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Exploring associations of financial well-being with health behaviours and physical and mental health: a cross-sectional study among US adults

Carla Mercado ,[1] Kai McKeever Bullard,[2] Michele L F Bolduc,[1] Desmond Banks,[1] Courtni Andrews ,[1] Zoe R F Freggens ,[1] Rashid Njai[1]

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[1]Office of Health Equity, Centers for Disease Control and Prevention, Atlanta, Georgia, USA
[2]Division of Diabetes Translation, Centers for Disease Control and Prevention, Atlanta, Georgia, USA

Correspondence to
Dr Carla Mercado;
CMercado@cdc.gov

ABSTRACT

Background Health disparities exist across socioeconomic status levels, yet empirical evidence between financial well-being (FWB) and health are limited.

Methods This cross-sectional study combined data from 25 370 adults aged ≥18 years in the 2019 National Health Interview Survey with estimated household FWB scores from the Consumer Financial Protection Bureau's 2016 National Financial Well-being Survey. FWB associations with health service visits, biometric screenings, smoking status, body mass index and physical and mental conditions were tested using age-adjusted, sex-adjusted and health insurance coverage-adjusted linear regression analysis.

Results In 2019, the mean FWB for US adults was 56.1 (range 14 (worse) to 95 (best)). With increasing time since the last health service visit or screening, FWB was increasingly lower compared with adults with visits or screenings <1 year (≥10 years or 'never', FWB ranged from −1 (blood sugar check) to −6.5 (dental examination/cleaning) points). FWB was lower with declining general health status (excellent (reference), very good (−0.5 points), good (−3.4 points) and fair/poor (−6.6 points)). Adults with physical health conditions had FWB lower than adults without (range −0.4 (high cholesterol) to −4.6 (disability) points). FWB were lower in adults who have ever been diagnosed with anxiety disorder (−1.8 points) or depression (−2 points). Adults managing their anxiety or depression (no/minimal symptoms currently) had greater FWB (anxiety: 3 points and depression: 4.1 points) than those with symptoms.

Conclusion Given the observed associations between FWB and health-related measures, it is crucial to consider FWB in primary and secondary health prevention efforts, recognising the relationship between economics, health and wellness.

WHAT IS ALREADY KNOWN ON THIS TOPIC

⇒ Consistent evidence exists on the associations between health and income or socioeconomic status. However, there is a limited understanding of financial well-being and its association with health.

WHAT THIS STUDY ADDS

⇒ The results of this study demonstrate how household financial well-being is negatively associated with unfavourable health behaviours and physical and mental health conditions, even after accounting for health insurance coverage, age and sex.

HOW THIS STUDY MIGHT AFFECT RESEARCH, PRACTICE OR POLICY

⇒ Attending to financial well-being as a root cause of health inequities and suboptimal societal health in public health measurement and intervention offers promise for ameliorating health inequities and improving societal health.

INTRODUCTION

Income[1] and wealth[2–4] have been established as factors associated with health and mortality and are inequitably distributed across demographic characteristics, where health inequities persist. In the USA, the life expectancy gap between people with higher and lower incomes has not only persisted but widened since the 1970s.[5] Higher income is positively associated with longer life expectancy among both men and women.[1] In 2019, wealth inequality gaps among racial and ethnic groups in the USA are estimated for white families to be upwards of 6.5 times greater than black families, 5.5 times greater than Hispanic families and 2.7 times greater than Asian families,[6] largely as a result of historical, cultural and social factors.[7] Sociodemographic factors have a multiplicative or compounding effect on mortality, such that the total overlapping sociodemographic factors' effect is greater than the sum of the individual risk factors.[8] Therefore, understanding aspects of income and wealth, such as financial well-being (FWB) related to health and health-related behaviours, is needed to potentially minimise economic adverse effects on health

outcomes and mortality. Eliminating one factor's association with health or mortality could potentially diminish the others' effects.[8 9]

FWB is a measure of the extent to which a person feels they are able to manage their financial obligations, absorb unexpected negative financial shocks, meet their financial goals and make choices that allow them to enjoy life (online supplemental table 1).[10] FWB considers a person's overall financial situation as it relates to their subjective feelings of financial security and control, ranging from strong feelings of financial strain to being fully satisfied with one's financial situation. Although FWB is a measure correlated with income and assets, variability in FWB exists across all income levels. While there are objective FWB-related measures (eg, debt-to-asset ratio, income, wealth, etc)[11 12] that have consistently shown associations with health,[13–15] further explorations of a subjective measure of FWB can provide additional clarification on the nature of the economic and health relationship. Similar to other important subjective assessments (eg, mental health assessment scales), FWB captures aspects of a person's health and well-being that can only be measured through subjective, qualitative perceptions. For example, a person with low or poor FWB may experience significant stress, including financial stress, known as the subjective stress of not having enough money for daily living.[16] However, there is relatively limited empirical research on the relationship between FWB and health status. There is some evidence of a positive association between subjective FWB[17 18] or financial worries[19] and objective financial indicators[15] with overall health or experiences of health. Additionally, financial experiences (eg, FWB and hardships), resources (eg, income) and resilience (eg, familial cohesiveness) have impacts at the familial or household level.[20–24] However, studies investigating FWB with health-related behaviours and specific physical and mental health conditions are needed to better understand the role FWB has in public health. Furthermore, there is a need to understand the potential link between low FWB levels (as a psychosocial stressor) in relation to the activation of chronic stress mechanisms (eg, allostatic load, chronic inflammation and cardiovascular disease) and related poor health consequences.[25]

When considering the relationship between financial factors (income, wealth, FWB, etc) and health, a common explanation focuses on health insurance coverage. Because the USA has a market-driven system for healthcare provision, healthcare costs are high, and insurance coverage helps cover the costs of medical care. However, health insurance costs may also be prohibitive for some families; low-income households tend to have lower health insurance coverage rates than higher-income households.[26] Health insurance is also linked to longevity, with several decades of research demonstrating that people with health insurance tend to live longer than people without health insurance.[7 27] These disparities impact personal finances because 'unequal access to medical services and rising costs of services reduce and impact disposable incomes'.[7] This study examines the association between estimated household FWB and health behaviours and physical and mental conditions, as well as the role health insurance coverage has in these associations.

METHODS

Health behaviours and physical and mental condition data

This study used National Health Interview Survey (NHIS) publicly available deidentified data (https://www.cdc.gov/nchs/nhis/2019nhis.htm),[28] an annual ongoing, cross-sectional, multistage probability sample of households where an adult (aged ≥18 years) was randomly selected to complete an interview-based survey on a wide range of health-related topics.[29] In 2019, there were 33 138 participating households in NHIS that yielded 31 997 adult respondents representative of the US non-institutionalised population (response rate: 59.1%). Of the 31 997 adult respondents' data, we linked 27 915 (87.2%) observations with imported average FWB scores. After excluding participants with missing data on health behaviours or conditions, the final sample size was 25 370 adults. This study did not involve human participants and performed analyses using publicly available, deidentified data sources; therefore, institutional review board approval was not necessary.

FWB score data

The Consumer Financial Protection Bureau's 2016 National Financial Well-being Survey (NFWS) was designed to be representative of the US non-institutionalised adult population aged ≥18 years, sampled from households via mail containing internet access codes to complete a profile and then invited to participate in the NFWS.[30] NFWS collected cross-sectional data from 6394 participants (cumulative response rate (recruitment, profile completion and survey completion): 3.6%), self-reporting financial characteristics, assets, experiences, opportunities and FWB scale completion, as well as demographics. The FWB scale consists of 10 items using a five-point Likert scale (range: 0–4), and FWB scores are based on an item response theory analysis where scores can range from 0 (worse) to 100 (best) (online supplemental table 1).[10]

Combining data

Using NFWS publicly available deidentified data (https://www.consumerfinance.gov/data-research/financial-well-being-survey-data/), we estimated average FWB score within cross-classified subgroups of census region (Northeast, Midwest, South and West), race/ethnicity (non-Hispanic white, non-Hispanic black, non-Hispanic other and Hispanic), household highest education attainment (<high school graduate, high school degree/GED, some college/Associate degree, Bachelor's degree and graduate/professional degree), household annual income per household person (<$5000, $5000–9999, $10 000–14,999, $15 000–24,999, $25 000–29,999,

$30 000–39,999, $40 000–49,999, $50 000–64,999, $65 000–99,999 and ≥$100 000) and own/rent housing status (own, rent and neither own/rent housing). Creating identical cross-classified subgroups in 2019 NHIS data as those used to estimate average FWB score in NFWS, we merged average FWB scores (range 14–95) from NFWS to NHIS matching on the identical cross-classified subgroups (87.2% of the 2019 NHIS adult sample was linked with an estimated FWB score) (online supplemental table 2). The dataset used in this study was generated by combining information from two publicly available data sources. The interpretation for FWB scores in NHIS is 'estimated average FWB score for individual adults from households in the same census region with similar income per household person, household education, housing status and race/ethnicity'.

Although the years of data collection are not the same between the NFWS and the NHIS in this study, we used the 2016 NFWS data because it is the only survey that collected a nationally representative FWB scores and contained all the household-level indicators used to combine data sources. Additionally, while there are no data comparing FWB scores between 2016 and 2019, we did not expect much change in FWB scores during this time and within subgroups of interest based on results for trends (2009–2021) in related measures from the Financial Capability report.[31]

Health measures

Health insurance coverage status (yes/no) at the time of the interview was determined as used in Health United States.[32] Health behaviours were self-reported as receipt of a health-specific exam in the last year or time since the last examination/visit. For eye examinations, survey respondents were asked, 'during the past 12 months, have you had an eye examination from an eye specialist such as an optometrist, ophthalmologist or eye doctor?' Additional health behaviour questions asked were, 'about how long has it been since you last (had a dental examination/cleaning or saw a doctor/healthcare provider about your (health or wellness visit))?' Respondents were also asked, 'when was the last time you had your (blood pressure, cholesterol or blood test for high blood sugar or diabetes) checked by a doctor, nurse or other health professional?' Cigarette smoking status was determined based on whether one had smoked at least 100 cigarettes in their lifetime (yes: current and former smokers and no: never smokers) and current smoking frequency (every day or some days: current smoker and not at all: former smokers). E-cigarette smoking status was categorised as current (ever smoked e-cigarette and currently smoke every day or some days), former (ever smoked e-cigarette and not using e-cigarettes now) and never (never smoked e-cigarette) users.

The body mass index (BMI) was calculated based on self-reported weight and height (weight (kg)/height (m) squared) and classified as underweight (<18.5 kg/m^2), healthy weight (18.5 to <25 kg/m^2), overweight (25 to <30 kg/m^2) and obese (≥30 kg/m^2). Respondents self-reported general health status (excellent, very good, good, fair or poor) and an indicator of disability (based on the Washington Group Short Set Composite[33]). The presence of chronic conditions was determined based on responses to 'have you ever been told by a doctor/health professional that you had (high cholesterol, hypertension, high blood pressure, coronary heart disease, angina, heart attack, myocardial infarction, stroke, asthma, diabetes (not gestational diabetes or prediabetes) or cancer/malignancy of any kind)?' Cardiovascular disease was defined as an affirmative response to coronary heart disease, angina, heart attack, myocardial infarction or stroke. Medication use was determined by whether the respondent is 'now taking any medication prescribed by a doctor (for high blood pressure or to lower your cholesterol).' Among respondents with asthma, data on having had an asthma episode or asthma attack during the past 12 months was collected (yes/no). For respondents with diabetes, the age when first diagnosed with diabetes was reported. Respondents were classified as having anxiety disorder or depression if ever told by a doctor/health professional they had anxiety or depression and/or respondent is currently taking medication for anxiety or depression. Anxiety symptom severity was calculated using the Generalised Anxiety Disorder (GAD-7) scale and categorised as none/minimal (values 0–4), mild (5–9) and moderate (10–14) or severe (15–21).[34] Anxiety management was determined among respondents with anxiety who had a GAD-7 value of 0–4 (none/minimal symptoms). Depression symptom severity was measured with the Patient Health Questionnaire (PHQ-8) depression scale and categorised as none/minimal (values 0–4), mild (5–9) and moderate (10–14) or severe (15–24).[34] Among respondents with depression, those with none/minimal symptoms and PHQ-8 values were classified as having depression management.

Statistical analysis

We described characteristics of adults across estimated mean FWB score quartiles (Q1: 14–49.2, Q2: 49.3–57, Q3: 57.1–62.3 and Q4: 62.4–95) as percentages and tested differences in distributions across FWB quartiles using a design-based Pearson χ^2 test. The characteristics considered were age group (18–34, 35–49, 50–64, 65–79 and ≥80 years), sex (male and female) and health insurance coverage (yes/no). Using linear regression, we tested the age-adjusted (continuous), sex-adjusted and health insurance coverage-adjusted associations between FWB (the dependent variable) and health behaviours and conditions (independent variables). A separate model for each health behaviour (eye, dental and medical examinations; checking of blood pressure, blood cholesterol, blood sugar and smoking status) and physical (BMI and chronic conditions) and mental (depression and anxiety) health conditions was tested. STATA (V.17.0, StataCorp LLC) statistical software was used to perform all analyses, produce graphs, account for sampling weights and adjust

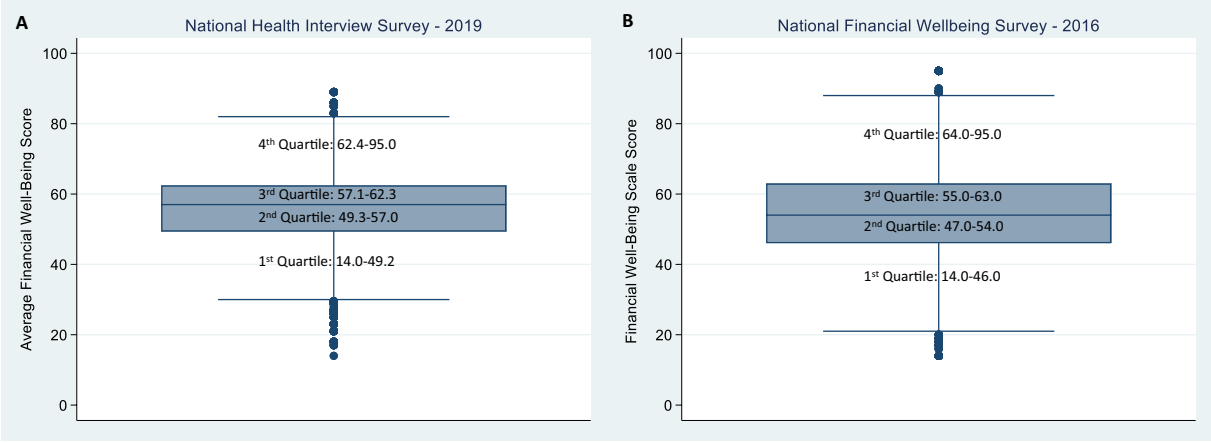

Figure 1 Distribution of financial well-being scores in (A) 2019 National Health Interview Survey and (B) 2016 National Financial Well-Being Survey.

variance estimates for the complex sampling designs. The p values <0.05 were considered statistically significant.

RESULTS

FWB score distributions from the 2016 NFWS (mean (SE)=54.2 (0.2)) and 2019 NHIS (mean (SE)=56.1 (0.1)) were similar (figure 1). Characteristics of US adults statistically significantly differ across FWB score quartiles (all p values <0.001; table 1). Adults with poor FWB scores in the first quartile were younger (39% were 18–34 years old) than the best scores in the fourth quartile (20% were 18–34 years old). The first FWB score quartile included a greater proportion of females (55%) than the fourth quartile (48%). In the fourth FWB score quartile, 97% of adults had health insurance coverage, compared to 80% of those in the first quartile.

FWB and health behaviours

US adults who had an eye examination in the past 12 months had, on average, a 1.8 point greater FWB score than those who did not have an eye examination in the past 12 months after accounting for age and sex (table 2).

With increasing time since the last health service visit or health-related practice, the FWB score was increasingly lower than for adults with visits or practices within the last year. Adults whose last dental examination/cleaning was ≥10 years or 'never' had FWB scores 6.5 points lower than those with dental examination/cleaning <1 year. Similar patterns in the FWB score were observed between adults with ≥10 years or 'never' than <1 year for the last doctor visit (−4.1 points), the last wellness visit (−3 points), the last time blood pressure was checked (−4.1 points) and

Table 1 Characteristics of US adults by quartiles of financial well-being score, 2019 National Health Interview Survey

	Financial well-being score quartiles				
	First quartile (14–49.2) N=5546	Second quartile (49.3–57) N=6452	Third quartile (57.1–62.3) N=6209	Fourth quartile (62.4–95) N=7163	
	% (95% CI)	% (95% CI)	% (95% CI)	% (95% CI)	P value
Age groups (years)					
18–34	38.9 (37.1 to 40.8)	31 (29.4 to 32.6)	23.3 (21.9 to 24.8)	19.6 (18.3 to 21)	
35–49	24 (22.7 to 25.3)	25.1 (23.8 to 26.4)	24.6 (23.2 to 25.9)	23.6 (22.5 to 24.8)	
50–64	20 (18.7 to 21.4)	22.3 (21.1 to 23.6)	27.5 (26.1 to 28.8)	33.5 (32.2 to 34.8)	
65–79	12.9 (12 to 13.9)	16.1 (15.1 to 17)	19.2 (18.1 to 20.3)	19.2 (18.2 to 20.2)	
80+	4.2 (3.6 to 4.8)	5.6 (5 to 6.1)	5.5 (4.9 to 6.1)	4 (3.6 to 4.5)	<0.001
Age (years), mean (95% CI)	44.1 (43.4 to 44.8)	47.4 (46.8 to 48)	50.4 (49.8 to 51)	51.3 (50.7 to 51.8)	<0.001
Sex					
Male	45.2 (43.5 to 46.9)	49 (47.5 to 50.5)	48.6 (47. to 50.2)	51.7 (50.3 to 53.1)	
Female	54.8 (53.1 to 56.5)	51 (49.5 to 52.5)	51.4 (49.8 to 52.9)	48.3 (46.9 to 49.7)	<0.001
Health insurance coverage					
Yes	80.3 (78.7 to 81.9)	86.6 (85.4 to 87.8)	93.4 (92.4 to 94.2)	96.6 (96 to 97.1)	
No	19.7 (18.1 to 21.3)	13.4 (12.2 to 14.6)	6.6 (5.8 to 7.6)	3.4 (2.9 to 4)	<0.001

The data presented are weighted percentages (95% CI) unless otherwise noted.

Table 2 Adjusted linear regression coefficients for health behaviour characteristics in the association with financial well-being score (dependent variable), 2019 National Financial Well-Being Survey (N=25 370)

Financial well-being score	Age-adjusted and sex-adjusted* coefficient (95% CI)	Age-adjusted, sex-adjusted and health insurance-adjusted* coefficient (95% CI)
Eye examination in the past 12 months	1.8 (1.6 to 2.1)	1.4 (1.1 to 1.6)
Last dental examination/cleaning (<1 year, reference)		
1 to <2 years	−2.9 (−3.4 to −2.5)	−2.6 (−3.1 to −2.2)
2 to <3 years	−4.2 (−4.9 to −3.6)	−3.7 (−4.3 to −3.1)
3 to <5 years	−4.7 (−5.4 to −4.1)	−4.2 (−4.8 to −3.6)
5 to <10 years	−5.4 (−6 to −4.8)	−4.8 (−5.4 to −4.2)
10+ years or never	−6.5 (−7.1 to −6)	−5.8 (−6.4 to −5.2)
Last doctor visit (<1 year, reference)		
1 to <2 years	−0.5 (−1.1 to 0.02)	0.1 (−0.4 to 0.7)
2 to <3 years	−2.4 (−3.3 to −1.5)	−1.3 (−2.1 to −0.4)
3 to <5 years	−2.2 (−3.2 to −1.3)	−0.9 (−1.9 to 0.03)
5 to <10 years	−3.2 (−4.5 to −1.9)	−1.3 (−2.6 to −0.02)
10+ years or never	−4.1 (−5.3 to −2.8)	−2 (−3.3 to −0.7)
Last wellness visit (<1 year, reference)		
1 to <2 years	−0.2 (−0.7 to 0.3)	0.3 (−0.2 to 0.8)
2 to <3 years	−1.9 (−2.7 to −1.1)	−1 (−1.8 to −0.3)
3 to <5 years	−1.9 (−2.7 to −1.1)	−1 (−1.8 to −0.2)
5 to <10 years	−2 (−3.1 to −1)	−0.6 (−1.6 to 0.4)
10+ years or never	−3 (-−3.8 to −2.2)	−1.2 (−2.1 to −0.4)
Last time blood pressure checked (<1 year, reference)		
1 to <2 years	−0.6 (−1.3 to 0.02)	−0.03 (−0.7 to 0.6)
2 to <3 years	−2.1 (−3.2 to −1)	−0.9 (−2 to 0.1)
3 to <5 years	−2.8 (−4.1 to −1.6)	−1.3 (−2.5 to −0.1)
5 to <10 years	−1.9 (−3.3 to −0.6)	−0.2 (−1.6 to 1.1)
10+ years or never	−4.1 (−5.5 to −2.7)	−2 (−3.3 to −0.6)
Last time cholesterol checked (< 1 year, reference)		
1 to <2 years	0.2 (−0.3 to 0.6)	0.5 (0.04 to 1)
2 to <3 years	−1 (−1.7 to −0.3)	−0.3 (−1 to 0.4)
3 to <5 years	−1.2 (−2.1 to −0.3)	−0.3 (−1.1 to 0.5)
5 to <10 years	−1.9 (−2.9 to −0.9)	−0.6 (−1.6 to 0.4)
10+ years or never	−2.2 (−2.8 to −1.6)	−1.3 (−1.9 to −0.7)
Last time blood sugar checked (<1 year, reference)		
1 to <2 years	0.03 (−0.5 to 0.5)	0.4 (−0.1 to 0.9)
2 to <3 years	−0.7 (−1.4 to −0.02)	−0.04 (−0.7 to 0.7)
3 to <5 years	−1.7 (−2.5 to −0.9)	−0.9 (−1.7 to −0.1)
5 to <10 years	−1.6 (−2.6 to −0.6)	−0.5 (−1.4 to 0.5)
10+ years or never	−1 (−1.6 to −0.5)	−0.3 (−0.9 to 0.3)
Cigarette smoking status (never smoker, reference)		
Former smoker	−0.5 (−0.8 to −0.2)	−0.5 (−0.8 to−0.2)
Current smoker	−4.1 (−4.5 to −3.7)	−3.8 (−4.2 to−3.4)
E-cigarette smoking status (never smoker, reference)		
Former smoker	−1.2 (−1.6 to −0.8)	−1.1 (−1.5 to −0.7)
Current smoker	−2.1 (−2.9 to −1.3)	−1.9 (−2.7 to −1.2)

*One model for each health behaviour.

the last time cholesterol was checked (−2.2 points). FWB scores were lower for current cigarette (−4.1 points) and e-cigarette (−2.1 points) smoking adults than never-smoking adults. Almost all associations between health-related behaviours and FWB scores were attenuated once adjusting for health insurance coverage, except for dental examinations as well as cigarette and e-cigarette smoking status.

FWB and physical health conditions

The FWB score was lower at each declining level of general health status (excellent (reference), very good (−0.5 point), good (−3.4 points) and fair/poor (−6.6 points)) after accounting for age and sex (table 3).

Adults with obesity had a 1.8 point lower FWB score than those with a healthy weight. Adults with other physical health conditions had lower FWB scores than adults

Table 3 Adjusted linear regression coefficients for the association between financial well-being score (dependent variable) and physical and mental health conditions, 2019 National Financial Well-Being Survey (N=25 370)

Financial well-being score	Age-adjusted and sex-adjusted* coefficient (95% CI)	Age-adjusted, sex-adjusted and health insurance-adjusted* coefficient (95% CI)
Physical health		
General health status (excellent, reference)		
Very good	−0.5 (−0.9 to −0.2)	−0.5 (−0.9 to −0.1)
Good	−3.4 (−3.8 to −3)	−3.1 (−3.5 to −2.8)
Fair/poor	−6.6 (−7.1 to −6.2)	−6.4 (−6.8 to −5.9)
Body mass iindex categories (healthy weight, reference)		
Underweight	−0.9 (−1.9 to 0.1)	−1 (−2 to −0.004)
Overweight	−0.6 (−0.9 to −0.2)	−0.5 (−0.8 to −0.1)
Obese	−1.8 (−2.1 to −1.4)	−1.7 (−2 to −1.3)
Disability	−4.6 (−5.1 to −4.1)	−4.6 (−5.1 to −4.1)
Cardiovascular disease	−3.7 (−4.1 to −3.2)	−3.7 (−4.2 to −3.3)
Cancer	0.2 (−0.3 to 0.6)	0.02 (−0.4 to 0.5)
Hypertension	−2.1 (−2.4 to −1.7)	−2.1 (−2.4 to −1.8)
Now taking high blood pressure medication	0.4 (−0.3 to 1.1)	0.1 (−0.6 to 0.8)
High cholesterol	−0.4 (−0.7 to −0.1)	−0.6 (−0.9 to −0.3)
Now taking cholesterol medication	−0.7 (−1.2 to −0.1)	−0.8 (−1.4 to −0.3)
Asthma	−1.2 (−1.6 to −0.7)	−1.3 (−1.7 to −0.9)
Asthma episode during the past 12 months	−2 (−3 to −1.1)	−2 (−3 to −1.1)
Diabetes	−3 (−3.4 to −2.5)	−3 (−3.4 to −2.6)
Age diagnosed with diabetes (60+ years, reference)		
<30	−2.1 (−3.7 to −0.4)	−2 (−3.7 to −0.4)
30–44	−2.6 (−3.9 to −1.3)	−2.6 (−3.9 to −1.3)
45–59	−0.8 (−1.9 to 0.2)	−0.8 (−1.8 to 0.3)
Mental health		
Anxiety disorder	−1.8 (−2.2 to −1.5)	−2 (−2.3 to −1.6)
Anxiety symptoms severity (no/minimal, reference)		
Mild	−1.7 (−2.2 to −1.2)	−1.6 (−2.1 to −1.1)
Moderate/Severe	−4.6 (−5.2 to −4)	−4.5 (−5.1 to −3.9)
Managing anxiety	3 (2.4 to 3.6)	2.9 (2.3 to 3.5)
Depression	−2 (−2.3 to −1.7)	−2.1 (−2.4 to −1.7)
Depression symptoms severity (no/minimal, reference)		
Mild	−2.5 (−3 to −2.1)	−2.5 (−3 to −2.1)
Moderate/severe	−4.9 (−5.4 to −4.3)	−4.7 (−5.3 to −4.2)
Managing depression	4.1 (3.5 to 4.7)	4 (3.4 to 4.6)

*One model for each health-related condition.

without for disability (−4.6 points), cardiovascular disease (−3.7 points), hypertension (−2.1 points), high cholesterol (−0.4 point), asthma (−1.2 points) and diabetes (−3 points). Among adults with asthma, the FWB score was two points lower in those with an asthma episode during the past 12 months than in those without. Adults who were diagnosed with diabetes at younger ages had lower FWB scores (diagnosed <30 years: −2.1 points and diagnosed 30–44 years: −2.6 points) than those diagnosed at age ≥60 years. We observed no statistically significant associations between the FWB score and being diagnosed with cancer or among adults with hypertension currently taking high blood pressure medication.

FWB and mental health conditions

FWB scores were lower in adults who have ever been diagnosed with anxiety disorder (−1.8 points) or depression (−2 points). Adults with greater symptom severity had lower FWB scores than those with no/minimal symptoms for anxiety (mild: −1.7 points and moderate/severe: −4.6 points) and depression (mild: −2.5 points and moderate/severe: −4.9 points). Adults who were managing their anxiety or depression (had ever been diagnosed with anxiety or depression and had no/minimal symptoms) were more likely to have greater FWB scores (anxiety: 3 points and depression: 4.1 points) than those with symptoms. Associations between the FWB score and physical and mental health conditions remained the same after adjusting for health insurance coverage.

DISCUSSION

In this nationally representative study of US adults, worse household FWB was associated with unfavourable health behaviours and physical and mental health conditions. Although there is evidence for the negative association between FWB and mental health,[35] research investigating FWB with health behaviours and physical health conditions is limited. Comparing FWB across health behaviours and conditions as well as their management, we observed that FWB scores differed within seven points. While absolute differences in FWB scores may seem small, given the scope of the health measures, any one of the FWB components (managing financial obligations, capacity to absorb a financial shock, securing a financial future or having the ability to choose opportunities to enjoy life) may contribute more to the association with health measures than others.

The current study also found health insurance coverage attenuated FWB and health-related behaviour associations, but not between FWB and dental examinations, smoking, or physical and mental health conditions. Having health insurance coverage may impact health behaviours[36] by making health services more affordable, increasing service use (eg, doctor visits) and creating opportunities for daily life activities that contribute to health and well-being.[1] However, the affordability of vision and dental services usually requires supplemental vision and dental insurance coverage,[37] which we were unable to account for and may be the reason why the associations with eye and especially dental examinations were not attenuated or attenuated to a lesser extent after taking into account health insurance coverage.[38] Additionally, the impacts of financial stress on the body cannot be alleviated by health insurance coverage alone, especially when considering structural and social health determinants such as policy.[1] For example, federal-level and state-level data demonstrate that persons covered by Medicaid are much more likely to acquire COVID-19, be hospitalised due to COVID-19 and be less likely to be vaccinated against COVID-19 than the general population.[39 40] Additional research is needed to understand the pathways by which stress contributes to specific physical and mental health conditions, as well as how physical and mental health challenges may further contribute to financial stress. The FWB association with health-related outcomes may be primarily explained by financial stress, defined as the subjective stress of not having enough money for daily living.[16] Research demonstrates that subjective financial stress is inversely associated with self-reported good health, quality of life and life satisfaction and positively associated with self-reported depression.[16] Financial stress varies across and within groups that are influenced by intersecting forms of power and oppression such as racism, sexism and ableism. For example, health disparities may be attributed more to financial access (stable income, banking, access to credit and financial knowledge) than financial behaviour (earning, spending, saving and planning).[41] The financial lived experience is often endured at the familial/household level rather than individually.[20–24] Due to historical legacies of structural and financial oppression, wealth in the USA is disproportionately concentrated among white households, whose median net worth in 2019 was eight times greater than that of black households and five times greater than that of Hispanic households[42] though household debt across race and ethnicity is similar.[43] Housing is the biggest wealth component; however, among young families, 46% of white families own their own home versus 17% of black families.[42] This gap may partially reflect differences in parental resources and intergenerational wealth transmission. There are similar inequities in wealth and wealth accumulation by gender due to disparities in income, occupation segregation, economic opportunities, unpaid care work, retirement, etc.[44] Nonetheless, positive financial behaviour across gender and race/ethnic identities is similar regardless of the different levels of financial access, suggesting most people are making the best of what they have,[41] even if the strain of doing so coincides with worse health behaviours and outcomes. Although investigating how the FWB and health outcomes associations differ across intersecting, social identities and positionalities is beyond the current study's scope, further efforts are needed to elucidate these associations.

The findings in this report are subject to at least five limitations. First, the FWB score was an estimation and not measured among NHIS respondents. However, NFWS included a nationally representative sample, and the nationally estimated FWB score distribution was similar for NHIS respondents. Second, NFWS data was collected in 2016 and used to estimate FWB for 2019 NHIS respondents. Therefore, we assumed the FWB distribution across merging characteristics remained the same between 2016 and 2019, which may be inaccurate since this data is not available to assess. Third, since we used variables highly associated with FWB to estimate average FWB scores within subgroups of these variables, it limited our ability to investigate the intersectionality of these variables with FWB and health behaviours and conditions by design. For example, we were unable to investigate if associations between FWB and health behaviours and conditions differed by race/ethnicity, education attainment, geographic region and homeownership status because average FWB score estimates were calculated by cross-classification of the subgroups of these variables. It is possible these characteristics could have an additive or multiplicative effect with FWB on health behaviours and conditions. Fourth, response rates (2019 NHIS was 59.1% and 2016 NFWS was 3.6%) in national surveys have experienced declines, and although we used sampling weights that account for non-response, there may be limited ability to calculate estimates representative of the US non-institutionalised population. Fifth, this is a cross-sectional study, and causality cannot be inferred. Additionally, reverse causation cannot be ruled out, given that health conditions can result in significant expenditures and can limit income-earning power.

Notwithstanding these limitations, this is the first study to our knowledge that combines nationally representative data from two sources to examine the FWB and health associations. The novel approach to combine data highlights the need to invest in direct subjective FWB measurements within national health surveys. The subjective nature of FWB provides an advantage over more established objective measures of economic security, such as income. For example, evidence indicates that first-generation college graduates will generate more income than their parents, other family members and peers who do not attend or graduate from college.[45 46] However, the social connection to their families and individuals within their communities—many of whom supported their successful completion of college—may create a sense of obligation and social responsibility to support those without incomes produced by a college degree.[47] Such income support may be regular (eg, assistance with rent, utility bills or childcare payments) or intermittent (eg, vehicle repair, bail/bond payment or other emergency relief). Regardless of frequency, however, this social obligation may impact one's subjective perceptions of financial security, as the feeling of being responsible for the financial well-being of one's family, friends and/or community could reduce the likelihood of feeling able to manage one's personal financial obligations or absorb their own unexpected negative financial shocks. Similarly, in addition to experiencing some of the highest risks for morbidity and mortality,[48] black men are disproportionately impacted by child support payments,[49] which may not be reflected in traditional income measurements. For these men, FWB captures the hidden impacts of well-intentioned public policy and provides greater context for future strategies to promote health equity. In summary, FWB can more fully capture one's sense of economic health and stability—including their social debts and other financial obligations—than objective measures such as income alone cannot.

CONCLUSIONS

Given the observed associations between FWB and health-related measures, it is crucial to consider FWB in primary and secondary prevention efforts that address health behaviours and physical and mental health conditions, recognising the relationship between personal and household finances, health and wellness. Socioeconomic inequities in morbidity and mortality have been widening over time.[50 51] It is important to understand the gaps in wealth that disproportionately affect various populations, such as those by race, ethnicity and sex/gender. Projected age-related, race-related, ethnicity-related and immigration-related demographic changes in the US population in the next few decades may result in a major shift and widening of the gap in the nation's wealth distribution.[52 53] Without consideration of the association between FWB and health in public health efforts, health inequities and societal health may worsen.

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ORCID iDs
Carla Mercado http://orcid.org/0000-0002-0490-9532
Courtni Andrews http://orcid.org/0000-0001-7581-4226
Zoe R F Freggens http://orcid.org/0000-0001-7677-596X

REFERENCES

1 Chetty R, Stepner M, Abraham S, *et al*. The association between income and life expectancy in the United States, 2001-2014. *JAMA* 2016;315:1750–66.
2 Hajat A, Kaufman JS, Rose KM, *et al*. Long-term effects of wealth on mortality and self-rated health status. *Am J Epidemiol* 2011;173:192–200.
3 Finegood ED, Briley DA, Turiano NA, *et al*. Association of wealth with longevity in US adults at midlife. *JAMA Health Forum* 2021;2:e211652.
4 Pollack CE, Cubbin C, Sania A, *et al*. Do wealth disparities contribute to health disparities within racial/ethnic groups? *J Epidemiol Community Health* 2013;67:439–45.
5 Waldron H. Trends in mortality differentials and life expectancy for male social security-covered workers, by socioeconomic status. *Soc Secur Bull* 2007;67:1–28.
6 Office CB. Trends in the distribution of family wealth, 1989 to 2019. 2022. Available: https://www.cbo.gov/system/files/2022-09/57598-family-wealth.pdf
7 Dickman SL, Himmelstein DU, Woolhandler S. Inequality and the health-care system in the USA. *Lancet* 2017;389:1431–41.
8 Mehta N, Preston S. Are major behavioral and sociodemographic risk factors for mortality additive or multiplicative in their effects. *Soc Sci Med* 2016;154:93–9.
9 Benichou J. Biostatistics and epidemiology: measuring the risk attributable to an environmental or genetic factor. *C R Biol* 2007;330:281–98.
10 Bureau CFP. CFPB financial well-being scale: scale development technical report. 2017.
11 Tenney JA, Kalenkoski CM. Financial ratios and financial satisfaction: exploring associations between objective and subjective measures of financial well-being among older Americans. *J Financ Couns Plan* 2019;30:231–43.
12 Brüggen EC, Hogreve J, Holmlund M, *et al*. Financial well-being: a conceptualization and research agenda. *J Bus Res* 2017;79:228–37.
13 Lenhart O. The effects of income on health: new evidence from the earned income tax credit. *Rev Econ Household* 2019;17:377–410.
14 Rist C. Wealth and health: exploring asset poverty as a key measure of financial security. *N C Med J* 2022;83:11–6.
15 Clayton M, Liñares-Zegarra J, Wilson JOS. Does debt affect health? Cross country evidence on the debt-health nexus. *Soc Sci Med* 2015;130:51–8.
16 Huang R, Ghose B, Tang S. Effect of financial stress on self-Rereported health and quality of life among older adults in five developing countries: a cross sectional analysis of WHO-SAGE survey. *BMC Geriatr* 2020;20:288.
17 Kim J, Garman E, Sorhaindo B. Relationships among credit counseling clients' financial well-being, financial behaviors, financial Stressor events, and health. Financial Counseling and Planning; 2003.14.
18 Piumatti G. Relations between longitudinal trajectories of subjective financial wellbeing with self-rated health among elderly. *Medicina (Kaunas)* 2017;53:323–30.
19 Ryu S, Fan L. The relationship between financial worries and psychological distress among US adults. *J Fam Econ Issues* 2023;44:16–33.
20 Fonseca G, Cunha D, Crespo C, *et al*. Families in the context of macroeconomic crises: a systematic review. *J Fam Psychol* 2016;30:687–97.
21 Stevenson C, Costa S, Wakefield JRH, *et al*. Family identification facilitates coping with financial stress: a social identity approach to family financial resilience. *J Econ Psychol* 2020;78:102271.
22 Friedline T, Chen Z, Morrow SP. Families' financial stress & well-being: the importance of the economy and economic environments. *J Fam Econ Issues* 2021;42:34–51.
23 Zietz S, Lansford JE, Liu Q, *et al*. A longitudinal examination of the family stress model of economic hardship in seven countries. *Child Youth Serv Rev* 2022;143:106661.
24 Alkhiary A. *The influence of stress, income status, and expenditures on families in economic crisis*. 2013.
25 Mocayar Marón FJ, Ferder L, Saraví FD, *et al*. Hypertension linked to Allostatic load: from psychosocial stress to inflammation and mitochondrial dysfunction. *Stress* 2019;22:169–81.
26 Health insurance coverage in the United States: 2018. U.S. Government Printing Office; 2019. 60–267.
27 Woolhandler S, Himmelstein DU. The relationship of health insurance and mortality: is lack of insurance deadly? *Ann Intern Med* 2017;167:424–31.
28 Centers for Disease Control and Prevention. Data from: national health interview survey. 2019. Available: https://www.cdc.gov/nchs/nhis/2019nhis.htm
29 Statistics NCfH. Survey description, national health interview survey, 2019. Hyattsville, Maryland, 2020.
30 Bureau CFP. National financial well-being survey, public use file user's guide. 2017.
31 Lin JT, Bumcrot C, Mottola G, *et al*. Financial capability in the United States: highlights from the FINRA foundation national financial capability study. 2022. Available: http://www.finrafoundation.org/NFCSReport2021
32 Statistics NCfH. Health, United States, 2019. Hyattsville, Maryland, 2021.
33 Madans JH, Loeb ME, Altman BM. Measuring disability and monitoring the UN convention on the rights of persons with disabilities: the work of the Washington group on disability statistics. *BMC Public Health* 2011;11 Suppl 4:S4.
34 Kroenke K, Spitzer RL, Williams JBW, *et al*. The patient health questionnaire somatic, anxiety, and depressive symptom scales: a systematic review. *Gen Hosp Psychiatry* 2010;32:345–59.
35 Hassan MF, Mohd Hassan N, Kassim ES, *et al*. Financial wellbeing and mental health: a systematic review. *Studies of Applied Economics* 2021;39.
36 Simon K, Soni A, Cawley J. The impact of health insurance on preventive care and health behaviors: evidence from the first two years of the ACA medicaid expansions. *J Policy Anal Manage* 2017;36:390–417.
37 Schneider JE, Garrison KD, Scheibling CM, *et al*. Analysis of dental and vision plan non-covered services and materials mandates 2021 update to 2016 report. 2021.
38 Ferdousi W. *Inequality in access to dental and vision care: examining the role of income and insurance*. State University of New York at Albany, 2017.
39 Medicaid U. Utah medicaid – COVID-19 vaccine comparison. Available: https://medicaid.utah.gov/Documents/pdfs/mcac/2022%20Minutes/Utah%20Medicaid%20Vaccine%20Comparison%2020220112.pdf [Accessed 13 Feb 2023].
40 Services CfMaM. Preliminary medicare COVID-19 data Snapshot. Presentation. 2023. Available: https://www.cms.gov/files/document/medicare-covid-19-data-snapshot-fact-sheet.pdf [Accessed 13 Feb 2023].
41 Jorgensen TJ. Inclusive financial wellbeing and empowerment: an intersectional analysis. Ph.D. University of Georgia; 2020. Available: https://libkey.io/libraries/1300/openurl?genre=dissertations&au=Jorgensen%2C+Timi+Joy&aulast=Jorgensen&issn=&isbn=9798645491819&title=Inclusive+Financial+Wellbeing+and+Empowerment%3A+An+Intersectional+Analysis&jtitle=&pubname=Inclusive+Financial+Wellbeing+and+Empowerment%3A+An+Intersectional+Analysis&btitle=&atitle=&volume=&issue=&spage=&date=2020&doi=&sid=ProQuest
42 Bhutta N, Chang AC, Dettling LJ, *et al*. Disparities in wealth by race and Ethnicity in the 2019 survey of consumer finances. *FEDS Notes* 2020;2020.
43 Choudhury S. Racial and ethnic differences in wealth and asset choices. *Soc Secur Bull* 2001;64:1–15.
44 Ruel E, Hauser RM. Explaining the gender wealth gap. *Demography* 2013;50:1155–76.
45 Manzoni A, Streib J. The equalizing power of a college degree for first-generation college students: disparities across institutions, majors, and achievement levels. *Res High Educ* 2019;60:577–605.
46 Hébert TP. An examination of high-achieving first-generation college students from low-income backgrounds. *Gifted Child Quarterly* 2018;62:96–110.
47 Tate KA, Fouad NA, Marks LR, *et al*. Underrepresented first-generation, low-income college students' pursuit of a graduate

education:investigating the influence of self-efficacy, coping efficacy, and family influence. *J Career Assess* 2015;23:427–41.
48 Gilbert KL, Ray R, Siddiqi A, *et al*. Visible and invisible trends in black men's health: pitfalls and promises for addressing racial, ethnic, and gender inequities in health. *Annu Rev Public Health* 2016;37:295–311.
49 Spjeldnes S, Yamatani H, McGowan Davis M. And recidivism: a statistical interaction pattern by race. *J Evid Inf Soc Work* 2015;12:628–36.
50 Singh GK, Daus GP, Allender M, *et al*. Social determinants of health in the United States: addressing major health inequality trends for the nation, 1935-2016. *Int J MCH AIDS* 2017;6:139–64.
51 Singh GK, Siahpush M, Azuine RE, *et al*. Widening socioeconomic and racial disparities in cardiovascular disease mortality in the United States, 1969-2013. *Int J MCH AIDS* 2015;3:106–18.
52 Medina LD, Shannon S, Vespa J. Living longer: historical and projected life expectancy in the United States, 1960 to 2060, current population reports. 2020.
53 Vespa J, Lauren M, Armstrong DM. Demographic turning points for the United States: population projections for 2020 to 2060, current population reports. 2020.