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Marriage continues to protect: Social support, stress, and perceptions of health just prior to the COVID-19 pandemic using cross-sectional data from a crowdsourced survey in the United States

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Abstract

Introduction: Most studies have focused on the effects of the COVID-19 lockdown on social relationships. However, few studies have examined differences in health, social support, perceived stress, and quality of life (QoL) just prior to the COVID-19 pandemic in the United States (U.S.). Historically, marriage has been a protective factor that buffers psychological distress and enhances a person's QoL. Yet, it is unclear whether some relationship groups entered the pandemic with these protective benefits over others. Therefore, the current study examines differences between relationship status groups' subjective assessment of health, stress, and social support prior to the widespread effects of COVID-19 in the United States.
Methods: In this study, data were used from a cross-sectional social network study completed just prior to the COVID-19 pandemic in the U.S. Individuals between the ages of 18 and 65 (N =284) years were recruited from a crowdsource platform to complete health, social support, and perceived stress measures.
Results: Among the sample, 66% reported psychological QoL scores below 60, followed by social QoL (60%), environment QoL (48%), and physical QoL (39%). Bivariate results identify positive correlations between social support, social network size, and QoL domains. Conversely, perceived stress was negatively correlated with these variables. ANCOVA results indicate that those who were married reported significantly higher psychological ($F_{3, 275} = 3.73$, $p = .012$), social ($F_{3, 275} = 16.50$, $p < .001$), and environmental ($F_{3, 275} = 6.03$, $p < .001$) QoL and less stress ($F_{3, 275} = 5.75$, $p < .001$) than single or cohabiting individuals. However, those in a committed relationship (not cohabiting) did not substantially differ from those who were married.
Discussion: Some groups entered the COVID-19 pandemic with greater protective benefits than others. In the current study, those who were married and in a committed relationship reported better QoL compared to other groups. Understanding the protective benefits experienced by particular groups may help policymakers, healthcare professionals, and service providers understand the full impact of the COVID-19 pandemic.

Take-home message: Some relationship status groups enter the COVID-19 pandemic with greater protective benefits. Individuals who are married reported greater quality of life, less stress, and greater health satisfaction compared to those who were single or cohabiting. Additionally, married individuals also reported greater support and network size than those who were single.

Keywords: Marriage; quality of life; social networks; social support.

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INTRODUCTION

Deaths across the globe related to COVID-19 total over six million [1], making it the deadliest viral pandemic in 100 years [2]. According to the Centers for Disease Control and Prevention (CDC), there are 98,174,364 confirmed cases of COVID-19 in the United States (U.S.), resulting in 1,073,115 deaths [3]. In January 2020, the CDC identified travel-related infections in Arizona and California, with the Department of Health and Human Services declaring COVID-19 a public health emergency by the end of January [3]. In subsequent months, the administration declared COVID-19 as a nationwide emergency and implement broader travel restrictions and social distancing in some areas of the United States [4]. The imminent threat to health, along with the increased isolation and the uncertainty associated with COVID-19, negatively impacted people's health [5,6] and mental health [7]. However, little is known about people's health just prior to the COVID-19 pandemic in the U.S.

A large-scale adverse event, such as a global pandemic, acts as a macro-level stressor that affects a significant portion of the population [8]. While the widespread effects of the COVID-19 pandemic were broadly felt during isolation, the social resources accumulated by groups prior to the pandemic may have placed some groups in a better position to manage the adverse effects. Historically, marriage has been an important protective factor during difficult times, as it provides access to social, emotional, and financial resources that buffer stress [9-11]. Previous Cross-sectional and longitudinal data indicate that married individuals report lower levels of psychological distress [12], greater psychological well-being [13,14], and higher quality of life (QoL) [15] compared to their unmarried counterparts. Unmarried individuals (e.g., single, cohabitating, or in a committed relationship) and those unable to access their partners during a prolonged macrolevel stressor may experience higher stress and more significant resource deprivation (e.g., less social support). For example, individuals with lower social and financial resources prior to the pandemic were more likely to be adversely affected by depressive symptoms [16].

Immediate access to social support and resources may be critical when a person's external support is restricted or inaccessible. While many studies have explored the impact of the lockdown during COVID-19, few have examined perceptions of health, mental health, and perceived support just prior to the COVID-19 pandemic. Understanding the health and QoL outcomes just prior to the pandemic may help in determining the extent of its impact and the resources in place prior to exposure to a macro-level stressor. Additionally, it is unclear whether all relationships provide access to important forms of support or whether marriage confers specific benefits that are distinct from other relationships. The current study examines differences between relationship status groups' subjective assessment of health, stress, and social support prior to the widespread effects of COVID-19 in the United States. Research examining multiple facets of health and mental health during different points of the pandemic, including the months leading up to the pandemic, may better assist healthcare and service providers in identifying the full impact of COVID-19 as well as the protective benefits of relationship status experienced by different groups.

Quality of Life (QoL) and benefits of marriage

Subjective health measures incorporate complex interactions between a person's physical, psychological, and social relationships in the context of their environment [17]. QoL has often been considered the missing measure of health status [18] and adds a humanistic assessment of a person's well-being [19]. The World Health Organization defines QoL as "an individual's perception of [their] position in life in the context of the culture and value system where they live and in relation to their

goals, expectations, standards, and concerns" [19] (p. 5). A person's QoL is often associated with their social integration and the quality of their social relationships [20].

Relationships are critical to one's health across one's life course and are a demonstration of a person's level of social integration within a community [21]. Social integration refers to the presence of meaningful relationships in one's life, with marriage often considered the most significant of such relationships [11]. Social integration and social support have demonstrated buffering effects related to mental health [22] and contribute meaningfully to health-promoting behaviors [23,24]. Access to resources within a relationship is often associated with closeness and trust [23]; however, some questions remain about whether all close relationships yield support or whether some are associated with additional protective benefits. The marital resource model posits that married people benefit from greater economic security, more extensive social integration and support, and better health than their unmarried counterparts [25,26]. For example, married people report higher satisfaction with their health, less chronic illness and depression, and greater longevity in life [27]. The resources associated with marriage also have implications for parental stress and distress [11]. Single parents often report greater financial strain and poorer mental health compared to those who are married [28]. Therefore, the benefits of marriage likely cross multiple roles and domains of life.

Despite the benefits of marriage, health researchers have suggested that other close relationships (e.g., cohabitating or in a committed relationship) may also provide social support that enhances one's health and well-being [11]. Therefore, investigating the benefits of other relationship status groups is essential in determining whether marriage confers specific benefits or whether all relationships provide some buffering effects and social support. Additionally, not all individuals benefit equally from marriage. Gender and age have been associated with observed health and QoL differences in marriage, with evidence suggesting that men and younger groups benefit the most [15]. Therefore, including variables that control for such differences is critical when determining whether particular relationship status groups provide salutogenic benefits. The aim of the current study is to examine differences in perceived health, stress, and social support between relationship status groups just prior to the COVID-19 pandemic. It was hypothesized that those who were married would report better health and QoL, higher levels of support, and lower perceived stress compared to other relationship status groups. Establishing baseline levels of perceived health, stress, and social support and differentiating between relationship status groups will help healthcare and service providers (e.g., therapists, social workers, and psychologists) better understand the impact of COVID-19, as well as the protective benefits experienced by different relationship status groups.

METHODS

Study design and procedure

The current study uses data from a cross-sectional egocentric social network study measuring respondents' relationship networks, demographic information, perceived health, stress, and social support. Only demographic (e.g., age, gender, number of children, and relationship status) and health-related data were used for analyses. In the initial study, the Tailored Design Method [29] was used when developing the survey and recruiting participants (e.g., recruitment messaging). The Tailored Design Method uses evidence-based survey research practices along with social exchange theory to minimize survey-related errors and maximize study recruitment and retention [29].

Study participants and sampling

Data collection was started in January 2020 and was completed by the beginning of February of the same year, which occurred just prior to the COVID-19 pandemic in the U.S. Respondents (N = 300) between the ages of 18 and 65 residing in the United States were recruited through Prolific-- a crowdsource data collection company. Prolific provides access to an available research workforce, which can be recruited to participate in different types of research [30]. Samples recruited through crowdsourced methods are more representative of the general population compared to convenience samples (e.g., student-based samples [30]). A link to an electronic survey was provided to Prolific and distributed to individuals meeting the inclusion criteria. Respondents were compensated based on a rate established by Prolific. While crowdsourced populations are increasingly used for research,

little is known about their health, stress, social support, or the role of relationship status as a protective factor, providing another important contribution to the existing literature. Some cases were removed during analyses, resulting in a total sample size of N = 284 for the current study. All procedures were approved by the Institutional Review Board associated with the researcher's institution.

The average age of respondents was M = 31.75 (SD = 10.58). Women (52.3%) composed a larger portion of the sample than men (45%). Single individuals (47.0%) represented the largest relationship status group, followed by those who were married (27.6%), cohabitating (12.9%), or in a committed relationship (10.6%). Respondents in the current study were largely white (69%), followed by those identifying as African American/Black (8%), Hispanic/Latinx (8%), Asian/Asian American (7%), Bicultural/Biracial (6%), Indigenous/Native Alaskan (1%), and those not reporting (1%) their racial/ethnic identity. The majority of respondents (71%) reported not having children. A bachelor's degree (30%) was the highest reported level of education, followed by those reporting some college (24%), a high school diploma/GED (21%), an associate degree (10%), master's degree (8%), vocational degree (3%), Ph.D., MD, or J.D. (3%), and those with less than a high school diploma (1%).

Study instruments

Demographic information related to age, gender, number of children, and relationship status was gathered from respondents. Age was measured as a continuous variable, while gender categories allowed respondents to select male, female, transgender, non-binary, asexual/agender, or a prefer to respond category. Relationship status options included single, married, divorced, widowed, cohabitating (i.e., living with a partner), or in a committed relationship but not living with a partner. The number of children was multiple choice, with response options ranging from 0 (*0*) to 5 (*5 or more*). Some changes in demographic variables occurred during analyses to meet the sample size requirements for ANCOVA.

Perceived health and Quality of Life (QoL)

The WHOQOL-BREF [19] was used to measure respondents' perceived health and is an abbreviated version of the WHOQOL-100. The WHOQOL-BREF includes two general items asking about a person's QoL and satisfaction with their health. Additionally, the WHOQOL-BREF measures four domains of QoL (i.e., physical, psychological, social, and environmental), which are often affected by a person's overall health and have been shown to correspond with healthy and unhealthy populations [17]. The WHOQOL-BREF domains measure a person's satisfaction with physical functioning, psychological symptoms, and affective states, the quality of a person's environment (e.g., housing), and social relationships. WHOQOL-BREF response options range from 1 to 5, with anchors varying based on the question. Scores were converted to a 100-point scale to facilitate interpretation [31], which ranges from 0 to 100. For WHOQOL-BREF domains, scores less than 60 often indicate poorly perceived health and QoL [32,33] and provide a threshold for evaluating the scores of different populations. The WHOQOL-BREF has demonstrated adequate reliability, factor structure, and validity for the current sample [20].

Perceived stress

The Perceived Stress Scale 4 (PSS-4; [34]) is a shortened version of the PSS-14, which asks respondents about the frequency with which they experienced difficulties managing events in life over the last month. Response options range from 0 (*Never*) to 4 (*Very often*), which are summed for a total score (0 to 16) indicating the overall level of perceived stress. While clinically meaningful cut scores have not been established for the PSS-4, Malik and colleagues [35] suggest that scores greater than six may be used as an indication of higher levels of stress.

The PSS-4 demonstrated acceptable levels of reliability (α = .73) in the current sample.

Social support and support network size

The Interpersonal Support Evaluation List -12 (ISEL-12; [36]) was used to measure perceived support. The ISEL-12 is a shortened version of the ISEL-40, which measures appraisal, belonging, and tangible support. Items are summed and produce scores ranging from 12 to 48, with higher scores indicating higher levels of support. Response options range from 1 (*Definitely false*) to 4 (*Definitely*

true). In previous studies, Cronbach alpha (α = .82) indicated adequate levels of reliability for the ISEL-12 [37]. Reliability in the current study was higher than previous estimates (α = .90). In addition to the ISEL-12, a single item was used to assess the perceived size of respondents' social support networks. Response options for the item ranged from 0 to 6, with higher numbers indicating greater supportive connections.

Data analysis

Analyses were conducted using SPSS 28. Measures of central tendency were computed for study variables where appropriate. Bivariate analyses were used to examine relationships between study variables. Age and number of children were entered as covariates in analyses to control for potential differences in variables that may influence relationship status differences. Frequencies were evaluated for relationship status and gender to determine whether group sizes were adequate for ANCOVA analyses. Groups with 30 or more are often of sufficient size to produce power of .80 for ANCOVA [38]. A small number of individuals identified as non-binary or transgender (n = 6) and divorced or widowed (n = 8), with group sizes not meeting the minimum threshold for analyses. Collapsing divorced and widowed into an unmarried category has often affected the outcomes related to group differences [13]. Similarly, collapsing gender identities with other groups is not appropriate. Therefore, these smaller groups were removed to ensure appropriate comparison during post hoc analyses. Listwise deletion was used to manage missing data, which removed additional cases from analyses. ANCOVAs were conducted for the single QoL and health items along with the physical, psychological, social, and environmental QoL domains included in the WHOQOL-BREF. Bootstrapping was conducted using 1,000 iterations for post hoc analyses. Bootstrapping improves standard errors and confidence interval estimates and avoids the pitfalls of traditional hypothesis testing by drawing numerous samples from a dataset to estimate a population's distribution [39].

Ethical considerations

All procedures were approved by the University of Louisville's Institutional Review Board (19.1239) through an expedited application. Participation in the study was completely voluntary, and participants were consented using an unsigned consent form (preamble) to minimize the collection of personally identifying information. All other information was kept confidential.

RESULTS

Information on respondents' age, gender, relationship status, race/ethnicity, number of children, and level of education were gathered in the electronic survey. Table 1 provides demographic information for the sample.

Table 1. Demographic Characteristics of Sample (n = 284).

Demographic Variables	*M* (*S*.D.)/ %
Age	31.75 (10.58)
Gender	
Male	45%
Female	52%
Non-binary	2%
Transgender	.3%
Relationship Status	
Single	47%
Married	27%
Divorced/Separated	2%
Widowed	.3%
Living with Partner	13%
In a Committed Relationship	11%
Race/Ethnicity	
African American/Black	8%

Asian/Asian American	7%
Bicultural/Biracial	6%
Hispanic/Latino/a	8%
Indigenous/Native Alaskan	1%
White	69%
Number of Children	
0	70%
1	10%
2	11%
3	4%
4	4%
5 or more	1%
Highest Level of Education	
Less than a High School Diploma	1%
High School Diploma	21%
Vocational Degree	3%
Associate Degree	10%
Some College	24%
Bachelor's Degree	30%
Master's Degree	8%
Ph.D., MD, J.D., or other advanced degree	3%

Means and standard deviations for study variables appear in Table 2, which are further disaggregated by gender and relationship status. Physical (0 to 100), social (0 to 100), psychological (4.17 to 100), and environmental (9.38 to 100) QoL scores demonstrated a substantial range in responses. Figure 1 provides histograms showing the distribution of WHOQOL-BREF scores across the sample. Overall, mean scores for the social, psychological, and environmental domains were lower than 60. Among all respondents, 66% reported psychological QoL scores below 60, followed by social QoL (60%), environmental QoL (48%), and physical QoL (39%). Of those individuals reporting psychological QoL scores below 60 (n = 182), 73% reported social QoL, 64% reported environmental QoL and 56% reported physical QoL scores below healthy levels, suggesting considerable co-occurrence between low QoL scores.

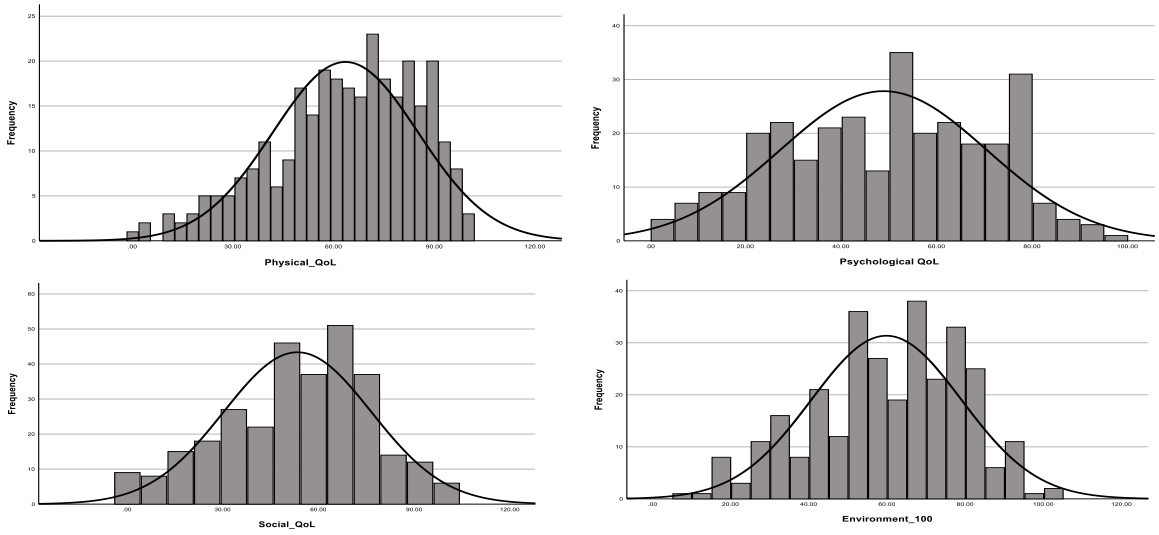


Figure 1. Histograms showing the distribution of WHOQOL-BREF domain scores across the sample (n = 284).

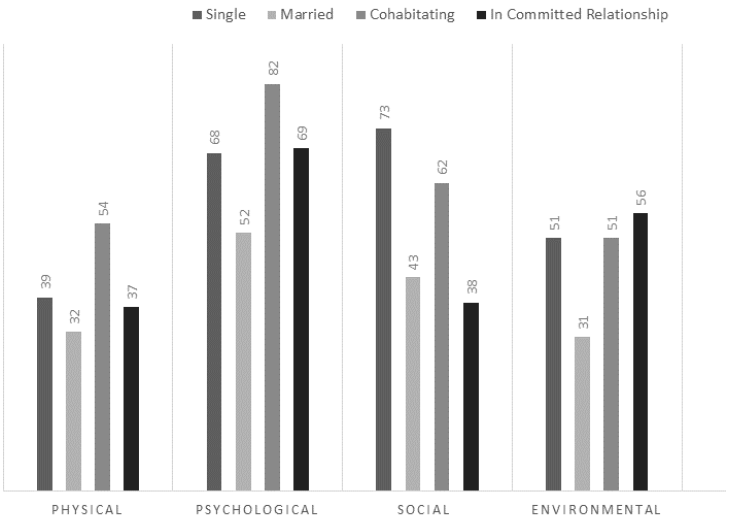
PSS-4 scores for the sample ranged from 0 to 13 and, on average, reported PSS-4 scores that exceeded six (M = 7.67, SD = 2.59). When examining score frequencies, 74% of respondents reported scores greater than 6, indicating a high stress level. Respondents' support network size ranged from 0 to 6 (i.e., five or more), and they reported perceived social support scores that ranged from 0 to 36. Respondents reported an average network size of three people and average social support scores of 21.52 (SD = 8.37).

Table 2. Means and standard deviations for study variables by gender, relationship status, and the overall sample (n = 284).

	Perceived Stress		Perceived Support		Network Size		Physical QoL		Psychological QoL		Social QoL		Environment QoL		Health		QoL	
	M	*SD*	*M*	*SD*	*M*	*SD*	*M*	*SD*	*M*	*SD*	*M*	*SD*	*M*	*SD*	*M*	*SD*	*M*	*SD*
Gender																		
Men	7.40	2.92	19.55	8.33	3.53	1.75	65.85	21.18	50.68	22.02	52.55	24.37	60.32	20.11	3.11	1.18	3.39	1.08
Women	7.82	2.27	17.67	9.13	3.51	1.76	62.12	21.44	47.90	21.22	54.06	21.63	59.51	18.46	3.04	1.17	3.49	.95
Relationship Status																		
Single	7.99	2.42	18.66	8.73	3.18	1.86	63.03	21.10	46.10	23.05	45.01	23.59	57.45	20.55	2.92	1.23	3.30	1.04
Married	6.80	2.96	25.05	6.69	4.09	1.69	66.84	21.86	56.22	18.89	63.79	20.03	66.63	18.34	3.27	1.15	3.79	.93
Cohabitating	8.31	1.94	24.64	7.56	3.64	1.46	56.78	19.80	43.12	19.30	54.91	19.66	53.45	16.00	2.82	1.00	3.23	.93
Committed Relationship	7.38	2.61	23.03	5.63	3.69	1.49	65.51	21.93	49.87	19.76	64.06	18.26	59.18	16.00	3.38	1.10	3.44	1.05
Overall Sample	7.67	2.59	21.52	8.37	3.52	1.77	63.34	21.62	48.77	21.65	53.26	23.16	59.69	19.22	3.05	1.18	3.43	1.02

Very few patterns emerged when examining QoL scores by gender. However, on average, single WHOQOL-BREF items indicated that men and women reported neutral feelings about their health and quality of life. Examining WHOQOL-BREF domains revealed more interesting findings. Men's and women's mean scores suggested that they may be having difficulties in their psychological and social domains of life while experiencing marginal satisfaction with their physical and environmental QoL. In evaluating stress, men (M = 7.40, SD = 2.92) and women (M = 7.82, SD = 2.27) reported PSS-4 mean scores that exceeded six, with 68% of men and 77% of women reporting high-stress levels.

When examining relationship status, single people reported marginal physical (M = 63.03, SD = 21.10) but low psychological (M = 46.10, SD = 23.05), social relations (M = 45.01, SD = 23.59), and



environmental (*M* = 57.45, *SD* = 20.55) QoL scores. Those cohabitating reported the lowest physical (*M* = 56.78, *SD* = 19.80), environmental (*M* = 53.45, *SD* = 16.00), and psychological (*M* = 43.12, *SD* =

Figure 2. Percentages of QoL scores below 60 by relationship status groups.

19.30) QoL scores across relationship groups. Conversely, married people reported the highest QoL scores across all domains (see Table 2) but did not produce a mean score greater than 60 in the psychological QoL (*M* = 56.22, *SD* = 18.89) domain. When examining scores by relationship status, 73% of those who were single reported social QoL scores lower than 60, followed by psychological QoL (68%), environmental QoL (51%), and physical QoL (39%). Figure 2 provides the percentages of QoL Scores below 60 by relationship status groups. Eighty-two percent of cohabiting respondents reported psychological QoL scores lower than 60, followed by social QoL (62%), physical QoL (54%), and environmental QoL (51%). For those who were married, psychological QoL (52%) was the domain with the highest percentage of scores below 60, followed by social QoL (43%), physical QoL (32%), and environmental QoL (31%). Psychological QoL (69%) was also associated with the highest percentage of QoL scores below 60 for those in a committed relationship, followed by environmental QoL (56%), social QoL (38%), and physical QoL (37%). When examined by relationship status group, 85% of those living with their partner reported PSS-4 scores greater than six, followed by those who were single (80%), married (62%), and those in a committed relationship (56%).

Bivariate analyses

Pearson's correlations were used to examine the relationships between continuous variables in the study, which appear in Table 3. Increases in age were associated with more children (r = .51, p < .001) and greater psychological QoL (r = .12, p = .023), while decreases in age were associated with lower perceived stress (r = -.10, p = .042). Additionally, more children were associated with higher social (r = .12, p = .016) and psychological (r = .13, p = .015) QoL, who likely provided positive relationships and more extensive support. Perceived stress was negatively correlated with a number of study variables, including social support (r = -.36, p < .001), network size (r = -.29, p < .001), general health satisfaction (r = -.56, p < .001), overall QoL (r = -.63, p < .001), and all QoL domains (p < .001). Greater social support and larger social networks were positively related to all QoL variables but demonstrated the most robust relationship to social (r = .62, p < .001) and psychological (r = .49, p < .001) QoL. All QoL variables were positively correlated with other QoL domains and single-item indicators of health satisfaction and QoL. However, social QoL demonstrated the weakest relationships with other QoL domains (physical r = .36, p < .001; psychological r = .51, p < .001; environmental r = .38, p < .001).

Table 3. Pearson's correlations between study variables (n = 284).

Study Variables	1	2	3	4	5	6	7	8	9	10	11
1. Age	1										
2. Number of children	.51***	1									
3. Perceived Stress	-.11*	-.06	1								
4. Social Support	.00	.09	-.29***	1							
5. Social Network Size	-.09	.01	-.28***	.62***	1						
6. Physical QoL	-.02	.01	-.42***	.33***	.31***	1					
7. Psychological QoL	.12*	.13*	-.48***	.49***	.37***	.69***	1				
8. Social QoL	-.01	.12*	-.35***	.62***	.47***	.36***	.51***	1			

9.	Environmental QoL	.02	.07	-.41***	.39***	.42***	.63***	.64***	.38***	1	
10.	Health	-.05	-.02	-.35***	.38***	.34***	.69***	.69***	.44***	.54***	1
11.	Overall QoL	.03	.04	-.44***	.38***	.35***	.62***	.67***	.41***	.65***	.59***	1

*$p < .05$; **$p < .01$; *** $p < .001$

General Quality of Life (QoL) and Health Satisfaction

Initial differences in QoL were examined using the general QoL item in the WHOQOL-BREF. Relationship status groups differed in QoL ($F_{3, 275} = 4.73$, $p = .003$). Post hoc analyses indicate that married individuals experience greater QoL compared to their single (95% CI, .26 to .91, $p < .001$) or cohabitating counterparts (95% CI, .22 to 1.08, $p = .004$). Neither age ($F_{1, 275} = .01$, $p = .942$), gender ($F_{1, 275} = .10$, $p = .751$), number of children ($F_{1, 275} = 1.98$, $p = .161$), nor the gender*relationship status interaction term ($F_{3, 275} = .09$, $p = .977$) were statistically significant. The overall model explained 6% of the variance in QoL. Similar analyses were performed using the WHOQOL-BREF's measure of health satisfaction. Results from analyses indicate that relationship status groups significantly differed in their satisfaction with health ($F_{3, 275} = 4.71$, $p = .003$). The overall model explained 7% of the variance in health satisfaction. Post hoc analyses indicate that those who were married reported greater satisfaction with their health compared to individuals who are single (95% CI, .19 to 1.02; $p = .006$) or cohabitating with a partner (95% CI, .23 to 1.19, $p < .001$). Additionally, those in a committed relationship but not cohabitating reported greater satisfaction with their health compared to those who were single (95% CI, .06 to .95, $p = .031$) and those who were cohabitating with a partner (95% CI, .08 to 1.09, $p = .022$). Similar to QoL, neither age ($F_{3, 275} = 1.13$, $p = .289$), gender ($F_{3, 275} = .09$, $p = .760$), number of children ($F_{1, 275} = 1.76$, $p = .186$), nor the gender*relationship status interaction term ($F_{3, 275} = 1.32$, $p = .269$) were statistically significant.

WHOQOL-BREF domains

Differences in social, psychological, environmental, and physical QoL domains were examined by gender and relationship status. Physical QoL was examined in the first model. Neither age, gender, number of children, nor relationship status were statistically significant ($F_{9, 275} = 1.39$, $p = .192$). As such, post hoc analyses were not conducted. Psychological QoL was examined in the second model. Relationship status groups differed in psychological QoL ($F_{3, 275} = 3.73$, $p = .012$). Overall, variables in the model explained 7% of the variance in psychological QoL. Post hoc analyses indicated that married individuals reported higher psychological QoL than individuals who were single (95% CI, 2.87 to 17.34, $p = .005$) or cohabitating with a partner (95% CI, 3.73 to 21.33, $p = .003$). Similar to physical QoL, neither age ($F_{1, 275} = .35$, $p = .555$), gender ($F_{1, 275} = 1.54$, $p = .215$), number of children ($F_{1, 275} = .11$, $p = .745$), nor the gender*relationship interaction term ($F_{3, 275} = .36$, $p = .784$) were significantly related to psychological QoL.

Social QoL was examined in the third model. Similar to the previous models, relationship status groups significantly differed in social QoL ($F_{3, 275} = 16.50$, $p < .001$). Post hoc analyses revealed a significantly higher social QoL for individuals who are married compared to individuals who are single (95% CI, 13.75 to 28.50, $p < .001$) or cohabitating (95% CI, 4.43 to 22.00, $p = .003$). Similarly, individuals in a committed relationship reported higher social QoL compared to those who were single (95% CI, 9.26 to 32.25], $p < .001$) or cohabitating (95% CI, 5.09 to 20.35, $p = .003$). However, individuals who were cohabitating reported higher social QoL compared to those who were single (95% CI, 1.01 to 14.82, $p < .001$). Analogous to the other analyses, neither age ($F_{1, 275} = 2.40$ $p = .122$), gender ($F_{1, 275} = .17$, $p = .683$), number of children ($F_{1, 275} = .21$, $p = .646$), nor the relationship status*gender interaction term ($F_{3, 275} = .51$, $p = .675$) were statistically significant. Overall, variables in the model explained 17% of the variance in social QoL.

Environmental QoL was examined in the final QoL model. Comparable to other WHOQOL-BREF domains, differences in relationship status also emerged when examining environmental QoL ($F_{3, 275} = 6.03$, $p < .001$). Post hoc analyses show that married individuals reported higher environmental

QoL compared to those who were single (95% CI, 5.13 to 18.47, $p < .001$), cohabitating (95% CI, 8.40 to 24.79, $p < .001$), or in a committed relationship (95% CI, 3.37 to 19.52, $p = .005$). Neither age ($F_{1, 275} = 2.67$, $p = .103$), gender ($F_{3, 275} = .12$, $p = .729$), number of children ($F_{1, 275} = .04$, $p = .846$), nor the gender*relationship interaction term ($F_{3, 275} = .21$, $p = .889$) were statistically significant. The overall model explained 7% of the variance in environmental QoL.

Perceived stress

Perceived stress was examined to determine whether gender and relationship status significantly differed in their stress levels. Relationship status groups statistically differed in perceived stress ($F_{3, 275} = 5.75$, $p < .001$). Post hoc analyses indicated that married individuals reported significantly less stress than individuals who were single (95% CI, -3.54 to -.82, $p = .003$) or cohabitating (95% CI, -4.58 to -1.06, $p = .002$). Similar to other analyses, neither age ($F_{1, 275} = .19$, $p = .662$), gender ($F_{1, 275} = 1.73$, $p = .189$), number of children ($F_{1, 275} = .19$, $p = .662$), nor the gender*relationship interaction term ($F_{3, 275} = .04$, $p = .988$) were statistically significant. Overall, the model variable explained 8% of the variance in perceived stress, with relationship status explaining a significant portion of the variance in all models.

Social support and support network size

Differences in perceived social support and support network size were also examined between gender and relationship status groups, controlling for age and the number of children. The overall model explained 14% of the variance in perceived support. Relationship status groups significantly differed in the level of support, $F_{3, 275} = 12.58$, $p < .001$). Post hoc analyses indicated that those who were married (95% CI, 3.86 to 10.50, $p < .001$), those cohabitating (95% CI, 1.47 to 9.49, $p < .001$), and those in a committed relationship (95% CI, .16 to 8.58, $p = .037$) reported higher perceived support compared to those who were single, with those who were married reporting the highest levels of support. Neither age ($F_{1, 275} = 1.51$, $p = .220$), gender ($F_{1, 275}$) = .10, $p = .750$), the number of children ($F_{1, 275} = .16$, $p = .687$), nor the gender*relationship status interaction term ($F_{3, 275} = .63$, $p = .594$) were statistically significant. Lastly, relationship status groups demonstrated differences in the size of their support networks ($F_{3, 275} = 4.18$, $p = .006$). The overall model explained 10% of the variance in support network size. Post hoc analyses indicated that those who were married reported larger support networks compared to those who were single (95% CI, .72 to 1.84, $p < .001$), those who were cohabitating (95% CI, .08 to 1.45, $p < .017$), and those in a committed relationship (95% CI, .03 to 1.46, $p < .017$). Age ($F_{1, 275} = 5.31$, $p = .022$) was positively related to support network size, while gender $F_{1, 275} = .30$, $p = .582$), the number of children ($F_{1, 275} = .95$, $p = .330$), and the gender*relationship status interaction term ($F_{3, 275} = 2.07$, $p = .105$) were not statistically significant.

DISCUSSION

A substantial portion of the research examining COVID-19 and relationships has focused on the effects of the public health lockdown without considering people's perceptions of health, stress, and support just prior to the pandemic in the United States. Measuring people's perceptions of health during the months prior to the pandemic helps to establish baseline levels that aid in understanding its impact in subsequent months. Overall, individuals who were married or in a committed relationship reported a higher QoL, greater satisfaction with their health, and more substantial support from more extensive social networks. Yet, some individuals experienced poorer QoL across multiple domains of life. For example, individuals reporting lower psychological QoL also reported lower QoL in other domains. Additionally, individuals reported relatively high stress levels, coinciding with reports of lower psychological QoL. As in other studies, social network size and perceived support were negatively correlated with stress and positively correlated with QoL domains and other indicators of health, suggesting salutogenic benefits are associated with a person's social relationships.

Relationship status has often served as an important protective factor in the face of stressful experiences, which the current study continues to support. Overall, respondents identifying as single, cohabiting, and in a committed relationship reported lower physical, psychological, and environmental WHOQOL-BREF scores. Those who were married reported the highest WHOQOL-

BREF scores compared to all groups, suggesting that married people were healthier and experienced greater QoL. Relationship status differences explained the largest portion of the variance in social areas of life, including social QoL, perceived social support, and support network size, with marriage consistently producing the largest differences between groups. This finding supports the observation that marriage facilitates social integration and provides access to resources that enhance one's health. However, married people did not substantially differ from those in a committed relationship in all areas, suggesting that some types of committed relationships may yield similar benefits. Those who were married often differed from those who were cohabitating, suggesting that marriage may provide more than simply the accumulation of resources (e.g., shared finances or housing) and likely provided access to protective benefits through their relationship as the COVID-19 pandemic began.

The WHOQOL-BREF provides important information about the potential protective benefits experienced by different relationship status groups just prior to the COVID-19 pandemic. Silva and colleagues [33] suggest that scores above and below 60 have adequate sensitivity for distinguishing between healthy and unhealthy populations. Skevington and colleagues [17] note that lower WHOQOL-BREF mean scores are associated with populations who self-identify as sick or are identified by health professionals as having a chronic health condition that influences one's health. Descriptively, those who were single or cohabitating produced scores consistent with unhealthy populations in the psychological and social domains, while those cohabitating also produced lower scores in the environmental domain. Cohabitation that results in marriage may be associated with comparable benefits, while those not moving toward marriage may experience increased strain [11]. Additionally, cohabitating couples are more likely to doubt the future of their relationship, perceive their relationship as less important, and report less satisfaction with family life [40], potentially accounting for differences in QoL, stress, and social support.

In the current study, cohabitating groups consistently produced scores lower than those who were married. Lower social health indicates less satisfaction with one's relationships, while lower environmental health suggests inadequate financial and living resources. Concomitantly, these factors influence psychological health, which may reciprocally affect cohabitating couples' access to social and environmental resources. Those who were married differed from those who were single or cohabitating in areas assessing the meaningfulness of a person's life, affective feelings, social support, financial security, access to healthcare, and general living conditions. Gondodiputro and colleagues [32] reported similar associations between marital status and the psychological, social, and environmental domains, indicating that marriage may not be associated with physical health benefits in some groups. Unlike cohabiting groups, those in a committed relationship produced scores consistent with healthy populations across all health indicators except in the psychological domain.

Those who were married did not significantly differ in perceived support from those cohabitating or those in a committed relationship but reported significantly larger support networks than all three relationship status groups. This finding is consistent with evidence that suggests that married couples' social networks grow larger and become more inclusive of newer family members and more positive and supportive relationships [41]. This finding is further supported by differences in social QoL between married and single and cohabitating people, which reflects a person's access to positive and supportive relationships. The presence of some support across relationships suggests that being in a relationship provides some benefits that do not translate to QoL outcomes.

Overall, gender and the number of children were not related to QoL in the current study, which is consistent with other findings. Skevington [42] found no differences between gender and QoL in a study spanning 23 countries. However, age is often a factor related to QoL, as increases in age are often associated with a higher prevalence of chronic health conditions [43]. Some differences in QoL have been found in older adults, with the oldest adults reporting lower QoL than their younger counterparts [32]. Conversely, these findings are not generalizable to younger samples of adults. As individuals transition through different stages of adulthood, their "goals, expectations, standards, and concerns" change (Skevington et al., 2014, p. 298). Individuals in the current sample produced remarkably lower scores than young adults in other studies. Skevington and colleagues [44] report

that young adults' domain scores fell in the 70s range, with the psychological domain producing the lowest score at 67. The low scores in the current sample may be attributed to the recruitment method, as little is known about crowdsourced populations. Additionally, a looming macrolevel stressor in the COVID-19 pandemic may have exacerbated perceptions of stress and lowered QoL in the current sample. Future studies should seek to understand the health-related experiences of crowdsourced groups to better understand whether lower QoL is associated with vulnerabilities specific to this population (e.g., underemployed). There are several limitations to the current study. Divorced or widowed individuals were not represented in the sample, nor was a broad range of gender identities. Cases representing these groups had to be removed from analyses because of insufficient sample size. Crowdsourced populations, especially those willing to participate in research, may differ in areas of life that relate to the subjective experiences with health (e.g., access to financial resources). Additionally, unknown confounding or residual confounding may be present because of a lack of operational precision and an inability to control for variables associated with QoL.

CONCLUSION

The current study provides some insights into the difficulties experienced by individuals just prior to the COVID-19 pandemic in the United States and the protective benefits associated with different relationship status groups. Overall, findings indicate that married individuals report greater QoL in psychological, social, and environmental domains and greater health satisfaction, social support, and lower perceived stress than all groups except those in a committed relationship. Identifying initial levels of health, perceived stress, and social support across groups just prior to the pandemic allows health researchers and policymakers to determine the cumulative impact of COVID-19 and the protective benefits experienced by different groups entering into this macro-level stressful experience.

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