



# Intimate Relationships and Coronary Heart Disease: Implications for Risk, Prevention, and Patient Management

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## Abstract

**Purpose of Review** Research and clinical services addressing psychosocial aspects of coronary heart disease (CHD) typically emphasize individuals, focusing less on the context of intimate relationships such as marriage and similar partnerships. This review describes current evidence regarding the role of intimate relationships in the development, course, and management of CHD.

**Recent Findings** Having an intimate partner is associated with reduced risk of incident CHD and a better prognosis among patients, but strain (e.g., conflict) and disruption (i.e., separation, divorce) in these relationships are associated with increased risk and poor outcomes. These associations likely reflect mechanisms involving health behavior and the physiological effects of emotion and stress. Importantly, many other well-established psychosocial risk and protective factors (e.g., low SES, job stress, depression, and optimism) are strongly related to the quality of intimate relationships, and these associations likely contribute to the effects of those other psychosocial factors. For better or worse, intimate partners can also affect the outcome of efforts to alter health behaviors (physical activity, diet, smoking, and medication adherence) central in the prevention and management CHD. Intimate partners also influence—and are influenced by—stressful aspects of acute coronary crises and longer-term patient adjustment and management.

**Summary** Evidence on each of these roles of intimate relationships in CHD is considerable, but direct demonstrations of the value of couple assessments and interventions are limited, although preliminary research is promising. Research needed to close this gap must also address issues of diversity, disparities, and inequity that have strong parallels in CHD and intimate relationships.

**Keywords** Couples · Marital quality · Marital adjustment · Marital conflict · Coronary heart disease

## Introduction

Several psychosocial risk and protective factors (e.g., depression, social support) predict the development and course of coronary heart disease (CHD) [1••]. A smaller and more preliminary literature suggests that interventions addressing these factors may be useful additions to patient care [2, 3]. Intimate relationships such marriage or similar partnerships

are integral—but often overlooked—aspects of behavioral or psychosocial influences on the development, course, impact, and management of CHD [4•]. Thus, the traditional focus on *individuals* developing or coping with CHD is usefully broadened by considering patients within the context of their *intimate relationships*.

Three issues illustrate the embeddedness of CHD patients in their relational contexts. First, the presence and quality of intimate relationships may influence coronary artery disease progression and the course of clinically apparent CHD through physiological effects of stress and emotion [5–7]. Second, health behaviors that confer risk and serve as prevention targets are affected by these relationships [8, 9]. Finally, intimate relationships are important aspects of patients' adjustment to stressful events posed by CHD and its treatment (e.g., acute coronary events, cardiac surgery),

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as well as the more prolonged process of medical management [10, 11].

Evidence of the importance of intimate relationships is substantial in each area. The presence of an intimate partner is typically associated with reduced risk of incident CHD, improved prognosis, and more effective health behavior change and patient management. But strained and disrupted relationships are sources of cardiovascular risk and more complicated care. The literature documenting these impacts of intimate relationships is extensive, but direct evidence of the utility of couple assessments and interventions in CHD patient care is more limited. Efforts to close the gap between evidence of the relevance of intimate relationships and current support for addressing these issues in patient care will be more informative to the extent that they draw on concepts, methods, and findings in relationship science.

## Psychosocial Influences on the Development and Course of Disease

A long history of observational evidence from well-designed epidemiologic and clinical studies indicates that living alone as opposed to with a married spouse or similar intimate partner is associated with increased risk of death from coronary disease [12, 13]. Subsequent research documents that general levels of social connection and support are robust protective factors in the development and course of CHD, whereas isolation and loneliness confer an approximately 30 to 60% increased risk for incident CHD and poor prognosis [14–16]. For many adults, marriage and similar intimate relationships are a primary source of social connection and support, and substantial recent evidence indicates that being married or in a similar relationship is associated with reduced risk of incident CHD and recurrent events and mortality among CHD patients [17–20]. The magnitude of these associations varies considerably across studies and outcomes, but risk among unmarried individuals is increased approximately 20 to 50%.

Despite these benefits of marriage and similar relationships, strain (e.g., recurring conflict, and dissatisfaction) and disruption (i.e., separation, divorce) in intimate relationships are commonplace and have clear implications for physical health [5, 21, 22]. Strained relationships are associated with increased risk of incident CHD [23, 24], more severe atherosclerosis [25–28], and poor prognosis (i.e., increased risk of recurrent events, reduced survival) among CHD patients [29–31]. Divorce is similarly associated with increased risk of incident CHD and poor outcomes among patients [20, 32, 33]. Here, too the magnitude of associations vary across studies and outcomes, but marital strain and disruption are associated with a 30 to 90% increase in risk. Hence, both

the presence and quality of intimate relationships predict the development and course of CHD.

Health behaviors (e.g., smoking, physical activity, diet, and adherence to medical regimens) discussed in the next section no doubt contribute to associations [34]. However, these effects of the presence and quality of intimate relationships are often significant even with statistical adjustments for behavioral influences. Mechanisms related to physiological effects of psychological stress and negative emotion are viewed as an additional likely pathway. Acute and chronic psychological stress activate cardiovascular responses (e.g., increased blood pressure and heart rate), heighten neuroendocrine activity (e.g., increased catecholamine and cortisol levels), mobilize circulating lipids, and increase systemic inflammation [35–38]. In contrast, positive emotions and experiences are associated with reduced levels [39]. This suite of physiological stress responses has been implicated in the development and progression of atherosclerosis, as well in the precipitation of acute coronary events and the course of CHD more generally [40–48].

Social support is associated with lower levels of these physiological responses [49]. Hence, as a key source of support and connection, positive relationships and interactions with intimate partners can attenuate these biobehavioral influences on disease. In contrast, strained and conflictual intimate relationships and interactions are associated with more frequent, pronounced, and prolonged physiologic stress responses [5, 6,]. In studies manipulating the tone of marital interactions, conflict evokes substantial increases in heart rate, blood pressure, and related neuroendocrine responses [5, 6, 50, 51]. Furthermore, the magnitude of these changes is associated with the degree of hostile and controlling behavior in those interactions and with prior levels of marital strain [6, 52, 53]. Hence, strained intimate relationships may contribute to pathophysiological stress responses in two ways: first, by undermining the protective support and connection otherwise available from an intimate partner, and second by increasing the frequency, severity, and duration of episodes of conflict which evoke these pathophysiological responses. Strained relationships are also associated with worry and rumination [54], and these repetitive thought processes elevate physiological stress responses [55]. Repeated and maintained over time, physiological effects of low support and high conflict could contribute to the development and progression of atherosclerosis and the precipitation of coronary events.

Intimate relationships may also contribute to the effects of other psychosocial characteristics that predict the development and course of CHD. At the social-environmental level, low socio-economic status is a well-established CHD risk factor, even with statistical adjustments for associations with health behaviors and access to medical care [56]. Presumably, the many stresses and strains of lower SES contexts

and daily life can influence disease development through psychophysiological mechanisms described previously [57]. Importantly, lower SES is associated with greater marital strain [58]. Various aspects of job stress and instability of employment also predict CHD morbidity and mortality [59–63]. Job stress is similarly associated with strain in intimate relationships, as spillover from stress at work disrupts relationship interactions at home [64, 65] and undermines overall relationship quality [66]. This association is reciprocal, potentially creating cycles of mutually exacerbating relationship and work stress [67], a process that is stronger in the presence of personality characteristics also associated with increased CHD risk, such as negative emotionality, antagonism (i.e., hostility), and low conscientiousness [68]. Thus, low SES and high job stress might influence CHD, at least in part, by undermining support and increasing conflict in intimate relationships [4•].

At the level of individual psychosocial risk factors, depression [69, 70], anxiety [71], posttraumatic stress disorder [72], anger and hostility [73, 74], and general negative emotion and perceptions of stress [75] have been established as CHD risk factors in systematic reviews and meta-analyses. Each of these aspects of emotional distress are also associated with more frequent and severe relationship conflicts and lower levels of support in intimate relationships [76–80]. For example, PTSD is associated with greater conflict and less support in intimate relationships [81], often reaching clinically significant levels [82]. Marital difficulties associated with PTSD are evident in more hostile behavior and elevated physiological stress responses during marital interaction [83, 84]. Some of these associations are bi-directional; emotional difficulties increase relationship strain, and relationship difficulties maintain or exacerbate emotional distress [76].

In contrast, positive personality traits and similar factors (e.g., optimism, subjective well-being, and conscientiousness) reduce CHD risk [85–90]. These positive psychosocial factors are associated with less conflict and more support in intimate relationships, and more positive close relationships may maintain and enhance emotional adjustment and resilience [77, 91–94]. Positive affect is associated with higher relationship quality, especially when shared between partners [95]. The continuing and potentially chronic nature of these risk and protective cycles likely increase their potential impact on the pathophysiology of CHD. Thus, some of the benefits of positive or protective individual differences may involve their robust associations with greater support and reduced conflict in couples, and the related altered physiological stress responses.

Traditionally, research on psychosocial influences on CHD has emphasized identification of independent risk and protective factors, so as to develop parsimonious models as a guide to efficient and optimally effective interventions. However, the consistent and often strong associations of a wide

array of psychosocial factors with the quality of intimate relationships suggest an alternative. The correlation between individual and relational factors could involve recurring patterns of interpersonal experience which, in turn, alter pathophysiological mechanisms. This view could also guide the refinement of psychosocial interventions [4•].

## Health Behavior and Prevention

Several modifiable behaviors are strongly predictive of the development and course of coronary heart disease, including smoking, physical activity, diet, and adherence to medical regimens [96]. As noted previously, these health behaviors contribute to the association of intimate relationship difficulties and health outcomes [34]. Several dyadic processes are relevant considerations for these health behaviors; in both useful and maladaptive ways, intimate partners can influence each other's health behavior. First, intimate partners are often concordant for these and other CHD risk factors [97, 98], suggesting that couple-based interventions may be efficient by including two at-risk individuals. Furthermore, this concordance may be associated with particular barriers to change, as when the daily cues produced by a still-smoking, over-eating, or sedentary spouse contribute to relapse and failure of the other partner's behavior change attempts. In non-concordant couples, adaptive spouse involvement (e.g., encouragement, collaboration) may facilitate behavior change and maintenance of those risk-reducing lifestyle alterations, but maladaptive processes (i.e., criticism, blame, or “nagging”) may undermine such efforts [99].

This relational context of behavioral risks for CHD suggests that partner involvement in health behavior change interventions could be useful, and preliminary evidence is consistent with this view [8, 100]. However, partner-assisted interventions for health behavior are sometimes no more effective than individually-focused interventions, as in smoking cessation [101–103]. Many couple-based interventions for health behavior change consist of relatively simple conjoint participation in which both partners receive the same educational interventions. Couple-based interventions that also focus more directly on adaptive and maladaptive couple patterns regarding health behavior change may be more beneficial. That is, interventions that go beyond simple partner participation to increase adaptive—and decrease maladaptive—couple interaction patterns surrounding health behavior change may have larger and more sustained effects.

Insufficient or low quality sleep is an increasingly recognized behavioral risk for CHD [104–107] and provides an additional example of the relational embeddedness of health behavior. Poor sleep (i.e., reduced duration and quality) is associated with the psychosocial risk factors for incident CHD and poor prognosis discussed previously

(e.g., depression, hostility, and PTSD) [108–112]. Sleep and these psychosocial factors are reciprocally related, with poor sleep and emotional distress likely comprising a vicious cycle [113]. Social isolation and strained intimate relationships also predict insufficient and low quality sleep [114, 115]. Social support, in contrast, is associated with better sleep [116]. These processes also likely comprise a reciprocating cycle between sleep and couple functioning; poor sleep predicts worse next-day couple conflict [117], dysfunctional conflict predicts worse sleep, and constructive conflict predicts better sleep [118, 119]. Sleep includes other dyadic processes (e.g., the degree of concordance in sleep schedules) that are important in emotional adjustment and physiologic risk factors [120, 121]. Furthermore, one partner's insomnia may confer CHD risk for the other [122]. In addition to effects on the next day functioning, marital conflict is associated with smaller nighttime blood pressure dipping [123], a pattern associated with increased risk of CHD [124].

These relational aspects of sleep are also evident in obstructive sleep apnea, a CHD risk factor managed with continuous positive airway pressure (CPAP) treatment [125]. Partners are often affected negatively by OSA patients' symptoms, and partners' behavior and relationship quality are associated with patients' often problematic adherence to CPAP treatment [126]. Positive partner behavior (e.g., encouragement, collaborative problem solving) is associated with better adherence, whereas blame and controlling behavior may undermine adherence [127, 128]. Hence, cultivation of adaptive interaction patterns and reduction in often well-intended but ultimately unhelpful behavior (e.g., nagging, criticism) may be useful in patient care [129].

## Adjustment to Acute and Chronic Disease and Related Care

The importance of the couple context as an influence on patients' adjustment to CHD has been recognized for decades [11] and is evident initially during acutely stressful coronary events and related care. Acute CHD patients in a couple are generally more adaptively engaged in their health care than single patients [130], but specific elements of this partner involvement can moderate its effects. Partners' understandable emotional distress can impact patients' adjustment negatively, as their expressions of distress may magnify patients' own fears and concerns. Patients' distress may be compounded further by their concerns over the impact of the health crisis on the partner. The patients' distress, in turn, can have a parallel negative impact on the partner's adjustment [131]. Forms of coping exhibited by both patients and partners are related to the severity of the medical crisis, and emotional adaptation in both parties suffers when they hold differing views of the illness and necessary aspects of management

[10]. Support from a spouse and shared efforts to manage the crisis (i.e., dyadic coping, collaborative problem solving) [132] are beneficial; hostility (e.g., criticism, blame) from a spouse, efforts to hide their concerns (i.e., protective buffering), and over-protection often are not [133]. Overall, although partners are often quite distressed during an acute coronary crisis their presence can be beneficial for patients, if the relationship has generally been functioning well beforehand and partners' responses to the crisis are modulated and mesh well with the patient's coping style.

Recent evidence suggests that symptoms of PTSD can arise during ACEs [134–136], particularly when patients perceive an enduring health threat [137, 138]. Although the presence of a partner during the coronary crisis can facilitate the patient's emotional adjustment, their presence in the emergency department during an ACE can sometimes increase patients' perception of the situation as threatening [139]. Some evidence suggests that intimate partners of ACE patients can themselves develop symptoms of PTSD [140]. In other PTSD populations (e.g., combat veterans), the partners' distress typically is not accurately characterized as secondary PTSD but instead should be seen as general emotional distress with prominent features of stress and anxiety [141]. Regardless of this specific diagnostic issue, partners of ACE patients are often quite distressed by these events, and witnessing spousal suffering can pose a risk for longer-term adjustment difficulties [142].

After the acute phase, patients' symptoms of anxiety and depression typically improve, but improvement is attenuated in cases with more medical morbidity [143] and greater stress during the ACE [144]. In its chronic phase, CHD is often co-morbid with psychosocial difficulties (e.g., depression, anxiety, stress, and sleep disturbance) that warrant attention in their own right, but also because they are associated with poor medical prognosis [145]. As discussed previously, these emotional difficulties are associated with strained couple functioning [4•].

Higher levels of positive affect in partners are associated with better patient well-being, by encouraging patients' perceptions of the illness as controllable [146]. Higher initial reports of marital satisfaction predict decreases in CHD patients' and partners' depressive symptoms over time [147]. The spouse's impact on patient health behavior change (e.g., smoking cessation), emotional adjustment, and medical outcomes (e.g., blood lipid levels) depends on how patients perceive the support provided by their spouses [148]. As noted previously, collaboration and shared problem solving are associated with better health outcomes, whereas perceptions of the spouse as critical, blaming, or controlling generally are not [149].

Multiple medications, exercise-based rehabilitation, and lifestyle change recommendations comprise the lynchpin of CHD medical management, and adjunctive interventions can promote better adherence [150, 151]. Exercise-based

rehabilitation is effective in improving medical and functional activity outcomes, but referral and participation rates are less than optimal [152]. Being married or similarly partnered is associated with increased likelihood of attendance at cardiac rehabilitation [153]. Despite the effectiveness of standard medications for chronic CHD care, adherence is often problematic, limiting overall benefits [154, 155]. Generally, having an intimate partner is associated with better medication and lifestyle change adherence, and some evidence suggests that couple-focused interventions can have beneficial effects on these behaviors [9]. Depression, PTSD, and other emotional difficulties common in CHD populations are associated with non-adherence to prescribed medical care [156, 157], and as noted previously, these psychosocial risks are closely tied to couple processes.

CHD patients and their intimate partners often express concerns about sexual activity. The medical/physiological demands of sexual activity and related patient safety are generally straightforward [158], but patients and their spouse often remain concerned [159]. In the general population seeking help with sexual functioning, the effectiveness of couple therapy is well supported [160], and these interventions are easily adapted for CHD couples.

Psychosocial interventions as adjuncts to usual management of CHD most often utilize individual or small group interventions delivered to patients, addressing their individual difficulties and concerns. When added to traditional exercise-based cardiac rehabilitation, interventions such as stress management or cognitive-behavioral therapy produce additional clinically meaningful benefits in psychosocial functioning (i.e., reduced stress, anxiety, and depression); improvements in health outcomes (e.g., cardiac recurrence, mortality) are apparent but typically weaker, ranging from non-significant reduction in risk for some outcomes (e.g., total mortality) to approximately 20% reductions in others (cardiovascular mortality) [2, 3, 161, 162]. Some well-controlled individual studies have produced stronger effects on medical outcomes [163], suggesting that refined individual interventions have additional potential.

Empirically-supported relationship therapies, such as cognitive-behavioral couple therapy, have been found to be useful in the treatment of relationship difficulties and emotional distress in medically healthy populations and can have clear benefits in reducing symptoms of depression, anxiety, and PTSD that are commonly co-morbid with CHD [76, 164–166]. There have been long-standing calls for adaptation of these couple therapies to the routine management of CHD [167], and a small but growing body of evidence suggests that they can be useful additions to the management of chronic medical illness [168, 169].

Most of the couple interventions in CHD research comprise basic partner involvement in patient education and health behavior change counseling. Across the relevant studies of

such interventions, there is some evidence that the approach produces benefits for patient and partner emotional adjustment, health-related quality of life, knowledge about CHD and its treatment, and satisfaction with patient care [170]. However, there are null results in otherwise well-designed trials of such partner participation approaches [171].

Evidence regarding couple interventions in CHD that are more closely based in relationship science is preliminary but encouraging [172]. For example, in a small trial, the Partners for Life program [173] was well received by patients and partners and was associated with increased physical activity levels and improvements in relationship quality. Observational research suggests that participation with a partner in the Diabetes Prevention Program is associated with better treatment outcomes [174], as is the case for similar interventions for CHD patients [175]. Couple interventions can not only have beneficial effects on patient-related outcomes (e.g., emotional adjustment, adherence, and health behavior) but also provides an opportunity to address adjustment and relationship difficulties experienced by partners [176]. In refining these interventions, qualitative studies of CHD patients and their partners underscore the presence of common relationship concerns (e.g., emotional disconnection and communication difficulties, overprotection of the patient, changes in couple roles, adjustment to recommended lifestyle changes) and needs for related services (e.g., access to relationship-focused resources, opportunities for supportive interactions with similar couples) [177].

Despite obvious challenges for health and well-being, significant life stressors can have positive effects on emotional adjustment and quality of life, through cultivation of personal meaning, altered life priorities, and other aspects of benefit-finding and posttraumatic growth [178, 179]. Posttraumatic growth is evident among patients following acute coronary events and surgical interventions for CHD, and it is associated with better adaptation to these stressors [180, 181]. Although little research on posttraumatic growth has been done in couples confronting CHD, these positive couple processes may be useful additions to the usual focus on increasing partner involvement and reducing conflict and maladaptive interaction patterns.

## Future Directions

This brief overview illustrates the obvious potential for couple-based approaches to risk and resilience factors in the development and course of CHD, and in adaptation to and management of the disease. More research in several areas is needed to guide the development and evaluation of couple-based approaches to routine care. Such efforts will be more informative if they utilize concepts, methods, and interventions from current relationship science [182–185].

## An Expanded Approach to Comprehensive Care

Integrative or comprehensive multi-disciplinary care for CHD patients is emerging as the optimal model, given its facilitation of coordinated effort across multiple professionals [186]. The role for psychologists and similarly trained professionals in these teams is increasingly recognized [187]. The literature reviewed thus far suggests that providers should inquire during clinical assessments about the presence, quality, and history of intimate relationships and the partner's role in related patient care, even though additional research is needed.

For care teams considering more formal couple assessments, well-validated short screening instruments can identify instances of clinically significant relationship difficulties [188]. A variety of single and multi-dimension self-report assessments of relationship quality are available [189], as well as well-validated inventories [190] that provide normed assessments of general levels of relationship quality, primary domains of positive (e.g., affection, closeness) and negative (e.g., conflict) couple functioning, and the degree of difficulty experienced in common specific relationship domains that are often particularly relevant for these couples (e.g., household labor, sexual functioning, etc.). Although often conceptualized as a single dimension, recent theory and research indicates that relationship quality is better characterized by separate positive (e.g., support, affection) and negative (e.g., conflict) dimensions [191]. Furthermore, current best practices in couple assessment include a range of factors, comprising behavioral, emotional, and cognitive aspects of couple functioning [182]. However, for all of these current approaches to couple assessment, it is important to note that there is minimal evidence available currently regarding their reliability, validity, sensitivity, and specificity in the context of CHD patient care, and little direct evidence of their utility in improving patient satisfaction or other outcomes.

A long tradition in couple research and clinical assessment utilizes direct observation of couple interactions, often accompanied by behavioral coding [182]. Such behavioral observation assessments can have incremental predictive utility above and beyond the information gleaned from self-report measures in studies predicting the presence and severity of CHD [192–194]. Observations of interactions about adherence and health behavior change may be useful in refining the management for high risk individuals and patients with established disease.

Inclusion of partners in routine patient evaluations provides an additional opportunity for more effective patient evaluation. A long-standing literature suggests that CHD patients often minimize or deny emotional difficulties, reducing the value of patient self-reports and potentially creating serious consequences in patient management [195]. There are well-validated informant rating versions of measures of emotional adjustment and related psychosocial risk and resilience factors, and some evidence suggests that partner

ratings obtained in this manner are more closely related to the presence and severity of CHD than are the much more widely used self-reports [196, 197]. Patients may be unwilling or unable to provide frank descriptions of their psychosocial functioning, whereas partners might provide accurate ratings more readily. Hence, beyond providing information about relationship quality and their own concerns, partners may be a valuable source of information about patients' emotional adjustment and social functioning.

As noted previously, several forms of couple therapy are effective treatments for not only relationship distress but also related emotional difficulties, such as depression and PTSD, with strongest support for behavioral, cognitive-behavioral, and integrative couple therapies [198]. However, the prevalence of significant couple distress exceeds considerably the available resources for expert services delivered to individual couples. Hence, stepped-care models where initial low-cost and often web-based self-directed therapies are provided first and followed as needed by increasingly resource-heavy approaches [199] have been adapted to include relationship interventions [200]. Relationship education programs can serve as an initial step in this format, and there is considerable evidence of their effectiveness [201]. These approaches are often self-directed, which may be more appealing to patients and partners concerned about the time, expense, and possibly the anxiety-provoking nature of traditional couple counseling. Time-limited structured interventions (e.g., relationship "check-ups") are slightly more intensive [202] and also are well-supported [203]. Traditional couple therapy approaches can be reserved as a "top step" for initially non-responsive couples or those facing more complex initial difficulties. The preliminary approaches for couple interventions tailored specifically for CHD populations described previously [172, 173] could be adapted for delivery in each of these stepped forms.

## Diversity, Disparities, and Inequities

Future research must also address aspects of diversity, disparities, and inequities that present parallel issues in CHD and relationship functioning. As described previously, CHD prevalence and adverse outcomes among patients [56, 204, 205] and significant relationship distress and disruption are greater in lower SES populations, and among some ethnic and racial minority groups, especially African-Americans [206, 207]. Also, manifestations and management of CHD differ for men and women [208–210], and the topics, severity, and urgency of intimate relationships difficulties may differ as well, especially among couples seeking therapy [211, 212]. There are obvious communalities with men experiencing the disease (e.g., physical limitations, fear and uncertainty about future health and functioning, and sexual concerns) and research on psychosocial aspects women's heart disease is growing [213, 214], but more research and

attention in clinical care for women is needed. Importantly, the available evidence supports the importance of intimate relationship difficulties for CHD among women [27, 31], and at least one psychosocial treatment tailored for women with CHD has been found effective in improving adjustment and medical prognosis [215].

Similar issues arise for the unique versus common aspects of intimate relationships among non-heterosexual patients and those from different cultural backgrounds. All of these aspects of diversity and health disparities are related to variation in intimate relationships [207, 216–218] and often occur in combination. For example, financial strain and racial discrimination are jointly and disproportionately experienced by African Americans [219], and are also associated with greater intimate relationship difficulties [220, 221]. Unfortunately, interventions for elevated levels of relationship distress and disruption in communities of color and lower SES are relatively understudied and have sometimes produced disappointing results, perhaps due to the unique challenges and contextual aspects of relationships in these groups [222, 223]. Expertise in research and clinical services regarding cultural and contextual adaptations of existing interventions is important for future progress.

Access to adjunctive services such as stress management and health behavior change counseling often begins in the context of exercise-based cardiac rehabilitation. Women, individuals from lower SES groups, and ethnic and racial minorities have a lower rate of referral to and participation in cardiac rehabilitation, as do individuals living in rural communities [224]. Hence, consideration of intimate relationships in comprehensive care for these groups may be less frequent and feasible, despite the fact that they experience greater prevalence and severity of strain and disruption in intimate relationships, as well as a more troubling CHD prognosis.

Increased provision of telehealth services during the COVID-19 pandemic may have an additional benefit in expanding couple services for CHD patients and their partners. During the COVID-19 era, providers and recipients alike have accepted digital couple intervention programs or couple teletherapy [225, 226]. In preliminary studies, such services are effective in improving relationship quality and emotional adjustment in low-income couples [227, 228]. Similar approaches to cardiac rehabilitation can be useful [229]. Pandemic-induced conversion of couple-based treatment for CHD has also been described [230]. These evolving changes in health care delivery may provide increased and more equitable access to couple services.

## Conclusions

All of these future directions for CHD research, prevention, and patient care begin with an expanded perspective, beyond the usual focus on individual patients to include the context

of their intimate relationships. A substantial and growing body of evidence documents that the presence and quality of these relationships predict the development and course of CHD, and are also closely associated with other well-established psychosocial risk factors, including social environmental risks (e.g., low SES, job stress) and characteristics of individuals (e.g., depression, PTSD, and optimism). Intimate relationships can have beneficial or adverse effects on health behaviors (e.g., smoking, physical activity, and adherence to medical regimens), depending on the quality of those relationships and patterns of couples' communication regarding those behaviors. This relational embeddedness of key modifiable risk behavior targets creates the opportunity for additional avenues for health behavior change efforts. Lastly, the CHD patient's intimate partner both affects and is affected by the patient's adaptation to acute coronary events and longer-term adjustment and care, again creating opportunities for expanded approaches in management.

Despite this considerable evidence, direct demonstrations of improvements in prevention or patient management from adding couple assessments and interventions to current care are limited. The vast majority of related evidence is observational. Although the randomized trials to date are encouraging, they are generally small, inconclusive, and few in number. Overall, the evidence is suggestive of the potential value of adding couple assessments and interventions to prevention and collaborative care models, but far from definitive. In pursuing the needed evidence, the next generation of research on couples and CHD would be strengthened by additional use of concepts, methods, and research findings in current relationship science.

## Compliance with Ethical Standards

**Conflict of Interest** The author has no financial or non-financial conflicts to report.

**Human and Animal Rights and Informed Consent** This article does not contain any studies with human or animal subjects performed by any of the authors.

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