Differences in Patient-Reported Processes and Outcomes Between Men and Women with Myocardial Infarction

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OBJECTIVE: Previous research measuring differences in the care between men and women with myocardial infarction has focused on differences in procedure use and mortality. However, little is known about differences in processes and outcomes that are reported by patients, such as interpersonal processes of care and health status. Our goal was to measure differences in patient-reported measures for men and women who recently were hospitalized with myocardial infarction.

PARTICIPANTS AND SETTING: We surveyed by mail patients with myocardial infarction discharged to home from one of 27 Cleveland area hospitals 3 months following discharge; 502 (64%) of 783 patients responded. The mean age of subjects was 65 years and 40% were women.

MEASUREMENTS: Process measures included the quality of communication during the hospitalization and at time of discharge and reports of health education discussions during hospitalization. Outcome measures included physical and mental health component scores of the Medical Outcomes Study 36-Item Short-Form Health Survey, change in work status, and days spent in bed because of ill health. We compared processes and outcomes in men and women using multivariate analyses that adjusted for age, other demographic characteristics, comorbid conditions, severity of the myocardial infarction, and premorbid global health status.

MAIN RESULTS: In multivariate analyses, women were as likely as men to report at least one problem with communication during the hospitalization (odds ratio [OR] 0.86; 95% confidence interval [95% CI] 0.56 to 1.33) or at time of discharge (OR 1.24; 95% CI, 0.82 to 1.89) and to report that they were given dietary advice before discharge (OR 0.60; 95% CI, 0.36 to 1.01), were told what to do if they developed chest pain (OR 1.21; 95% CI, 0.66 to 2.23), or, if they smoked cigarettes, given advice about how to stop smoking (OR 0.64; 95% CI, 0.26 to 1.58). However, 3 months after discharge, women reported worse physical health ($P < .05$) and mental health ($P < .05$), were more likely to report spending time in bed because of ill health (OR 1.80; 95% CI, 1.06, 3.05), and

were more likely to report working less than before their myocardial infarction (OR 4.02; 95% CI, 1.58 to 10.20).

CONCLUSIONS: In terms of processes of care measured with patient reports, women with myocardial infarction reported their quality of care to be similar to that of men. However, 3 months following myocardial infarction, women reported worse health status and were less likely to return to work than men.

KEY WORDS: myocardial infarction; gender; patient-reported processes; outcomes; health status; patient satisfaction.

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Differences in treatment and survival have been consistently demonstrated for men and women with myocardial infarction.¹⁻¹⁵ Women hospitalized with myocardial infarctions are less likely to be treated with thrombolytics or revascularization.¹⁻⁶ Women also have a higher mortality rate following myocardial infarction, which may be partially explained by higher ages and increased comorbidity.⁴⁻¹⁵

Despite this extensive literature comparing procedures and mortality in men and women with myocardial infarction, there is little information about patients' perceptions of processes and outcomes. For example, little is known about processes of care that require patient reports to measure, such as the quality of communication during the hospitalization or at the time of discharge, or health education discussions with providers. In terms of outcomes, gender differences have seldom been examined in outcomes important to the quality of life of patients such as health status or employment status.

Our goal was to measure differences in the processes and outcomes of care for men and women hospitalized for myocardial infarction, focusing on processes and outcomes that require patient reports. We surveyed patients in a community-based cohort 3 months after their myocardial infarction. We focused on 3 domains of process of care: quality of communication during the hospitalization, quality of communication at the time of discharge, and health education discussions. In addition, we measured several health care outcomes: physical and psychological health, bed days because of ill health, and employment status.

METHODS

Study Population

All patients discharged to home with a principal diagnosis of myocardial infarction from one of 27 hospitals in

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the Cleveland metropolitan area participating in Cleveland Health Quality Choice¹⁶ between January 1 and March 31, 1995, were eligible. We mailed surveys 3 months after discharge, with up to 2 repeat mailings to nonresponders. Surveys were returned by 502 (64%) of the 783 patients. The proportion of women was similar among respondents and nonrespondents (40.4% vs 39.9%, $P = .87$), as was the mean age (65.4 vs 64.6 years, $P = .42$).

Survey Description

We included items to assess the processes and outcomes of hospital care. Process measures included reports of problems with in-hospital communication with nurses and physicians, communication problems at the time of discharge, and health education discussions between patients and providers. Problems with hospital communication, such as whether test results were explained in a way that patients could understand, and problems with communication at the time of discharge, such as whether the purposes of discharge medicines were adequately described, were measured using the component scales from the Picker-Commonwealth survey.¹⁷ Patients were classified by whether or not they reported a problem on a particular scale. To minimize respondent burden, our survey included only the scales of the Picker-Commonwealth instrument that were central to our study hypotheses rather than the entire instrument.

We selected health education discussions that patients could report and that could affect the risk of future morbidity.¹⁸ These included whether patients were given advice about how to eat a healthy diet before leaving the hospital, whether they were told what to do if they developed chest pain before leaving the hospital, and whether anyone gave them advice about how to stop smoking prior to hospital discharge.¹⁹

Outcome measures included the physical health and mental health summary component scores of the Medical Outcomes Study 36-Item Short-Form Health Survey (SF-36), bed days, and work status.^{20,21} The SF-36 summary scores combine the original 8 scales into 2 scales (worst health = 0, best health = 100), each of which is calibrated so that the mean and standard deviation in the general U.S. population are 50 ± 10 .²² Bed days were measured by asking patients how many days they spent in bed the past month because of illness.²³ We classified patients as spending either no days in bed, or 1 or more days in bed. To evaluate work status, we asked patients whether they were working full-time, part-time, or not working, both immediately before their hospitalization and at the present time. We classified patients as having decreased their amount of work if they converted from full-time work to either part-time work or not working, or from part-time work to not working.

We also collected patients' assessments of their overall health status prior to their hospitalization and demographic information.

Additional Data Collection

Each hospital provided additional clinical data obtained by chart abstractors.²⁴ This included the presence or absence of comorbid conditions (diabetes, congestive heart failure, chronic obstructive pulmonary disease, stroke, peripheral vascular disease, and previous myocardial infarction), and electrocardiographic evidence of an acute anterior myocardial infarction. A predicted risk of in-hospital death was calculated for each patient based on chart data, using a validated multivariate model.^{16,24} Chart data were available for 428 (85%) of the 502 patients.

Analyses

We did bivariate and multivariate analyses to compare men and women for each process and outcome measure, using χ^2 tests and t tests as appropriate. Our analysis of receiving advice about how to stop smoking was limited to subjects that smoked prior to hospitalization. Our analysis of change in work habits was limited to subjects that worked prior to their hospitalization.

For the multivariate analyses, we used linear regression or logistic regression, as appropriate. Our multivariate models adjusted for age, marital status, whether or not the subject had a high school education, ethnicity, insurance, history of stroke, peripheral vascular disease, congestive heart failure, chronic obstructive pulmonary disease, diabetes, prior myocardial infarction, anterior myocardial infarction, predicted risk of in-hospital death, and baseline subjective health status. For the 15% of subjects for whom we were unable to retrieve medical records, we imputed gender-specific mean values for each chart variable and included an indicator variable for imputed data. Analyses limited to the 85% of subjects with available chart data yielded similar results.

RESULTS

Characteristics of Subjects

The mean age of the patients was 65.4 years and 40% were women. Women were on average about 6 years older than men, about half as likely to be married, less likely to be working prior to hospitalization, and reported poorer baseline health (Table 1).

Process of Care

For each of the items about communication during hospitalization and at discharge (Table 2), the proportions of men and women reporting problems were similar ($P > .2$). Proportions of men and women who reported at least one problem with communication during the hospitalization (35.8% vs 33.7%, $P = .63$) or at the time of discharge (35.9% vs 40.5%, $P = .30$) were also similar. Women were

Table 1. Baseline Characteristics of Men and Women Patients

Variable	Men (n = 299)	Women (n = 203)	P Value*
Mean age, y	62.9	69.2	<.001
Ethnicity, %			
White	88.9	85.0	NS
African-American	7.7	13.0	
Other	3.4	2.0	
Married, %	80.3	46.3	<.001
Completed high school, %	75.8	68.3	.07
Uninsured or Medicaid, %	13.4	18.2	NS
Working status prior to hospitalization, %			
Working full-time	35.1	13.8	<.001
Working part-time	5.0	4.9	
Not working	59.9	81.3	
Health status prior to hospitalization, %			
Excellent	6.2	4.2	.05
Very good	21.9	16.2	
Good	31.2	29.8	
Fair	27.4	34.6	
Poor	13.4	15.2	
Comorbid conditions, %			
Prior stroke	8.9	8.9	NS
Peripheral vascular disease	9.7	8.9	NS
Congestive heart failure	10.9	12.8	NS
Chronic obstructive pulmonary disease	12.5	10.0	NS
Diabetes mellitus	24.6	31.1	NS
Prior myocardial infarction	3.6	7.8	.06
Anterior myocardial infarction on admission, %	6.1	8.9	NS
Electrocardiogram, %			
Predicted probability of in-hospital death	.046	.039	NS

*NS indicates not significant ($P > .10$)

less likely than men to report receiving dietary advice (75.8% vs 83.7%, $P = .03$) before discharge, but reported similar rates of discussion about what to do for chest pain and advice about how to stop smoking.

After adjusting for demographic characteristics, comorbid conditions, baseline health status, predicted risk of death, and electrocardiogram findings, women were as likely as men to report at least one problem with communication during the hospitalization (odds ratio [OR] 0.86; 95% confidence interval [95% CI] 0.56 to 1.33) or at the time of discharge (OR 1.24; 95% CI, 0.82 to 1.89). Women were also as likely as men to report that they were given dietary advice before hospital discharge (OR 0.60; 95% CI, 0.36 to 1.01), told what to do if they developed chest pain (OR 1.21; 95% CI, 0.66 to 2.23), or given advice about how to stop smoking (OR 0.64; 95% CI, 0.26 to 1.58).

Outcomes of Care

Three months after discharge, women reported worse physical and mental health than men and were more likely to report spending at least 1 day in bed because of poor health over the prior month (Table 3). Among those working before their hospitalization, most men returned to their previous level of work, while half of the women decreased their work level. These differences persisted in multivariate analyses (Table 3).

Relation Between Processes and Outcomes

In multivariate analyses, patients who reported one or more problems with communication during the hospitalization had lower adjusted SF-36 physical component scores (adjusted difference, 3.0 points; 95% CI, 1.0 to 5.0) and SF-36 mental component scores (adjusted difference, 3.6 points; 95% CI, 1.7 to 5.5) than patients reporting no communication problems. Similarly, patients who reported one or more problems with the discharge process had lower adjusted SF-36 physical component scores (adjusted difference, 4.0 points; 95% CI, 2.0 to 5.9) and mental component scores (adjusted difference, 3.4 points; 95% CI, 2.5 to 5.3) than patients reporting no problems.

DISCUSSION

Previous studies have documented gender differences between men and women in procedure use and mortality among patients hospitalized with myocardial infarction,¹⁻¹⁵ but few studies have assessed whether there are differences in processes and outcomes that require patient perceptions to measure. We found that women had worse health status outcomes than men, as indicated by worse physical and mental health, a greater likelihood of spending time in bed due to ill health, and a lower likelihood of returning to work 3 months after discharge; however, we found no differences in the quality of interpersonal communication or health behavior counseling for men and women. Thus, it is unlikely that previously described differences in outcomes between men and women can be explained by differences in the quality of physician-patient communication, or health behavior counseling.

The communication processes we assessed in our survey address discrete aspects of quality of care that can be measured only with patient reports. The items in our survey have previously been described by patients as components of hospital care that were most important to them.¹⁷ Although our data do not allow us to assess the technical quality of care, our results do demonstrate that for one key component of the quality of care, women and men received similar care.

We are not aware of other studies of gender differences in patient reports of process and outcome measures shortly after hospitalization for myocardial infarction. However, our results are consistent with those reporting similar mea-

Table 2. Relation Between Gender and Processes of Care: Bivariate Results

Process Measure	Men, % (n = 299)	Women, % (n = 203)	P Value*
Communication during hospitalization			
Doctor or nurse always explained tests results in a way I could understand	87.9	89.7	NS
I always got answers I could understand when I had important questions to ask the doctor	88.5	89.7	NS
I always got answers I could understand when I had important questions to ask the nurse	88.7	88.0	NS
Doctor or nurse discussed any anxieties or fears I had	86.9	86.1	NS
Family had enough chances to talk to my doctor	89.3	91.4	NS
Right amount of information given to those close to me	85.4	89.0	NS
Family given all information they needed to help me recover	91.9	91.2	NS
Involved in decisions as much as I wanted	86.5	87.9	NS
Any problem with communication [†]	35.8	33.7	NS
Communication at discharge (Before you left the hospital did someone...)			
Explain the purposes of medicines you were supposed to take at home	91.8	91.1	NS
Tell you about medicine side effects to watch for	74.6	69.8	NS
Tell you about danger signals about your illness to watch for	79.9	79.8	NS
Tell you what activities you could do after you got home	86.5	85.1	NS
Tell you who to contact for advice or help	86.3	84.5	NS
Any problem with discharge [‡]	35.9	40.5	NS
Health education discussion			
Given dietary advice before discharge	83.7	75.8	.03
Told what to do for chest pain	84.9	85.9	NS
Given advice about how to stop smoking [§]	52.6	42.1	NS

*NS indicates not significant ($P > 0.1$).

[†]Any problems reported on any of the above communication items.

[‡]Any problems reported on any of the above discharge items.

[§]Limited to the 118 patients (39 women and 79 men) who reported smoking cigarettes prior to hospital admission.

tures in other groups of patients with cardiovascular disease. Schwartz et al., for example, reported that among patients with coronary artery disease and a prior history of myocardial infarction, physical health deteriorated more over 1 year in women than in men.²⁵ Similarly, Chin and Goldman reported that in patients hospitalized with congestive heart failure, women were not more likely than men to report problems with their hospital care, but did report worse physical health than men 1 year following discharge.²⁶

Although the adjusted differences between men and women on the SF-36 scales are modest, we believe they

are clinically significant and important on a population level. For example, the 3.8-point difference on the physical function scale we documented in the bivariate analysis is approximately equivalent to the effect of a diagnosis of type 2 diabetes or chronic obstructive pulmonary disease. The 2.1-point difference in the multivariate analysis is similar to the effect of depression.²⁰ Although our data do not identify the reasons for these differences, we believe there are several potential explanations. First, women may have worse baseline health than men. We believe this is unlikely to fully explain differences in health outcomes given the consistency of results across multiple

Table 3. Relation Between Gender and Outcomes

Outcome Measure	Bivariate Results			Multivariate Results: Women Compared to Men,* β Coefficient (95% CI)	Odds Ratio (95% CI)
	Men	Women	P Value		
SF-36 physical component	40.6	36.8	< .001	-2.1 (-0.1 to -4.1)	
SF-36 mental component	49.2	46.5	.007	-2.2 (-0.1 to -4.3)	
≥1 bed day over past month, %	19.1	29.3	.01		1.80 (1.06 to 3.05)
Decreased work after myocardial infarction, % [†]	18.3	50.0	< .001		4.02 (1.58 to 10.20)

*Analysis limited to the 117 men and 41 women who worked prior to hospitalization; CI indicates confidence interval.

[†]Models adjust for age, marital status, education, ethnicity, insurance status, history of stroke, peripheral vascular disease, congestive heart failure, chronic obstructive pulmonary disease, diabetes, or prior myocardial infarction, electrocardiogram evidence of an anterior myocardial infarction predicted risk of in-hospital death, and baseline health status.

health measures, and the persistence of differences when adjusting for comorbidity and a baseline global measure of self-assessed health. Second, gender differences in outcomes may be related to differences between men and women in aspects of the quality of care other than those we measured, or that occur after discharge. Third, different health status outcomes could reflect differences in the biologic or sociologic responses to myocardial infarction in men and women. Finally, differences in employment status following myocardial infarction could be partially the result of role differences and different societal expectations in men and women.

Our results demonstrated that patients who reported no communication problems or problems with the discharge process had better SF-36 physical and mental component scores than patients who did report problems. It would be premature, however, to conclude there is a causal link between these processes and physical and mental health outcomes. In fact, we think it is unlikely that the interpersonal processes we measured in this study would have such a dramatic effect on the outcomes we studied over a short 3-month time span. Rather, we think the association between the quality of interpersonal processes and outcomes is, in part, the result of a tendency of patients with worse health status to report less satisfaction with their care than patients with better health status.²⁷ For example, we previously reported in this journal that among hospitalized older patients, changes in health status during a hospitalization are not associated with satisfaction with the hospitalization after controlling for discharge health status.²⁷ These previous data suggested that the tendency of patients with better health status to report greater satisfaction with their care was better explained by an intrinsic tendency for patients with better health to be more satisfied with their health care, rather than by a tendency for patients whose health improves after an encounter with the health system to be more satisfied. Thus, the association we observed between better communication and discharge processes and outcomes may have been the result of patients with better health outcomes being more satisfied with their hospital care. Nonetheless, the finding of an association between interpersonal processes and outcomes, along with the lack of gender differences between these processes, strengthens the conclusion that gender differences in outcomes are not explained by differences in the interpersonal processes measured in this study.

Although some of the specific aspects of communication and behavior counseling we measured might not by themselves be expected to influence outcomes 3 months after myocardial infarction, we believe that in aggregate these measures describe a process of care that may have strong influences on long-term outcomes. For example, the quality of the physician-patient relationship, especially the quality of physician-patient communication, has been demonstrated to have significant effects on the outcomes for several chronic conditions.^{28,29} Likewise, the

belief that counseling patients about health behaviors will improve outcomes is supported by research demonstrating a strong relation between physician counseling about adverse health behavior and the subsequent cessation of that health behavior.^{19,30}

A strength of our study was the use of a representative community-based sample. Several limitations of our study should also be considered. First, we had only limited data on baseline health status, and only partial data on comorbid conditions and the severity of the myocardial infarction. Nonetheless, as most previous studies of gender differences in outcomes following myocardial infarction have used administrative databases, our ability to adjust for potential confounders exceeds that of most published studies. Second, we have no data about use of invasive procedures or thrombolytic therapy in our patients. Third, nonresponse bias may have affected our results. Nonetheless, our response rates exceed those of many community-based surveys, and were similar for men and women. Finally, it is possible that women may systematically report lower scores on health status measures such as the SF-36. We think this is unlikely to explain our results, for several reasons. First, normative data suggest that among older patients, median scores among men on the SF-36 summary scales are no more than 1 point higher than among women.²⁰ Second, adjustment for baseline health status most likely controlled for this possible reporting bias. Third, the consistency across multiple measures of health status, including more objective measures such as bed days and changes in employment, supports the conclusion that women had worse health status outcomes.

In conclusion, we found that among patients hospitalized for myocardial infarction, women were not more likely than men to report problems with the quality of communication in the hospital or at discharge. However, women reported poorer health outcomes than men 3 months following myocardial infarction. Although it is reassuring that the care provided to men and women was similar for this one area of quality, the reasons for outcome differences in men and women with myocardial infarction remain undetermined.

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