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RESEARCH ARTICLE

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Marital Status, Ethnicity, and Cardiovascular Health: A Systematic Literature Review

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ABSTRACT

Objective: The association between marital status and health has long been recognized albeit not without controversy. While substantial empirical research provides evidence that being married confers health benefits, there is evidence that heterogeneity exists in these benefits based on sociodemographic factors, including race/ethnicity, gender, and income. Given continued disparities in a range of health outcomes, there is a need to identify and better understand variations in the health advantage of being married versus unmarried (i.e., never-married, married, widowed, separated, or divorced). In this systematic literature review, we aimed to examine racial/ethnic variations in the purported protective role played by marital status with regard to cardiovascular disease (CVD) risk factors and CVD outcomes. The review focused on studies that included population groups highly vulnerable to poor cardiovascular health.

Design: We conducted a search of MEDLINE, PubMed, PsycINFO, and lists of relevant articles published during a five-year period in English. Databases were searched using Medical Subject Headings (MeSH) terms and other appropriate keywords related to marital status, race/ethnicity, and CVD risk factors and outcomes. Four reviewers independently screened titles and abstracts and abstracted data from full-text articles. Preferred Reporting Items of Systematic Reviews and Meta-Analyses (PRISMA) guidelines were followed.

Results: The search yielded 4,577 titles, and 18 studies were included in this review. Studies showed mixed findings on the relationship between marital status, race/ethnicity, and CVD risk factors. With regard to CVD outcomes, most studies reported findings that suggest being married may serve as a protective factor across race/ethnic categories.

Conclusion: Some cardiovascular risk factors and disease outcomes vary by the intersection of marital status and race/ethnicity. Differences in the relationship between marital status, race/ethnicity, and cardiovascular health need to be examined further in future research. These differences should be considered in the development of interventions aimed at addressing health disparities.

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Introduction

Cardiovascular disease (CVD) is the leading cause of morbidity and mortality globally and in the United States (U.S.) [1,2]. Nearly half of adults in the U.S. have at least one form of CVD [3]. Cardiovascular-related health disparities have persisted both in terms of CVD risk factors (e.g., high blood pressure, diabetes, obesity, smoking) and outcomes, including mortality, stroke, and heart failure [4,5].

There is evidence that marital status influences health outcomes [6,7] and substantial research indicates that being married confers protective health benefits [8,9]. While the association between marital status and health has long been described, it is not without controversy [10-12]. Research indicates that these protective benefits lack consistency based on sociodemographic factors, including racial/ethnic identification [13,14]. Given the continued disparities in health in the U.S., there is a need to better understand the role of marital status in health as it relates to race/ethnicity.

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While previous reviews have examined the relationship between marital status and health, the findings have been mixed [8,15-21]. In addition, our understanding remains limited about how marital status influences cardiovascular health both in terms of risk factors and disease outcomes across race/ethnic categories [15,17,20]. While substantial empirical research provides evidence that being married confers health benefits, there is evidence that heterogeneity exists in these benefits based on sociodemographic factors, including race/ethnicity, gender, and income [20,22,23].

Given the standing of CVD as the leading cause of morbidity and mortality nationwide, there is a strong rationale for evaluating existing knowledge pertaining to interactions between marital status, race/ethnicity, and CVD risk factors and outcomes. Such research could aid in the development and tailoring of effective interventions. The purpose of this literature review was to assess the influence of marital status on cardiovascular health across race/ethnicity. To our knowledge, this study represents the first systematic review that focuses on the interplay between marital status, race/ethnicity, and cardiovascular health.

Methodology

The review study was conducted and its findings reported in conformance with the Preferred Reporting Items of Systematic Reviews and Meta-Analyses (PRISMA) guidelines [24]. The study's protocol was registered in Open Science Framework (OSF) (Registration DOI 10.17605/OSF.IO/RWB8M).

Eligibility Criteria

We selected studies that examined the interactions between marital status, race/ethnicity, and cardiovascular health (i.e., CVD risk factors and outcomes for CVD-related health conditions and complications). The review targeted studies that included racial/ethnic population groups recognized as highly vulnerable to poor cardiovascular health. Studies were included in the review if they were published during the five-year timeframe from 2017 through 2022, written in the English language, and performed using samples based in the U.S. We excluded case reports, case series studies, conference abstracts/proceedings, and literature reviews. Studies that did not assess marital status and race/ethnicity and evaluate specific cardiovascular health factors were also excluded. Studies that did not measure interactions between marital status, race/ethnicity, and cardiovascular health were similarly excluded. Literature reviews were examined to identify additional studies that met inclusion criteria.

Search Terms and Database

We identified studies published during 2017 through 2022 via PubMed, MEDLINE, and PsycINFO databases. The exact free search terms were: ("marital status") AND ("acute coronary syndrome" or "acute myocardial infarction" or "alcohol" or "cardiac arrest" or "cardiovascular disease" or "cardiovascular diseases" or "CVD" or "cardiovascular mortality" or "cardiovascular risk factors" or "cholesterol" or "coronary artery disease" or "diabetes" or "fitness" or "heart disease" or "heart failure" or "health" or "hypertension" or "obesity" or "physical activity" or "smoking") AND ("race" or "ethnicity" or "Hispanic" or "Latino" or "African American" or "Asian American" or "Asian" or "Native American" or "Black" or "White" or "Caucasian"). The bibliographies of relevant studies and reviews were inspected for additional studies that met inclusion criteria.

Study Selection and Data Extraction

Study authors independently screened potentially eligible studies by title and abstract to assess whether they met the inclusion criteria. We subsequently reviewed the full text of these articles to determine whether to include or exclude them. Discrepancies were resolved by discussion. Independent double extractions were performed by two reviewers who collected data pertaining to study design, publication date, sample size, participant characteristics, CVD health factors, and methods whereby health information was measured (e.g., participant self-report, physician report, medical record information). Relevant characteristics of all studies included were tabulated. We examined whether there were significant interactions between marital status, CVD risk factors/outcomes, and race/ethnicity.

Quality Assessment of Included Studies

We assessed for risk of bias in the included studies by evaluating sample size, method whereby race/ethnicity was assessed (e.g., self-report, medical record, physician report), inclusion of population groups at high risk for poor cardiovascular outcomes, study design, and CVD risk factor and outcome measure (e.g., self-report, medical record, laboratory test). We tabulated relevant characteristics of all the included studies.

Results

The search resulted in 4,577 titles. After elimination of studies not meeting review criteria, 190 studies were considered pertinent for screening. Of these, 85 studies were eliminated based on exclusion criteria, and 17 due to duplication. Out of the remaining 88 studies, 70 were eliminated due to publication dates (older than five years), duplication, or the lack of analyses of three-way interaction effects involving marital status, cardiovascular health, and race/ethnicity. Eighteen studies were determined to meet criteria for inclusion in this review. Figure 1 summarizes our study identification and selection.

Study Characteristics

The bulk of the selected studies (n=14) examined the relationship between marital status, race/ethnicity, and CVD risk factors. CVD risk factors measured in these studies included diabetes, hypertension, overweight and obesity, smoking, sleep adequacy, depressive symptoms, stress, and healthcare access. Five studies examined CVD-related health conditions and complications, including acute myocardial infarction (AMI), heart failure, and mortality associated with cardiometabolic conditions (e.g., diabetes mellitus). All studies reviewed were based on samples that included racial/ethnic groups impacted by cardiovascular health disparities in the U.S. Table 1 provides a summary of study characteristics.

Table 1: Basic characteristics of studies included.

Investigator(s)	Marital status (%)	Race/ethnicity (n)	Gender (%male)	CVD risk factor/ outcome	Measure	Findings
Baah et al. [38]	SI: 16 M/P: 57 D/S/W: 27	AA: 117 AS: 35 WH: 391	63.9	HF self-care; treatment adherence	Validated self-report instrument	M/P marital status associated with greater self-care. No significant interactions based on race/ethnicity.
Bell & Thorpe (2019)	SI: 20 M: 62 D/S/W: 18	AA:1881 WH:4264	100	Obesity	BMI based on medical exam	SI marital status associated with lower odds of obesity among men across race/ethnic groups.
Ettman et al. [32]	SI: 18.3 M/P: 63.2 D/S/W: 18.5	AA:5,610 HL:6,981 WH:11,072 Other: 2,719	48.9	Depression	PHQ-9	M marital status associated with lower probable depression across all race/ethnic groups.
Flores et al. [39]	SI: 4.4 M: 62 D: 16.3 W: 17.3	AA: 14,560 ASPI: 4,176 HL: 6,455 NA :710 WH: 132,913	0	Mortality	Death certificates; hospital records	M marital status associated with lower risk of death. No interactive effect of race/ ethnicity by marital status on survival.
Frederick et al. [40]	SI:14.5 M: 63.5 D/S/W: 22	HL: 2,850	53.6	AMI	Autopsy records	Marital status not associated with in-hospital mortality.
Gabriel et al. (2020)	M: 19.5 Other: 80.5	AA: 831 WH: 572	44.7	Hypertension	Blood pressure tests; hypertension medication self-report	Marital status not associated with hypertension. No significant interactions of race/ ethnicity by marital status on hypertension prevalence.
Gong et al. [28]	NR	AS: 3,810 AA: 2,078 HL: 7,996 WH: 30,605 Other: 3,481	40.6	BMI	Self-report	Marital status not associated with overall obesity prevalence. Obesity significant related to never married status among KA adults and married status among VA adults.
Kim et al. [26]	SI: 27.5 M/P: 51.4 S/D/W: 21.1	HL: 16,415	40.1	Sleep duration; insomnia; sleep efficiency	Self-report and actigraphy	Being married or cohabitating associated with normal sleep duration, fewer insomnia symptoms, and higher sleep efficiency among HL.
Kposowa et al. [37]	SI:20.4 M: 62.2 D/S/W:17.4	AA: 119,249 AS: 30,533 NA: 11,170 HL: 157,877 WH:1,059,208 Other: 6,479	47	Diabetes mellitus mortality	Death certificates	Among men, D/S marital status associated with diabetes mortality across race/ethnicity. Among women, W marital status associated with mortality across race/ethnicity.
Kroeger & Frank [33]	NR	AA: 1,616 AS: 334 HL: 1,275 WH: 7,501 Other: 334	46.6	BMI	Self-report and exam	Being married associated with increases in BMI among AA, HL, and Multiracial women relative to WH women. Among men, marital status had similar although less pronounced BMI increases.
Li et al. [27]	M: 89.1 Other: 10.9	AS:100	100	Heart disease, hypertension, smoking	Self-report	Marital status not associated with smoking. Nonmarried current and former smokers more likely to have heart disease and depression. Nonmarried participants less likely to experience hypertension.

Monserud, M. (2019)	NR	HL: 1,452	NR	Depressive symptoms	CES-D	W status associated with greater depressive symptoms than M status.
Morey et al. [34]	M/P: 85.6 Other: 14.4	AS:100	46.8	Hypertension	Self-report	M and P marital status associated with higher risk of being diagnosed with hypertension or having undiagnosed hypertension relative to being unmarried.
Narcisse et al. [29]	SI: 48.4[a] M: 51.6[a]	AA: 4,725 AS: 2,001 HL: 5,710 NHPI: 1,916 WH: 20,430	51.6	Smoking	Self-report	M marital status associated with smoking across race/ethnicity with exception of AA participants.
Nguyen et al. [35]	M: 58.5 Other: 41.5	AAPI: 3,739 WH: 34,961	51.2	Diabetes	Self-report	Marital status was not significantly associated with the presence of diabetes among WH participants. AS/PI participants with M marital status face nearly double the odds of diabetes compared to those who were unmarried
Ramsey et al. [30]	SI: 17.2 M/P: 64.2 D/S/W: 18.6	AA: 1,841 HL: 2,405 WH: 7,643	48.6	Current cigarette smoking	Self-report	Smoking was more likely among WH participants who reported marital statuses other than M. Smoking more likely among AA participants who reported marital statuses other than M with the exception of those who reported their marital status as W. Among HL, those who with P, S, or D marital status more likely to report higher rates of current cigarette smoking than M participants.
Thomas Tobin et al. [36]	SI: 28.42 M/P: 48.97 D/S/W: 22.6	AA: 330 WH: 333	0	Chronic stress	Stress-related biomarkers	Among WH women, marital status was not significantly associated with allostatic load (AL). Among AA women, marital dissolution associated with heightened AL. AA women with M and SI marital status have similar AL incidence rates.
Vohra-Gupta et al. [31]	SI: 45.7 P: 54.3	AA: 16,558 AS: 7,316 HL: 18,740 WH: 85,870	0	Healthcare access	Self-report	Higher odds of healthcare barriers relative to WH women with P marital status faced by: SI women from all racial/ethnic groups; AS and HL women with P marital status; AA and WH women with P marital status faced similar odds.

Note: M/P, Married/partnered; D/S/W, Divorced, separated, widowed; SI, Single; AA, African American/Black; AS, Asian American; ASPI: Asian American/Pacific Islander: HL, Hispanic/Latino; KA, Korean American; NA, Native American; NHPI, Native Hawaiian and Pacific Islander; VA, Vietnamese American; WH, White; NR, Not reported; HF, Heart Failure; CES-D, Center for Epidemiologic Studies Depression Scale, PHQ-9, Patient Health Questionnaire.
[a]Based on current smokers.

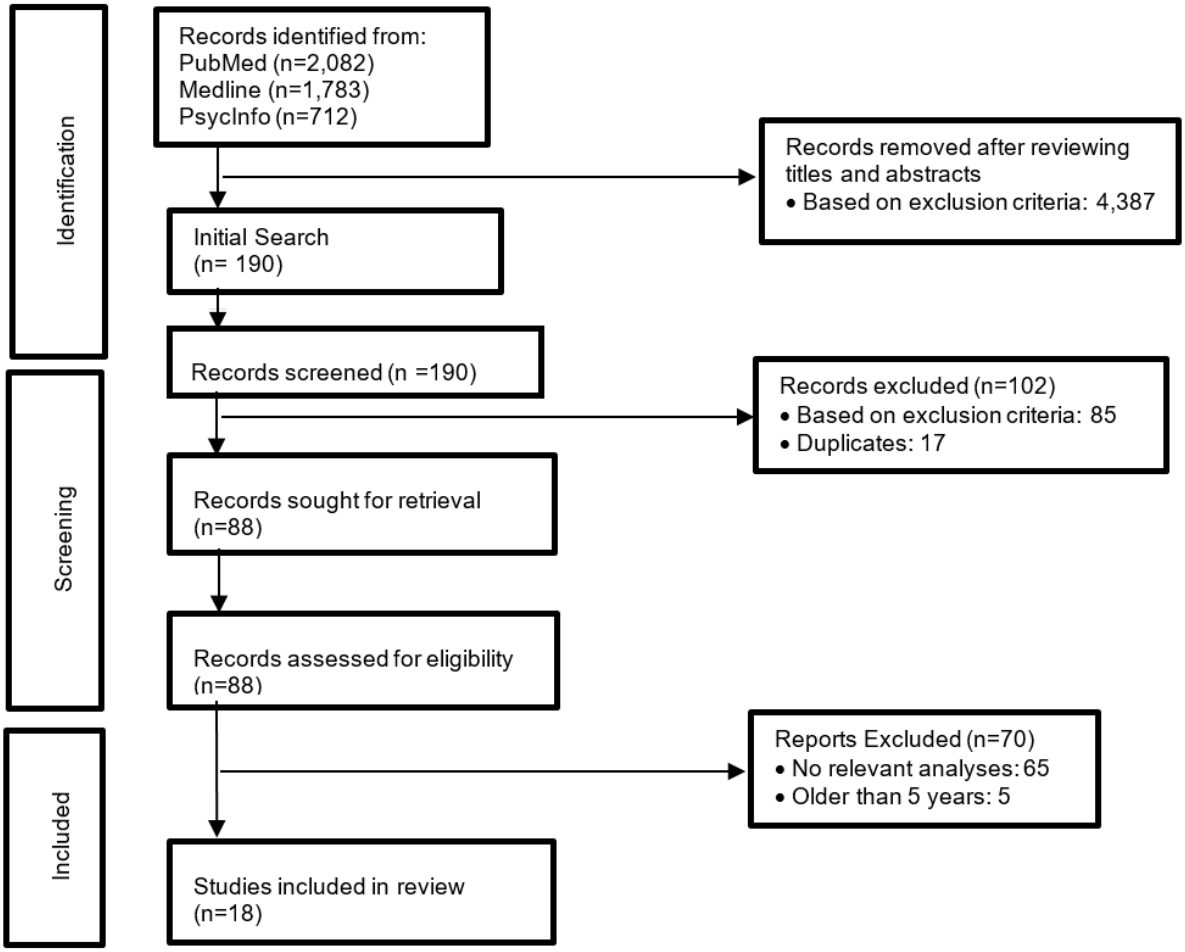

Figure 1: Flow diagram of study selection.

CVD risk factors

Studies show mixed findings on the relationship between marital status, race/ethnicity, and reduced CVD risk factors. While some studies suggest that being married is uniformly associated with reduced CVD risk across race/ethnic categories [25-27], others show racial/ethnic variations in the cardiovascular health-related benefits of marriage [28-31]. The inconsistency in relationship between marital status, race/ethnicity, and CVD risk is further demonstrated through studies with findings that suggest being married may increase vulnerability for poor cardiovascular health [27,28,32-36].

Depressive symptoms and sleep

Findings indicate that being married reduces the severity of depressive symptoms. In one study that used data from a nationally-representative sample of 26,382 adults to examine the relationship between depression and race/ethnicity, investigators found that married individuals across all race/ethnic groups showed lower probable depression than individuals who were never married, or living with a partner [25]. Similar findings related to the influence of marital status on depressive symptoms among racial/ethnic populations vulnerable to poor cardiovascular health were reported in other studies [27]. Such support was also provided in a large epidemiological study of sleep [26]. The study provided support for marriage as a positive influence on normal sleep duration among Hispanic/Latino adults.

In contrast to studies related to depression and sleep adequacy, other studies report findings that either contradict or show racial/ethnic variations in any health-related benefits of marriage with regard to CVD risk factors, such as smoking, excess weight, and obesity [28-31].

Smoking

In a study using data from the National Health Interview Survey (NHIS), investigators found that the proportion of adults who reported smoking was highest among married/cohabitating participants across race/ethnicity, with the exception of African-American participants [29]. Among African-Americans, smoking was more prevalent among study participants who reported their marital status as single than those who reported it as married/cohabiting. Variations by race/ethnicity in the relationship between marital status and smoking were also reported in a study of current cigarette smoking prevalence based on a nationally representative sample of 11,889 adults [30]. The study found the highest prevalence of cigarette smoking among African American adults with cohabiting marital status, White adults who reported their marital status as separated, and Hispanic adults who were single/never married. In contrast, a study of older Chinese American men found no significant relationship between marital status and smoking history [27].

Cardiometabolic conditions

Mixed findings in research examining the relationship between marital status, race/ethnicity, and CVD risk factors were further demonstrated in studies focusing on cardiometabolic conditions, including overweight, obesity, hypertension, and diabetes. These studies (n=7) reported findings that suggest being married may actually influence an increase in CVD risk [27,28,32-36]. For example, in their study of obesity among African American and White men, Bell and Thorpe [32] found that being never married was associated with lower odds of obesity compared to being currently married regardless of race/ethnicity.

Similar findings were reported in a study by Kroeger and Frank [33] that examined the interplay between race/ethnicity, marital status, and changes in body mass index (BMI) during young adulthood. Findings in that study showed that among women, being married was associated with larger increases in BMI for African-American, Hispanic and multiracial women relative to White women. Cohabitation was also associated with larger BMI increases for African-American and Hispanic women. Among Asian American women, marriage and cohabitation were associated with less weight gain relative to White women. The study found comparable albeit less pronounced differences in the relationship between marital status and BMI gains among men along racial/ethnic lines. In addition, contradictory findings on the influence of marital status on overweight and obesity were reported in a study based on a diverse sample of 47,970 California adults [28]. Investigators in that study found that among Korean-Americans, the prevalence of obesity was highest among participants who were never married whereas among Vietnamese-Americans it was highest among those who were married.

Being married was also associated with an increased risk for diabetes and hypertension. In a study of diabetes among 38,700 non-Hispanic White (NHW) and Asian American/Pacific Island (AAPI) adults in Texas, investigators found that the prevalence of diabetes among NHW adults was not associated with marital status whereas among AAPI adults, the odds of diabetes among AAPI who were married were nearly two times higher than those who were unmarried [35].

In a study of hypertension among Chinese and Korean American immigrants (n= 355, ages 50-75) in the Baltimore-Washington, DC metropolitan area, Morey and colleagues reported findings that unmarried participants experienced a lower risk of being diagnosed with hypertension or having undiagnosed hypertension compared to married/cohabiting participants [34]. Similarly, a study by Li and colleagues found that non-married older Chinese American men (ages 60 and over) in the Chicago metropolitan area were less likely than married participants to experience hypertension [27]. In contrast, Gabriel and colleagues found no relationship between marital status and hypertension in a sample of 1,403 African-American and White adults living in Baltimore.

CVD outcomes: CVD-related health conditions and complications

Heart disease, heart failure, diabetes mellitus mortality

Findings in five studies provided evidence of interconnections between marital status, race/ethnicity, and CVD-related health conditions and complications. Three studies reported findings that suggested being married may serve as a protective factor across race/ethnic categories in outcomes related to heart disease progression [28], diabetes mellitus mortality [37], and treatment adherence and self-care maintenance among heart failure patients [38]. Using data from the National Longitudinal Mortality Study (NLMS), Kposowa and colleagues [37] found that for the sample overall, divorced/separated and widowed statuses were significantly related to diabetes mellitus mortality. For minority men and non-Hispanic white men, only divorced/separated status was significantly related to diabetes mortality while for minority women and non-Hispanic white women, widowed status alone was related to diabetes mortality.

In a study of older Chinese-American men, investigators found that current and former smokers who were not married were more likely to experience heart disease [28]. Baah and colleagues [38] found that being married was a significant predictor of self-care maintenance among heart failure patients ($p = 0.024$). There were, however, no interactions between marital status variables and race/ethnicity with regard to self-care ($p = 0.114$).

Two other studies pertaining to CVD-health related conditions and complications also showed no interactions between race/ethnicity, marital status, and health outcomes [39,40]. For example, in their study of Puerto Rican patients with incidental acute myocardial infarction (AMI), Frederick and colleagues [40] found no noticeable association between marital status and in-hospital mortality.

Discussion

This systematic literature review reports findings from studies that examined associations between marital status, race/ethnicity, and cardiovascular health. We aimed to assess whether being married confers benefits to cardiovascular health and the extent to which such benefits exist across racial/ethnic categories. Marital status has long been shown to have an impact on CVD risk [8,9,22,23,41], and the predominant discourse in the existing literature has suggested a protective effect of marriage on various cardiovascular health measures. Our results, however, indicate considerable heterogeneity in marriage-related health benefits and highlight some variations in the influence of marital status on cardiovascular health in the context of race and ethnicity.

While some studies in this review suggest that being married is uniformly associated with positive measures of cardiovascular health [25-27,37,38], others report findings that indicate being married serves as a negative influence [27,28,32-36]. In addition, the review includes studies that show racial/ethnic variations in the influence of marriage on cardiovascular health and provide evidence that marital status has a differential impact depending on race/ethnicity [28-31]. The inconsistency of the findings presented in this review demonstrates there may be a more nuanced relationship between marital status and cardiovascular health when examined within the context of race/ethnicity. This relationship needs to be considered when

designing interventions aimed at addressing health disparities.

Although this review contributes to our understanding of the influence of marital status on cardiovascular health, it has some limitations that must be acknowledged. Eleven of the 18 studies reviewed relied wholly or partly on self-report data which are inherently susceptible to recall bias. In addition, the racial/ethnic categories utilized across studies were often broad, sometimes aggregating diverse subgroups under singular labels that may overlook variations within larger population groups. Future studies should be pursued to examine such variations within larger racial/ethnic categories.

Future research should also be developed that further explores the inconsistency in findings related to the relationship between marital status, race/ethnicity, and cardiovascular health. This inconsistency in the findings suggests the need to address larger systemic factors that fuel health disparities, including those related to sociocultural and economic barriers [20,22,23,31,42].

The review has several implications for research and clinical interventions. Findings in this review are of particular value in connection with continued efforts to address health disparities. The review highlights the differential impact of marital status in specific areas of CVD risk and CVD-related health conditions and complications. While some studies showed being married served as a positive influence with regard to depression and sleep outcomes across race/ethnic categories, several studies report variations in its role in connection with areas such as smoking, overweight and obesity, hypertension, and diabetes. For healthcare practitioners, this is a clear indication that incorporating marital status and socio-cultural considerations into CVD risk assessments may be beneficial to improving patient health outcomes. The findings from this review show the need to address the interplay between marital status and race/ethnicity in designing effective CVD prevention and treatment interventions.

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