Women's Hearts Need Special Treatment

Gunilla Burell and Brittmarie Granlund

Coronary heart disease (CHD) is the leading cause of death for both men and women in the Western world. Some studies show that the observed decline in cardiovascular mortality is not as pronounced among women as among men. There is a growing awareness that most earlier studies both on primary and secondary risk factors, diagnosis, prognosis, and rehabilitation have focused mainly on men. Thus, there is a need to develop knowledge about women with CHD and to address gender issues in treatment and rehabilitation strategies. Negative affect and emotions increase risk and may interfere with effective cardiac rehabilitation. Therefore, methods for coping with emotional stress need to be included in treatment regimens after a coronary event. The feasibility of a stress management program for women with CHD was assessed in a pilot study. The program consisted of twenty 2-hr group sessions during 1 year, with 5 to 9 participants per group. The pilot study showed that this treatment program had a low dropout rate and resulted in improvement in quality of life and reduction in stress and symptoms. Further work to optimize psychosocial interventions for women with CHD is needed.

Key words: coronary heart disease (CHD), cardiac rehabilitation, psychosocial intervention, stress management, gender differences, women

"Men die—women suffer." Women in Western countries seek more medical treatment, use more medication, and live longer than men. But they live with greater disability (Grossi, Soares, & Lundberg, 2000). Cardiovascular disease is the leading cause of death for women in the Western world. Although there has been a decline in cardiovascular mortality due to substantial improvements in surgical interven-

Gunilla Burell and Brittmarie Granlund, Department of Behavioral Medicine, Umeå University, Umeå, Sweden.

This research was funded by the National Board of Health and Welfare in Sweden.

Correspondence concerning this article should be addressed to Gunilla Burell, Department of Behavioral Medicine, Umeå University, S–901 85 Umeå, Sweden.

tions and effective medications (Tunstall-Pedoe et al., 1994), this decline is more evident among men than women (Peltonen, Lundberg, Huhtasaari, & Asplund, 2000). There is a growing number of surviving coronary patients living with chronic illnesses such as heart failure, many of whom are older women. This population subgroup has been neglected, relative to younger men. There is a need to improve their care. The purpose of this article is to highlight the need for gender-specific cardiac rehabilitation programs and to present preliminary data on a pilot cardiac rehabilitation program for women.

CARDIAC RISK AND REHABILITATION: GENDER GAPS

Cardiac rehabilitation and secondary prevention programs are to a large extent based on clinical trials of younger male patients. Results have been generalized and applied to women and elderly patients. They have not generally been evaluated for effectiveness in women. *Optimal* treatment is not necessarily *the same* treatment for all.

Increasing evidence points to the importance of depression as an independent risk factor for first and recurrent cardiac events. Numerous studies show that 20% to 40% of coronary heart disease (CHD) patients exhibit depressive symptoms or syndromes (Ahearn et al., 1990; Ariyo et al., 2000; Carney, Freedland, Rich, & Jaffe, 1995; Ferketich, Schwartzbaum, Frid, & Moeschberger, 2000; Ford et al., 1998; Frasure-Smith, Lespérance, & Talajic, 1993, 1995; Horsten, Mittleman, Wamala, Schenck-Gustafsson, & Orth-Gomér, 2000; Ladwig, Roll, Breithardt, Budde, & Borggrefe, 1994). These studies show that depressive symptoms have an adverse impact on prognosis both immediately after a cardiac event (Frasure-Smith et al., 1993, 1995) as well as several decades after the event (Ford et al., 1998). Vital exhaustion—a syndrome of unusual fatigue and loss of energy, increased irritability, and depressive symptoms-has also been demonstrated to increase risk of MI (Appels, Golombeckm, Gorgels, De Vreede, & van Breukelen, 2000; Appels & Mulder, 1988) and of recurrent angina pectoris after angioplasty (Mendes de Leon, Kop, de Swart, Bar, & Appels, 1996). "Type D personality" was shown to increase risk of MI (Denollet et al., 1996). This "distress" syndrome entails a cluster of negative affects and social inhibition.

However, these studies have included only, or mostly, men with CHD. It is rare that men and women have been analyzed separately and compared with each other (see, e.g., the review by Brezinska & Kittel, 1995). Thus, the conclusion must be drawn that there is substantial evidence for men that hostility, depression, social isolation, and inability to express feelings and emotions contribute to increased risk of CHD. It has been inferred that such risk factors affect women, too. However, there may be other psychosocial risks for women, of which we have little knowledge so far.

CARDIAC RISK AND REHABILITATION IN WOMEN

Psychosocial Risk Factors for an Initial Coronary Event

The Framingham Study (Haynes & Feinleib, 1980) showed that women of lower socioeconomic status (SES), and who experienced tension, anxiety, suppressed hostility, lack of vacations, and loneliness, were at increased risk of CHD. House-wives were at particular risk and being employed outside the home was protective. However, tension between work demands and personal commitments may increase risk of CHD (Dixon et al., 1991), especially if a woman's boss is nonsupportive (Eaker, 1989). After adjustment for known risk factors, Dixon et al. (1991) demonstrated that incidence of CHD was significantly elevated in women who felt that their professional opportunities had been constrained by personal commitments to husband and children, and that their family was hurt by their job involvement. This points to a major gender role-related difference between men and women: Many women derive self-esteem from relational success and satisfaction, whereas the male role demands vocational and status success.

Hallstrom et al. (1986), in a prospective study, showed passive dependency, neuroticism (i.e., anxiety), and major and minor depression predicted angina pectoris. Findings from a population-based study in Stockholm (The Stockholm Female Coronary Risk Study) showed that although most women were working outside the home, the main stressors were not work-related, but associated with family and marital problems. Both the risk of developing CHD and of suffering a recurrence were elevated in women with family-related problems. The effect of these factors was stronger in women who had poor coping abilities, were of lower SES, were socially isolated, and were depressed. A recent study by Hallman, Burell, Setterlind, Oden, and Lisspers (2001) showed that women were more sensitive to certain stress-related factors than were men. Psychosocial risk factors that were stronger predictors of CHD for women were physical stress reactions, emotional stress reactions, burnout, family relationships, and daily hassles.

The profile that emerges of "coronary-prone" women is the experience of worries, anxiety, depression, exhaustion, burnout, and low self-esteem, in such settings as a lack of perceived support, low status and powerlessness at work, and considerable family stress. What, then, happens after the woman has had her cardiac event?

Prognosis After the Cardiac Event

Female patients with CHD are often diagnosed and treated by different clinical standards than male patients and, in particular, those women with angina pectoris have often been misunderstood, misinterpreted, and misdiagnosed (Ayanian & Epstein, 1991, 1997). Women have worse prognosis after acute myocardial infarction

(MI) even when adjusted for clinical covariates (Marrugat, Gil, & Sala, 1999). Women report greater general morbidity following an MI than men, including more chronic illness, poorer health, and longer period of reduced activity (for an overview, see Brezinska & Kittel, 1995).

Post-MI women are more likely than men to be anxious, dissatisfied with social support (Frank & Barr-Taylor, 1993), and depressed (Horsten, 2000). Schron, Pawitan, Shumaker, and Hale (1991) showed that post-MI women were more limited in social functioning, less satisfied with their current life situations, and reported more emotional and physical stress symptoms than men, regardless of age and severity of disease.

Psychosocial risk factors increase risk of recurrent CHD. Lack of social support (Orth-Gomér, 1998), low SES (Wamala, 1999), and exhaustion (Appels, Falger, & Schouten, 1993) are important risk factors for recurrence. This array of psychosocial stressors tends to cluster in certain groups and may dramatically increase the likelihood of poorer health outcomes. For example, women in Stockholm who experienced both work and family stress had a five-fold increased risk for CHD compared to women who did not have either of these experiences (Orth-Gomér, 2000). A follow-up of 64 women and 315 men in North Sweden after coronary artery bypass graft (CABG) surgery (Lerner, 2000) showed that women were significantly more depressed than men both before and after surgery. Presurgery they did not differ in anxiety; however, postsurgery women were significantly more anxious than men. The overall results showed that the women's quality of life was significantly lower than the men's both before and after CABG surgery. Thus, distress, feelings of inadequacy, and psychosocial stressors related to family demands may interfere with recovery and increase the risk for recurrent CHD.

Rehabilitation

Previous evaluations of gender-mixed programs have revealed that women are less likely to participate in cardiac rehabilitation programs than men following an MI or CABG surgery. They show lower attendance rates and greater dropout rates from such programs (Ades, Waldmann, McCann, & Weaver, 1992; Boogard, 1984; Conn, Taylor, & Abele, 1991; Downing & Littman, 1994; Haskell, 1994; Schuster & Waldron, 1991). Some reasons for the lower participation and attendance in women may include the physicians' lack of recommendation or referral to cardiac rehabilitation, or a dependent spouse at home who may make attendance more difficult. Because women with CHD are generally working in low status occupations, they may have difficulties in taking time off from work. However, when women do participate in cardiac rehabilitation, they have shown to have similar or better improvement (Ades et al., 1992; Cannistra, Balady, O'Malley, Weiner, & Ryan,

1992; Toobert, Glasgow, Nettekoven, & Brown, 1998). Data from an ongoing study in North Sweden featured active personal follow-ups of men and women after their cardiac event (Norrman, 2002). Results indicated that depressed women attended the offered rehabilitation programs to a larger degree than men and nondepressed women. This suggests the value of active personal follow-up of women as a way to maximize adherence to these programs.

The first major psychosocial intervention trial for CHD patients was the Recurrent Coronary Prevention Project (RCPP), in which Friedman and his coworkers demonstrated that reductions of the so-called Type A Behavior Pattern led to significantly decreased risk of subsequent cardiac morbidity and mortality (Friedman et al., 1986). It should be noted, however, that over 90% of the participants of the RCPP were Caucasian men.

Based on the experiences from this intervention, we developed a 1-year group-based treatment, which was evaluated in a randomized Swedish study (Burell et al., 1994), including only men under the age of 65. The results showed that our treatment format was effective in achieving significant reductions of Type A behavior. Results were promising enough for us to try a group-based stress management program with a larger sample of CHD patients (the New Life Trial; Burell, 1996). Our concept of stress management was broadened to not only include impatient time-urgent Type A behaviors but also depression, anxiety, and fatigue. In the New Life Trial, 228 male and 37 female patients (mean age 58 years) who had undergone CABG surgery were invited to participate and were randomized to 1-year group treatment or a usual care control condition. Overall, a follow-up of 5 to 6.5 years showed significant reductions of total mortality and cardiac events for patients who had received group treatment. The number of women was too small, though, to allow a subgroup analysis.

The RCPP and our own studies thus showed that we had developed a stress management program that could significantly reduce recurrence in younger male patients. Powell et al. (1993) showed that the treatment offered in the RCPP had no benefit in terms of clinical endpoints for women. Predictors of mortality in the women were arrhythmias on ECG, being divorced, and the lack of a college degree (probably a marker of financial stress and lack of power and influence at work) and not Type A behavior. Because the diagnostic instrument for assessing Type A behavior relies on nonverbal behaviors showing intensity of voice, gestures, and body motions, a fair guess is that absence of such reactions could possibly indicate depression.

The Montreal Heart Attack Readjustment Trial (M-HART) Study (Frasure-Smith et al., 1997) was a randomized controlled trial aimed at relieving distress, when it occurred, in post-MI male (N = 903) and female (N = 473) patients. The program included a telephone contact to determine level of stress, and a home-based nursing intervention to alleviate any stress that was detected. The program had no overall effect on cardiac mortality, and only minimal effects on de-

pression and anxiety. For women in the intervention group, though, there was a higher cardiac and all-cause mortality, compared to control women. The authors' conclusion was that the results do not warrant the implementation of this type of psychosocial intervention, because it may possibly be harmful to some women.

The Enhancing Recovery in Coronary Heart Disease (ENRICHD) trial (The ENRICHD Study Group, 2000) was a randomized controlled trial aimed at reducing depression and increasing social support in 2,481 post-MI patients, 44 % of which were women (The ENRICHD Study Group, 2001). The primary outcome variable was total mortality plus nonfatal MI. The program used Beck cognitive therapy (Beck, 1995) to reduce depression and improve social support. Patients were recruited from eight centers across the United States within 28 days of the MI, and those who scored above a certain criterion of depression and/or low social support and who were randomized to the intervention were offered a combined program of individual and group sessions. The groups were gender-mixed. The overall results showed no survival difference between treatment and usual care patients (Powell, 2002). The treatment patients reduced depression scores significantly more than controls, but the clinical difference was small. Control patients showed a substantial spontaneous improvement in depression and social support. A significant Gender × Treatment interaction indicated that the young Caucasian men did significantly better with this treatment. The women in treatment, however, did significantly worse than control women in terms of recurrence. Some factors other than the cognitive treatment could have contributed to this. The men were younger, had less comorbidity, and were more aggressively treated by their cardiologists. The women in intervention were older and had more comorbidity, factors that are known to contribute to increased risk of recurrence (Schneiderman, 2002). Thus, one should be careful in drawing conclusions about the harmfulness of this psychosocial treatment for women. But it did not do them any good. It should be remembered that the clinical population of CHD women is older, shows more comorbidity, and exhibits more psychological and adjustment problems, thus this was a representative sample.

Past studies of cardiac rehabilitation in women are not encouraging. New directions in the treatment of these patients are needed.

WHAT DO WOMEN WITH CORONARY DISEASE NEED?: CLINICAL OBSERVATIONS

We have had considerable experience observing and working with women who have experienced coronary events. In the New Life Trial, the treatment groups were gender-mixed, but there were generally only 1 to 2 women with 5 to 7 men. In terms of group dynamics, this situation was unfavorable to the women. The women came across as much less assertive than most of the men, and seemed to withhold their

own reactions and opinions. They would be supportive of others—especially of the men in the group—at the expense of expressing themselves. Thus, ingrained, submissive gender role behaviors were often automatically activated in the presence of the men, and an important therapeutic target that emerged for women was to improve self-confidence. Thus, there is reason to target low self-esteem and lack of communication and relational skills in "stress management" training.

The women experienced their disease differently from the men. Despite technically successful surgery, some women still experienced angina, which, of course, was a disappointment to them. More women than men had comorbidity with various diseases, such as cancer, arthritis, and chronic pain. Their risk factor burden was often greater, and yet they often had to wait longer for the correct assessment or diagnosis. Most strikingly, many of these women were depressed, anxious, bitter, and frustrated. They did not converse with other people about their disease, and rarely participated in active rehabilitation programs. They would try to avoid involving the families in their worries and concerns, because they did not want to "burden" them, and thus missed obtaining any necessary support. The life areas where they encountered stress and other problems were quite different from those of the men. Women experienced a lack of both physical and psychological well-being.

In summary, our clinical observations in the New Life gender-mixed groups suggested that the psychological and social consequences of suffering an MI or going through CABG are different for men and women. In the groups, it was sometimes difficult to pay enough attention to the unique problems of the women, such as low self-esteem, family-related stress, and severe life events. It seems reasonable that therapeutic efficacy for female patients could be enhanced in single-gender groups. In this setting, problem areas that are shared by many women could be emphasized, and mutual understanding and support could be maximized.

PILOT RESULTS OF A SKILLS DEVELOPMENT PROGRAM FOR WOMEN WITH CORONARY DISEASE

The aim of this treatment was to help women develop coping skills to manage everyday life problems, minimize cardiac symptoms, improve quality of life, and decrease the risk of a recurrent event. Therapeutic targets included anger management, coping with anxiety and depression, increasing self-assertion and self-efficacy, improving communication, handling social roles and burdens, coping with severe life events and grief, and managing medical symptoms.

Before embarking on a randomized clinical trial, we undertook this pilot study to determine feasibility and effectiveness on psychosocial endpoints. The pilot study was a treatment-group-only study of 23 women with CHD, with a mean age of 59 years (range 46–73). The treatment was conducted in groups, the first six of which took place during a 1-month stay at a wellness center where participants

were enrolled in a program of change in dietary and exercise habits. The stress management group sessions were added to this pre-existing general program and then continued in outpatient settings for the remainder of 1 year.

Assessments

Assessments were made before treatment and at the 1-year conclusion of treatment. Perceived stress was assessed by The Everyday Life Stress Scale, a self-administered questionnaire consisting of 20 statements referring to stress reactions in everyday life situations (Lindahl, Burell, Granlund, & Asplund, in preparation). The participant responds to each statement on a 4-point scale. Vital exhaustion was measured by the Maastricht Questionnaire (Appels, Höppener, & Mulder, 1987). Quality of Life was measured using the Göteborg Quality of Life Inventory (Tibblin, Tibblin, Peciva, Kullman, & Svärdsudd et al., 1990), which consists of two parts: the Well-Being Scale, which assesses perceived well-being in various areas of life, and a Symptom Scale.

Description of the Program

Structure. The program consisted of twenty 2-hr sessions over the course of 1 year. Sessions were held weekly for the first 10 weeks. Patients entered the program between 3 to 6 months after the acute coronary event. Treatment groups consisted of 5 to 9 participants. Each session agenda covered a specific theme and was presented using written texts, case illustrations, slides, films, audio and videotapes, and specific exercises. Participants worked with homework assignments between sessions. Relaxation was practiced in each session to increase the probability that it would be applied as a coping technique in everyday situations.

Each group session began with a few minutes of relaxation. Homework assignments were discussed and the group leader and the participants provided feedback. New themes were introduced using factual information, case illustrations, or other exercises. Throughout the treatment, social support from the group was utilized to facilitate therapeutic progress.

Components of the program. There were five key components of the program:

1. *Education:* The goals of education can be summarized as developing knowledge about: basic anatomy and physiology of the cardiovascular system; manifestations of, and treatment procedures for, CHD; the symptoms and signs of different types of stress reactions; and the relation between stress and CHD.

Homework assignments included booklets about heart and stress and the study of case illustrations, where the participants can identify their own reactions. Of relevance would be discussions on risk factors of particular importance for women, such as anxiety, exhaustion, and marital stress. Each woman was asked to discuss which of the risk factors were relevant and present when she experienced her cardiac event.

2. *Self-monitoring:* The goals of self-monitoring can be summarized as: becoming more alert to bodily signals such as muscular tension, heart rate, and pain; noticing behavioral and cognitive cues; and observing, reflecting, and drawing conclusions about contingencies of behavior. To increase awareness of one's own reactions, case illustrations and audio-visual materials were used and participants practiced systematic observation of specific behaviors, both in themselves and in other people. The use of systematic diaries during extended periods of time was very important. Group processes were used to facilitate disclosure and ensure social support. Of relevance would be the monitoring of situations involving a need for assertion (e.g., in relation to demands from family members or workmates). One example was the woman who had an offer from a female friend to go on a week's vacation but did not dare to ask her husband for fear of his refusal. She worried that it was her total responsibility to care for her disabled son at home.

3 *Skills training:* The goals of skills training were to reduce negative affect by learning to express thoughts and emotions directly, honestly, and in a caring manner; and learning to *act*, rather than merely *react*, to everyday problems of living. Of relevance would be practicing to let go of perfection in household chores, asserting about own needs in the work situation, and communicating to family about finding recreational time for oneself. The group setting can provide a stage for rehearsing the specific situation. The group leader makes use of group processes, support, and modeling, where both the group leader and the other group members become important role models. A booklet of daily behavioral exercises is used throughout most of the treatment period. The focus is on stress situations related to managing the relationship ("say no lovingly").

The woman in the aforementioned example would need to practice assertive communication with her husband. In this particular case, the woman never even mentioned the issue to her husband because of her fear of violent reactions in him. After having reflected on pros and cons in the group, she decided to decline her friend's offer in order not to provoke her husband. She is one of many examples of the kinds of marital stress that many CHD women encounter, including having to deal with abuse and severe physical or mental illness in family members. Applying certain behaviors that seem appropriate (at least to the group leader!) might in some complex social contexts entail negative consequences. It is important then to agree on what is possible and feasible for the woman to do, and sometimes the first steps to-

ward assertion and self-esteem must be very small and applied with care, persistence, and a long-term perspective.

4. *Cognitive restructuring:* The goals of cognitive restructuring can be summarized as the development of self-talk that enhances self-respect and self-esteem; the ability to cope with the unexpected; tolerance, acceptance, and respect for people different from oneself; trust in others; and positive emotions such as joy, enthusiasm, curiosity, optimism, and love. The contents are the women's personal, day-to-day experiences. Group discussions and sharing of similar experiences facilitate re-interpretation and alternative attributions. Social support and feedback from other group members, who may provide different views and attitudes, helps the participants to adopt alternative ways of thinking.

A relevant example came from one group member who struggled with anginal pains whenever she cleaned her windows. The group members discussed various practical solutions, implying that she could let go of her expectation of doing the work herself. But the woman was resistant and what became obvious was that not being able to clean her house triggered a loss of self-esteem and worth. A situation that may at first glance look trivial could then be used to get at profound issues of re-orientation and finding a new basis for self-esteem. In women's groups, self-monitoring very often reveals situations that many men would regard as trivial, but which often hold a deeper meaning for the woman. The group leader must be sensitive to when this is the case, and it would be counter-therapeutic to step into the role of advice giver.

5. *Spiritual development:* The goals for the discussion of spiritual and life values can be summarized as: creating a balance between work, family, health, pleasurable activities, and spiritual interests; finding new interests; developing joy, enthusiasm, and hope; and accepting and giving love. Spiritual discussions and exercises are an integrated part of the program, especially the last sessions. The social support provided by the group becomes an important facilitating mechanism. In work with women, the issue of—and right to—provide themselves with as much care and need fulfillment as they give to others is crucial.

RESULTS

The results after 1 year of treatment showed significant reductions of self-rated stress (p < .001) and vital exhaustion (p < .01) and improvements in quality of life (p < .05; Table 1).

Attendance was excellent. Once a woman decided to participate in the program, she did not drop out. The mean attendance rate was about 80%.

	Pretreatment		Follow-Up		
	М	SD	М	SD	p^a
Everyday life stress	26.2	6.9	16.0	8.0	.000
Vital exhaustion	21.8	6.7	15.0	8.0	.002
GQL well-being	55.4	14.3	61.3	13.9	.045
GQL symptom	13.1	4.9	12.0	6.0	.273

TABLE 1 Psychological Variables Before Treatment and at Follow-Up

Note. Göteborg Quality of Life Inventory.

^aWilcoxon Signed Ranks Tests

DISCUSSION

Our program was feasible and attractive and the dropout rate was low. Thus, it seemed to meet many of the emotional needs of these women. Apparently, when women with CHD are offered rehabilitation programs that are tailored to their needs, good adherence can result. Our initial results suggest that quality of life may improve considerably as well.

Many women were very unhappy when they first came to group sessions. They often blamed themselves for their disease. In contrast, many of our male patients in our former trials (Burell, 1996) seemed to cope fairly well. In our experience, such optimism and eagerness is rare in women with CHD. The women were often worse off medically and might have justification for worry. Very often they were depressed, anxious, and bitter regarding the adequacy of their medical treatment. They felt lonely and had no one to talk to about their situation. They did not want to burden their family and friends. They did not expect people around them to accommodate to their needs in the new situation and/or had difficulties asserting themselves.

Self-worth and communication were core issues in the therapy. At its conclusion, many participants reported that they developed an enhancement of their self-esteem. Many participants expressed what this experience meant to them in the following ways: "I feel calmer; I relax so much better; I worry less; I take it easy. I don't need to finish everything today; I feel hope for the future."

It is clear that this program improved psychosocial function in the women. As we continue our study of it, we will determine whether or not these psychosocial changes translate into improved prognosis.

CONCLUSIONS

We do not yet know how to optimize psychosocial interventions in secondary prevention for women with CHD. Because of this, we believe that it is time we start listening to the women themselves and their common experiences. It is time to start to implement insights into their psychosocial situation after a cardiac event. Some of what has been tried may have been harmful to a number of women. Thus, potential interventions must be relevant not only for women's bodies, but also their psyches and everyday lives. There is a need to offer treatment that attracts women and enhances adherence to treatment. There is a need to meet this imminent challenge, as observed by the U.S. Department of Health and Human Services, National Heart, Lung, and Blood Institute (1995): Further scientific studies should address the following: Evaluations of the effects of cardiac rehabilitation exercise training, education, counseling, and behavioral interventions on special populations. These populations include elderly patients, women of all ages, patients from different ethnic groups, and those with lower educational and socio-economic levels. (Recommendations for additional research).

REFERENCES

- Ades, P. A., Waldmann, M. L., McCann, W. J., & Weaver, S. O. (1992). Predictors of cardiac rehabilitation participation in older coronary patients. *Archives of Internal Medicine*, 152(5), 1033–1035.
- Appels, A., Falger, P. R. J., & Schouten, E. G. W. (1993). Vital exhaustion as risk indicator for myocardial infarction in women. *Journal of Psychosomatic Research*, 37, 881–890.
- Appels, A., Golombeckm, B., Gorgels, A., De Vreede, J., & van Breukelen, G. (2000). Behavioral risk factors of sudden cardiac arrest. *Journal of Psychosomatic Research*, 48(4–5), 463–469.
- Appels, A., Höppener, P., & Mulder, P. (1987). A questionnaire to assess premonitory symptoms of myocardial infarction. *International Journal of Cardiology*, 17, 15–24.
- Appels, A., & Mulder P. (1988). Excess fatigue as a precursor of myocardial infarction. European Heart Journal, 9, 758–764.
- Ariyo, A. A., Haan, M., Tangenm C. M., Rutledge, J. C., Cushman, M., Dobs, A., & Furberg, C. D. (2000). Depressive symptoms and risks of coronary heart disease and mortality in elderly Americans. Cardiovascular Health Study Collaborative Research Group. *Circulation*, 102, 1773–1779.
- Ayanian J. Z., Epstein A.M. (1991) Differences in the us of procedures between women and men hospitalized for corornary heart disease. *New England Journal of Medicine*, 325, 221.
- Ayanian, J. Z., & Epstein, A. M. (1997). Attitudes about treatment of coronary heart disease among women and men presenting for exercise testing. *Journal of General Internal Medicine*, 12, 311–314.

Beck, J. S. (1995). Cognitive therapy: Basics and beyond. New York: Guilford.

- Boogaard, M. A. (1984). Rehabilitation of the female patient after myocardial infarction. Nursing Clinical Northern America, 19, 433.
- Brezinska, V., & Kittel, F. (1995). Psychosocial factors of coronary heart disease in women: A review. Social Science Medicine, 42, 1351–1365.
- Burell, G. (1996). Group psychotherapy in project New Life: Treatment of coronary prone behavior in coronary artery bypass graft surgery patients. In R. Allan & S. Scheidt (Eds.), *Heart & mind: The practice of cardiac psychology* (pp. 291–310). Washington, DC: American Psychological Association.
- Burell, G., Öhman, A., Sundin, Ö., Ström, G., Ramund, B., Cullhed, I., & Thoresen, C. E. (1994). Modification of the Type A behavior pattern in post-myocardial infarction patients: A route to cardiac rehabilitation. *International Journal of Behavioral Medicine*, 1, 32–54.

- Cannistra, L. B., Balady, G. J., O'Malley, C. J., Weiner, D. A., & Ryan, T. J. (1992). Comparison of the clinical profile and outcome of women and men in cardiac rehabilitation. *American Journal of Cardiology*, 69, 1274–1279.
- Carney, R. M., Freedland, K. E., Rich, M. W., & Jaffe, A. S. (1995). Depression as a risk factor for cardiac events in established coronary heart disease: A review of possible mechanisms. *Annals of Behavioral Medicine*, 17, 142–149.
- Cohen, S., Mermelstein, R., Kamarck, T., & Hoberman, H. M. (1985). Measuring the functional components of social support. In I. G. Sarason & B. R. Sarason (Eds.), *Social support: Theory, research, and applications* (pp. 73–94). Dordrecht, The Netherlands: Martinus Nijhoff.
- Conn, V. S., Taylor, S. G, & Abele, P. B. (1991). Myocardial infarction survivors: Age and gender differences in physical health, psychosocial state, and regimen adherence. *Journal of Advanced Nursing*, 16, 1026–1034.
- Contrada, R. J., Hill, D. R., Krantz, D. S., Durel, L. A., & Wright, R. A. (1986, August). *Measuring cognitive and somatic anger and anxiety: Preliminary report.* Paper presented at the Annual Meeting of the American Psychological Association, Washington, DC.
- Denollet, J., Sys, S. U., Stroobant, N., Rombouts, H., Gillebert, T. C., & Brutsaert, D. L. (1996). Personality as independent predictor of long-term mortality in patients with coronary heart disease. *Lancet*, 347(8999), 417–421.
- Dixon, J. P., Kison, J. K., Spinner J. C. (1991). Tensions between career and interpersonal commitments as a risk factor for cardiovascular disease amoung women. *Women's Health*, 17(3), 33-57.
- Eaker E.D. ((1989). Psychosocial factors in the epidemiology of coronary heart disease in women. *Psychiatric Clinics of North America*, 12, 167.
- The ENRICHD Study Group. (2000). Enhancing recovery in coronary heart disease (ENRICHD) study: Design and rationale. *American Heart Journal*, 139, 1–9.
- Downing J., Littman A. (1994). Gender differences in response to cardiac rehabilitation. In: Czajkowski S.M., Hill D.R., Clarkson T. B. (Eds.) Women, Behavior and Cardiovascular Disease. Washingon, DC: NIH Tublications, Vol 94, 3309.
- The ENRICHD Study Group. (2001). Enhancing recovery in coronary heart disease (ENRICHD): Baseline characteristics. *American Journal of Cardiology*, 88, 316–322.
- Ferketich, A. K., Schwartzbaum, J. A., Frid, D. J., & Moeschberger, M. L. (2000). Depression as an antecedent to heart disease among women and men in the NHANES I study. Archives of Internal Medicine, 160, 1261–1268.
- Ford, D. E., Mead, L. A., Chang, P. P., Cooper-Patrick, L., Wang, N. Y., & Klag, M. J. (1998). Depression is a risk factor for coronary artery disease in men: The precursors study. *Archives of Internal Medicine*, 158, 1422–1426.
- Frank, E., & Barr-Taylor, C. (1993). Coronary heart disease in women: Influences on diagnosis and treatment. Annals of Behavioral Medicine, 15, 156–161.
- Frasure-Smith, N., Lespérance, F., Prince, R. H., Verrier, P., Garber R. A., Juneau, M., Wolfson, C., & Bourassa M. G. (1997). Randomised trial of home-based psychosocial nursing intervention for patients recovering from myocardial infarction. *The Lancet*, 350(9076), 473–479.
- Frasure-Smith, N., Lespérance, F., & Talajic, M. (1993). Depression following myocardial infarction: impact on 6-month survival. *Journal of the American Medical Association*, 270, 1819–1825.
- Frasure-Smith, N., Lespérance, F., & Talajic, M. (1995). Depression and 18-month prognosis after myocardial infarction. *Circulation*, 91(4), 999–1005.
- Friedman, M., Thoresen, C. E., Gill, J. J., et al. (1986). Alteration of Type A behavior and its effect on cardiac recurrences in postmyocardial infarction patients: Summary results of the Recurrent Coronary Prevention Project. *American Heart Journal*, 112(4), 653–665.
- Grossi, G., Soares, J. J. F., & Lundberg, U. (2000). Gender differences in coping with musculoskeletal pain. *International Journal of Behavioral Medicine*, 7, 305–321.

- Hallman, T., Burell, G., Setterlind, S., Oden, A., & Lisspers, J. (2001). Psychosocial risk factors for coronary heart disease, their importance compared with other risk factors and gender differences in sensitivity. *Journal of Cardiovascular Risk*, 8, 39–49.
- Hallstrom T., Lapidus L., Bengtsson C., Edström K. (1986). Psychosocial factors and risk of ischemic heart disease and death in women: A twelve-year follow-up of participants in the population study of women in Gothenburg, Sweden. *Journal of Psychosomatic Research*, 30(4), 451–459.
- Hamilton, M. (1967). Development of a rating scale for primary depressive illness. British Journal of Social and Clinical Psychology, 6, 278–296.
- Haskell W. L., Alderman, E. L., Fair J. M., et al. (1994). Effects of intensive multiple risk factor reduction on coronary atherosclerosis and clinical cardiac events in men and women with coronary artery disease. The Stanford Coronary Risk Intervention Project (SCRIP). *Circulation*, 89(3), 975–990.
- Haynes S. G., Feinleib M. (1980). Women, work and coronary heart disease: Prospective findings from the Framingham heart study. *American Journal of Public Health*, 70(2), 133–141.
- Horsten, M., Mittleman, M. A., Wamala, S. P., Schenck-Gustafsson, K., & Orth-Gomér, K. (1999). Social relations and the metabolic syndrome in middle-aged Swedish women. *Journal of Cardiovascular Risk*, 6, 391–397.
- Horsten, M., Mittleman, M. A., Wamala, S. P., Schenck-Gustafsson, K., & Orth-Gomér, K. (2000). Depressive symptoms and lack of social integration in relation to prognosis of CHD in middle-aged women: The Stockholm Female Coronary Risk Study. *European Heart Journal*, 21, 1072–1080.
- Ladwig, K. H., Roll, G., Breithardt, G., Budde, T., & Borggrefe, M. (1994). Post-infarction depression and incomplete recovery six months after acute myocardial infarction. *Lancet*, 343(8888), 20–23.
- Lerner, A. (2000). *Gender differences in quality of life after coronary artery bypass grafting surgery.* Report from the Department of Biomedical Laboratory Science, Umeå University, Sweden.
- Lindahl, B., Burell, G., Granlund, B., & Asplund, K. *Gender differences in emotional well-being in a healthy population*. Manuscript in preparation.
- Marrugat, J., Gil, M., & Sala, J. (1999). Sex differences in survival rates after acute myocardial infarction. Journal of Cardiovascular Risk, 6, 89–97.
- Mendes de Leon, C. F., Kop, W. J., de Swart, H. B., Bar, F. W., & Appels, A. P. (1996). Psychosocial characteristics and recurrent events after percutaneous transluminal coronary angioplasty. *American Journal of Cardiology*, 77(4), 252–255.
- Norrman, S. (2002, June). Abstract for the VI Nordic Congress on Cardiac Rehabilitation, Reykjavik, Iceland.
- Öhman, A., Burell, G., Ramund, B., & Fleischman, N. (1992). Decomposing coronary-prone behavior: Dimensions of Type A behavior in the Videotaped Structured Interview. *Journal of Psychopathology and Behavioral Assessment*, 14, 21–54.
- Orth-Gomér, K. (1998). Psychosocial risk factor profile in women with coronary heart disease. In K. Orth-Gomér & M. Chesney (Eds.), *Women, stress, and heart disease*. Mahwah, NJ: Lawrence Erlbaum Associates, Inc.
- Orth-Gomér, K., Moser, V., Blom, M., Wamala, S., & Schenck-Gustafsson, K. (1997). Kvinnostress kartläggs. Läkartidningen, 94, 632–638.
- Orth-Gomér, K., & Schneiderman, N. (Eds.). (1996). Behavioral medicine approaches to cardiovascular disease prevention. Mahwah, NJ: Lawrence Erlbaum Associates, Inc.
- Orth-Gomér, K., Undén, A-L., & Edwards, M-E. (1988). Social isolation and mortality in ischemic heart disease: A 10-year follow-up study of 150 middle-aged men. Acta Medica Scandinavica, 224, 2105–2215.
- Orth-Gomér, K., Wamala, S. P., Horsten, M., Schenck-Gustafsson, K., Schneiderman, N., & Mittleman, M. A. (2000). Marital stress worsens prognosis in women with coronary heart disease: The Stockholm Female Coronary Risk Study. *Journal of the American Medical Association*, 284, 3008–3014.
- Pearlin, L. I., & Schooler, C. (1976). The structure of coping. *Journal of Health and Social Behavior*, 19, 2–21.

- Peltonen, M., Lundberg, V., Huhtasaari, F., & Asplund, K. (2000). Marked improvement in survival after acute myocardial infarction in middle-aged men but not in women: The Northern Sweden MONICA study 1985–1994. *Journal of Internal Medicine*, 247, 579–587.
- Powell, L. H., Shaker, L. A., Jones, B. A., Vaccarino, L. V., Thoresen, C. E., & Patillo, J. R. (1993). Psychosocial predictors of mortality in 83 women with premature acute myocardial infarction. *Psy-chosomatic Medicine*, 55, 426–433.
- Powell, L. H. (2002, March). The ENRICHD clinical trial: Main results. Paper presented at the annual meeting of the American Psychosomatic Society, Barcelona, Spain.
- Schneiderman, N. (2002, March). The ENRICHD clinical trial: Impact on population subgroups. Paper presented at the annual meeting of the American Psychosomatic Society, Barcelona, Spain.
- Schron, E. B., Pawitan, Y., Shumaker, S. A., & Hale, C. (1991). Health quality of life differences between men and women in a postinfarction study. *Circulation*, 84(Suppl. II), 245.
- Schuster, P. M., & Waldron, J. (1991). Gender differences in cardiac rehabilitation patients. *Rehabilitation Nursing*, 69(16), 248–253.
- Tibblin, G., Tibblin, B., Peciva, S., Kullman, S., & Svärdsudd, K. (1990). "The Göteborg Quality of Life Inventory": An assessment of well-being and symptoms among men born 1913 and 1923. Scandinavian Journal of Primary Health Care (Suppl 1), 33–38.
- Toobert, D. J., Glasgow, R. E., Nettekoven, L. A., & Brown, J. E. (1998). Behavioral and psychosocial effects of intensive lifestyle management for women with coronary heart disease. *Patient Education* and Counseling, 35, 177–188.
- Tunstall-Pedoe, H., Kuulasmaa, K., Amouyel, P., Arveiler, D., Rajakangas, A-M., & Pajak, A. (1994). Myocardial infarction and coronary deaths in the World Health Organization MONICA project. *Circulation*, 90.
- Undén, A. L., & Orth-Gomér, K. (1989). Development of a social support instrument for use in population surveys. Social Science Medicine, 29, 1387–1392.
- Wamala, S. P., Lynch, J., & Kaplan, G. A. (2001). Women's exposure to early and later life socioeconomic disadvantage and coronary heart disease risk: the Stockholm Female Coronary Risk Study. *International Journal of Epidemiology*, 30, 275–284.
- U.S. Department of Health and Human Services, National Heart, Lung, and Blood Institute. (1995). Cardiac rehabilitation. *Clinical Practice Guideline*, 17.
- Wamala, S. P., Mittleman, M. A., Schenck-Gustafsson, K., & Orth-Gomér, K. (1999). Potential explanations for the educational gradient in coronary heart disease: A population-based case-control study of Swedish women. *American Journal of Public Health*, 89, 315–321.