

EXAMINING THE ASSOCIATION BETWEEN PANDEMIC-RELATED CHANGES IN CAREGIVER MENTAL HEALTH AND CHILD WEIGHT STATUS OVER TIME



Tatiana Pimentel-Soler, BS^{1*} Maureen Black, PhD² Elizabeth Parker, PhD² Raquel Arbaiza, MS³ Yan Wang, DrPh⁴ Erin Hager, PhD^{2,3}

¹Universidad Central del Caribe School of Medicine ²University of Maryland School of Medicine ³Johns Hopkins Bloomberg School of Public Health ⁴George Washington University Milken Institute School of Public Health

Background

- COVID-19 disease controlling policies altered daily social, occupational, and personal routines.
- Caregivers of young children (preschool and early elementary school; ages ~4-8 during the early pandemic) had to cope with enduring stressors, including fear of contagion, financial hardships, and loss of social support.
- Studies suggest that caregivers experience a heightened degree of adverse mental health symptoms and stressors, compared to their non-parent counterparts, during this time given unprecedented factors (Kerr, 2021; Russel, 2020).
- A recent meta-analysis (Chang, 2021) reports a significant increase in body weight and BMI among school-aged children.
 - This trend is concerning because children with overweight and obesity face a higher risk of sustained comorbidities throughout adulthood.
- The Family Stress Model (FSM) poses that parental economic stress can trigger a cascade of negative associations by first impacting caregiver mental health, followed by interpersonal encounters. These associations ultimately contribute to detrimental child health outcomes, such as excess weight gain and increased risk for obesity.
- Based on the FSM, the multifactorial impact of the COVID-19 pandemic on the family structure may exacerbate the well established relationship between poor caregiver mental health and adverse physical health outcomes in children.

Hypothesis

An increase in caregiver mental health symptoms from before the pandemic (2017-2020) to the early pandemic (2020) will be associated with less favorable weight changes in children, increasing risk for childhood obesity.

Methods

- Participants.** Caregivers and their children who participated in the CHAMP (Creating Healthy Habits Among Maryland Preschoolers) Project (Armstrong, 2019) pre-pandemic were re-recruited to participate in the "COVID-19 Family Study" in Spring 2020.
- Caregiver Survey.** 328 caregivers were re-recruited to complete the survey, including the following measures completed pre-pandemic (2017-2020) and repeated in 2020 and 2021:
 - Demographics:** Caregiver and child gender, race, ethnicity, and age; Household number of dependents & income (used to calculate poverty ratio) and food insecurity measures (Hager, 2010).
 - Anxiety:** The 6-item short form of the State-Trait Anxiety Inventory (STAI-6) is one of the most frequently used measures of anxiety in applied research and has been shown to be a reliable ($\alpha = 0.82$) and sensitive measure of anxiety, producing scores similar to those obtained using the full 20-item STAI in populations experiencing normal and raised levels of anxiety (Marteau, 1992; Van Knippenberg, 1990).
 - Stress:** The 4-item Perceived Stress Scale (PSS-4) measures the degree to which situations in the previous month are appraised as stressful (Cohen, 1983). The scale is designed for use in community samples and has been used to assess parenting stress (Lee, 2012).
 - Depression:** The Center for Epidemiological Studies – Depression Scale Short Form (CESDR-10) is a widely used valid and reliable instrument in psychiatric epidemiology designed to measure depressive symptomatology in the general population (Van Dam, 2011).
- Child Anthropometry.** Height and weight were measured in triplicate pre-pandemic and in 2021; caregivers could submit measures from a doctor's office if uncomfortable meeting in person (24.5%); measures were used to generate gender-specific BMI-for-age-z-scores (CDC, 2000).
- Analysis Plan.** Analysis (IBM SPSS Statistics Software 28) was restricted to those with anthropometric data in 2021 (n=163). Mixed regression models accounted for clustering within individuals over time.

Results

Table 1: Sample Description (n=163)

		% or Mean \pm SD
Caregiver		
Gender	Male	9.9%
	Female	90.1%
Race/Ethnicity	Non-Hispanic African American/Black	17.3%
	Non-Hispanic White	73.5%
	Other	9.3%
	Age	36.2 \pm 4.8
Child		
Gender	Male	52.1%
	Female	47.9%
Race/Ethnicity	Non-Hispanic African American/Black	17.3%
	Non-Hispanic White	68.5%
	Other	14.3%
	Age	4.1 \pm 0.6
Household		
Number of Household Child Dependents	1	24.2%
	2	61.5%
	3+	19.7%
At-risk for Food Insecurity	Food secure	84.7%
	Food insecure	12.3%
	Poverty Ratio	<185% FPL
	185-300% FPL	11.3%
	>300% FPL	80.0%
Time Since Baseline Measurement (years)	Baseline-2020 (T1)	1.8 \pm 0.6
	Baseline-2021 (T2)	2.8 \pm 0.6

Figure 1A. STAI-6

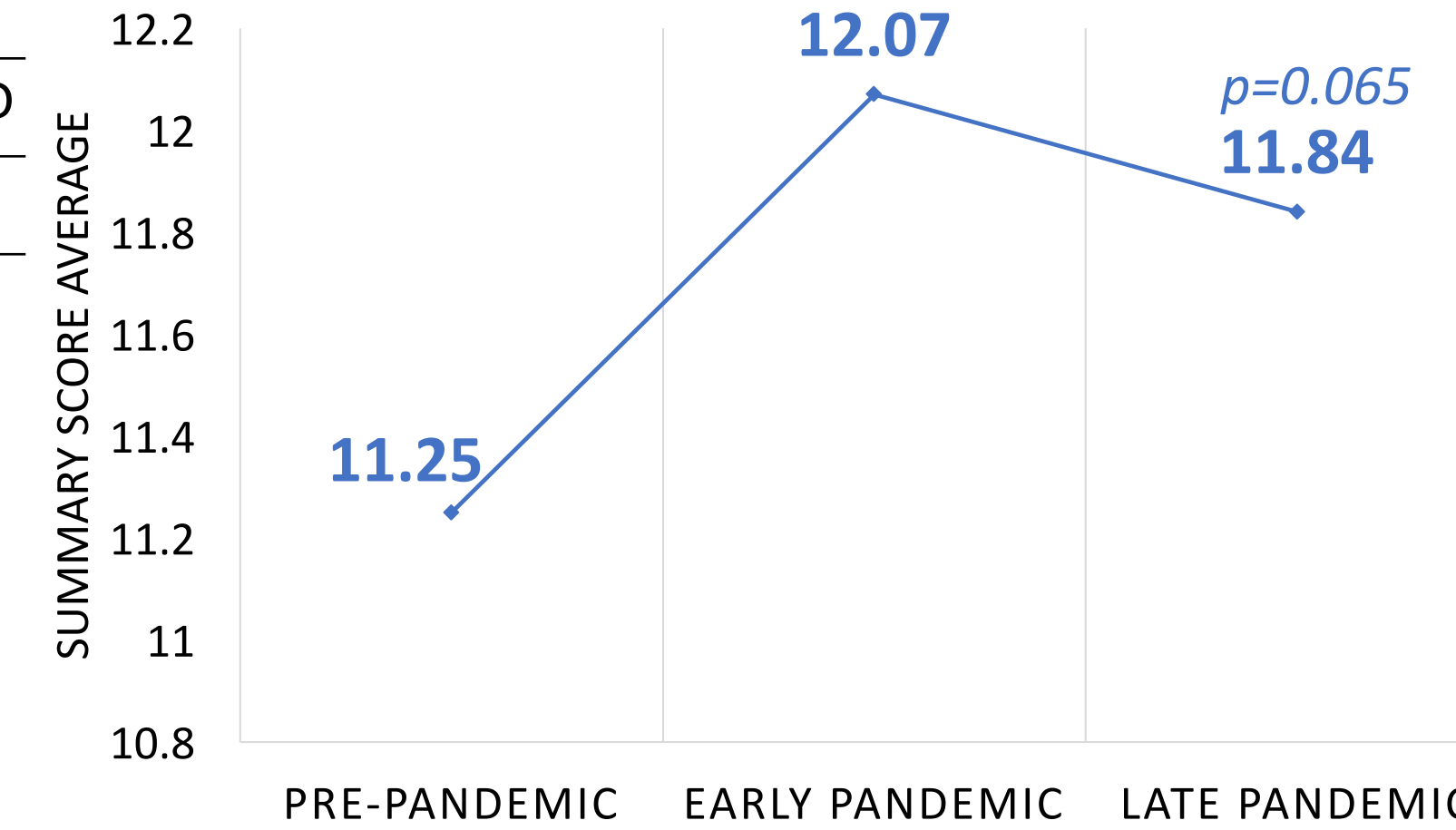


Figure 1B. PSS-4

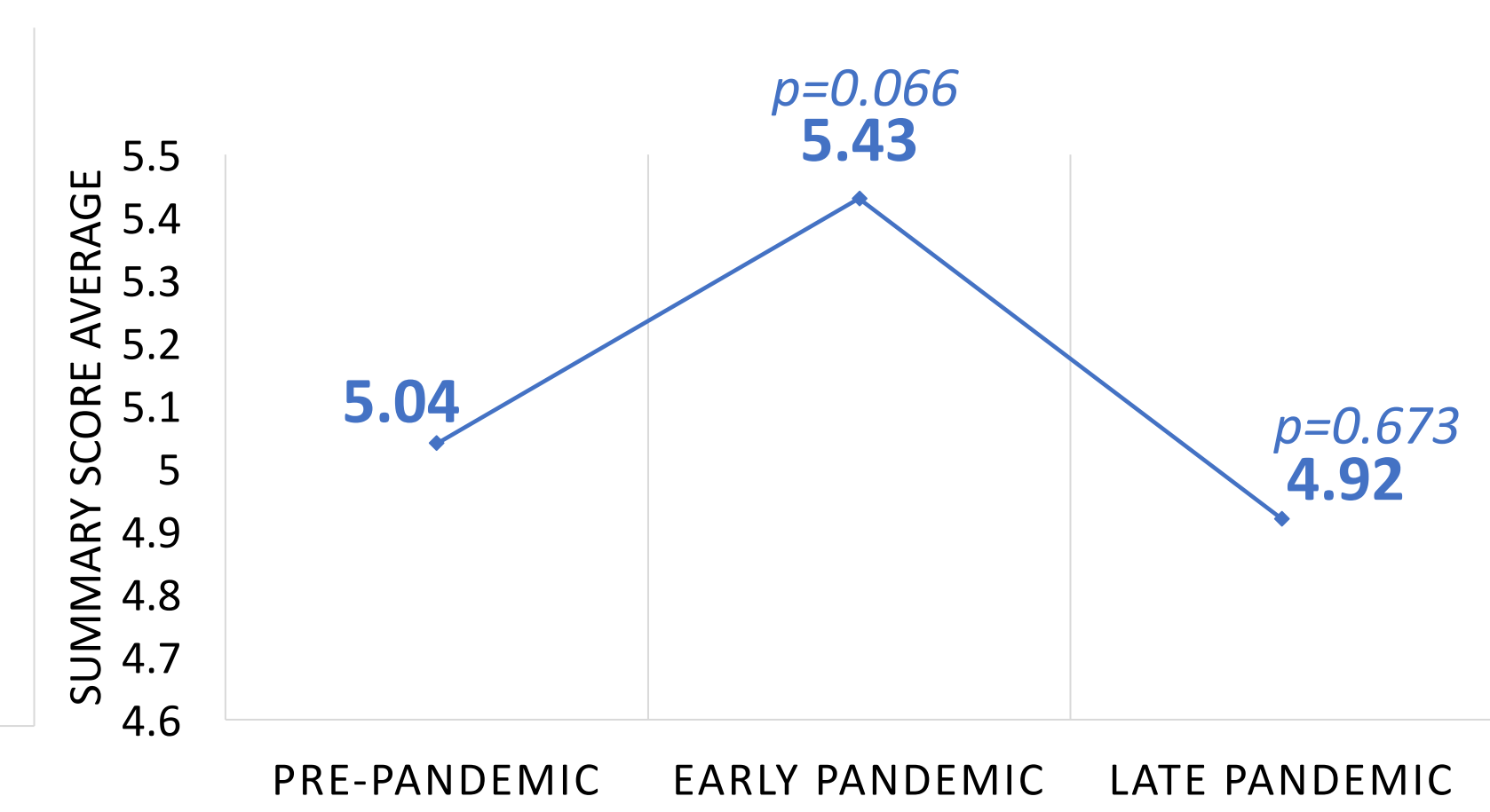


Figure 1C. CESDR-10

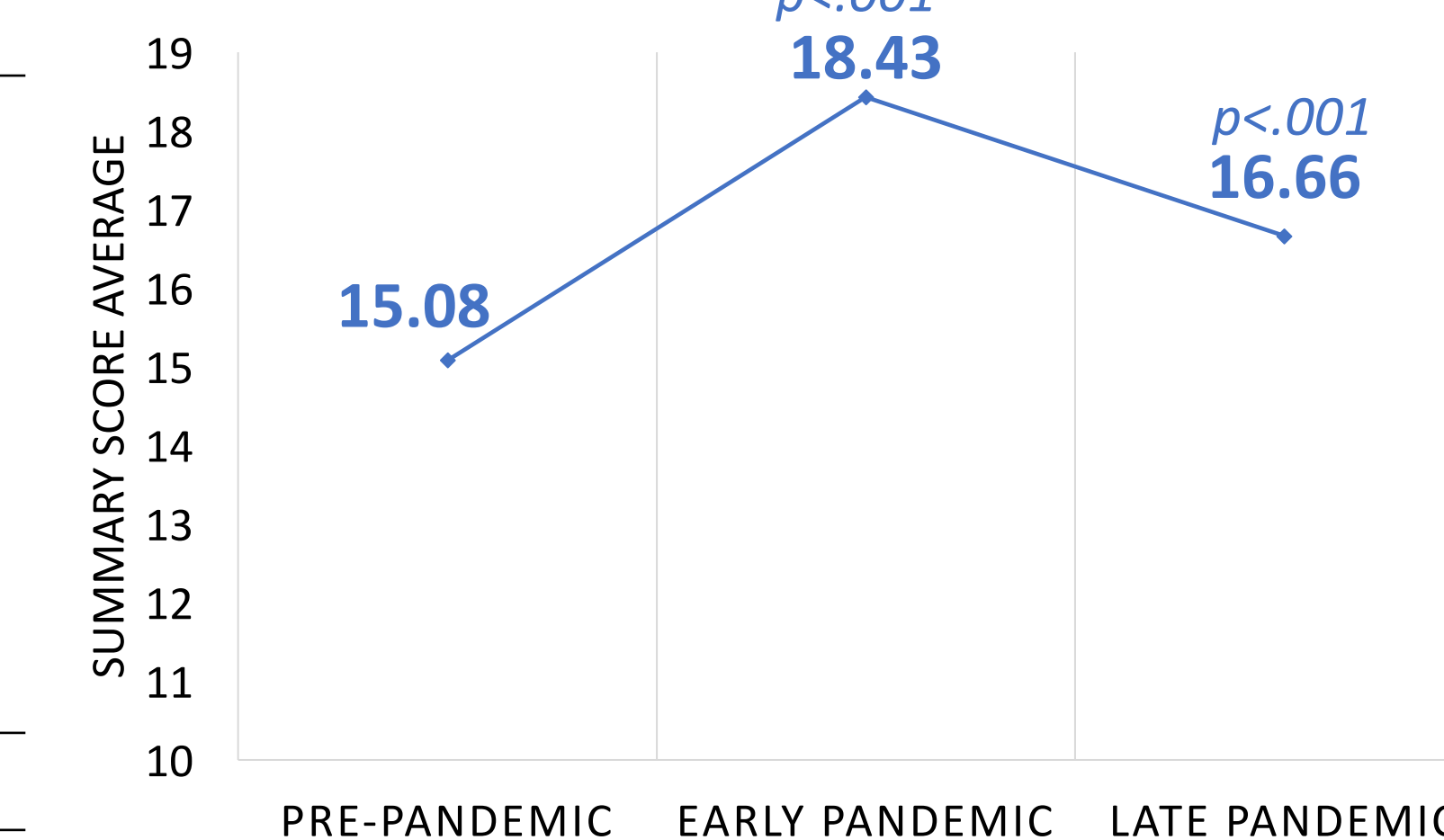
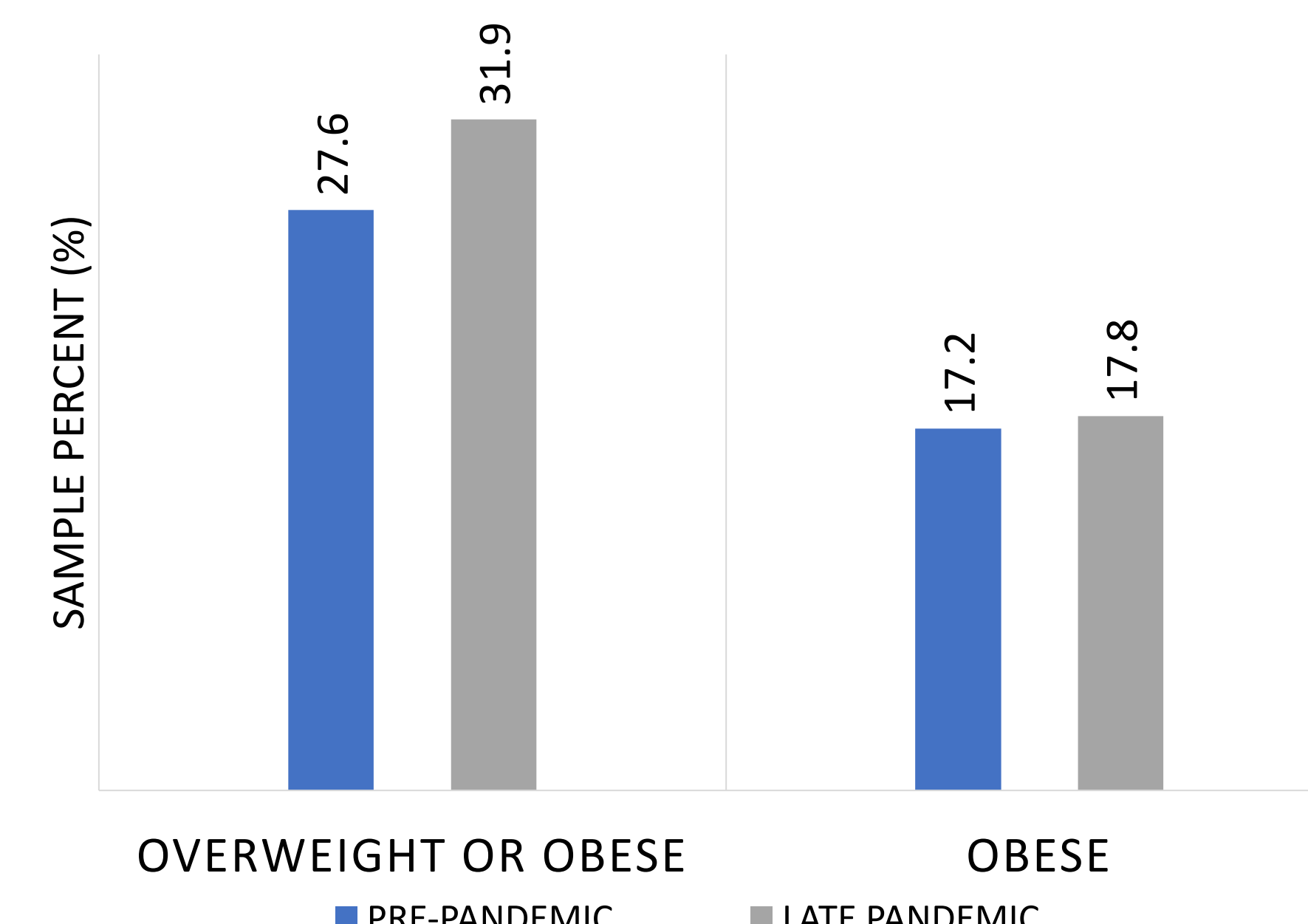


Figure 1. A) Lower scores reflect less self-reported anxiety symptoms; BL-T1: $\beta=0.77$, ** $p<.001$; T1-T2: $\beta=-0.58$, $p=0.065$. B) Higher scores have been correlated with more stress symptoms; BL-T1: $\beta=0.44$, $p=0.066$; T1-T2: $\beta=0.88$, $p=0.673$. C) Lower scores reflect a decreased likelihood of depression; BL-T1: $\beta=3.39$, ** $p<.001$; T1-T2: $\beta=-1.69$, ** $p<.001$.

FIGURE 2: CHILD WEIGHT STATUS CHANGES FROM PRE- TO EARLY TO LATE PANDEMIC



Hypothesis Testing:
In mixed regression models, accounting for clustering within individuals over time, an increase in caregiver mental health symptoms from before the pandemic to the early pandemic was **not associated** with less favorable weight changes in children, increasing risk for childhood obesity ($p>.005$).

Note. All variables are from pre-pandemic (BL) measurements. "Other" race/ethnicity includes Hispanic/Latino, Asian, American Indian/Native American, Native Hawaiian/Pacific Islander, and Mixed.

Summary

- Anxiety and depression**, but not stress, symptoms in caregivers increased significantly ($p < .001$) from pre-pandemic to early pandemic.
 - Trends were followed by a recovery period from early to late pandemic. Anxiety was sustained at a heightened state, with no significant decrease, while depressive symptoms decreased significantly ($p < .001$).
- Although there was an **observed increase** in prevalence of overweight/obese weight status, changes in BMI-for-age-z-scores were not statistically significant across time.
- A significant association between pandemic related changes in caregiver mental health symptoms and child weight status over time was not observed.

Conclusions & Future Directions

- Although caregivers endured an increase in anxiety, stress, and depression symptoms from pre- to early pandemic, preschool aged children in our cohort were protected against entering less healthy weight categories, lowering their risk for obesity and comorbidities.
- Our next steps include exploring the moderating role of caregiver, child, and family demographics in the association between caregiver mental health and excess weight gain in children.
 - We aim to replicate the analysis in other child age cohorts (i.e. school aged, adolescents), expand our sample size, and collect measures at additional time points to further explore potential protective and risk factors in the caregiver-child wellbeing relationship.

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Contact Information

Tatiana C. Pimentel-Soler, BS
121tpimentel@uccaribe.edu
www.linkedin.com/in/tatiana-pimentel-soler