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Changes in Food Consumption during the COVID-19 Pandemic among School Going Children of Thiruvananthapuram District

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Abstract: ***Key Issues: Covid pandemic had an impact on the Food availability and consumption pattern. Methodology: Two hundred and fifty school going children (10-12 years) were randomly selected from four schools from Trivandrum district. Pre and Post study was conducted in this study for a assessing the changes in the food consumption pattern of school going children before and during pandemic. Results: Compared to before the epidemic, the majority of children's have changed their food consumption pattern. Children had the habit of consuming unhealthy food items like bakery foods, snacks, sugar-sweetened beverages and foods with high sugar were increased during pandemic. The consumption of regular meal pattern, consumption of balanced diet, fruits and vegetables and milk products were decreased during pandemic when compared with before pandemic. Conclusion: Findings of the present study recommends that there is a need to decrease the consumption pattern of unhealthy foods and need to increase the consumption of healthy foods in children. Because the unhealthy consumption pattern of food may cause many health problems in children.***

Keywords: Food consumption pattern, COVID-19 impact

1. Introduction

The corona virus disease 2019 (COVID-19) is a respiratory infection caused by the SARS-COV-II virus that was first identified in Wuhan, China, in December 2019. Since then, it has been widely reported and on March 11, 2020, the World health organization (WHO, 2021) declared it to be a global pandemic (WHO, 2021). Globally, more than 113 million cases and more than 2.5 million fatalities had been reported by February 2021 (WHO, 2021). The COVID-19 problem poses the most serious hazards to children not from the disease itself, but from its side effects include poor nutrition with a risk of being overweight or underweight, screen addiction, lack of education, effects on mental health, social isolation, unhealthy eating habits, unhealthy food consumption pattern (Raman *et al*., 2020). Some families purchased extremely long-life foods that are often ultra – processed and calorie-dense due to the widespread concern at the start of the epidemic. Moreover, the epidemic had socio economic repercussions. Many children increase the consumption of readily available, calorie-dense foods and sugary beverages (Nicola *et al.,* 2020). There is a substantial increase in the unhealthy eating pattern in children (Pietrobelli *et al.,* 2020). Children increased their consumption of processed "comfort foods" such as bakery foods, snakcs during the lockdown (Bracale and Vaccaro, 2020). Food consumption pattern refers to the food combinations that make up a person's typical dietary intake, including daily and longer cycle changes.

In the present research study, an attempt is made to assess the food consumption pattern of school going children during COVID-19 pandemic

2. Materials and Methods

2.1 Location of the study

The present study was conducted in four schools in Trivandrum district.

2.2 Selection of the respondents

250 school going children in the age group of 10-12 years were randomly selected from 4 schools for assessing the food consumption pattern.

3. Conduct the Study

250 children were interviewed using questionnaire to elicit information on the consumption pattern. The consumption pattern of various foods such as, meal, lanced diet, bakery items, snacks, fruits and vegetables, milk products, sugar-sweetened beverages. Foods with high sugar were investigated.

4. Results

Table 1: Food consumption pattern of children

Items	Average intake before pandemic	Average intake during pandemic	Differences	Std. Deviation	t value	p value
Meal pattern	4.6280	3.0760	- 1.552	1.24479	19.714	.000
Bakery items	1.5960	3.6680	2.072	1.459	- 22.441	.000
Snacks	1.7800	4.3720	2.592	1.12365	- 36.473	.000
Fruitsand vegetables	4.4200	3.0400	- 1.38	1.60434	13.600	.000
Balanced diet	4.5040	3.4360	- 1.068	1.38819	12.164	.000
Milk products	2.4240	2.0160	- 0.408	1.19299	5.407	.000
Sugar-sweetened beverages	1.4360	2.7120	1.276	1.209	- 16.68	.000
Foods with high sugar	1.8640	3.4880	1.624	1.210	- 21.218	.000

Results obtained in the study were explained below in various relevant sub headings

4.1 Consumption of regular meal pattern

Consumption of regular meal pattern furnished in the Table 1 indicates that the average intake of before pandemic was 4.6280 and during pandemic are 3.0760. There is significant difference in the food consumption pattern in consuming regular meal pattern before pandemic and during pandemic (t value = 19.714, p value=.000).

4.2 Consumption of Bakery items

From the above table1, the average intake of before pandemic is 1.5960 and during pandemic are 3.6680. There is significant difference in the food consumption pattern in consuming bakery items includes potato chips, banana chips etc. before pandemic and during pandemic (t value=-22.441, p value=.000).

4.3 Consumption of snacks

From the above table 1, the average intake of before pandemic is 1.7800 and during pandemic are 4.3720. There is significant difference in the food consumption pattern in consuming snacks include samosa, puffs, meat roll, cutlet, pizza, burger, noodles before pandemic and during pandemic (t value=-36.473, p value=.000).

4.4 Consumption of fruits and vegetables

From the above table1, the average intake before pandemic is 4.4200 and during pandemic are 3.0400. There is significant difference in the food consumption pattern in consuming fruits and vegetables before pandemic and during pandemic. (t value = 13.600, p value =.000).

4.5 Consumption of balanced diet

From the above table1, the average intake of before pandemic is 4.5040 and during pandemic are 3.4360. There is significant difference in the food consumption pattern in consuming balanced diet include whole wheat, pulses, legumes, egg, nuts, fruits and vegetables before pandemic and during pandemic (t value = 12.164, p value.000).

4.6 Consumption of milk products

From the above table 1, the average intake before pandemic is2.4240 and during pandemic was 2.0160. There is significant difference in the food consumption pattern in consuming milk products which includes curd, buttermilk, cheese, paneer before pandemic and during pandemic (t value=5.407, p value=.000).

4.7 Consumption of sugar-sweetened beverages

From the above table 1, the average intake before pandemic is 1.4360 and during pandemic are 2.7120. There is significant difference in the food consumption pattern in consuming sugar sweetened beverages includes juice, soft drinks, flavored soda before pandemic and during pandemic (t value=-16.68, p value=.000).

4.8 Consumption of foods with high sugar

From the above table 1, the average intake before pandemic is 1.8640 and during pandemic are 3.4880. There is significant difference in the food consumption pattern in consuming foods with high sugar includes cake, sweet, porridges, pastries, sweets, chocolate before pandemic and during pandemic (t value=-21.218, p value=.000).

5. Discussion

Food consumption patterns refer to the food combinations that make up a person's typical dietary intake, including daily and longer cycle changes. The selection and usage of foods are governed by recurrent, consistent decision-making and behavior. Such decision-making and behavior tend to be patterned in relation to certain people. Ramachandran (2013), noted that other evaluations including the assessment of the research population's food consumption pattern will increase the significance of the nutritional assessment value.

The present study resulted that meal consumption pattern of the children before the pandemic was 4.6280 and it decreased to 3.0760 during the pandemic. A study conducted by Jia *et al.*, (2020), indicated that during the COVID-19 lockdown, the consumption of rice, vegetables, fresh fruits, a Balanced diet, and milk products significantly decreased among young participants. Similar results were piloted in the study of Tome *et al.*, (2020). Bennett *et al.*, (2021) found that several studies indicated that meal consumption number was rising. Many studies have revealed higher meal

consumption during the pandemic (Blaszyk *et al.,* 2020; Buckland et al., 2021; Carroll *et al*; 2020). Tian *et al*., (2022) indicate that one year after the lockdown were lifted, rural residents continued to increase their meal consumption pattern. Neira *et al., (*2021) indicate that frequent meal eating is one method of coping with worry and boredom while recovering at home during the COVID-19 pandemic.

Balanced diet that offers all the nutrients that need in the right amounts and in the correct proportions to support good health. It includes fruits, vegetables, cereals, dairy products and protein. It doesn't contain any foods that re either too much or too little (Kathleen, 2010). The present study reveals that before pandemic it was about 4.5040 and it is decreased to 3.4360 in during pandemic. Similar results are piloted in the study conducted by Bennett *et al.,* (2021) which indicates that majority of individuals reported that better felt health compared to pre COVID-19, but about the same percentage also reported that unhealthy eating habits increase over the COVID-19 period. They feel there was an overall change in nutrition intake, consuming un healthy foods, increasing meal time. During the COVID-19 pandemic, maintaining a healthy balanced diet is crucial. Bodies capacity to avoid, fight, and recover from infections can be impacted by the foods and beverages we consume (WHO, 2022). A study conducted by Katherine, (2020) observed that when a rural/urban comparison was made, majority of the studies stated that during the pandemic, the prevalence of food insecurity and inadequate intake of healthy food in rural areas as higher than in urban-dwelling individuals. This demonstrates that persons who live in rural areas have been disproportionately affected by the COVID-19 pandemic

The present study resulted that consumption pattern of bakery item before pandemic was low when compared with during pandemic. Before pandemic it was about 1.5960 and it is increased to 3.6680. Similar results were piloted in the study conducted by (Rundle *et al*., 2020). Another study showed that kids were consuming more bakery foods the before the lockdown, as well as frozen foods like pizza and more sweets, chocolates, cakes biscuits and cupcakes (Ayranci *et al*., 2020). A study conducted by Bracale and Vaccaro, (2020) indicates that there was an increase in the consumption of bakery food during pandemic as significantly greater than the prior year, particularlt a study conducted in turkey and Italy.

According to the findings of the current study, consumption pattern of snacks during pandemic was high (4.3720) when compared to before pandemic (1.7800). Similar results are piloted in the study conducted by Gerritsen et al., (2020). A study conducted by Malta *et al*., (2020) reported that an increase in snacking tendency when compared with pre lockdown period. Another study conducted by Robinson *et al., (*2020) indicates that 32, 7% states an increase in their daily snacking consumption during lockdown. Pujia *et al., (*2021) also indicates that a change in consumption pattern with an increase in consumption of snacks during lockdown period.

The present study resulted that the consumption of fruits and vegetables before pandemic was high (4.4200) when compared with during pandemic (3.0400). Similar results are piloted in the study conducted by (Hirvonen *et al*., 2021). Another study conducted by Pakravan *et al*., (2021) revealed that a decrease in the consumption of fresh fruits and vegetables. Yet another study of Nurual *et al*., (2021) indicates that the average daily intake of fruits and vegetables (0.84 servings) was scaring. For the majority of participants, it was found that their daily intake of fruits and vegetables during the COVID-19 outbreak was less than one serving. Nonetheless, the consumption of fruits and vegetables reveals in this study was significantly lower than another similar studies. Pate *et al*., (2020), also explains that most kids between the ages of 10-12 year don't eat enough fruits or vegetables to match the nutritional guidelines during lockdown period. A study of 820 teenagers from Italy, spain, chile, Colombia and Brazil revealed that COVID-19 confinement significantly affected eating patterns and altered consumption of fruits and vegetables (Ruiz *et al*., 2020). Although it is frequently noted that people between the ages of 10-12 are the most at risk for eating too few fruits and vegetables (BIRDEM, 2013). When comparing the consumption pattern of fruits and vegetables between urban and rural, rural population was consuming more fruits and vegetables when compared to urban area during pandemic. A study conducted by Sadia *et al*., (2021) reported that less the recommended five servings of fruits and vegetables per day are consumed by 92% of respondents in rural regions and 75% of respondents in urban areas.

According to the findings of the present study, milk products consumption pattern among school going children before pandemic was high (2.4240). During pandemic it was decreased to 2.0160. Urban area children had higher percentage of consuming milk products in before and during pandemic. A study conducted by Kant and Graubard, (2020) reported that the children consumed fewer dairy products like curd, bueetmilk, cheese, paneer during pandemic.

Consumption of sugar sweetened beverages increased during pandemic. Before pandemic it was about 1.4360 and during pandemic it is increased to 2.7120. A study conducted by Snuggs and Gregor, (2021) in the UK examined that lockdown meant more junk and take-out food for some families and had bad dietary choices. The results also indicated that the parents said that their children ate more sugar sweetened beverages during lock down. Another study conducted by Khlood *et al*., (2022) reported that kids ate more sugar sweetened beverages during lockdown claimed that because kids were typically at home during lockdown, Sugar sweetened beverages were easier to get by. Some parents observed that while the drink was readily available, their child did not ask for it, allowing them to drink more regularly. The study by Zup *et al*., (2020) also quoted that COVID-19 pandemic reflect shifts towards increased intake of sweetened beverages as well as processed foods with heavy salt and sugar. WHO, 2019 also suggests that reduce the consumption of sodas, soft drinks and other sugary beverages like fruit juices, fruit juice concentrates and syrups, flavored milk and yoghurt drinks.

The present study resulted that consumption of foods with high sugar before pandemic was low (1.4360). During pandemic the consumption was high, it about 3.4880.

Similar results are piloted in the study conducted by Ruiz *et al*., (2020). It showed that the intake of high sugar content food consumption increased significantly during COVID-19 pandemic lockdown. Another study conducted by Ruiz *et al*., (2020) reported that people are eating more comfort foods with a lot of sugar, such as chocolate, cake, sweets during lock down. Another important factor that reported in a study of (Yilmaz and Gokmen, 2020) was screen time during COVID-19 can be stressful, which causes participants to overeat, especially "comfort foods" that are high in sugar. A study conducted by Cathy, (2020), reported that consistently consuming too much sugar harm the health and increases the risk of developing more severe form of COVID-19. WHO (2019), suggests that avoid foods that are rich in sugar. Instead of sweet foods like cookies, cake and chocolate, choose fresh fruits.

There is a significant difference in the overall food consumption pattern before and during the pandemic. Consumption of regular meal patterns (t value =19.714, p value=.000), balanced diet (t value= 12.164, p value=.000), fruits and vegetables (t value = 13.600, p value=.000), and milk products (t value = 5.407, p value =.000) was decreased and bakery items (t value=-22.441, p value =.000), snacks (t value=-36.473, p value=.000), sugar-sweetened beverages (t value =-16.68, p value=.000), and food with high sugar (t value =-21.218, p value=.000) increased. Studies across the globe have shown that the overall food consumption has drastically changed in the school going children. Similar results are piloted in the study conducted by Carroll *et al*., (2020); Fore *et al*., (2020); Lim *et al., (*2020); Guan *et al*., (2020).

6. Conclusion

Food consumption pattern of the school going children were assessed through the collection of details on the food consumption pattern of having different food items and meal pattern. Majority of the children follow unhealthy food pattern like consumption of bakery items, snacks, sugar-sweetened beverages and foods with high sugar during pandemic and regular meal pattern, balanced diet, consumption of fruits and vegetables, milk products were decreased during pandemic. Findings of the present study recommend that there is a need to decrease the consumption pattern of unhealthy foods and need to increase the consumption of healthy foods in children. Because the unhealthy consumption pattern of food may cause many health problems in children**.**

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