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A Study on the Impact of COVID-19 on Adolescent Food Insecurity: How Adolescent Food Insecurity is Associated with Future Food Insecurity

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ABSTRACT

The intention of this study was to determine the significance of transformations in adolescent food insecurity following the outbreak of COVID-19, and to investigate the possible effects that adolescent food insecurity has on the future. The data was compiled from an open-source network regarding adolescent food insecurity from January 2019 to December 2021. To further study the implications of adolescent food insecurity, I implemented a qualitative research design and focused on statistical data provided by the USDA's Economic Research Service and the Centers for Disease Control and Prevention. To accurately estimate the number of residents experiencing food insecurity in the United States, the USDA ERS uses publicized data from the U.S. Census Bureau of Labor Statistics to research the factors contributing to food insecurity. From the statistical data released by the USDA ERS in September 2021, it is evident that the pandemic caused an increase in food insecurity across the nation. But when looking closer at the age discrepancy of the research, it is evident that adolescents are understudied compared to younger children and adults. However, adolescents' vulnerability to food insecurity makes it imperative to conduct deeper research on food insecurity for their age group. The socioeconomic and demographic indicators used by the USDA and CDC to analyze food insecurity are low income, health issues, education level, Supplemental Nutrition Assistant Program status, race disparities, and urbanization. To analyze the factors influencing adolescent food insecurity in the United States, it is necessary to examine the meaning of these indicators.

Introduction

The COVID-19 pandemic began in the United States in 2020 and affected public health and the economy, with resulting changes to existing nutrition assistance programs, as well as the development of additional new programs. These many changes have affected food insecurity in many ways. The prevalence of food insecurity has increased for all household with children from 13.6 percent in 2019 to 14.8 percent in 2020. The problem persisted within household with 7.6 percent of children in US households (2.9 million households) being food insecure, up from 6.5 percent in 2019. These households with food insecurity among children were often unable to provide adequate, nutritious food for their children (U.S. Department of Agriculture, 2021).

Adolescence is a period of rapid transition into adulthood, precisely because it is an important development stage during older childhood. But if these adolescents experience food insecurity during this period, they will not have the opportunity to benefit from education, health care, and social experiences. Food insecurity among adolescents who have become unstable after the pandemic is highly likely to affect food insecurity in the United States in the near future.

Literature Review

To conduct this research, I focused on comparing food insecurity before and after the onset of COVID-19. After the outbreak of COVID-19 in 2020, food insecurity increased due to an increase in the unemployment rate, a decrease in income sources, and changes in the fiscal situation. In previous studies, there is minimal data separating food insecurity by age, and analysis corresponding to each age group. However, looking at government data sources, we can get a better perspective: the rate of food insecurity experienced by adolescents is comparably high. Food insecurity among adolescents is likely due to low income, education, and inadequate food support programs, leading to households suffering from food insecurity even as adults.

Food insecurity, which affects an estimated 15 million Americans (Colman et al., 2018), is the limited or uncertain availability of safe and nutritionally adequate foods in socially acceptable ways (U.S. Department of Agriculture: ERS, 2018). Prior to COVID-19, approximately 11 percent of households in the United States were food insecure; among them, 11 million children (7.8% of children nationwide) experienced food insecurity (Ralston et al., 2017). One in seven children (15.2%) still do not have consistent access to a nutritionally adequate diet (Parekh et al., 2021). Food insecurity was estimated to increase sharply due to COVID-19 (Nicola et al., 2020). Post pandemic, approximately 14.8 percent of households reported having low or very low food security; this grew to 17.5 percent among households with children (Parekh et al. 2021).

Food insecurity has been consistently associated with poor health outcomes in children, including overall substandard health status, acute and chronic health problems, and limited healthcare access (Heidi et el.,:CDC, 2022). While previous research has relied on parents' reports, it is important to note that adolescents' experiences are unique, and they are willing and reliable research participants; they should be included in future food insecurity research (Jennifer et al., 2020). The USDA classifies households as having high food security, low food security, or very low food security and provides data on households with and without children (Coleman-Jensen, Rabbitt, Gregory, & Singh, 2019). In 2018, 2.7 million or 7.1% of all U.S. households with children, both adults and children were food insecure (Coleman-Jensen et al., 2019). Whereas almost 14% of all households with children are affected by food insecurity, about half the time only the adults are food insecure, often because parents protect children from the effects of food insecurity (Coleman-Jensen et al., 2019). The younger children are more often protected by adults from the effects of food insecurity than older children or adolescents (Coleman-Jensen, McFall, & Nord, 2013). In food insecure households with children, adults and children often rely on low-cost and unhealthy food or adjust their intake by reducing portions, skipping meals, or by going hungry. This leads to an exacerbation of the problem, especially with older children not consuming enough healthy food to support their health. This raises an initiative for all adolescents to be screened for food insecurity in pediatric and other health care settings. (Jennifer et al., 2020). Ultimately, food insecurity in adolescence is caused by low-income households, poor health care, and low education levels, and it is highly likely that they will continue to experience food insecurity as adults in future.

Materials and Methods

Motivation for the research began when I came across the UN's Food Insecurity Report published in 2021. The 240-page report is a regional study of increased global food insecurity and child hunger since COVID-19. Among them, there are case studies in Africa and low-income countries where Home Grown School Feeding (HGSF) programs are installed and set effective to resolve food insecurity and nutritional imbalances among students in schools. The research started with these two questions: "Amidst the global food insecurity that has increased due to COVID-19, what is the situation of food insecurity among adolescents in the United States?" and "What is the insight of current adolescent food insecurity to the future?"

Data Collection

For comparative analysis of pre-pandemic and post-pandemic data, initial data analyzed from the U.S. Census Bureau and Bureau of Labor Statistics (2021) were used to determine the factors contributing to food insecurity. Adolescent food insecurity data for the period between January 2019 and December 2021 in United States were obtained through statistics from the U.S. Department of Agriculture Economic Research Service. Statistics from USDA ERS provide an analysis of trends in food insecurity during the period of 2001 to 2020. Looking at the trends in food insecurity over the past 20 years, the rate of food insecurity has been slowly improving since 2017. However, it seems that food insecurity from 2018 to 2020, just before and after the pandemic, increased and returned to the state of food insecurity in 2016.

A study on the effects of adolescent food insecurity on future food insecurity in US began with a literature review. An initial search of NIH PubMed and Google Scholars using combinations of the terms "adolescent food insecurity," "after Covid-19," "USA" yielded a combined sample of 1,173 manuscript titles. The initial search was limited to works published in 2021 with a focus on food insecurity after COVID-19 outbreaks in the United States. After eliminating duplicates and reviewing article titles, a total of 142 remaining articles were chosen. But after reviewing these articles, there was no study focused on the adolescent food insecurity and their implications for the future. Rather, most of the research papers were just focused general food insecurity and health issues in adolescence.

After reviewing existing research papers, I came across important statistics that were recently published by CDC (2022). This report named 'Children Living in Households That Experienced Food Insecurity: United States, 2019–2020' is more focused on aspects of adolescent food insecurity. The annual reports from the USDA and the U.S. Census Bureau have only provided statistics for households with children divided by two age groups, such as under the age of 6 and under the age of 18. Existing studies on food insecurity have pointed out that statistical data on the two age groups of families with children have limitations in researching food insecurity in adolescence. Citing a 2016 paper by Feeding America, 'Unfortunately, the annual USDA report on household food insecurity does not provide a breakdown on ages of children beyond the presence of children under the age of 6, so the full extent to which adolescents, including those in early and middle adolescence, are affected by food insecurity has not received a great deal of public attention.' (Elaine et al.,2016). The latest statistics published by the CDC were good source for this study, as they provided figures on food insecurity by classifying adolescents aged 12-17.

To determine the impact of current adolescent food insecurity to the future food insecurity, I analyzed the socioeconomic and demographic indicators. These indicators were incorporated by USDA and CDC to analyze food insecurity in their report. In this study, indicators such as low income, health care, education level, racial disparities, urbanization, and SNAP program were considered to have important meanings for future food insecurity. References were made to examine these factors and the meaning of food insecurity in adolescence.

Analysis

The changes of food insecurity since COVID-19 outbreaks in United States were compared. To reveal the impact on adolescent food insecurity, the incident data of changes from 2018 to 2020 were compared. Microsoft Excel (Microsoft Corporation, WA, USA) and Google Sheets (Google LLC. Mountain View, CA, USA) were used to create that visualize the collected data. To analyze the future food insecurity, I used socioeconomic and demographic indicators from data collected through the USDA ERS (2021) and CDC (2018–2020 National Health Interview Survey).

This study may have various biases as it includes future implications of food insecurity. In order to reduce the bias as much as possible, statistical data and terms published by the USDA and CDC, both recognized as U.S. government agencies with public credibility, were collected and used.

Findings

<reference>

*The food insecurity of households with children is measured by USDA ERS in three ways:

-food insecurity in households with children (adults, or children, or both are food insecure)
-food insecurity among children
-very low food security among children

* Definition of food insecurity (USDA ERS, 2020):

Low food security (old label=Food insecurity without hunger): reports of reduced quality, variety, or desirability of diet. Little or no indication of reduced food intake.
Very low food security (old label=Food insecurity with hunger): reports of multiple indications of disrupted eating patterns and reduced food intake.

* Households that are categorized as low food secure or very low food secure are considered to be food insecure. (CDC, 2021)

Increased Adolescent Food Insecurity after Covid-19(2018- 2020)

Looking at the trends in food insecurity over the past 20 years, food insecurity was decreasing in 2018 and 2019 but started an upward trend again in 2020. (**Figure 1**).

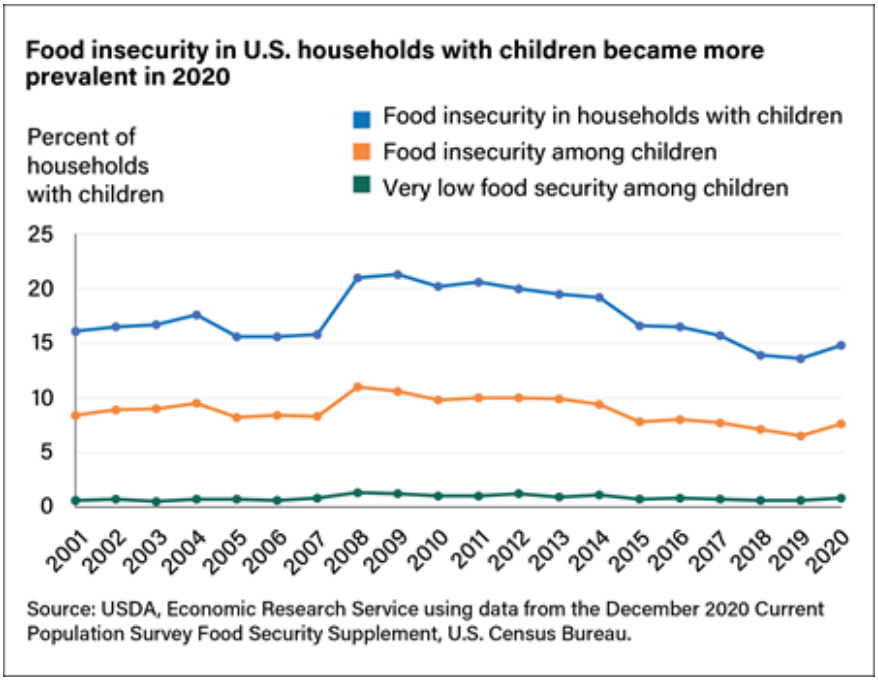

Figure 1. Food insecurity in U.S. Households with children became more prevalent in 2020. Source: Population Survey Food Security Supplement (CPS-FSS) from the U.S. Census Bureau (December 2020)

When comparing the percentage of households with children for three consecutive years from 2018 to 2020, it can be seen that there has been a marked increase in 2020. The findings for household with children show that in 2020, 7.6 percent of U.S. household suffered from food insecurity, which was a significant increase from the 6.5 percent recorded the previous year. These households were unable to provide adequate and nutritious food for their children because of their food insecurity **(Table 1)**.

Table 1. Trends in the prevalence of food insecurity and very low food security in U.S. households from 2018 to 2020.

Year	Category	Total	Percentage
2018	All household with Children (<18)	37,612	100.0
	Food-secure households-Percent		86.1
	Food-insecure households-Percent		13.9
	Households with food-insecure children-Percent		7.1
	Households with very low food security among children-Percent		0.6
2019	All household with Children (<18)	37,614	100.0
	Food-secure households-Percent		86.4
	Food-insecure households-Percent		13.7
	Households with food-insecure children-Percent		6.5
	Households with very low food security among children-Percent		0.6
2020	All household with Children (<18)	37,903	100.0
	Food-secure households-Percent		85.2
	Food-insecure households-Percent		14.8
	Households with food-insecure children-Percent		7.6

	Households with very low food security among children-Percent		0.8

Source: Population Survey Food Security Supplement (CPS-FSS) from the U.S. Census Bureau (2020)

Note: This is the USDA's annual report series Household Food Security in the United States. Next update (2021 statistics) will be released in September 2022.

The rate of food insecurity in households with children was always higher than in households without children. Data recorded from 2019 to 2020 shows that almost 11% of children between the ages of infantry and 17 resided in households affected by food insecurity. When looking at the statistics analyzing food insecurity by age group in 2020, it was found that the food insecurity of adolescents (12-17 years old) was higher regardless of gender since Covid-19 **(Figure 2)**.

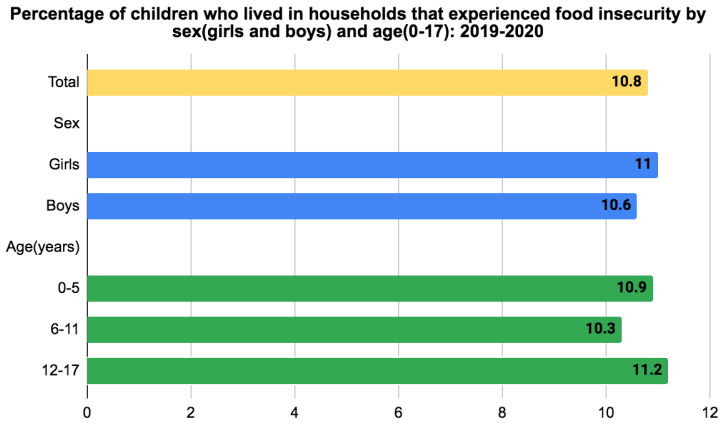

Figure 2. Percentage of children aged 0-17 years who lived in households that experienced food insecurity by sex and age in the United States from 2019 to 2020. Source: CDC National Center for Health Statistics, National Health Interview Survey, 2019–2020.

Since 2020, when the pandemic began, food insecurity among households with children has increased. The pandemic is not over yet, and projection for 2021 suggest that food insecurity will increase further. When looking at food insecurity by age group during the pandemic, adolescents (12-17) have a higher proportion. For this reason, it has great significance for households with old children(adolescents) in research on food insecurity.

Impact adolescent food insecurity on future food insecurity

The rate of food insecurity in households with children was always higher than in households without children. The discrepancy between households with and without children are roughly 6 percent, a decrease from 14.8 to 8.8 percent in prevalence of food insecurity **(Figure 3).**

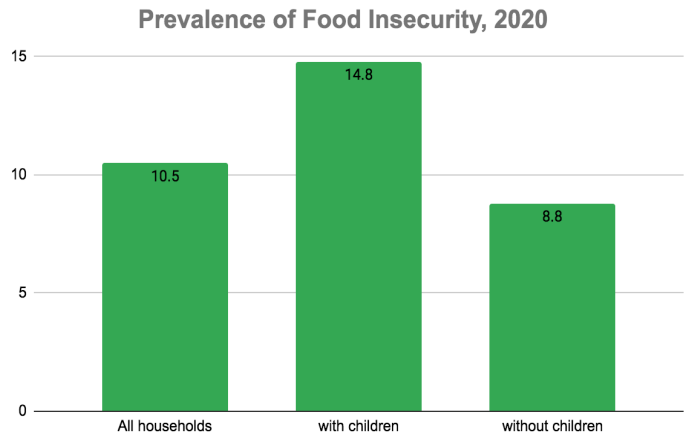

Figure 3. Prevalence of food insecurity by selected household characteristics, 2020**.** Source: Current Population Survey Food Security Supplement (CPS-FSS) from the U.S. Census Bureau (December 2020)

Looking at the trends in food insecurity over the past 20 years, the rate of food insecurity has been slowly improving since 2017. However, it seems that food insecurity from 2018 to 2020, just before and after the pandemic, increased and returned to the state of food insecurity in 2017. Food insecurity among children, including adolescents, has been on the rise since 2020 **(Figure 4).**

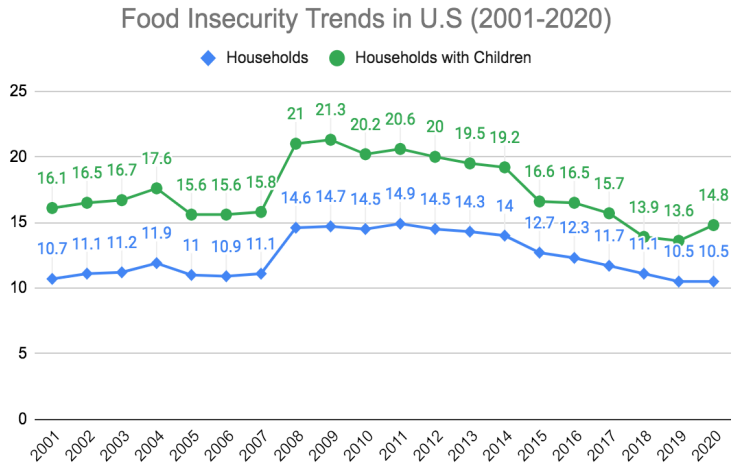

Figure 4. Food Insecurity Trends in U.S(2001-2020): Comparison Households vs. Households with Children. Source: Current Population Survey Food Security Supplement (CPS-FSS) from the U.S. Census Bureau (December 2020)

As seen, ever since the start of the pandemic, the trend of food insecurity among household with children is increasing. This means that the prevalence of food insecurity among adolescents is also increasing. While there are many factors causing this widespread household food insecurity such as "education, employment, disability status, and by labor force characteristics," it is necessary to examine the meaning of these socioeconomic and demographic indicators associated in context with adolescents (USDA ERS, 2021).

Low income households with adolescents

Data shows that low food security is associated with house income-to-poverty ratio. The lower the income, the higher the rate of food insecurity **(Figure 5)**.

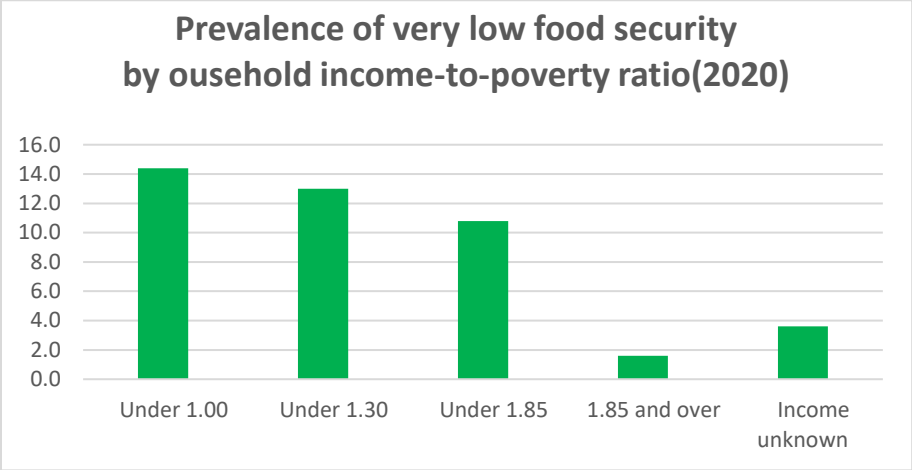

Figure 5. Prevalence of very low food security by household income-to-poverty ratio (2020). Source: Current Population Survey Food Security Supplement (CPS-FSS) from the U.S. Census Bureau (December 2020). Note: Under 1.00 means that annual income is below the federal poverty line.

It can be observed that food insecurity decreased from 2018 to 2019. However, food insecurity among low-income households with children increased after the outbreak of COVID-19 in 2020. Looking at the data, the food insecurity among low-income households (income-to-poverty ratio under 1.00) increased from 37.1% in 2019 and to 40.5% in 2020. (**Figure 6).**

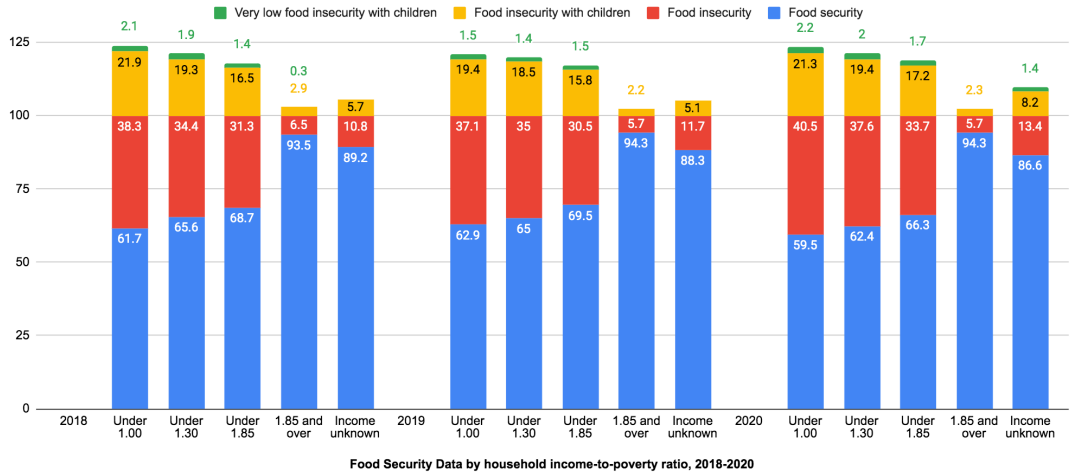

Figure 6. Prevalence of very low food security by household income-to-poverty ratio (2020). Source: The Current Population Survey Food Security Supplement (CPS-FSS) from the U.S. Census Bureau (December 2020). Note: Under 1.00 means that annual income is below the federal poverty line.

Food insecurity among low-income households with children (and adolescents) has been on the rise from 19.4% in 2019 and to 21.3% in 2020 (**Figure 6**). When these factors are analyzed by age group, it can be seen that the proportion of adolescents is quite large. If the number of adolescents experiencing food insecurity in low-income families increases, it will inevitably affect future food insecurity along with socio-economic and racial characteristics. Income is closely related to indicators of health care, education, urbanization, and race. This study intends to consider the implications of health care and education level derived from low income households with adolescents.

Health care (obesity and oral care) with adolescents

It is found that youth from low-income backgrounds are at greater risks for negative health outcomes like obesity and mental disorder. Obese children and adolescents were around five times more likely to be obese in adulthood than those who were not obese. Around 55% of obese children go on to be obese in adolescence, around 80% of obese adolescents will still be obese in adulthood, and around 70% will be obese over age 30. (Simmonds et al., 2015)

Poverty leads to financial constraints that in turn lead to the consumption of cheap, high-energy staple foods, primarily carbohydrates and fats rather than nutritionally dense food. Through the consumption of carbohydrates and fats, energy levels spike; but nutritional quality is compromised. The consequence includes reduced nutritional quality and nutrient deficiencies. Poverty plays a significant role in regulating access and preference of foods (Delisle et al., 2016) and this is evident in studies that showcase that when people living in poverty get a chance to spend relatively more on food; they often prefer to buy better tasting food, rather than good quality food (Banerjee 2011). Similarly, within high-income countries, low-income households spend a significant proportion of their income on food: USA (28.8–42.6%). In comparison, the wealthiest households in the USA spend a much lower 6.5–9.2% of household income on food. Despite spending a large proportion of their household income on food, many poor households continue to remain food insecure because of their insufficient, irregular, and fluctuating incomes (Alex G., 2016). Such unstable or low income has an adverse effect on health care in adolescence.

Those who experience food insecurity during adolescence often find it difficult to manage their health care. Recent statistics show that obesity and poor oral care among adolescents have deteriorated since the pandemic **(Figure 7)**.

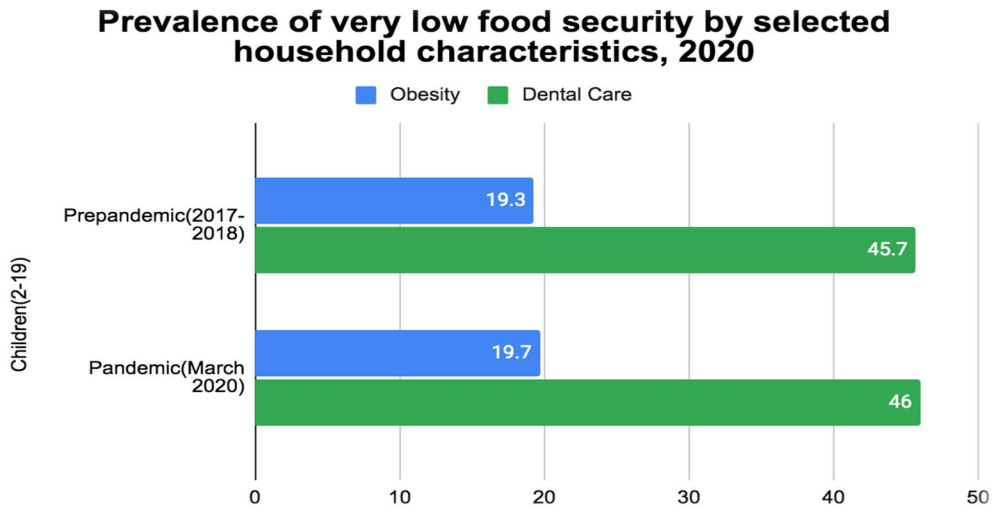

Figure 7. Health outcomes compared with pre-pandemic and pandemic data: 2017-2018 and March 2020(Age: 2-19 years old). Source: National Center for Health Statistics, National Health and National Examination Survey, 2017-March 2020 data files.

Shown statistics by age group, the rate of untreated or restored dental care of adolescence (12-19) is higher than that of other children's age groups **(Figure 8)**.

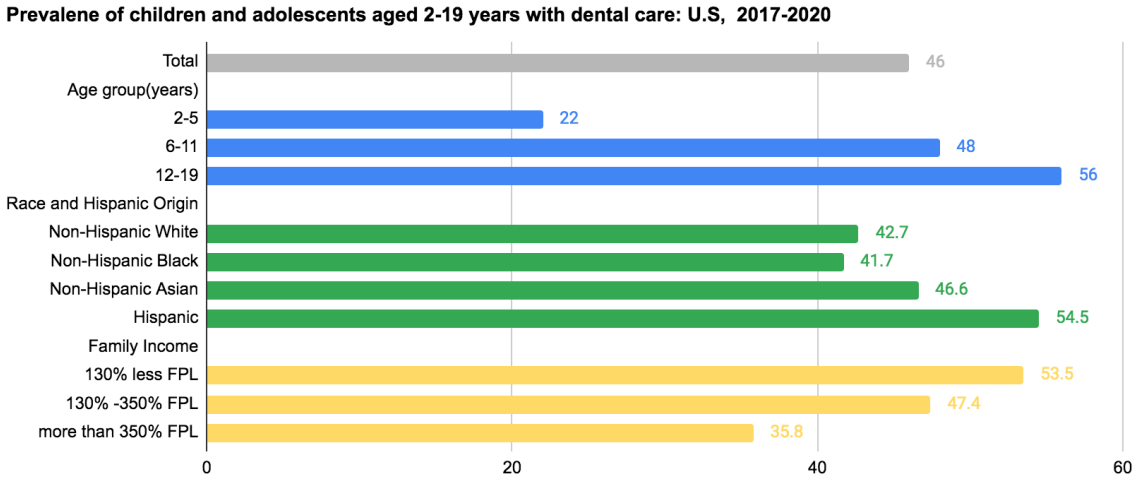

Figure 8. Prevalence of children and adolescents aged 2-19 years with untreated or restored dental caries: US 2017-2020. Source: National Center for Health Statistics, National Health and National Examination Survey, 2017-March 2020 data files.

Shown statistics by age group, the rate of obesity of adolescence (12-19) is higher than that of other children's age groups **(Figure 9).**

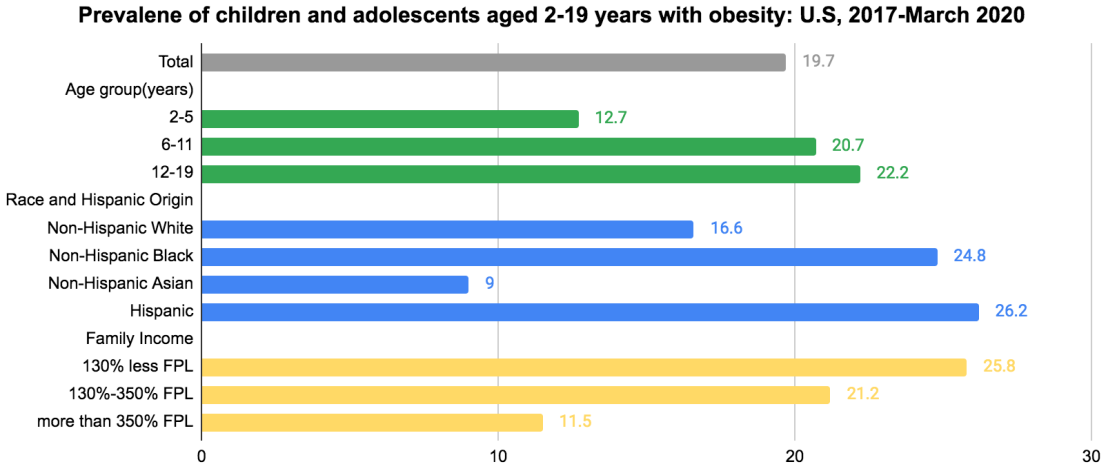

Figure 9. Prevalence of children and adolescents aged 2-19 years with obesity: US 2017-2020. Source: National Center for Health Statistics, National Health and National Examination Survey, 2017-March 2020 data files.

Food insecurity among adolescents after the pandemic has led to an increase in obesity rates among adolescents and a decrease in dental care rates. Food insecurity has led them to eat carbonated drinks, nutrient poor food, high processed foods, and high sugar desserts rather than eating healthy foods. Obesity due to food insecurity in adolescence leads to adult obesity in the United States.

Education status with adolescents

Food inequality was closely related to sociodemographic like racial disparities, urbanicity and disabilities. Also, their school absences and low academic achievements result in being transferred into low income households. The demographic factors that were the strongest determinants of food insecurity were unemployment, education (less than a Bachelor's degree), and lower income. These associations persisted, and were stronger, among households with children, where 17.5% experienced food insecurity (Parekh et al., 2021).

Students whose parents had obtained a high school diploma or less or whose parents had completed some college or an Associate's degree, had higher odds of food insecurity than students whose parents had a Bachelor's degree or higher. (Raskind et al., 2019) Food-insecure children and teenagers have been shown to miss school more frequently, and are more likely to repeat a grade than food-secure children; it has been shown to reduce a child's chances of graduating from high school. A study of food-insufficient teenagers found that they not only scored lower on academic achievement tests, but were also more likely to have repeated a grade or been suspended than food-sufficient teenagers. (Alaimo et al., 2001)

Analyzing the statistics for the past four years (2017-2020), it can be seen that the food insecurity of households with less than a college degree is quite high. Less than High school and High school status are more vulnerable to food insecurity. Since adolescence is just before entering college, children from families unable to attend college due to poverty or health issues are likely to become food insecurity households in near future.

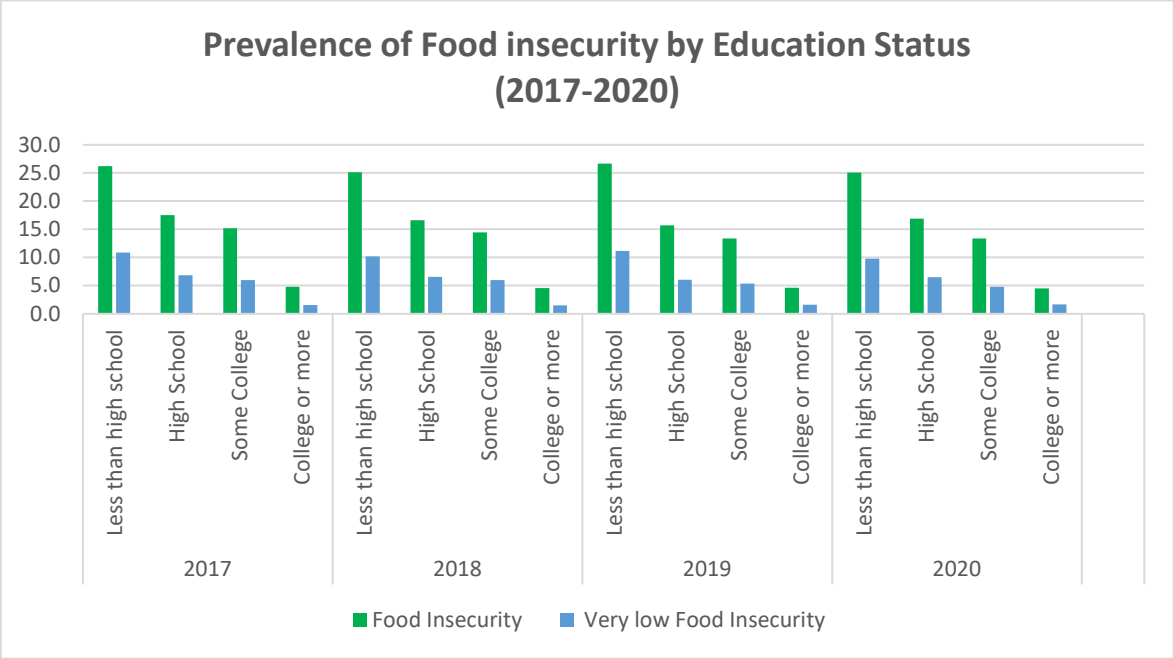

Figure 10. Prevalence of Food insecurity by Education Status (2017-2020). Source: Current Population Survey Food Security Supplement (CPS-FSS) from the U.S. Census Bureau (December 2020)

Adolescents from low-income families are more likely to suffer from food insecurity, have poor health care, and have low academic achievement. As a result, there are many cases where it is difficult to receive higher education. After all, in the case of a family that does not have a college degree or higher, there is a high probability that they will become food insecure families in the United States again.

Urbanicity/ethnic disparities with adolescents

Food insecurity among children depends on urbanization and racial characteristics. Children in large central metropolitan areas (13.2%) were more likely than those in large fringe metropolitan (7.4%) and medium and

small metropolitan (10.5%) areas to live in households that were food-insecure. Non-Hispanic Black (18.8%) and Hispanic (15.7%) children were more likely to live in food-insecure households compared with non-Hispanic White children (6.5%) **(Figure 11)**.

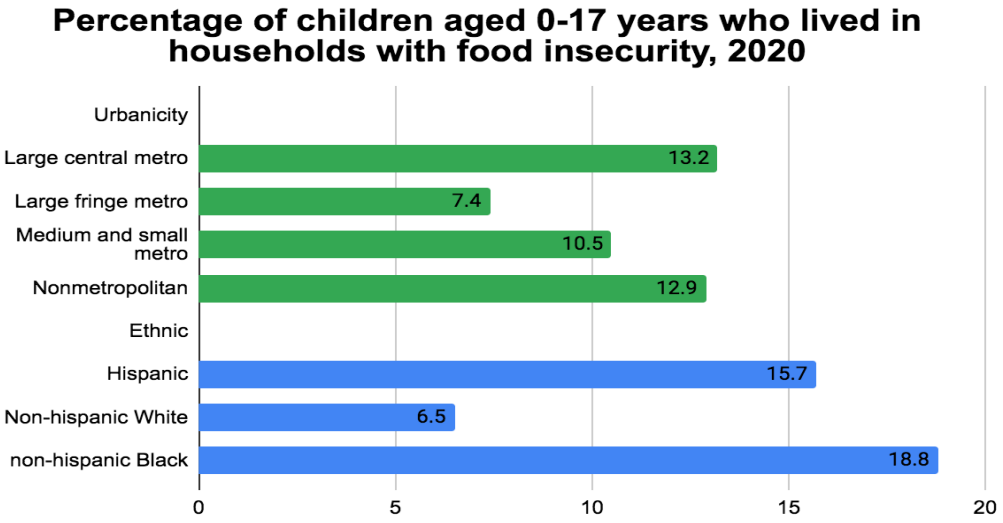

Figure 11. Percentage of children aged 0-17 years who lived in households with food insecurity. (2020). Source: CDC National Center for Health Statistics, National Health Interview Survey, 2019–2020. Note**:** urbanization level-categories were determined using the "2013 NCHS Urban–Rural Classification Scheme for Counties" (Ingram, 2014)

Furthermore, it is imperative to create and enforce a plan for food insecurity across the nation through the diverse research of Hispanics and non-Hispanic Black living in large size urban and rural, as well as adolescents coming from low-income families struggling with food insecurity. An analysis of ethnicity with urbanicity also shows a correlation between Hispanic and non-Hispanic Black with low income and poor health care **(Show Figure 8 and Figure 9)**. In line with this correlation, it is important that future plans to combat food insecurity in the United States reflects the sociodemographic characteristics of our nation.

Food assistance program (SNAP) for adolescents

After the pandemic, food insecurity among adolescents has increased. But now, the United States is making efforts to alleviate the food insecurity of youth through various supplemental programs. A representative program is SNAP, and I want to examine whether a program such as SNAP can be an alternative that helps youths with food insecurity. If it can help enough, it could be an important key to addressing future food insecurity in the United State.

The Supplemental Nutrition Assistance Program (SNAP, formerly called the Food Stamp Program) is the largest food-assistance program in the United States and is the cornerstone of the federal food-assistance programs. It serves as the first line of defense against hunger (USDA 2007) and is designed to reduce food-related hardship, such as food insecurity. (Caroline et al., 2010). While charitable assistance plays a critical role in helping families meet their food needs, federal nutrition programs are the first line of defense against hunger (Feeding America, 2020).

The U.S. Department of Agriculture (USDA) typically administers 15 domestic food and nutrition assistance programs that together affect the lives of millions of people and account for roughly two-thirds of USDA's annual budget (USDA 2020).

As statistics shown, SNAP comprises a large portion of food assistant program. (Figure 12). Despite the estimated 65 billion dollars the federal government spent on SNAP benefits in 2018, teens still persistently experience food insecurity. A recent analysis by the Urban Institute shows that SNAP does not cover the cost of meals for low-income individuals and families in 99 percent of U.S. counties (Ana, 2019).

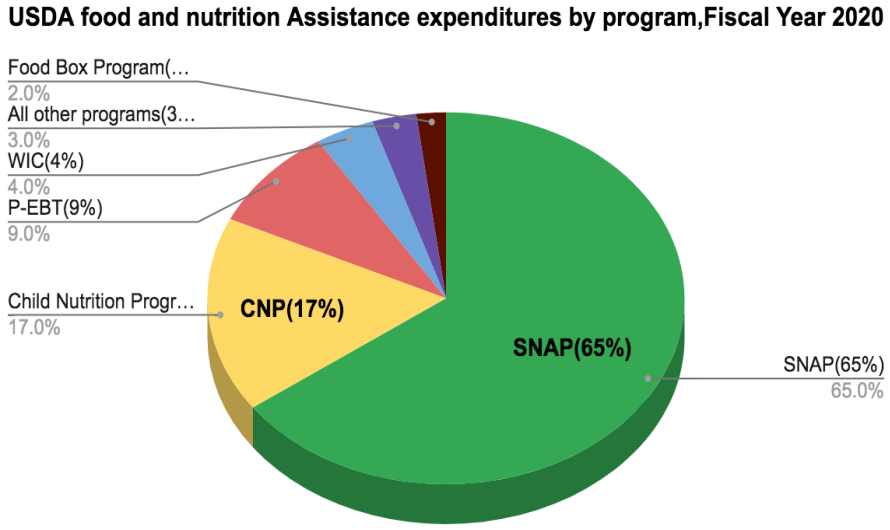

Figure 12. USDA food and nutrition assistance expenditures by program, Fiscal Year 2020. Source: USDA, Food and Nutrition Service (January 2021)

Comparing the rates of program SNAP participants by age group, it can be seen that the participation of children and adolescents are comparably high **(Figure 13) & (Table 3).**

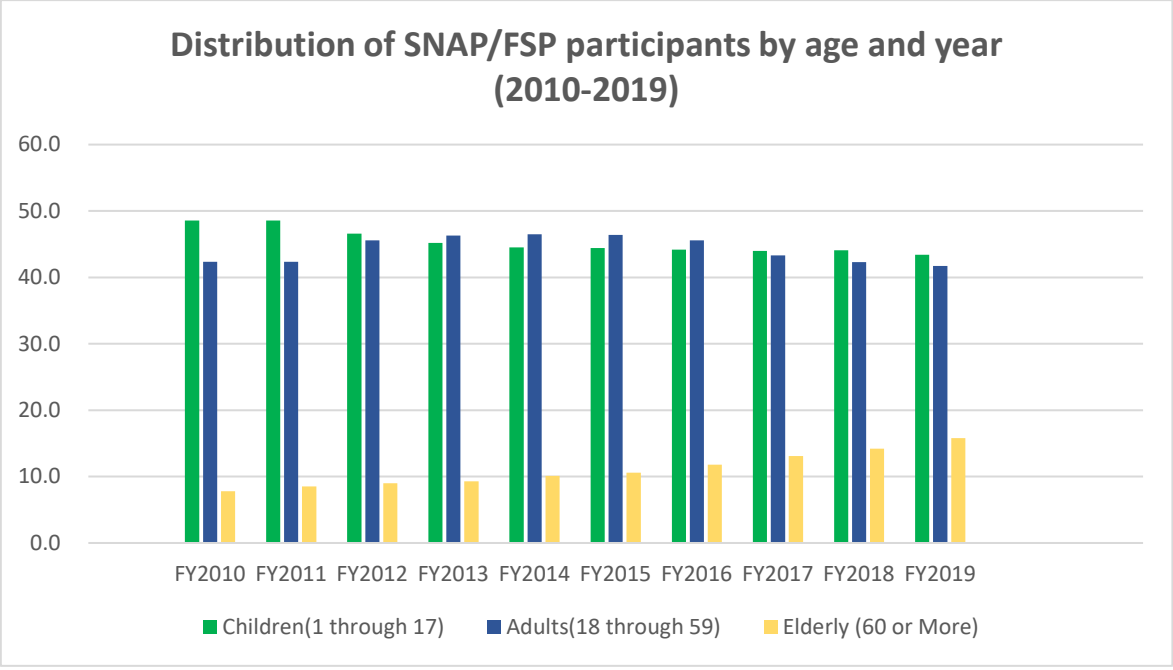

Figure 13. Distribution of SNAP/FSP participants by age and year (2010-2019). Source: USDA Food and Nutrition Service using data from annual reports in the series (2010 -2019). Note: SNAP is the Supplemental Nutrition Assistance Program, and FSP is the Food Stamp Program.

Table 3. Distribution of SNAP/FSP participants by age and year (2010-2019): Label of Figure 11. Source: USDA Food and Nutrition Service using data from annual reports in the series (2010 -2019)

Age	FY2010	FY2011	FY2012	FY2013	FY2014	FY2015	FY2016	FY2017	FY2018	FY2019
Children(1-17)	46.6	45.2	44.5	44.4	44.2	44.0	44.1	43.4	43.5	42.7
Adults(18-59)	45.6	46.3	46.5	46.4	45.6	45.4	44.2	43.3	42.3	41.7
Elderly(60 or more)	7.8	8.5	9.0	9.3	10.1	10.6	11.8	13.1	14.2	15.8

Analyzing the children's SNAP participation by age group, it can be seen that the participation rate (11.7%) of children aged 12 to 17, which corresponds to adolescence, occupies a high proportion **(Figure 14).**

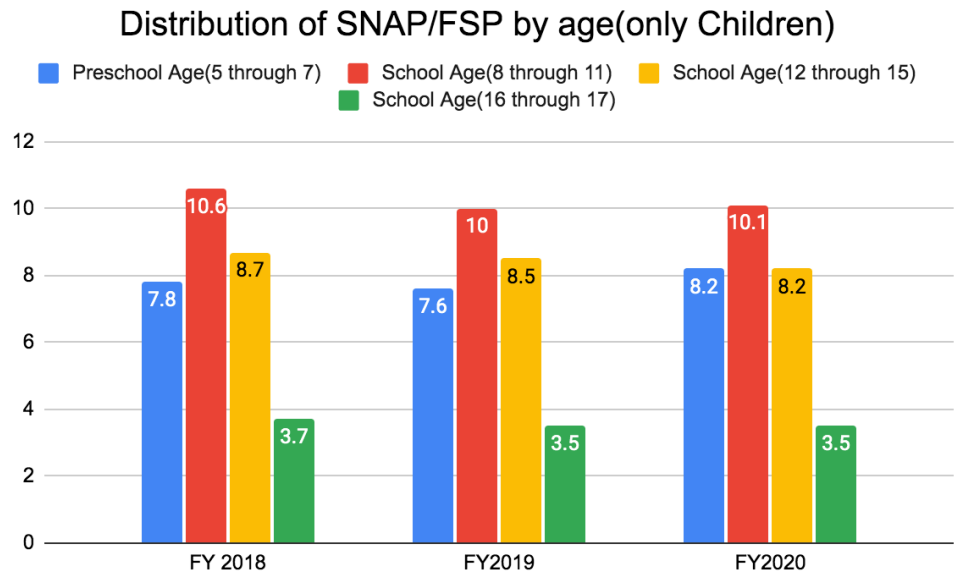

Figure 14. Distribution of SNAP/FSP participants by age (only Children). Source: USDA Food and Nutrition Service using data from annual reports in the series (2010 -2019)

Although children's SNAP participation in 2019 seems to have decreased slightly, this is because the program was suspended due to school closures due to the pandemic. Instead, the budget for the new program has increased significantly. Pandemic-related disruptions to child nutrition programs resulted in 7.9 billion total meals being served across the National School Lunch Program (NSLP), School Breakfast Program (SBP), Child and Adult Care Food Program (CACFP), and Summer Food Service Program (SFSP), down 17 percent from

FY 2019. While meals served through NSLP, SBP, and CACFP declined, the number of meals served through SFSP increased to 1.3 billion, nearly nine times greater than in FY 2019 (USDA 2020).

For teenagers who need to grow for a long time, it was found that SNAP was not satisfactory. Most young people living with their parents must continue to receive benefits in the same SNAP household until they are 22, though generally they can apply on their own once they reach 18 if they are outside of their parent's home (USDA, 2020). SNAP is widely available compared with other benefits, but benefit levels are largely inadequate to meet young people's needs. Studies of pre-pandemic show that SNAP benefits are generally inadequate. Studying Waxman's research suggests that the average cost of a low-cost meal is 27 percent higher than the maximum SNAP benefit level, and the benefits do not cover the cost of such a meal in 99 percent of US continental counties (Waxman et al., 2018). In additional to, the benefit levels do not recognize the significantly higher food consumption levels of adolescents and young adults.

SNAP is more widely accepted than other benefits. SANP is an easy solution for teenagers from food insecure families. However, since the actual food price exceeds the cost provided by SNAP, it is not enough for young people from food insecure families to get adequate nutrition. SNAP participants who struggled to afford healthy foods were more than twice as likely to experience food insecurity. The most recent USDA report said 88% of SNAP participants are facing challenges to a healthy diet. And 61%reported cost of healthy foods as a barrier. (USDA 2021)

I compared the latest consumer price index(CPI: vegetables and beverages) with the national average for SNAP subsidies. Post-pandemic inflation has led to a steep rise in the price index, and SNAP subsidies for youth have increased, but it seems insufficient to buy healthy food **(Figure 15)**.

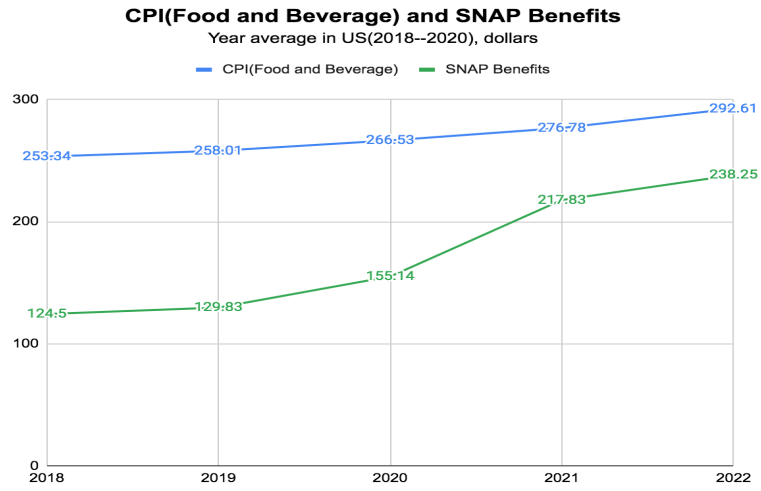

Figure 15. CPI and SNAP benefits: Year Average in U.S(2018-2020), dollars. Source: U.S. Bureau of Labor Statistics (annual CPI average: 2018-2020), U.S. Department of Agriculture: Food and Nutrition Service (national level annual summary: 2018-20200. Note: CPI (Customer Price Index) Food and Beverage National Year Average (Period: January 2018-April 2022), SNAP benefits: National Year Average (Period: January 2018-April 2022)

SNAP has high hopes that it can help resolve food insecurity in the United States. SNAP may be an alternative to solving youth food insecurity, but the reality is different. Children growing up in families with incomes below the poverty line typically fare worse over the long term — in terms of physical and mental health, educational attainment and labor market success, and other outcomes — than children from more affluent families. In order for the poor and hungry youth to gain opportunities, hunger must be fundamentally addressed. Therefore, the amount of food assistant program needs to reflect the reality through the analysis of the actual nutrition and consumption of youth.

<reference>

* SNAP-Supplemental nutrition Assistance Program
* Child Nutrition Program-National School lunch Program
* P-EBT-Pandemic Electronic Benefit Transfer
* WIC-Special Supplement Nutrition Program for Women, Infants, and Children.
* All other programs-nutrition family assistance grants to Puerto Rico, the Northern Marianas, and American Samosa; the Commodity Supplemental Food Programs; the Food Distribution Program on Indian Reservation; the Nutrition Services Incentive Program; the Special Milk Program; Disaster Feeding; The Emergency Food Assistance Program.
* Food Box Program-Famers to Families Food Box Program

Source: USDA ERS(2021)

Limitations

A limitation of this study is that the sample for research was too large to collect data directly, and statistics from government agencies were used for analysis. Most of the data were statistical data made in the same category for a long period of time, and although it was the most reliable data, it was not possible to accurately contain all statistical process (eg, margin of error or standard for collecting samples). I tried to extract the period or category suitable for my research period from among the long-term statistics, and to create the most up-to-date statistical data myself. It is true that COVID-19 acted as a big variable, but in order to examine its impact, it was difficult to determine the exact trend in the short two-year period of 2020 and 2021.

In addition, it is difficult to explain only a few indicators that analyze the impact on food insecurity in the United States. However, I thought that the objectivity of the data would be secured and there would be no confusion in terms by analyzing the indicators appearing in the government's statistical data. However, it may be difficult to see that these factors are sufficient conditions to cause food insecurity in the United States as a whole.

Conclusion

Adolescent food insecurity has been a growing concern since the COVID-19 pandemic began in the United States in 2020. The prevalence of existing food insecurity has been exacerbated by many factors, from economic challenges to lacking public knowledge on the impending circumstances that could be brought upon due to widespread food insecurity. Especially among households with adolescents, the problem is consistently on the rise; adolescents experiencing food insecurity are losing the important nutritional steps in development and are bringing rise to an even greater problem as they head into adulthood encompassed in the same problems caused by food insecurity.

It is critical to realize the many factors that are giving rise to the widespread food insecurity constantly aggravating the social, educational, and economical scene of adolescents and developing children. The factors of low income, health issues, education level, SNAP status, race disparities, and urbanization are all critical to address in the development of a clear cut plan to combat food insecurity, but by realizing the consequences that these factors are having on the youth, it is possible to derive effective solutions that can both enhance the experiences of adolescents growing up in food insecure households, and give rise to a better national health scene, both imperative to the growing economy fueled by the innovative minds of developing adolescents.

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