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# Employment Changes Among Patients Following Coronary Bypass Surgery: Social, Medical, and Psychological Correlates

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DURING THE PAST DECADE the number of coronary artery bypass operations performed in the United States has been increasing dramatically. It is estimated that more than 100,000 procedures are now performed annually at an approximate cost in the mid-1970s of \$10,000–\$12,000 per procedure (1,2). This cost increases to an estimated average of \$20,000 for patients with unstable angina (3). The cost of the surgery is but one important economic consideration. Another is whether the patient resumes gainful employment following surgery. Among patients in their economically active years, return to work is a particularly important index of the recovery process.

Reports in *Lancet* in 1976 claimed that bypass surgery is capable of improving the "quality of life" of angina patients (4,5). Several studies have reported that 70 to 80 percent of such patients experience significant improvement in angina symptoms in the early years following surgery (6,7). Thus, the data suggest

that a majority of patients could be expected to return to work following surgery. In the studies we reviewed, the percentage of patients returning to work ranged from 90 to 50 percent (8–18). Therefore, further investigation is needed concerning the factors that influence return to work and the quality of the postoperative work experience. In the study we report, we sought to evaluate the effects of surgery on the work status of 496 coronary artery bypass patients. Changes in employment status, the work environment, and the patient's perception of these changes were examined with respect to social, medical, and psychological factors.

Most studies reported in the literature focused on the male bypass patient. The large number of men undergoing this surgery annually makes this emphasis understandable. Although the procedure is becoming more common among women, there is a paucity of data on the female bypass patient. Therefore, our comparisons of men and women provide an opportunity to further knowledge concerning the factors that contribute to an important aspect of the recovery process, namely, return to gainful employment among patients undergoing this surgical treatment.

Return to work may be partly a factor of the worker's choice, but it is also affected by the willingness of the employer to rehire a person with a history of severe coronary disease. In fact, 15 percent of the survey respondents in this study reported encountering job discrimination as a function of their heart surgery. It has often been alleged that forcing a person to retire under-

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mines his or her morale and raises the risk of both psychological and physical health problems. This issue is difficult to study because of the problem of discerning whether psychological and physical health status led to retirement or whether retirement led to poorer health. Because of its importance, however, the impact of forced retirement on persons below the mandatory retirement age was also assessed.

In summary, the objectives of this study were to answer the following questions. First, what is the profile of the bypass patient who typically returns to work postoperatively, and do the profiles for men and women differ? In addition to extent of disease, what difficulties are characteristic of those not returning to work? Last, what effect does forced retirement have on the heart patient's postsurgery adjustment?

## **Methods**

**Sample characteristics.** A 25 percent random sample was drawn from former surgery patients listed on the membership rolls of each chapter of Mended Hearts, Inc., a self-help group of heart surgery patients with chapters located throughout the United States. Each selectee was mailed a precoded 8-page questionnaire and a form to indicate consent for participation. Of the 1,400 questionnaires mailed, more than 1,100 were returned for a response rate of 81 percent. The high rate of return suggests that the respondents were likely to be representative of the total group membership. Although chapter patients from all sections of the na-

tion were represented, we have no information on how representative this sample is of all U.S. heart surgery patients, inasmuch as this surgical population has not been adequately described.

Overall, 76 percent of the respondents (724) had bypass surgery. The 24 percent who had valve surgery or surgery to repair congenital anomalies were excluded from this report, as were those having rare or minor procedures. There were six times as many men as women in the bypass group. The average coronary bypass respondent underwent surgery at age 54.

Given the heterogeneous nature of the sample and a desire to make direct comparisons with other published studies, the sample for this report was restricted to white patients between the ages of 40 and 60 years who had their first coronary artery bypass surgery within the past 5 years. The upper age limit was set in order to allow an adequate interval for returning to work which would not overlap with usual retirement ages. The selection of white persons had minimal influence because less than 1 percent of the sample were members of other racial groups. Limiting the sample to initial surgery was necessary to control for prior recovery experiences. Finally, the distribution of the number of years since surgery in this sample ranged from 1 to more than 15 years. Thus, only patients who had the surgery within the past 5 years were retained so as to control better for accuracy of recall and changes in the surgical procedures over time. When all inclusion criteria were

Table 1. Sociodemographic and job-related characteristics of patients, by work status before surgery and sex

Characteristics	Men's work status (percentages)				Women's work status (percentages) <sup>1</sup>		
	Not working (N = 31)	Full time (N = 340)	Part time (N = 9)	Self employed (N = 46)	Not working (N = 29)	Full time (N = 35)	Part time (N = 5)
Family income of \$20,000 or more <sup>2</sup> . . . . .	23	39	22	50	31	29	40
College graduate <sup>3</sup> . . . . .	13	24	22	15	7	20	20
Type A score (mean) . . . . .	3.5	1.2	-3.1	2.6	-0.5	0.8	6.6
Symptom duration (median years) <sup>2,4</sup> . . . . .	4.0	1.1	3.0	2.5	1.2	1.0	0.7
Mean years since surgery . . . . .	3.1	3.1	4.0	2.8	2.6	2.9	2.2
3 vessels bypassed . . . . .	48	44	33	52	24	31	0
Job before surgery:							
Heavy exertion . . . . .	...	16	11	26	...	14	20
Professional level <sup>4</sup> . . . . .	...	44	44	57	...	37	0
Mean hours worked per week <sup>4,5</sup> . . . . .	...	45	32	55	...	39.1	26.2

<sup>1</sup> 1 woman was self-employed.

<sup>2</sup> Differences between male workers and nonworkers  $P \leq .05$ .

<sup>3</sup> Differences between female workers and nonworkers  $P \leq .05$ .

<sup>4</sup> Differences between full-time and self-employed men  $P \leq .05$ .

<sup>5</sup> Differences between women employed full time and part time  $P \leq .05$ .

employed, the sample available for study was reduced to 496 persons, including 70 women.

**Questionnaire content.** The questionnaire contained a broad array of precoded items covering demographic and social background, life circumstances before surgery, the surgical experience, emotional and social adjustment in the first year after surgery, and appraisals of current physical and emotional health, social relationships, and economic factors (19). Occupational level before and after surgery was also investigated. The coronary-prone or type A behavior pattern was estimated by a brief ad hoc scale (20).

Some questions probed changes in the work environment before and after surgery and the patient's reactions to them. A broad spectrum of issues was addressed including preparation for return to work, changes in work status, changes in the work environment, relationships with co-workers and employers, job title, physical exertion, job pressures, satisfaction, and responsibility as well as the timing of return to work and the number of hours worked per week before and after surgery.

**Results**

**Work status before surgery.** Since those working just before surgery are most likely to be employed again afterward, the impact of preoperative employment was the first issue to be examined. As expected for this age cohort, more men (92 percent) than women (59 percent) were employed preoperatively.

In table 1, selected characteristics are presented by work status before surgery. The major differences between preoperative employed and nonemployed men

were that income levels were lower and the presurgical symptom duration longer for the nonemployed. Level of education, type A behavior, and years since surgery were not significantly different between the combined employed groups and those not working. Among the patients working before surgery, the self-employed men were more likely than the "employees" to be in professional occupations, have higher family incomes, and work longer hours. Men employed full time had the shortest average duration of preoperative symptoms of all employed categories.

Because of the few women patients in the sample, many relationships are only suggestive rather than being statistically significant. Working women were better educated than those not working before surgery (table 1). Working women were as likely as men to report that their job before surgery involved heavy physical exertion. Compared to men, women tended to work fewer

Table 2. Employment rates among total sample at time of surgery and rate of return to work among the employed, by sex

Type of bypass	Total sample		Employed at surgery		
	Number	Percent employed at surgery	Number	Percent returning to work	Average months to return
<b>Men</b>					
1-vessel . . . . .	58	91	53	79	3.8
2-vessel . . . . .	176	94	165	82	3.9
3-vessel . . . . .	192	92	177	81	3.5
<b>Women</b>					
1-vessel . . . . .	19	58	11	46	4.4
2-vessel . . . . .	33	58	19	53	5.2
3-vessel . . . . .	18	61	11	82	4.6

Table 3. Preoperatively employed patients who returned to work, by sex and preoperative sociodemographic characteristics

Preoperative characteristic	Men (N = 395)		Women (N = 41)	
	Number	Percent	Number	Percent
<b>Family income:</b>				
\$20,000 or more	158	188	12	67
Less than \$20,000	220	180	29	55
<b>Education:</b>				
College graduate	90	87	9	56
Less than college graduate	304	82	32	59
<b>Job-related physical exertion:</b>				
Heavy	67	166	6	33
Not heavy	321	187	33	67
<b>Job level:</b>				
Professional	177	189	14	57
Nonprofessional	209	179	25	64
<b>Employment:</b>				
Full time	339	83	35	63
Part time	9	89	5	40
Self-employed	46	85	1	0

<sup>1</sup> Percentages returning to work within each subgroup differ at  $P < .05$  (by chi-square) across levels of the demographic characteristic.

NOTE: some sections of the table have slightly lower total sample sizes due to nonresponse.

hours per week, a smaller proportion were college graduates, and the women had undergone their heart surgery more recently.

The relationship between employment status at surgery and the number of vessels bypassed is shown in table 2. This measure of extent of disease showed no relationship to prior working status, but women generally had fewer vessels bypassed than men (table 1).

The return to work rate for preoperatively employed persons was high for males (81 percent) and much

Table 4. Postsurgery medical conditions among preoperatively employed patients, by sex and return to work status, in percentages

Postsurgery condition	Men		Women <sup>1</sup>	
	Returned (N = 328)	Did not return (N = 67)	Returned (N = 24)	Did not return (N = 17)
Heart-related hospitalization	8	12	21	24
Any hospitalization	44	51	63	59
Bedridden 3 or more days in past month <sup>2</sup>	3	10	13	18
Severe, recurring chest pain or dyspnea in past month	2	8	8	12
Number of medication types currently taken <sup>2</sup>	1.6	2.1	2.3	2.6

<sup>1</sup> Small sample sizes for these groups seriously reduce the power to detect significant differences.

<sup>2</sup> Differences between returnees and nonreturnees  $P \leq .05$ .

lower for females (58 percent). Return rates were uniformly high for males with 1-, 2-, or 3-vessel disease (table 2). For women with 1- and 2-vessel bypasses, the proportion returning to work was substantially lower than for women with triple bypasses and for men of all three categories. Males also tended to return to work an average of 3.6 months after surgery; females took an average of 1 month longer to return.

**Returnees versus nonreturnees.** The remainder of this analysis concentrates on that group with the greatest probability of postoperative employment—the 395 men and 41 women who were employed preoperatively. Table 3 shows characteristics of this group associated with return to work following surgery. Men likely to return had higher family incomes and held professional

Table 5. Preoperative characteristics of patients employed before surgery by postoperative retirement status, in percentages

Characteristics	Men currently working (N = 282)	Retired men		P value	Women currently working (N = 12)	Retired women		P value
		Forced (N = 81)	Voluntary (N = 32)			Forced (N = 17)	Voluntary (N = 12)	
<b>Sociodemographic:</b>								
Family income of \$20,000 or more <sup>1</sup>	44	37	16	.01	42	12	42	.12
College graduate <sup>1</sup>	25	21	9	.12	25	24	17	.86
Type A score <sup>2</sup>	.9	2.1	1.6	.65	-2.4	5.1	.6	.05
<b>Preoperative job-related:</b>								
Heavy physical exertion <sup>1</sup>	12	30	25	.001	8	18	17	.76
Professional level <sup>1</sup>	50	35	28	.01	42	18	50	.15
Mean hours worked per week <sup>2</sup>	46	46	45	.77	40	34	38	.32
<b>Medical:</b>								
3 vessels bypassed <sup>1</sup>	45	46	41	.98	33	24	25	.66
Symptom duration (median years) <sup>2</sup>	2.9	4.1	3.2	.13	3.1	2.2	4.1	.67

<sup>1</sup> Probability determined by chi-square (df = 2).

<sup>2</sup> Probability determined by 1-way analysis of variance.

**Table 6. Postsurgery conditions among preoperatively employed patients, by sex and postoperative retirement status, in percentages**

Postsurgery condition	Men				Women			
	Currently working (N = 282)	Retired		P value	Currently working (N = 12)	Retired		P value
		Forced (N = 81)	Voluntary (N = 32)			Forced (N = 17)	Voluntary (N = 12)	
Heart-related hospitalization <sup>1</sup>	17	42	25	.001	8	47	33	.09
Any hospitalization <sup>1</sup>	41	63	47	.001	42	77	58	.16
Bedridden 3 days or more in past month <sup>1</sup>	8	19	16	.01	16	35	8	.20
Severe, recurring pain <sup>1</sup>	2	6	6	.07	0	6	25	.09
Other continuing health problem <sup>1</sup>	30	41	48	.03	16	37	50	.09
Number of medication types <sup>2</sup>	1.4	2.4	2.2	.001	2.1	2.9	2.3	.40
Physician's preparation for return to work inadequate <sup>1</sup>	3	10	14	.03	8	33	16	.03

<sup>1</sup> Probability determined by chi-square (df = 2).

<sup>2</sup> Probability determined by 1-way analysis of variance.

jobs requiring little physical exertion. For the smaller number of women, none of these variables were associated with statistically reliable differences. Level of education was not statistically associated with return to work for either sex. Return to work rates were comparable for men employed full time, part time or self-employed. For women, this comparison cannot be safely made because of small sample sizes. Unfortunately, no data were available on the working status of the patient's spouses. In this age group, however, a small percentage of the wives and a large percentage of the husbands could be expected to be employed. This discrepancy could account for some of the sex differences among those returning to work.

Postoperative medical problems in persons returning and not returning to work are presented in table 4. Two statistically significant differences were noted for men. First, more of the men not returning to work required bed rest for more than 3 days in the past month; nevertheless, only 10 percent of the nonworkers, as compared with the returnees, were so affected. Second, the nonreturnees also had been prescribed more types of medication. The same trends appeared for women, but

they were not statistically significant. Other variables examined showed similar trends, that is, a tendency toward more hospitalizations, especially heart related ones, and more frequently recurring chest pains or dyspnea during the past month. Yet, except for all hospitalizations, these markers of ill health were experienced by only a small minority of the respondents, and they make only a small contribution to explaining failure to return to work. Alleviation of angina, for example, was gratifyingly high in this sample with 90 percent of men and 79 percent of women reporting total or partial relief of angina and dyspnea postoperatively. Still, women manifested far more of all these markers of ill health than did men, irrespective of employment status.

**Retirement status.** In this retrospective study, retirement status was identified as follows: (a) forced to retire, (b) voluntarily retired, and (c) currently working. All persons were younger than the traditional retirement age of 65 years.

Selected comparisons are summarized in table 5. Men currently working differed from those who retired

**Table 7. Preoperatively employed patients who reported worsened feelings after surgery, by sex and postoperative retirement status, in percentages**

Changed for worse regarding—	Men				Women			
	Currently working (N = 282)	Retired		P value	Currently working (N = 12)	Retired		P value
		Forced (N = 81)	Voluntary (N = 32)			Forced (N = 17)	Voluntary (N = 12)	
Pleasure in life	11	26	31	.01	17	29	8	.35
Worry	20	32	34	.02	42	41	42	.99
Depression	20	35	38	.01	42	59	33	.37
Ease of adjustment to changes	19	35	28	.01	8	47	25	.08

voluntarily in what has now become a familiar profile. They represent the upper socioeconomic status as reflected in the higher income, education, and occupation levels and jobs requiring little physical exertion. They did not differ in terms of type A behavior or in the number of hours worked per week. Again, the benefits and advantages of being able to work longer following surgery are more likely to be enjoyed by the upper socioeconomic level worker. In income and education, those forced to retire more closely resembled those currently working than those who retired voluntarily. They differed in terms of holding jobs which required more physical exertion, and they were less likely to have a professional level job than those who continued to work. All groups tended to report substantial amounts of overtime work.

Characteristics associated with retirement for females are also shown in table 5. Like their male counterparts, female patients showed the same upper socioeconomic status pattern but, with the reduced sample, only one trend is significant. It shows that women forced to retire were more likely to exhibit type A behavior. A similar but nonsignificant trend was observed for men. Unlike the men, women retiring voluntarily were as likely to be professionals as those who continued to work. Moreover, men forced to retire tended to have a long period of experiencing symptoms before surgery compared with men who retired voluntarily, but the opposite trend was the case for women.

The associations observed between postsurgical medical conditions and retirement status for men and women are presented in table 6. For all outcomes examined, those currently working experienced the least morbidity. Those who reported that they had been forced to retire, however, form the extremes in four of the seven comparisons shown. Thus, as far as medical problems related to the heart surgery are concerned, those forced to retire represent a group with a higher percentage of morbidity, both for men and for women.

To complete this profile, the data presented in table 7 illustrate, for the same three groups, the associations found between postoperative emotional adjustment and retirement status. It is important to note that the prevalence rates we report are for the study month in comparison to the way the patient felt before surgery. Subjects were asked to respond, on a 5-point scale, ranging from much worse through no change to much better, how they felt nowadays (that is, this month) in comparison to the way they felt 1 year before their surgery. The results in table 7 are only for those reporting they felt worse or much worse. Men who were forced to retire, or who retired voluntarily, uniformly reported high rates of negative emotional adjustment problems

compared with those currently working. The pattern is less consistent for the few voluntarily retired women, but the women forced to retire tended to have the worst reported emotional adjustment on 3 of the 4 indices (but the difference was not statistically significant because of the small sample).

## Discussion

In this study we attempted to document the relation of postoperative employment status to economic, social, and psychological statuses of persons who had coronary bypass surgery in the previous 5 years. This sample is adequately representative only of the nationwide organization of former heart surgery patients; how well it represents all persons in the United States who have had major heart surgery cannot be demonstrated because the characteristics of that larger population are not known. The data reported by our respondents, in general, did not differ greatly from what our experienced clinical consultants believe to be characteristics of bypass surgery patients. Nevertheless, caution in interpretation is warranted because these data are derived from patients' self-reports of states of health in a retrospective study.

The socioeconomic data suggest that, compared to the general U.S. population in this age range, the membership of Mended Hearts, Inc., has higher levels of education and higher presurgical occupational status. If major heart surgery is more readily available to middle- and upper middle-class persons, it is possible that the population of U.S. heart surgery patients may differ from the general population in the same direction. A recent study conducted in Buffalo, N.Y., provides some evidence that people in lower occupational and economic levels are less likely to have bypass surgery (21).

In our sample, rate of return to work is highest for professionals perhaps because they have the most authority and flexibility over their own work situations. Nevertheless, the return to work rates do not drop below 80 percent until one reaches blue-collar levels.

Most respondents came from cohorts of patients whose surgery had been performed since 1973, and hence loss from the sample due to deaths following surgery seems acceptably low. In terms of the influence that the course of recovery has on entry into Mended Hearts, Inc., the opinion of the organization's leaders is that persons with a poor initial course of recovery are less likely to join the organization. Also, persons who quickly establish their normal routine and social activities often feel that they have no further need for a patient organization and drop out of membership. Thus, it appears that the membership lists represent a distribution of recovery outcomes truncated at the extremes, and per-

haps, the mean level of recovery of the current membership may not differ seriously from the true but unknown mean of the total population.

In most recent studies concerning the effects of this surgery on postsurgical employment, return to work rates range widely from 90 to 50 percent. For example, in one study, patients experienced no noticeable increase in work activities postoperatively; for example, there was no net improvement in hours worked after surgery among 350 bypass patients (8). The authors also reported no statistically significant relationships between return to work rates and the factors of age, sex, marital status, and occupation. The findings with respect to occupation and sex are in direct contrast to those reported in this study.

On the other hand, in a study involving 893 men, the investigators report that 90 percent of those under 55 years and 75 percent of those over 55 returned to work an average of 14 months after surgery (9). The overall return to work rate was 83 percent. This high level of re-employment is similar to that reported for survivors of myocardial infarction (22). Similar rates of return to work were reported in a third study of 564 male bypass patients (10). The researchers found that 90 percent of the men under 55 years, 68 percent of those 55-59, and 44 percent of those 60 years or older at surgery were employed 4 years after surgery. Of patients not employed before surgery, 22 percent were found to be employed 4 years later. In a fourth study, the investigators monitored 329 survivors of bypass surgery an average of 2 years postoperatively and found that 81 percent of those under 55 years and 75 percent of those over 55 years old returned to work (11). The overall return rate was 79 percent. Symmes and co-workers also reported that 11 percent of the patients who were unemployed at the time of surgery returned to work following surgery. Finally, in two other studies, somewhat different results were reported. Among patients working at the time of surgery, David and co-workers observed that only 62 percent returned to work (12), and the proportion reported by Frick and co-workers was 60 percent (13).

Thus, the high preoperative employment rate and the high postoperative return to work rate for men in our study replicates rates reported by several other investigators who used large clinical samples. The relatively quick average of 3.6 months to return to work is also a significant indicator of the success of this type of surgery. In men, the short average recuperative period and the high percentage of patients returning to work speaks well for this aspect of the recovery process. The much lower preoperative work rate and the smaller return to work rate for women is noteworthy, as is the

longer average recuperative interval. These observations deserve further exploration for the underlying reasons, and perhaps the vocational rehabilitation services offered to women should be upgraded.

Return to work following surgery was most clearly related to socioeconomic level for both sexes in this study. In addition to the differences in physical exertion and monetary rewards, the motivation to return to work may also differ systematically among different occupational groups. It is known that work satisfaction tends to follow the same declining profile across occupational status classifications.

Another correlate of return to work was the patient's postoperative physical health. Those men who experienced more morbidity postoperatively were significantly less likely to have ever returned to work. This observation is in agreement with several studies which indicate a strong association between postoperative angina and resumption of employment (10-12). A related characteristic to emerge from these comparisons is the observation that, on the average, men who were unemployed at the time of surgery experienced symptoms for nearly 5 years before surgery. Thus, examining return to work rates among those working full time before surgery is possibly biased in favor of those in better health at surgery. Furthermore, some persons do not return to work after surgery even though they are markedly improved in terms of symptoms and functional capacity. Logue and co-workers, in particular, noted that only 50 percent of patients returned to work, although 90 percent experienced symptomatic improvement and relief of angina (18). Physiological improvement is sufficient to bring some patients back to work, but many others need added motivation. Unfortunately, no data were collected concerning the patient's health insurance or retirement benefits. These benefits are often so financially generous that they tend to make returning to work a less attractive option.

An important new observation involves patients who were forced to retire. Men (but not women) forced to retire were more likely to have higher socioeconomic status than those who retired voluntarily. Women (but not men) forced to retire were more likely to experience greater postoperative morbidity and poorer emotional adjustment and to report, as a group, that their physicians had least adequately prepared them for return to work. Thus, potentially they face a more difficult adjustment following forced retirement, as the continuing and chronic nature of these adjustment problems seems to indicate. They are a particularly vulnerable group of patients who would seem to require additional postoperative support and counseling. Further research is needed to clarify and replicate these potential high-risk

groups and to plan for more appropriate clinical and psychological management following surgery.

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## SYNOPSIS

**ZYZANSKI, STEPHEN J.** (Case Western Reserve University School of Medicine), **ROUSE, BEATRICE A., STANTON, BABETTE A., and JENKINS, C. DAVID:** *Employment changes among patients following coronary bypass surgery: social, medical, and psychological correlates. Public Health Reports, Vol. 97, November-December 1982, pp. 558-565.*

The relations of socioeconomic and psychological factors to resumption of employment following coronary artery bypass surgery were studied using a questionnaire returned by a sample of 426 men and

70 women. The sample was drawn from the membership of Mended Hearts, Inc., a nationwide voluntary organization of persons who have had heart surgery.

Preoperatively, more men (92 percent) than women (59 percent) were employed. Return to work rates were high for men (81 percent) and much lower for women (58 percent). The 395 men tended to return to work an average of 3.7 months after surgery whereas the 41 women took an average of 4.8 months. Return to work following surgery was most clearly related to socioeconomic level for both sexes. In addition, for men, those most likely to return had less

postoperative morbidity and held jobs requiring little physical exertion.

Patients who reported that they were forced into an early retirement represent a particularly vulnerable group in that they were more likely to experience the most postoperative morbidity. As a group, they believed that their physicians had least prepared them to return to work, and they experienced the poorest emotional adjustment. Thus, women and those forced into early retirement represent two potentially high-risk groups of patients who would seem to require additional clinical and psychological management following surgery.