Issues related to psychological recovery following coronary bypass surgeries (CABG) have emerged in recent years. Other research has shown the effects of spiritual or religious activities on health and aging. However, little is known about the relationship of spiritual coping, including religious coping, to post-CABG adjustment. This study addressed multifactorial determinants of postoperative psychological recovery and the effects of private prayer, a form of spiritual coping, on the recovery of 151 older patients. Results show that most patients pray about their postoperative problems and that private prayer appears to significantly decrease depression and general distress one year post-CABG.

Key Words: Private prayer, Spiritual coping, Psychological adjustment, Coronary artery bypass graft surgery

The Role of Private Prayer in Psychological Recovery Among Midlife and Aged Patients Following Cardiac Surgery

Amy L. Ai, PhD, Ruth E. Dunkle, PhD, Christopher Peterson, PhD, and Steven F. Bolling, MD

Religion and spirituality play a significant role in the lives of older Americans. In recent years, research in medicine, epidemiology, gerontology, and other social sciences has shed new light on effects of religious involvement and spirituality on the health or mental health of elderly adults, particularly in the form of organizational religiosity (Kimble, McFadden, Ellor, & Seeber, 1995; Levin & Taylor, 1997). However, few studies have examined the use of private prayer, a form of spiritual coping (Sodestron & Martinson, 1987), and its relationship to psychological recovery following coronary artery bypass graft (CABG) surgery, a common surgical procedure in the United States. Research has shown that psychological problems, especially depression, following CABG may be persistent and may affect patients' well-being and the long-term efficacy of this expensive procedure (Folks, Blake, Freeman, & Sokol, 1987; Hagen, 1991; Lindal, 1990; Magni et al., 1987; Venn et al., 1987). Nonetheless, the shortage of professional care following this surgery has left most patients' long-term recovery, especially their psychological recovery, largely dependent on their self-care behaviors, including spiritual coping. These findings underscore the importance of enhancing the understanding of factors, such as the use of private prayer, related to psychological distress following CABG surgery. Based on these considerations, the present study investigated the role of private prayer in the psychological recovery of midlife and aged CABG patients.

Aging, Spirituality, and Private Prayer

In the end of the twentieth century, there has been a sociocultural trend in the United States to express increased concern about the role of faith and spirituality in relation to health (Wallis, 1996). The revival of such interests appears to be driven by a wide continuum of growing interests, ranging from the exploration for "more personal forms of religion . . . in American Protestant circles" (Spohn, 1997, p. 111) to "New Age" practices. This trend is also consistent with the aging of the baby boomers, who are now playing an important role on the U.S. political and economic stage. An aging population tends to have more religious and spiritual needs (Anderson, Anderson, & Felsenthal, 1993). Both the baby boom generation, now approaching 55, and the near elderly generation, ages 55 to 65, are currently facing new challenges related to living with chronic conditions, the rapid change of health care and welfare reforms, and dissatisfaction with modern materialism. These interconnected concerns have intensified the need for interdisciplinary research that encompasses components of aging, spirituality, and coping with related issues among the current and next generations of elderly adults. The present study thus attempted to explore a relevant coping practice—the use of private prayer—and its effects on older patients' adjustment to CABG, an expensive medical procedure.

Prayer, as a private devotional practice, is widely used among Americans (Levin, 1995). The effect of
prayer among the elderly has been examined by scientists in the past decade (Koenig et al., 1995; Koenig et al., 1992). These researchers assessed prayer as religious coping from patients' responses to open-ended questions regarding their coping with problems. These questions were asked before questions on religion to avoid bias (Koenig et al., 1992). The definition of religion was defined primarily based on Jewish and Christian traditions (Koenig, 1995).

In the present study, we viewed prayer as a tool of "spiritual coping" in light of the facts that (a) the 1971 White House Conference on Aging has highlighted an interfaith, nondenominational focus regarding religious services for the elderly community (Goldstein, 1971); (b) logically, various types of religion are subsumed under spirituality, viewed as a broader phenomenon; (c) private prayer can be used by people who may identify themselves as spiritual but not religious in a mainstream sense; and (d) the next generations of elderly Americans appear to be more complex with respect to their beliefs; there are perhaps more New Age people among the baby boom and near elderly cohorts who might identify themselves as spiritual but not religious (Zinnbauer, Pargament, Cowell, & Scott, 1996).

It should be noted that, for centuries, varying definitions of private prayer have been presented in different world traditions, from the conventional belief in prayer as "the practice of the presence of God" to a naturalistic understanding of it as a health-related behavior. Most often, prayer is understood either as a human encounter with the self or as an endeavor to be in communion with the deity or God (Levin, 1996). Because seeking metaphysical or mystical explanations of prayer was not the focus of the present study, we simply considered private prayer in terms of a broad set of health-related, private devotional behaviors associated with the users' beliefs and practices.

Religion, Health, and Elderly Adults

In recent years, gerontologists and other scientists have investigated private prayer within the context of mainstream religions. To be consistent, it is essential to review the previous findings on religiosity and health from this traditional perspective. Currently, older Americans are predominantly Christian or of other major religious faiths and engage in religious practices accordingly (Princeton Religion Research Center, 1985). Research has found that higher levels of religious involvement and subjective religiosity are positively associated with health (Levin, 1989). Religiosity and religious coping have been found to affect health status positively, including overall morbidity and mortality, acute conditions, fatal ailments, pain, and chronic illness; these associations occur across age, gender, culture, and study design (Levin, 1994). These aspects of religion also appear to protect against mental disorders, including depression, suicidal and life-threatening behaviors, anxiety, alienation, loneliness, and substance abuse; positive relationships have been shown to exist between religiosity and well-being, life satisfaction, adjustment, internal locus of control, and coping (Koenig & Futterman, 1994).

The main focus of this research was on private prayer, a form of spiritual or religious coping. To avoid confusion, it is necessary to mention briefly the definition of religiosity in aging studies and to clarify the limits of using this term. Religiosity has been referred to as activities or behaviors of religious commitment (Ellor, 1997). This term has been used interchangeably with religiousness and religion in aging research. According to Payne (1990), the term religiosity was used in 1965 by Moberg, an early user of this term in aging studies, in this context without a definition (Moberg, 1965). Payne pointed to the difficulties of defining and measuring religiosity and the need to move beyond a unidimensional measure of religion to multidimensional measures of religious behaviors (Pittard, 1966). One of the conceptual limitations of religiosity rests upon its reductionist view of religious involvement, a view that by its very nature refers to the need for external measurement in scientific research. It was dissatisfaction with this aspect of some social scientists' work in religious gerontology that led to the use of the broader term spiritual well-being later by Moberg as well as in the document of The 1971 White House Conference on Aging (Ellor, 1997; Moberg, 1971, 1997). However, achieving a refined conceptualization of spiritual well-being is beyond the scope of this article.

Among social scientists, the definition and measurement of religiosity remain quite varied, however, this diversity has also partially addressed the multidimensional measurement issue regarding this concept (Pittard, 1966). As summarized by Futterman and Koenig (1994), sociological conceptualizations of religiosity have focused on dimensional assessments of traditional Judeo-Christian aspects of belonging and believing. Particularly notable are Glock and Stark's (1965) five-dimension model and King and Hunt's (1975) thirteen factors of religiosity. Psychological conceptualizations, on the other hand, have tended to center around the individual's belief system, related especially to motivation, experience, and well-being. Examples are seen in Allport's (1950) distinction between intrinsically and extrinsically motivated religiosity, Hood's (1973) operational definition of religious experience, and Batson and Schoenrade's (1991) measure of religion as a quest.

Stark's (1968) work on age and faith contributed to the development of the religiosity concept with respect to aging. An apparently increasing piety among elderly adults was seen to be associated with frequency of praying. Today, gerontologists are more likely to be concerned with relationships between religious activities or spiritual experiences and aging related factors such as health, mental health, deprivation, and death. This view was tentatively adopted in the present study, though the study did not focus on religious involvement per se. In gerontological studies, religiosity itself has tended to be investigated in a three-factor model that includes organizational religiosity (e.g., church or service attendance), nonorganizational religiosity (e.g., prayer or Bible reading), and subjective religiosity (i.e.,
importance of religion; Chatters, Levin, & Taylor, 1992). Several surveys have indicated that organizational religiosity among older adults is inversely related to depressive symptoms (Idler, 1987; Nelson, 1989; Pressman, Lyons, Larson, & Strain, 1990) and death anxiety (Thorson & Powell, 1990). Less well documented are the roles of nonorganizational types of religiosity—such as private prayer, a form of spiritual coping in our view—in physical and mental health.

Research suggests that it is important to examine the relationship of these different forms of religiosity and other aspects of spirituality to various dimensions of health status. As some health investigators recommend, a multidimensional conceptualization of health should include the physical definition, the functional model, and the subjective evaluation (Liang, 1986; Ware, 1987). In this regard, organizational religiosity and nonorganizational religiosity have been found to be correlated differently with these various dimensions. For instance, Koenig and Futterman (1994) reviewed six studies that included religious variables and subjective health. A strong association between organizational religiosity and subjective health was found in all of these studies. However, with one exception (Ferraro & Albrecht-Jensen, 1991), the significance of such relationships dropped considerably when objective health status or physical capacity was introduced into the equation. Three other studies have also found organizational religiosity to be related negatively to functional disability and unrelated to objective health conditions (Ainlay, Singleton, & Swigert, 1992; Idler, 1987; Idler & Kasl, 1992). These outcomes imply two possibilities: first, that organizational religiosity served to sustain better health status or, alternatively, that a certain level of physical capacity is a prerequisite for frequent involvement in organizational religious activities. In other words, people who are able to maintain frequent involvement in church services or organized religious activities may have better physical health or functional status, compared with those who cannot.

In contrast to the association between organizational religiosity and functional capacity, some studies have found that nonorganizational religiosity, including private prayer, is unrelated to functional status (Ainlay et al., 1992; Idler, 1987; Idler & Kasl, 1992). However, nonorganizational religiosity might be positively related to objective health problems (Ainlay et al., 1992), especially among older patients with poor health (Koenig, Moberg, & Kvale, 1988). Perhaps nonorganizational religious coping can be used by any elderly person no matter what level of functional capacity he or she has. The positive relationship between objective health problems and nonorganizational religiosity is also subject to differing interpretations: (a) poor health may hinder older people's ability to pursue organizational religious involvement, thus the sicker and more disabled elderly populations would depend more on private religious coping; or, alternatively, (b) people who use private religious coping tend to become sicker. The second interpretation appears unlikely, because patients would give up the practice if this were the case.

Depressive Symptoms, CABG, and Religious Involvement

It is important to conduct research on spiritual coping with psychological problems following expensive medical procedures, CABG in particular. Three reasons underscore the significance of the present study. The first reason lies in the considerable impact of heart disease in American society. Cardiovascular disease (CVD) is the leading cause of premature death among American elderly persons, claiming 923,422 lives in 1991 (42.7% of all deaths in the United States in 1991). One in three individuals aged 65 or older has some form of heart disease or stroke (American Heart Association, 1994). CABG is also a major reason for expensive hospital-bed use and Social Security disability payments ("1992 Hospital Charges for Two Major Surgical Procedures for Cardiovascular Diseases," 1994). Among all cardiovascular diseases, coronary heart disease (CHD), which causes heart attack and sudden cardiac arrest, is the most life-threatening condition. Through vascularization of coronary arteries, CABG serves as an advanced treatment for CHD. For patients with CHD, CABG has achieved impressive long-term clinical efficacy in terms of symptom relief. However, the postoperative quality of life may be decreased to levels lower than that expected by patients due to poor psychological adjustment (Sokol, Folks, Herrick, & Freeman, 1987; Townes et al., 1989). Through research, additional knowledge of older patients' spiritual coping, or use of private prayer, may help to improve patients' satisfaction with this major operation and its long-term effectiveness.

The second reason underlying the importance of such research stems from the association between mental health issues and medical rehabilitation and the lack of long-term care within current service delivery systems. The literature shows that both acute and chronically ill patients tend to have a high prevalence of comorbid major depression, which is related to lower quality of life and increased rates of mortality (Kayton, 1996). Previous research has frequently linked depression among elderly adults with chronic conditions, especially CHD. Depressive disorders are associated generally with slower recovery from physical conditions and with a higher death rate (Hesse, Campion, & Karamouz, 1984; Rovner et al., 1991). Depression has also predicted new cardiac events among CHD patients and a worse prognosis following a heart attack, because rehabilitation is thereby impaired (Carney et al., 1988; Frasure-Smith, Lesperance, & Talajic, 1993). Hence, a better understanding of the use of private prayer among older cardiac patients may enhance professional service during the recovery process.

The third reason is related to the need to increase the scientific basis for behavioral strategies to be used in controlling chronic illnesses. It is well-known that professional behavioral intervention is critical for control of cardiac disease, a stress-related illness (American Psychological Association, 1994). However, few reports of an empirical nature have addressed self-care behaviors, especially spiritual coping, and such
behaviors' influence in patients' adjustment to post-CABG psychological distress. For cardiac patient populations, previous studies have indicated that religious faith and comfort predicted lower blood pressure ( Larson et al., 1989), a lower mortality of coronary heart diseases (Goldbourt, Yaari, & Medalie, 1993), and a higher survival rate following cardiac surgery ( Oxman, Freeman, & Manheimer, 1995). Yet, little is known about how spiritual coping methods, such as private prayer, affect post-CABG psychological recovery, such that it may be conducive to a better survival rate.

Moreover, the precise ways in which private prayer might affect psychological recovery are not clear thus far. Social scientists have assumed a buffering role of religious involvement in moderating stress ( Maton, 1989; Maton & Wells, 1995). Krause and Tran ( 1989) suggested that the buffering role of religion in mental health can be presented in different ways. In their "suppressor" model, which is additive and linear, stress increases religious coping, which in turn reduces adverse mental health. In their "moderator" model, the relationship between stress and religious coping is interactive: religion has a greater effect on mental health of individuals with higher stress than on that of individuals with lower stress. Assessment of these patterns may help identify one or more potential subgroups that would especially benefit from private prayer.

Based on the above considerations, the present study investigated the use of private prayer among midlife and aged CABG patients. Three research questions were addressed: (a) how prevalent was the use of private prayer among midlife and older aged patients during the year following CABG; (b) what factors were associated with this practice; and (c) how was private prayer related to psychological recovery in terms of psychological distress one year after surgery? We hypothesized that the patients who engaged in private prayer would have better psychological recovery one year following CABG. The effect of such prayer was to be investigated by controlling for three important variables: (a) noncardiac physical illness, one of the most powerful stressors in late life ( Larson, 1978); (b) post-CABG depression (in the first month immediately following the surgery), given the prolonged process of post-CABG depression as mentioned earlier; and (c) social support, which has been associated with public religious activities ( Ellision, 1994) and affected short-term but not long-term rehabilitation in this population ( Coombs, Roberts, Crist, & Miller, 1989; Fontana, Kerns, Rosenberg, & Colonese, 1989; Kulik & Maher, 1993).

Finally, private prayer may improve well-being. Because its use demands limited functional levels ( i.e., certain reading, speaking, and hearing capacities) and attendance at religious services is not required, older postoperative patients might pursue it more than other types of nonorganizational religious coping or organizational involvement in their crises. Thus, making a simple correlation between private prayer and health is bound to be ambiguous. Instead, different analytic strategies are needed that control for initial levels of health. In addition, the determinants of prayer use and the role of private prayer can be identified in separate analytical steps. Otherwise, more advanced statistics, ( e.g., structural equation modeling) can be used for assessing these factors simultaneously, if the quality of data permits the use of this tool in the future.

Method

Patients

The sample for this study was drawn from the cardiac data registry at the University of Michigan Medical Center ( Ann Arbor). Eligible candidates ( aged 40–80 years) were 196 patients who were admitted for their first CABG only, who were discharged alive from January 1, 1993, to January 1, 1994, and who had returned a 6-month follow-up questionnaire to the department of thoracic surgery regarding their postoperative cardiac condition. For the present study, an additional questionnaire was sent to these 196 patients and was completed by 151 patients (77%) one year after CABG. Based on data in medical records, there was no statistical difference concerning demographic, surgical, and cardiac conditions ( except death rate) between patients who returned and did not return the two questionnaires.

Data Sources

Demographic, surgical, and medical information during hospitalization was obtained from a computer database maintained by the department of surgery. The first questionnaire, completed six months following the surgery, asked about cardiac conditions post-CABG. The second questionnaire was sent one year after the surgery and asked participants about (a) pre-CABG background/socioeconomic information; (b) ongoing chronic disorders; (c) perceived social support following CABG surgery; (d) religious or spiritual practices and other types of nonmedical services within 12 months following CABG surgery; and (e) post-CABG depression ( depressive symptoms in the first month following surgery) and current psychological distress ( one year after CABG surgery).

Measures

Psychological Adjustment—In the second questionnaire, general distress and depression were measured with the Symptom Checklist-90-R ( SCL-90-R; Derogatis, 1983). The SCL-90-R is a self-report symptom inventory assessing psychological distress along nine dimensions: I Somatization ( SOM); II Obsessive-Compulsive ( O-C); III Interpersonal Sensitivity ( INT); IV Depression ( DEP); V Anxiety ( ANX); VI Hostility ( HOS); VII Phobic Anxiety ( PHOB); VIII Paranoid ideation ( PAR); and IX Psychosis ( PSY). Internal consistency alpha coefficients ranged from .77 for the psychosis domain to .90 for the depression domain. Test-retest correlation coefficients for the subscales of this measure ranged from .78 to .90, and internal consistency alpha coefficients ranged from .77 to .90. We used the total SCL-90-R score as a measure of general distress. In an additional section,
patients were also asked to respond to the depression subscale for symptoms they experienced during the first month following CABG. This strategy is not ideal, because it might be biased by recall. However, it was necessary to have a baseline estimate of early distress and affective disorder immediately following surgery.

Health Conditions—The hospital database provided surgical information, including left ventricular ejection fractions (LVEF) and number of bypassed arteries for each patient. These were used as indicators of preoperative cardiac conditions. In the questionnaire at the six-month follow-up, patients were asked to indicate the presence or absence of post-CABG cardiac complications (e.g., angina, fatigue, shortness of breath, swelling, congestive heart failure, irregular cardiac rhythm, and stroke), using yes or no answers. These were used as indicators of postoperative cardiac conditions. In the additional questionnaire, subjects rated their general health status on a 5-point scale (excellent, very good, good, fair, and poor), both at the time of the operation and currently. They also indicated the presence or absence of 15 noncardiac medical conditions, including chronic disorders commonly seen on geriatric units.

Social Support—In the second questionnaire, perceived social support, as a covariant as mentioned previously, was measured by the Multidimensional Scale of Perceived Social Support (MSPSS; Zimet, Dahlem, Zimet, & Farley, 1988). Cronbach’s coefficient alphas for the MSPSS were .91 for the total scale and .90 to .95 for the subscales. Three sources of support were measured through three subscales (family, friends, and significant others), with higher scores corresponding to more support.

Religious or Spiritual Coping—In the second questionnaires, measures were obtained regarding religious practices, using a 4-point scale (not important, a little important, pretty important, and very important). Emphasis on religion was examined with one question: How important is religion in your life? Patients were asked whether they had used any of the following religious strategies to cope with problems related to CABG: attending church services, participating in church activities, having faith in God, and praying for guidance or strength. Replies were measured using a 4-point scale (strongly disagree, disagree, agree, and strongly agree).

It should be noted that private prayer was also asked about in an additional set of questions regarding pursuit of nonmedical services for problems following the surgery. This set of questions was not part of the section on religious practices. Patients were asked whether they had sought help from any type of service that was not delivered by MDs or RNs (including private prayer) for physical/mental health problems or other issues during the year following CABG. Using yes or no answers, participants indicated the use of 21 nonmedical services or practices.

The choice of dichotomous rather than scaled answers was made for three reasons: (a) given the age range of the sample, a dichotomized indicator would be less affected by recall bias; (b) the primary interest of the study was CABG patients’ spiritual coping and help-seeking behavior rather than the efficacy of a specific service; and (c) the quantitative measure of each service might not be additive as a whole, if each was measured by different types of frequencies. No question addressed religious affiliation due to considerations of survey length. Finally, an open-ended question invited free comments and advice from patients about the recovery needs following CABG surgery.

Major Variables and Statistical Analysis

For the major dependent variables, psychological recovery was operationalized as general psychological distress. Psychological distress has been defined in general as a variety of uncomfortable subjective states and a lack of positive states. Depression (or negative affect), malaise (a symptomatic dimension), and anxiety have been identified by researchers and clinicians as three major aspects of psychological distress (Mirowsky & Ross, 1986). Other significant factors were taken into account as essential covariates to eliminate the proportion of their effects on the variation of current distress. Three important control variables include (a) physical illness in terms of both chronic noncardiac conditions and postoperative cardiac complication, (b) depression in the first month after surgery, and (c) postoperative social support, a potential protective factor.

Statistical analyses were of two types: (a) description of the sample, including means, standard deviations, ranges, frequencies, skewness, and kurtosis of selected characteristics; and (b) tests of relationships between and among the variables. The findings of the first type of analysis were used for the second stage of analysis. To separate the protecting effect of private religious coping on outcome from the possibility that sicker patients would use this strategy more, we used two steps in this stage of analysis. First, a multiple logistic regression was performed to identify predictors of using private prayer following CABG. This analysis yielded a coefficient for each predictor in the equation, and the coefficients equaled the natural logarithms of the odds ratios for them. These coefficients are presented as odds ratios to make interpretation easier. The reference category of each predictor was assigned an odds ratio of 1. For the other categories, the odds ratio represents the odds of using private prayer relative to the reference category.

Second, analysis of covariance (ANCOVA) was utilized for comparisons among subgroups (e.g., prayer vs nonprayer groups, patients who had cardiac conditions vs those who did not) for current psychological distress by controlling for important covariants. These covariants included postoperative social support, the number of other chronic conditions (without self-reported depression and anxiety), and first-month post-CABG depression. Further, we assumed that
postoperative cardiac symptoms would be a major stressor. Thus, in the present study the role of private prayer as a "suppressor" versus a "moderator" was tested in interactions between the use of private prayer and postoperative cardiac health conditions. The presence of a significant interaction between the use of prayer and postoperative cardiac health condition would imply a moderating effect. Otherwise, the role of private prayer would be a suppressor. The independent variables involved private prayer and three major postoperative cardiac complications (e.g., fatigue and shortness of breath, which were the two most frequently reported cardiac complications, as well as angina, a targeted symptom of CABG surgery).

**Results**

**Sample Characteristics**

Table 1 shows selected demographic and socioeconomic data. The sample was a convenience CABG population, composed predominantly of patients who were male, White, and married. The sample included 112 men (74%) and 39 women (26%). One hundred and forty-seven patients were Caucasian (97%), 3 were African American (2%), and 1 was Hispanic (1%). The average age was 65 years ($SD = 8.8$, range = 40.8–80.8 years). The Medicare beneficiaries (people aged 65 or older) accounted for about half of the sample at CABG surgery. The majority of patients (74%) were married, and 35% had full-time employment at the time of CABG surgery. The average education was 13 years ($SD = 3.7$, range = 4–24 years) at the time of the surgery. Fifty-five patients (36%) had a college education and 62 (41%) reported an annual family income over $35,000. Results of the six-month follow-up indicated that the majority (88.1%) of patients had no cardiac symptoms or had heart conditions better than their pre-CABG conditions. However, more than one third of them experienced fatigue, while more than one fourth had shortness of breath. Many patients also reported ongoing noncardiac chronic disorders, such as insomnia (47%), hypertension (40%), arthritis (37%), diabetes (21%), and back problems (21%).

**Spiritual Coping and Religious Involvement**

The descriptive data showed that private prayer in this sample was the most frequent practice (67.5%) on the list of 21 types of nonmedical help-seeking behaviors. The only other popular coping device was exercise (45.7%). Responding to the question about emphasis on religion, 76% of the total group reported that religion was pretty important or very important in their lives. The use of religious coping was ascertained by adding "agree" and "strongly agree" items from corresponding 4-point scales. Of the sample, 54% attended church services on a regular basis, 52% participated in church activities, 73% had faith in God, and 68% prayed following CABG. Only private prayer was entered into the inferential analysis for prediction of current general distress, because this type of coping was less affected by post-CABG health conditions and functional status.

**Predictors of Private Prayer**

As shown in Table 2, the logistic regression analysis indicated that private prayer during the year following CABG was significantly less common among older patients (older than 65), those with income above $35,000, and those who rated their pre-CABG health as poor. However, the relationship of private prayer

<table>
<thead>
<tr>
<th>Variable/Label</th>
<th>N</th>
<th>%</th>
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<tr>
<td>Sex</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Male</td>
<td>112</td>
<td>74</td>
</tr>
<tr>
<td>Female</td>
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</tr>
<tr>
<td>Race</td>
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<tr>
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<tr>
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</tr>
<tr>
<td>Above 65</td>
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<tr>
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<td>&gt;$50,000</td>
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<td>&lt;$35,000</td>
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<td>&gt;$35,000</td>
<td>62</td>
<td>41</td>
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<tr>
<td>Employment at CABG</td>
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<td>Housework</td>
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</tbody>
</table>

**Table 2. Multiple Logistic Regression Predicting Use of Prayer in the Year Following CABG**

<table>
<thead>
<tr>
<th>Independent Variable</th>
<th>Parameter Estimates</th>
<th>Odds Ratio</th>
<th>Significance</th>
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<tr>
<td>Importance of religion</td>
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<td>3.40</td>
<td>.001</td>
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<tr>
<td>Depression in the first month</td>
<td>.70</td>
<td>2.02</td>
<td>.037</td>
</tr>
<tr>
<td>Number of noncardiac conditions</td>
<td>-.19</td>
<td>.82</td>
<td>.062</td>
</tr>
<tr>
<td>Perceived poor pre-CABG health</td>
<td>-.51</td>
<td>.60</td>
<td>.010</td>
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<tr>
<td>Income &gt;$35,000</td>
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<td>.32</td>
<td>.025</td>
</tr>
<tr>
<td>Age ≥65</td>
<td>-.150</td>
<td>.22</td>
<td>.003</td>
</tr>
</tbody>
</table>

Notes: $N = 151$. Overall $\chi^2 = 36.69$, $df = 4$, $p < .00001$. Only variables that achieved $p$ values < .10 are included in the table.
and an objective measure of general health, the number of noncardiac chronic conditions (not including insomnia and headache), was nearly significant (p < .062), with its effect in the same direction as that of the subjective measure of health. As expected, those respondents who considered religion important were more likely to pray. Private prayer was also marginally more likely among patients with higher levels of depression in the first month following CABG. The other preoperative variables that were entered in the model (e.g., gender, education, bypass number, and left ventricular ejection fraction) did not predict the use of prayer. (Their correlations are not shown in Table 2.)

**The Effect of Private Prayer**

A paired t test showed a markedly reduced level of current depression compared with the recalled depression in the month following CABG (t = 9.7, p < .00005). To explore the moderator versus suppresser effect of private prayer, a 2 (prayer) x 2 (fatigue) x 2 (shortness of breath) x 2 (angina) ANCOVA test was used to examine the effect of prayer. Noncardiac conditions, first-month depression, and social support were entered as was mentioned earlier. The result shows that there was a significant main effect of private prayer predicting a lower level of current general distress, F(1, 134) = 8.4, p < .005, after controlling for the effects of noncardiac health conditions, first-month depression, and social support (see Table 3). The means of current distress for prayer users and nonusers were .54 and .65, respectively. Neither the effects of the three cardiac conditions nor their interactions with prayer were significant. The absence of interactions indicates an additive relationship between prayer and current distress.

As expected, the effects of covariants, number of noncardiac conditions, and depression in the first month were strong, but the effect of social support was nonsignificant. This was consistent with previous findings that the role of support was not effective after the first six months following CABG (Fontana et al., 1989; Kulik & Mahler, 1993). Because two functional problems, insomnia and headache, might confound the measures of depression, the ANCOVA was recomputed by removing these from the number of other illnesses, resulting in essentially the same finding.

**Discussion**

**Private Prayer and Psychological Recovery**

The present study investigated the prevalence of religious practices and especially the effects of a specific form of spiritual coping—private prayer—on psychological adjustment for midlife and aged CABG patients. Most patients in this sample used private prayer and other spiritual or religious practices for problems following surgery. Consistent with our hypothesis, patients who prayed had better psychological outcomes one year post-CABG. This effect was revealed through an analysis controlling for other important coexisting factors, including depression in the first month following CABG, noncardiac chronic conditions, and social support. Because no interactions were identified in the analysis, the findings suggest that the use of private prayer in current distress was not a moderator but rather a suppresser. This means that use of private prayer may work for any CABG patient regardless of whether he or she has a high level of health distress.

Patients' stress following CABG was reflected in their spontaneous comments on the returned questionnaires:

I think it's interesting that depression is brought up in this survey. I assume that since it has been brought up that, in fact, depression may be heightened by the surgery—something I had not considered. I do have lots [sic] with depression and probably more since surgery than before.

After spending a total of fifteen days in the hospital, ten days prior to surgery and five days after surgery and receiving a great deal of attention, I felt at a loss to what would be the best approach during the recovery period.

These comments also suggest a lack of professional care following intensive hospital treatment and the desire for intervention. Accordingly, private prayer might function as patients' last spiritual coping tool for pursuing control over their health and related conditions following the surgery.

The findings of this study show that users of private prayer tended to be more religiously oriented, to be more depressed in the first month following CABG, to earn less income, to be relatively younger, and to rate their preoperative health as "better." Previous studies have indicated that private prayer was more common among disadvantaged groups (e.g., African Americans, women, poor, elderly, ill), who relied on these practices in situations of dissatisfaction (Princeton Religion Research Center, 1985, 1994; Koenig et al., 1992; Levin & Taylor, 1997). In Bearon and Koenig's (1990)
study of prayer and illness, this coping strategy was used more among persons with less education, most conservative religious affiliations, and certain types of symptoms (palpitations, shortness of breath, and forgetfulness). Our findings are partially consistent in terms of more religiosity, a higher level of depression in the month following CABG, and a lower level of socioeconomic status among private prayer users. In addition, the higher depression level in the first month has added another piece of evidence to the existing literature on the positive association between sicker people and use of private prayer. This fact also ruled out the possibility that the effect of private prayer merely stemmed from better affective conditions at the outset.

A general perception has been that older cohorts pray more than do younger ones (Levin & Taylor, 1997). However, consistent with Bearon and Koenig’s (1990) finding, our study did not show any effect of older age or gender in the use of private prayer. Rather, those who prayed in this sample were younger on average and tended to have a better subjective, preoperative health rating. Koenig, Smiley, and Gonzales (1988) found that elderly adults were more likely to rely on spiritual coping (including religious coping) when they perceived situations as being uncontrollable. The same may be true among younger people. Thus, the stereotype of greater private prayer among elderly adults might be mediated by undetected stressors faced by different groups in the general population. Perhaps only in cases when an event is interpreted by the person as stressful or frustrating does it lead to spiritual coping. For instance, younger age and healthier status among CABG patients may be associated with greater expectations. Alternatively, functional and psychological consequences following the event may impose more stress, substantially and spiritually, for middle-aged and self-identified healthier patients than for those who are older. On the other hand, older patients, who were more likely to be in poor health but not working, may have viewed CABG as not so stressful, due to the fact that they may have faced other health-related problems previously. In comparison with the younger patients, they might be less worried about death and loss.

However, this conclusion on the relationship between a given stress level and prayer might be speculative. Our study was focused primarily on the role of using private prayer in postoperative psychological recovery. As defined by other researchers, there are different activities of prayer; the relationships of such activities with stress have not been examined in the present study. For example, based on a survey, Poloma and Gallup (1991) described four independent dimensions or activities of prayer. The first is ritual prayer, involving reading a relevant book or reciting memorized prayers. The second is conversational prayer, an informal communication with God. The third is petitionary prayer, which addresses the accomplishment of spiritual or material needs. The final is meditative prayer, which concerns behaviors that involve thinking about or experiencing the divine, sometimes including God’s voice. Whether the use of various dimensions of prayer would be affected differently by stress will need more exploration in the future.

The present study did not explain how private prayer worked. In this regard, previous studies have pointed to the role of a sense of control, optimism, and forgiveness. Our regression model showed that the strongest predictor of private prayer was the rating of religious importance. For the more religious groups, faith may function as a motivating force. Alternatively, it can be considered as a type of control over their lives. Some social and behavioral scientists have documented the association between religious belief and feelings of personal mastery or control, a relationship that supports the notion that patients can take responsibility for their own psychological recovery following surgery (Saudia, Kinny, Young-Ward, & Brown, 1991). Perhaps the transcendent nature of religion empowers those who may not be able to control situations. Shrauger and Silverman (1971) found that participants in religious activities perceived themselves as having more control over what happened to them. Kivett (1979), studying the religious motivation of middle-aged and older adults, found a relationship between intrinsic religiosity and internal locus of control. In Krause and Tran’s (1989) research, nonorganizational religiosity was positively related to personal mastery.

Another possible mechanism may be optimism. Research has suggested that religious and spiritual people tend to look more into the future. Faith has been shown to be a significant correlate of optimism for the short-term future. A large-scale study indicated that a conservative religious perspective fostered hope and long-term optimism (Sethi & Seligman, 1993). Still other theorists have pointed to the potential effect of forgiveness, a concept, at the center of the Judeo-Christian belief system, on mental health (Kaplan, 1992). Future studies with sophisticated measures and designs may provide better explanations for the relationship between private prayer and post-CABG psychological recovery.

Furthermore, consistent with previous research, the role of social support declined after several months following CABG (Coombs et al., 1989; Fontana et al., 1989; Kulik & Mahler, 1993). This seems contrary to an association among public religious involvement, social support, and mental health as suggested by other studies (Ellison, 1994; Pargament, 1997). Our use of the MSPSS for social support did not make participation in religious congregations explicit. However, some comments from patients indicated that supporting letters from members of their congregations after the surgery were apparently one source of their support. Further analysis of such findings suggests several explanations. First, as indicated by previous researchers, more substantive approaches are needed for long-term rehabilitation of cardiac patients. Prayer, a private coping tool, appears to figure among these, as shown in the present study. Second, the facts indicate by research of the general population may not fit this specific group. Finally, the beneficial role of public and private spiritual coping, as well as religiosity in particular, may act through different channels.
Thus, more studies should pay attention to the precise association of different factors related to different dimensions of spiritual coping, including religious coping.

**Methodological Limitations and Future Implications**

Several limitations of the present study should be acknowledged. First, as mentioned earlier, the use of the MSPSS has its limitations. A different instrument measuring social support may need to be considered if a future study attempts to explore the relationship between participation in religious congregations and satisfaction with social support. Second, the study was not prospective, which makes our causal conclusions tentative. Third, preoperative spiritual coping, religiosity, and psychological measures, such as depression one month before CABG, should be included in the model when the study is replicated prospectively. Fourth, the use of a retrospective measure for depression in the first month following CABG is open to criticism. The correlation between first-month depression and current distress tends to be higher than the true value if the measure can be done in a prospective design. However, because the retrospective first-month depression is likely to be closer to the level of current distress, due to recall biases, than the actual one-month measure, this bias is likely also to have suppressed the effect of private prayer on current distress in the same equation. Fifth, the theoretical limitation of the term religiosity with its inherent reductionism should be examined in future research. Finally and most regretfully, standardized instruments, like the Springfield Religiosity Tool (Koenig, 1988), were not employed in this study in order to reduce the length of the questionnaire. If such a tool had been utilized, the results could have been compared with those of other studies in this area. These issues will be addressed in our future research.

Despite these limitations, our findings make several contributions to the existing gerontological literature. First, they clarify potential effects of using private prayer in psychological recovery following major cardiac surgery. Second, they replicate previous findings on the positive relationship between mental health issues and spiritual coping. Third, they underscore the need for in-depth study of spiritual coping and health in different elderly subgroups rather than sociological investigation of the general population. Finally, they highlight the need for investigating the psychological mechanisms of spiritual coping. In an era of scant medical resources, such investigation will be important. Many health providers are neither religious nor trained to respond to spiritual concerns of clients (Gallup, 1985; Peterson & Roy, 1985; Sherril & Larson, 1987). This type of study will facilitate their understanding of the role of the spiritual aspect in rehabilitation and spiritual coping of elderly patients, which will improve health education. Psychological intervention needs to address both specific and general factors. Examining some specific (e.g., control) and general psychological factors (e.g., optimism) in the study of health in relation to spiritual coping will enhance intervention strategies of health care providers.

What are some implications of our findings for research on and health care delivery of long-term psychological rehabilitation? First, with regard to the treatment of dysthymic disorders, the current trend in health care reform involves a shift from specialty care to primary care, accompanied by encouraging acute care and certain types of biopsychiatric care instead of long-term psychosocial interventions (Wells, 1997). This trend may not suit the needs of elderly patients, especially those who are recovering from major surgery and are already under polypharmacological treatment. Given an inadequate level of long-term intervention, the future configuration in health care may well require that elderly patients take a more active self-care role in a partnership with professional care for the purpose of psychological rehabilitation and spiritual well-being. Health care providers, on the other hand, need to provide strong support and professional guidance in this regard through available opportunities such as discharge planning, follow-ups, or community-oriented health education.

Second, elderly adults and others facing medical crises or illnesses tend to be more concerned with these spiritual issues, in particular religious issues among these who are currently elderly, due to their facing life-and-death challenges. However, research has found that, generally, the pastoral or spiritual needs of rehabilitation patients have not been met (Anderson et al., 1993). If future studies provide fuller evidence regarding the protective role of spiritual coping, professional health providers will need to be more attentive to these strategies and value systems of older patients.

Finally, depression is a societally important condition that has been mostly remediable yet is undertreated (Wells, 1997). In the United States, the annual cost of depression in 1990 was already $43.7 billion (Greenberg, Stiglin, Finkelstein, & Berndt, 1993). Because post-CABG depression predicts more surgical procedures, the expected expense could be even higher. To reduce costs and improve the quality of care, comorbidity issues related to CABG as well as the potential benefits of positive spiritual coping among older patients deserve more research attention. Encompassing a spiritual dimension into current health care for elderly adults will help accomplish better functioning of both cardiac and other patients, and it may also contribute to substantial reduction in health care costs in the future.

**References**


**Busse Research Awards**

Promoting international research in gerontology, two Busse Research Awards will be given at the Pan-American Conference in San Antonio, Texas, February 1999. Two gerontologists (junior or mid-career) will be selected. One award will recognize a scientist from the social/behavioral sciences; the other from the biomedical sciences. Awards are $2,000 each, with up to $2,500 provided for travel/living expenses. Awardees must present a lecture based on their research at the conference. Deadline for the receipt of applications: November 1, 1998.

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Received July 17, 1997
Accepted July 20, 1998

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