiry et al. (21) showed not only that female patients had higher levels of anxiety and depression, but also that depression correlated with lower rates of smoking cessation

and exercise compliance. Blumenthal et al. (22) reported that ego strength and social introversion were significantly predictive of non-compliance to a cardiac rehabilitation programme. Thus, gender differences in QL may have a considerable input on the degree to which secondary prevention measures after a cardiac event are successful in facilitating the patients' return to a "state of complete physical, mental and social well-being", in accordance with the WHO definition of health.

Ischemic heart disease is the prime cause of death among both men and women in Sweden (as it is in the United States), but most research efforts continue to concentrate on investigations of male patients (23–26). The results presented in this study lend support to the notion that conclusions about men may not be valid for women and that we need more gender-related research. It is important to include aspects of gender differences in the management of patients with IHD, possibly by special follow-up facilities for female patients, to ensure optimal secondary prevention results after a cardiac event.

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