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The effect of the lone parent household on cardiovascular health (National Health and Nutrition Examination Survey, 2015–2016)

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Abstract

Study objective: Single parenthood is associated with adverse health outcomes. How cardiovascular risk differs by parenthood status has had limited study. We hypothesized that single parents would have worse cardiovascular risk profiles compared to those in partnered-parent households.

Design: We compared associations of parenthood status and the American Heart Association's Life Simple 7 (LS7), an established metric measuring modifiable components of cardiovascular health (smoking status, body mass index, physical activity, diet, cholesterol, glycohemoglobin, and blood pressure) in multivariable-adjusted models.

Participants: We selected adults (age ≥ 25) from the National Health and Nutrition Examination Survey (NHANES) 2015–16 cycle. We defined single parenthood as reporting a child <18 years residing in the home and marital status other than married or living with partner.

Main outcome measures: LS7, continuous (range 0–14) and categorized as poor (0–4), intermediate (5–9), or ideal (10–14).

Results: In total, 2180 NHANES participants identified as parents and 1782 (82%) had complete LS7 scores. Of these, 462 identified as single parents, of whom 356 (74.9%) were women. Single parents were more likely to smoke, have poor physical activity, and have high blood pressure ($p <$ 0.01) than partnered parents. Single parents had 1.3-fold greater likelihood of poor cardiovascular health compared with partnered parents, adjusting for age, sex, race/ethnicity, health insurance,

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Declaration of competing interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

Appendix A. Supplementary data

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healthcare access, poverty index, educational attainment and number of children (95% confidence interval [CI] 1.01–1.71).

Conclusions: We identified an association between single parenthood and adverse cardiovascular health. Our results demonstrate the importance of considering household composition in risk assessment and cardiovascular disease prevention.

Keywords

Epidemiology; Health services; Risk factors; Primary prevention; Women

1. Introduction

Cardiovascular disease is among the leading sources of morbidity and mortality in the United States. The contributions of psychosocial and socioeconomic factors to cardiovascular risk have been increasingly recognized [1]. Household composition is one such social factor yet receives limited attention. Single parenthood – characterized as parenting without a spouse or partner in the household – is increasingly common in the United States. The Census Bureau's 2019 Current Population Survey estimated 10.2 million one-parent households in the United States – 7.7 million mother-only and 2.5 million father-only [2]. Given the large number of individuals who are single parents in the United States today, it is important to evaluate the health associations of this living structure.

Single parents, more so than partnered parents, are faced with structural and economic barriers as well as stigma that can lead to inadequate resources and employment opportunities [3]. Previous studies demonstrate an association between single motherhood and poorer health outcomes, including self-rated health, mental health, rates of hypertension, diabetes mellitus, and tobacco use, and mortality [4–14]. Despite evidence of general health associations with single motherhood, the association between single parenthood and cardiovascular risk has not been well elucidated. Understanding how family composition influences cardiovascular risk may identify individuals at increased risk and enhance targeted primary prevention.

The American Heart Association developed the Life's Simple 7 (LS7) metric to identify and prioritize seven modifiable behavioral and clinical risk factors that contribute to heart health [15]. This tool has been associated with cardiovascular disease risk, events, and mortality [16–19]. We examined the association between household composition, as measured by single- or partnered-parent household, and LS7 score, as an enhanced measure of cardiovascular risk, in a nationally representative cohort (the National Health and Nutrition Examination Survey, or NHANES). We hypothesized that single parents in the United States, particularly single mothers, would have worse cardiovascular risk profiles compared to those in partnered-parent households.

2. Materials and methods

2.1. Study sample

NHANES is conducted in 2-year cycles by the National Center for Health Statistics of the Centers of Disease Control and Prevention. The survey is designed as a cross-sectional, stratified, clustered, four-stage sample to assess the health and nutrition status of a representative segment of the non-institutionalized United States population. NHANES survey materials, methods and data are publicly available on the National Center for Health Statistics website [20]. The National Center for Health Statistics Research Ethics Review Board approved NHANES administration, and all participants signed informed consent. Survey data consists of a combination of self-report and directly measured values. NHANES has a written survey to assess demographic and lifestyle data, and an in-person examination portion which consists of an interview, physical exam, and laboratory measurements.

In this study, we analyzed the 2015–2016 NHANES cycle ($n = 9971$). Participants were included in this analysis if they completed both the interview and medical examination components ($n = 9544$), were at least 25 years old at the time of examination ($n = 5053$) and reported at least one child aged < 18 years old in their household ($n = 2180$). Of these, 1782 (82%) had complete data to construct a LS7 score. All analyses were weighted with the medical examination weights for the 2015–2016 NHANES cycle according to the analytic instructions provided by the NHANES Analytic Guidelines [20].

2.2. Risk factors and covariates

Participants reported demographic and lifestyle information via a household questionnaire. Race/ethnicity was obtained via self-report and classified as non-Hispanic White, Mexican American, Other Hispanic, non-Hispanic Black, non-Hispanic Asian, or other. We defined single as reporting a marital status of widowed, divorced, separated, or never married. We defined partnered as reporting a marital status of married or living with partner. Poverty index was calculated by dividing monthly family income by the 2015–2016 Department of Health and Human Services' federal poverty guidelines, specific to family size and state [21]. Medical conditions, health insurance status and education level were self-reported by participants. To assess for healthcare access, participants were asked to respond yes or no to the question "is there a place you usually go when you are sick or need advice about your health?" [20]

2.3. Life's Simple 7

Table 1 details the definitions for the LS7 cardiovascular health metrics: smoking, body mass index, physical activity, diet, total cholesterol, glycohemoglobin, blood pressure. Participants reported frequency and duration of physical activity over the past 7 days. Calculated totals were used to categorize level of physical activity as poor, intermediate, or ideal based on time engaged in moderate and vigorous activity. Regarding diet, NHANES reports each food item with a United States Department of Agriculture food code [22]. Food descriptions and portion sizes were obtained from the USDA Food and Nutrient Database for Dietary Studies to convert the quantity of food reported in grams to portion sizes [23]. For liquids, reported grams were converted to fluid ounces with the assumption that 30 g

is equivalent to 1 fluid ounce across all beverage types. Two dietary recall questionnaires asking about 24-hour intake of fruits, vegetables, whole grains, sugar-sweetened beverages, and sodium were administered, and means were calculated. Fish intake was recalled over the course of 30 days and adjusted to determine weekly intake.

Total cholesterol and glycohemoglobin were collected with laboratory measurements. Consistent with prior studies of NHANES data, we used blood glycohemoglobin in place of fasting plasma glucose due to only a subset of participants having fasting plasma glucose data available [24–26]. To obtain blood pressure measurements, participants rested quietly for 5 min in a seated position then had three consecutive blood pressure readings taken. If a measure was incomplete or interrupted, a fourth measurement was taken. Blood pressure measurements were averaged over all available measurements for a participant [27].

We determined summary LS7 scores for each participant using the American Heart Association's definitions for poor, intermediate, and ideal levels of each component (Table 1). Ideal health metrics were allotted two points, intermediate health metrics one point, and poor health metrics zero points [17]. All seven individual scores were summed to determine a continuous score for each participant. We presented results of both the continuous outcome and the trichotomous outcome, in keeping with the American Heart Association's classification system.

2.4. Statistical methods

Demographics were obtained across all participants as well as across parenting status. For continuous variables, characteristics are presented as means and standard deviations and categorical variables are presented as proportions. Regarding continuous LS7 scores, means and 95% confidence limits of the means were calculated and distributions were analyzed across subgroups of interest. *t*-Tests were used to identify significant differences in continuous LS7 scores across subgroups. Fig. 1 was constructed using GraphPad Prism 8.4.3 for Windows (GraphPad Software, La Jolla California United States). The proportions of component LS7 scores were examined across partnered parent and single parent status with the poor, intermediate and ideal categorizations described in Table 1. Chi-squared tests were used to detect differences across the subgroups of interest within each component LS7 score. To better understand the relation between missing components for the construction of a complete LS7 score and our collected demographics, we compared characteristics for the sample population with a missing LS7 variable to those with complete LS7 scores using chi-squared tests and *t*-tests, as appropriate, as summarized in Supplementary Table 1.

For regression analyses, missing data for the LS7 score were incorporated into each analysis and considered not missing completely at random by including the 'NOMCAR' option in the 'PROC SURVEYLOGISTIC' statement in SAS. Ordinal logistic regression was performed, and probabilities were modelled across the lower ordered values (poor and intermediate categories). Prior literature has established that poor and intermediate categories are associated with increased cardiovascular risk when compared with the ideal category [19]. Collinearity was not assessed since age was the only continuous variable in analyses, but the influence of highly associated categorical variables was checked by calculating percent agreement and measuring fluctuations in regression models in both

coefficients and C-statistics. The proportional odds assumption was checked with the Brant test ($p > 0.05$) in Stata 16.1 [28,29]. Multivariable models consisted of (1) Model 1, adjusting for parenting status, age, sex, and race/ethnicity; (2) Model 2, adjusting for Model 1 and previously diagnosed medical conditions, health insurance, and access to healthcare; and (3) Model 3, adjusting for Model 1 covariates, health insurance, access to healthcare, poverty index, number of children aged ≤ 5 years (none, single, multiple), and number of children aged 6–17 years (none, single, multiple), and educational attainment. Additionally, subgroup analyses stratified by sex were conducted across parenting status with the construction of similar multivariable-adjusted models. Interactions by sex were assessed across parenting status with access to healthcare, poverty index, and educational attainment in models adjusting for age and race/ethnicity. All analyses utilized the complex survey procedures in SAS 9.4 (SAS Institute, Cary, NC) where sample weights were incorporated to produce nationally representative estimates. For all analyses, a two-tailed p-value of <0.05 was considered significant.

3. Results

3.1. Study cohort: single and partnered parents

After exclusions there were 2180 NHANES participants identified as parents and 1782 (82%) had complete LS7 scores. Of these, 462 (21%) identified as single parents, of which 356 (75%) were women and 106 (25%) were men. Table 2 summarizes baseline characteristics of the study participants by parenthood status. Mean age was 42.0 ± 11.2 years for all participants, 41.8 ± 10.2 years for partnered parents and 44.2 ± 13.9 years for single parents. Males comprised 52.2% of the partnered parenting sample and 25.1% of the single parent sample. Race/ethnicity differed between lone and partnered parenting cohorts; most notably, the partnered cohort was comprised of 57.5% White and 9.2% Black participants, while the lone parenting group had 41.9% White and 24.8% Black participants. When comparing single to partnered mothers, 41.5% versus 59.6% participants were White, and 26.3% versus 8.8% were Black, respectively. Poverty index was 2.9 ± 1.5 for partnered parents in comparison to 1.9 ± 1.4 for single parents. Additionally, 36.1% of partnered parents reported less than or equal to high school education, as compared with 51.7% of single parents. Health insurance was reported by 82.8% of partnered parents compared with 74.9% of single parents. Supplementary Table 1 reports characteristics of the sample population with missing LS7 variables.

3.2. Life's Simple 7 analysis

Partnered and single parenthood cohorts were evaluated by components of LS7 score, and by a continuous LS7 score. Overall, mean continuous LS7 scores were 8.8 ± 2.1 for partnered parents, and 8.2 ± 2.2 for single parents, as demonstrated in Fig. 1. Fig. 2 presents component LS7 analysis. Significant differences were found between partnered and lone parents with respect to smoking, physical activity, glycohemoglobin levels, and blood pressure. Active smokers comprised 15.0% of the partnered parent cohort and 26.6% of the lone parenthood cohort; 82.8% of partnered and 69.3% of single parents were never smokers. Notably, 69.4% of partnered parents and 58.4% of single parents had ideal physical activity scores, while 16.9% and 25.0%, respectively, had poor physical activity scores.

3.3. Multivariable analysis

The assumption of no collinearity and the proportional odds assumption were met in all models. Health insurance and access to healthcare had a 76% agreement and education and income-poverty ratio had a 65% agreement; however, neither set of variables significantly influenced our primary independent variables of interest. Single parents had 1.6-times greater likelihood of having poor cardiovascular health, defined as low or intermediate LS7 scores, when compared to partnered parents (95% CI 1.26–2.00) with adjustment for age, sex, and race/ethnicity. Prior literature has established that ideal cardiovascular health is associated with significant risk reduction, and both poor and intermediate risk scores are associated with increased cardiovascular morbidity and mortality [19]. Single parents had 1.5-fold increased likelihood of poor cardiovascular health relative to partnered parents with further adjustment for previously diagnosed medical conditions, health insurance, and access to healthcare (95% CI 1.2–1.9). Finally, when adjusting for poverty index, number of children, and educational attainment in addition to the prior covariates, single parents maintained a 1.3-times greater likelihood of poor cardiovascular health (95% CI 1.01–1.71). Table 3 displays odds ratio and 95% confidence internals for each of the models employed.

3.4. Sex-stratified analysis

LS7 scores for partnered mothers were 9.0 ± 2.2 and 8.2 ± 2.2 for single mothers. A significant difference in smoking and blood pressure scores between lone and partnered mothers was identified. Sex-specific differences in LS7 components are summarized in Supplementary Table 2. Single mothers had 2.1-times increased odds of poor cardiovascular health than partnered mothers in unadjusted analysis (95% CI 1.60–2.64). With full multivariable adjustment the association between single parent status and cardiovascular health in women was attenuated (OR = 1.20, 95% CI 0.82–1.82, $p = 0.30$).

Factors associated with poor cardiovascular health in women in both single and partnered households were poor access to healthcare (OR 2.16, 95% CI 1.24–3.75), and both low (OR 1.78, 95% CI 1.17–2.71) and medium (OR 1.62, 95% CI 1.18–2.22) poverty index. We did not identify significant interactions between single motherhood and (a) healthcare access ($p = 0.14$), (b) poverty index ($p = 0.25$), or (c) education ($p = 0.20$).

We considered the number of men identified as single parents ($n = 106$) as insufficient to perform a subgroup analysis comparing single and partnered fathers.

4. Discussion

We identified that single parents had increased likelihood of poor cardiovascular health compared to those in partnered parent households when controlling for age, sex, race/ethnicity, insurance status, access to healthcare, medical conditions, poverty index and educational attainment. We conducted our analysis in a nationally representative, population-based cohort (NHANES). We used the American Heart Association’s LS7 as an accessible, well-validated measure to assess cardiovascular risk. Our results demonstrate the importance of considering household composition in cardiovascular prevention and risk assessment.

Single parents have been observed to experience poorer overall health than coupled parents [11,13]. Prior literature evaluating the cardiovascular health associations of single parenthood has been primarily sex-specific, with a focus on single motherhood [5,7,8]. The concentration on single motherhood is likely due to the higher prevalence of single mothers in the single parent population, as single parents in the United States are more likely to be women by a >3 to 1 ratio [2]. Demographic trends of single and partnered parents identified in our analysis are consistent with other nationally representative data [2]. Single mothers may face social and structural barriers not faced by their male counterparts [3]. The prior literature on health and single motherhood helps to situate our findings and is important in contextualizing them. To facilitate an examination of the contribution of single parenthood to cardiovascular health we included single mothers and single fathers in our primary analysis and found a difference in cardiovascular risk for all single parents when compared with partnered parents. We performed sex-stratified analysis to elucidate sex-specific health associations for single parents; however, we had insufficient numbers of single fathers to compare cardiovascular health between single and partnered male parents.

Prior analysis of NHANES III data (conducted 1988–1994) found that single mothers were more likely to have diabetes mellitus, hypertension and hyperlipidemia when compared with partnered mothers [7]. Moreover, mothers who reported a history of a cardiovascular event, defined by self-report of a heart attack, stroke or congestive heart failure, were more likely to be single mothers [7]. We did not detect significant differences in the number of participants with a history of cardiovascular disease across partnered and single parents, which we attribute as likely due to the low prevalence of cardiovascular disease in the age group we examined. Nonetheless, our findings highlight critical opportunities to address cardiovascular health and risk reduction in single parents. Our analysis, using LS7 as a meaningful barometer of cardiovascular health, complements prior findings and indicates a persistent health disparity experienced by single parents despite demographic and social changes over the past several decades.

Mechanisms of increased cardiovascular risk in single parents likely have social and behavioral contributions. Inequalities due to sex and race/ethnicity further influence health outcomes in single parenthood [3,30–32]. Black Americans comprise one quarter of single parents, as well as single mothers, while representing 12.5% of the overall parenting population [2]. Race/ethnicity and, more importantly, structural racism, have been long associated with cardiovascular disease, with Black women often experiencing the worst outcomes [33]. Single parents are more likely to experience limited education and employment opportunities, which have independently been associated with poor cardiovascular outcomes [3,10,32,34,35]. In our analysis, single parenthood maintained a significant increase in cardiovascular risk when controlling for sex, race/ethnicity and several socioeconomic factors, which suggests there are factors specific to single parenthood that influence health. While socioeconomic factors clearly drive some of the disparity, they do not fully explain it.

Single parenthood is a complex phenomenon with intersecting social, economic and psychological entities, and single parents comprise a heterogenous group. While the nuclear family has traditionally been considered the standard family structure in the United States,

the rise in single parent households has often been lauded as a negative phenomenon. There are, however, many avenues to becoming a single parent, some of which are a positive experience, and many people are single parents by choice [36]. Studies have demonstrated that no matter the situations leading to single parenthood, there is a clear need for policy initiatives to improve work-life balance of single mothers [37].. Single mothers have reported being less satisfied with their lives than their partnered counterparts [38,39], however, some studies demonstrate that divorced women are happier than their married counterparts who are not in quality relationships [40]. It is reasonable to consider that the quality of partnered relationships may influence overall health. In heterosexual couples, men have been demonstrated to get greater health benefits from partnership than have women [41]. Addressing the intersectionality of single parenthood with further investigation of what drives overall health disparity in this heterogenous population is necessary.

Our findings support the importance of addressing cardiovascular health in single parents. Cross-sectional analyses have attempted to examine whether poor health outcomes in single mothers compared with partnered mothers differ based on the availability and accessibility of social support systems [5,35,42,43]. Many European nations have more robust family support structures—including paid maternal and paternal leave, nationalized healthcare, and affordable childcare—than the United States. Despite this, studies have not identified clear delineation between types of social support systems that lead to improved health for single parents across international borders [5,43]. Looking specifically at work-family trajectories, being a single working mother was more common in the United States than Europe, but the increased risk of cardiovascular disease in single mothers when compared with partnered mothers was present at similar rates in both regions [42].

Our analysis, supported by prior research, demonstrates that single parents are a high-risk population. Parenthood status is not typically measured in clinical trials or in health registries, and thus it is as an unmeasured risk factor that may promote disparities in cardiovascular risk. Single parents may be less likely to receive specialized care and services due to lack of protections to facilitate participation or may experience discrimination from structural racism or other factors [44]. The COVID-19 pandemic has exacerbated financial and social stressors for many and may pose particular challenges for single parents. Further research that is attentive to the association of household composition and health outcomes during the COVID-19 pandemic is warranted.

Our study has several noteworthy strengths. First, we conducted our analysis in NHANES, a representative, population-based study, which enhances the generalizability of our findings. Second, we employed a validated metric for cardiovascular health assessment, the LS7, which has been broadly adopted for cardiovascular risk measurement and been demonstrated to predict mortality and cardiovascular disease risk and events [16–19]. Third, in contrast to prior literature we incorporated male and female parents in our analysis to broadly examine the relation of single parenthood to cardiovascular health.

There are several limitations to our study that warrant discussion. It is a cross sectional analysis, and thus cannot elucidate temporality. Further investigation regarding timing of exposures and cardiovascular risk onset can help to better characterize the role single

parenthood plays in exacerbating risk. Second, the NHANES survey depends on a large amount of self-reported data with resulting potential for recall bias. Third, our study lacked relevant biologic markers or functional assessments of cardiovascular risk beyond those incorporated into LS7 scores. Fourth, we did not explore other varieties of household composition, such as multigenerational households, which may impact cardiovascular risk profiles. Lastly, NHANES interviews asked about household composition from which we inferred single or partnered parent household status. We cannot discount potential misclassification of parenting status; however, we expect that such misclassification would be non-differential with respect to cardiovascular risk metrics measured here, and thereby bias our results towards the null.

In conclusion, we determined that single parenthood is associated with increased cardiovascular risk as measured by American Heart Association's LS7. Household composition, specifically parenthood status, merits consideration for enhanced assessment of cardiovascular risk. With the goal of improving cardiovascular health in this high-risk population, further investigation is needed to understand the nature and context of challenges facing single parents institutionally and individually. Such information may improve individualized risk assessment and promote development of equitable health services and policies.

Supplementary Material

Refer to Web version on PubMed Central for supplementary material.

Declaration of competing interest

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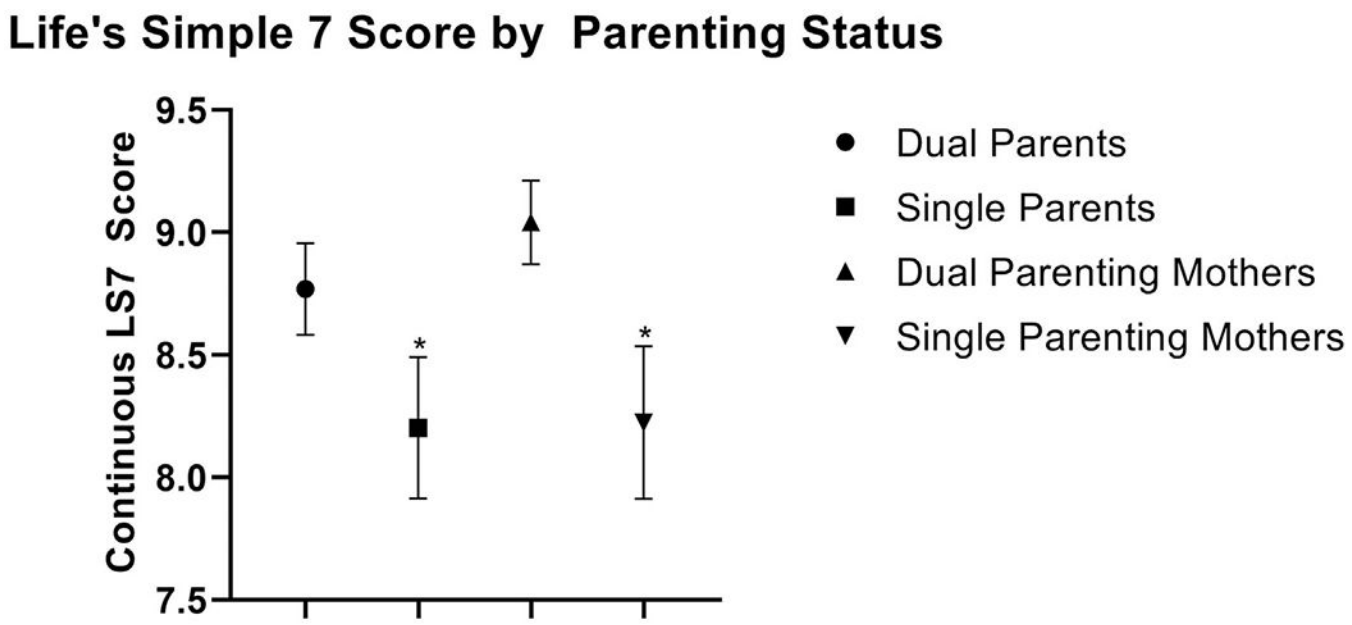

Fig. 1.

Life's Simple 7 Scores by parenting status. Continuous LS7 scores by parenting status (partnered parents, 8.8 ± 2.1; single parents, 8.2 ± 2.2). In women, mean LS7 scores for partnered mothers was 9.0 ± 2.2 compared to 8.2 ± 2.2 for single mothers ($p < 0.05$).

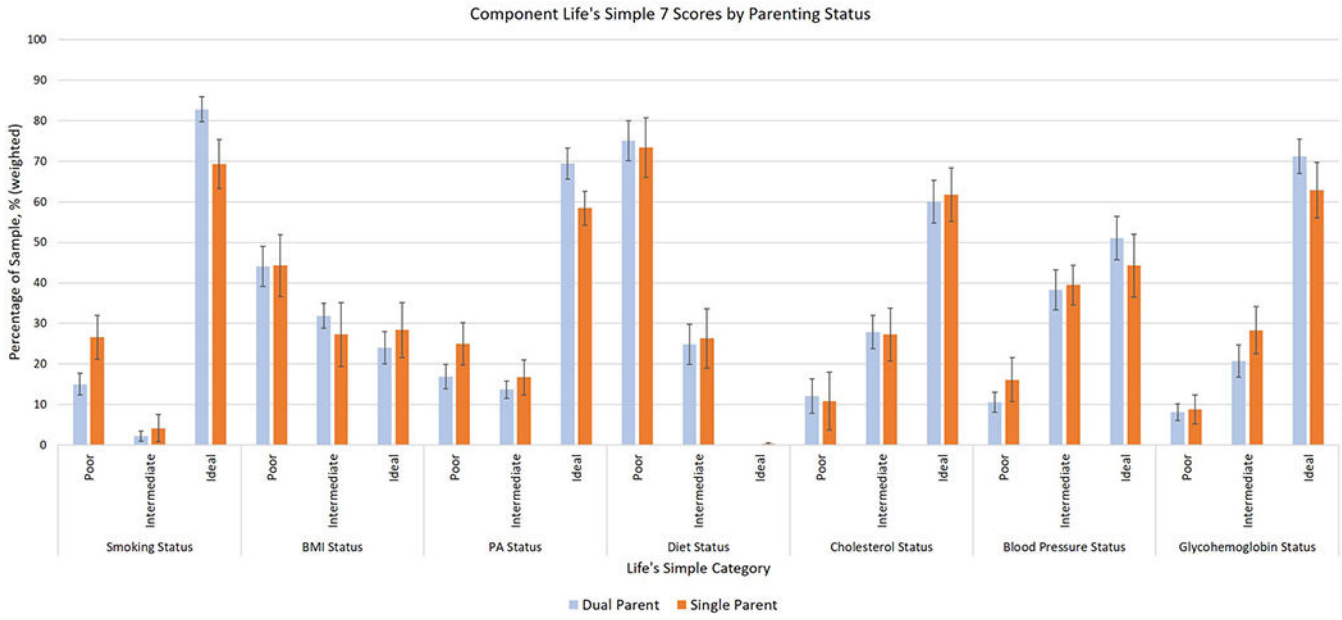

Fig. 2.

Component Life's Simple 7 Scores by parenting status. Component LS7 scores by parenting status. Significant differences were found between partnered and single parents with respect to physical activity, smoking, blood pressure and glycohemoglobin levels.

Table 1

Categorization of each cardiovascular health metric as Poor, Intermediate, or Ideal.

Cardiovascular health metric	Poor	Intermediate	Ideal
Smoking status	Current	Former, ≤12 months	Never or quit >12 months
Body mass index (kg/m^2)	≥30	25–29.9	18.5–24.9
Physical activity (min/week)	None	1–149 moderate or 1–74 vigorous 1–149 moderate + 2 × vigorous 0–60 min of moderate or vigorous every day	≥ 150 moderate or ≥ 75 vigorous ≥ 150 moderate + 2 × vigorous ≥ 60 of moderate or vigorous every day
Healthy diet pattern, number of components[a]	0–1	2–3	4–5
Total cholesterol (mg/dL)	≥240	200–239	<200
Glycohemoglobin (%)	≥6.5	5.7–6.49	<5.7
Blood pressure (mmHg)	SBP ≥ 140 or DBP ≥ 90	SBP 120–139 or DBP 80–89 or treated to goal	<120 SBP/ <80 DBP

[a]Five healthy eating components: consume ≥ 4.5 cups/d of fruits and vegetables, ≥ 2 servings/wk. of fish, ≥ 3 servings/d of whole grains, no more than 36 oz/wk of sugar-sweetened beverages, and no more than 1500 mg/d of sodium.

Table 2

Demographics of parents from the National Health and Nutrition Examination Survey Year 2015–2016.

	All parents *n* = 1782	**Partnered parent *n* = 1320**	**Single parents *n* = 462**	**p-Value**	**Partnered parenting mothers *n* = 630**	**Single parenting mothers *n* = 356**	**p-Value**
Age (mean, SD)	42.0 (11.2)	41.8 (10.2)	44.2 (13.9)	<0.01	40.7 (10.1)	44.4 (14.0)	<0.01
Gender, male (n, %)	796 (46.5)	690 (52.2)	106 (25.1)	<0.01	–	–	–
Race/ethnicity (n, %)				<0.01			<0.01
NH White	450 (54.3)	364 (57.5)	86 (41.9)		177 (59.6)	62 (41.5)	
Mexican American	441 (14.8)	344 (15.0)	97 (13.8)		172 (14.5)	75 (13.2)	
Other Hispanic	236 (7.9)	162 (7.4)	74 (10.1)		78 (6.7)	63 (11.0)	
NH Black	370 (12.5)	212 (9.2)	158 (24.8)		95 (8.8)	124 (26.3)	
NH Asian	217 (6.6)	189 (7.3)	28 (4.1)		89 (7.6)	22 (4.7)	
Other Race	68 (3.9)	49 (3.6)	19 (5.2)		19 (2.9)	10 (3.4)	
Poverty index (mean, SD)	2.71 (1.54)	2.93 (1.52)	1.97 (1.37)	<0.01	2.92 (1.54)	1.94 (1.36)	<0.01
Education (n, %)				<0.01			<0.01
≤ HS	858 (39.4)	599 (36.1)	259 (51.7)		253 (30.3)	185 (44.6)	
≥HS	924 (60.6)	721 (63.9)	203 (48.3)		377 (69.7)	171 (55.4)	
Reported medical conditions (n, %)							
Congestive heart failure	41 (1.4)	23 (1.1)	18 (2.3)	0.09	7 (1.1)	12 (2.1)	0.43
Coronary heart disease	40 (1.8)	26 (1.8)	14 (1.8)	0.99	8 (1.8)	9 (1.6)	0.85
Myocardial infarction	51 (1.8)	35 (1.7)	16 (2.0)	0.68	9 (1.2)	9 (1.7)	0.61
Health insurance, yes (n, %)	1346 (81.1)	1008 (82.8)	338 (74.9)	<0.01	485 (83.9)	279 (82.3)	0.53
Access to healthcare, yes (n, %)	1429 (81.5)	1065 (82.4)	364 (78.0)	0.24	554 (89.8)	296 (83.4)	<0.01

Abbreviations: SD, standard deviation; NH, non-Hispanic; HS, high school.

Table 3

Odds of low or intermediate cardiovascular health by single and partnered parent status (referent, partnered parent).

	Single parent (men and women) OR (95% CI)	Single mother[a] OR (95% CI)
Model 1	1.57 (1.26–1.96)	2.05 (1.59–2.64)
Model 2	1.52 (1.21–1.91)	1.13 (0.70–1.82)
Model 3	1.29 (0.82–2.04)	1.02 (0.58–1.80)

Model 1. Adjusted for age, sex, race/ethnicity.

Model 2. Adjusted for Model 1 and previous medical conditions, health insurance, and access to healthcare.

Model 3. Adjusted for Model 1, health insurance, access to healthcare, poverty index, education, number of children age ≤ 5, and number of children between ages 6 and 17.

[a]Indicates single mother not adjusted for female sex.