

COVID-19 Mandates Associated with Increased Rate of Weight Gain and Liver Function Test Elevation in Children with Fatty Liver Disease

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Introduction

- Recent studies have shown an accelerated rate of weight gain among children and adolescents during the COVID-19 pandemic that has been attributed to a variety of reasons, including inability to be in a structured school setting and disruptions in family income or other social determinants of health^{1, 2}
- Our study aims to explore the effect of COVID-19 stay-at-home mandates and school closures on weight gain and liver function of children with non-alcoholic fatty liver disease (NAFLD)

Methods

- Retrospective chart review on children aged 13-20 years who were seen at Lurie Children’s Hospital (LCH) hepatology clinic for NAFLD and had two or more clinic visits at least three months apart during the pandemic period, defined as 3/1/20-9/1/21, and the pre-pandemic period, defined as before 3/1/20
- Demographic and clinical data (race, ethnicity, age, BMI, height, weight, AST, ALT) abstracted
- Monthly BMI, AST, and ALT differences during the two periods calculated for each patient
- Paired-samples T-Tests used to analyze differences between the two periods, relative risk for increase in BMI/ALT calculated
- IRB approval obtained (IRB 2021-4333)

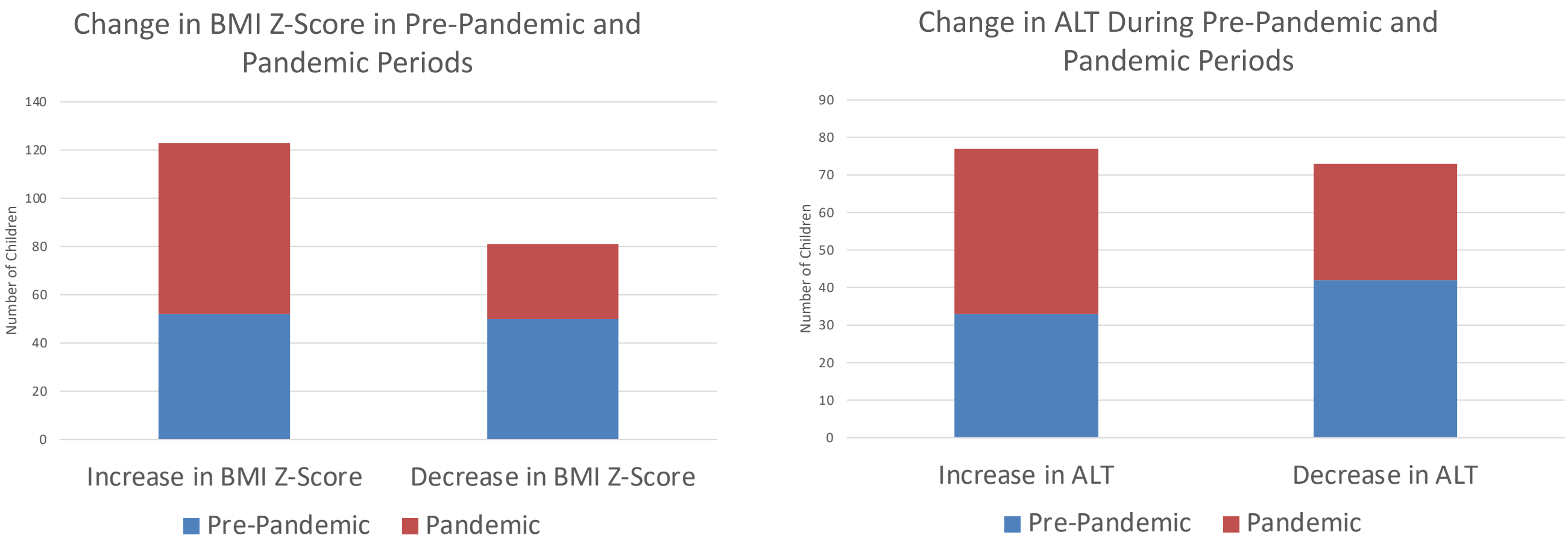
Table 1: Summary of Patient Clinical Characteristics and Demographics

Infant Characteristics		N=102 (%)
Age During Pre-pandemic Period (years)##		14.5 (1.6)
Age During Pandemic Period (years)##		15.6 (1.4)
Sex (male)		71 (70%)
BMI During Pre-pandemic Period (kg/m²)##		34.2 (7.16)
BMI Z-Score During Pre-pandemic Period##		2.16 (0.56)
BMI During Pandemic Period (kg/m²)##		35.5 (7.0)
BMI Z-Score During Pandemic Period##		2.21 (0.56)
Had Liver Biopsy/Other Imaging Consistent with NAFLD Diagnosis		76 (75%)
Race	White	16 (16%)
	Black or African American	2 (2%)
	Asian	4 (4%)
	Other	78 (76%)
	Unknown/Not Reported	2 (2%)
Ethnicity	Hispanic or Latino	85 (83%)
	Not Hispanic or Latino	17 (17%)

#Median (IQR) ##Mean (SD)

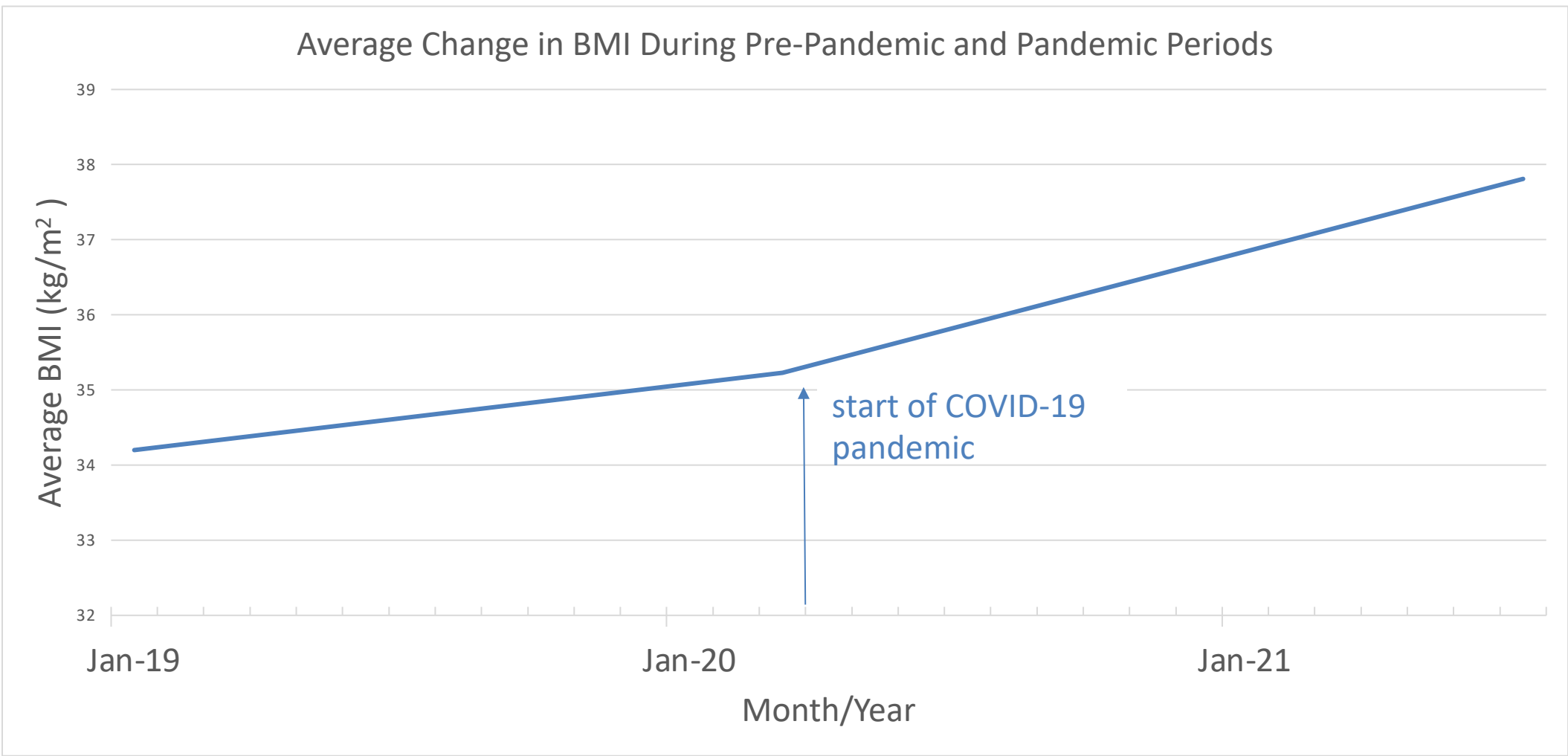
Results

Figure 2: Change in BMI Z-Score and ALT During Pre-Pandemic and Pandemic Periods



The relative risk of having an increase in BMI Z-score during the pandemic period compared to the pre-pandemic period was 1.37 (95% CI [1.09-1.72], p < 0.01). The relative risk of having an increase in ALT or AST during the pandemic period compared to the pre-pandemic period was not significant.

Figure 3: Average Change of BMI During Pre-Pandemic and Pandemic Periods



There was a significant difference between monthly BMI differences during the pre-pandemic period (mean 0.0691 kg/m²/month, SD 0.271) and pandemic period (mean 0.161 kg/m²/month, SD 0.271); p=0.02 and a significant difference between monthly ALT differences during the pre-pandemic period (mean -2.39 IU/L, SD 8.67) and pandemic period (mean 1.70 IU/L, SD 11.3); p=0.01. There was no significant difference between monthly AST differences during the two time periods.

Conclusions

Our cohort of children with NAFLD experienced an accelerated rate of BMI increases and ALT elevation during the COVID-19 pandemic. These findings underscore the importance of increasing access to resources for healthy behaviors during public health emergencies or extended school closures in facilitating the health and well-being of children with NAFLD.

Future Study

Based on our results, we hope to look more into potential interventions that could be implemented during national emergencies such as pandemics that would prevent the accelerated rate of weight gain and ALT elevation seen in children with NAFLD during the COVID-19 pandemic.

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References

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