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A Comparative Study on Change in Consumption Patterns of Essential Food Items during Pre and post-Covid Periods

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ABSTRACT: After the outbreak of the pandemic, people had undergone severe lockdowns under two phases for over two months. As a result, the general public was forced to change their consumption habits in response to the situation. There have been significant changes in the consumption of essential food items, which are the basic commodities required for survival. To assess these changes, a structured questionnaire was administered to 200 respondents, 100 from rural areas and 100 from urban areas, using a multi-stage sampling technique. According to the findings of this study, people's food consumption habits have changed as a result of price increases, accessibility, preference, and nutrition, with respondents in rural areas reporting an increase in consumption of milk, chicken, fresh fruits, dry fruits, and green leafy vegetables based on their perception as healthy foods and availability. Urban respondents reported an increase in milk, chicken, citrus fruits, and vegetable consumption, but a decrease in rice consumption due to physical inactivity and a decrease in green leafy vegetable consumption due to a lack of availability. Despite the change in consumption of these foods, normal consumption of other essential food items was observed with less significant changes when compared to pre-Covid time. The survey was a little difficult to conduct because respondents had difficulty remembering the quantities consumed in 2019 and 2020. It was a bit challenging to conduct the survey as respondents found it difficult in memorizing the quantities of foods consumed during 2019 and 2020.

Keywords: Consumption pattern, Essential food items, Covid-19, Dietary habits.

INTRODUCTION

Covid-19 posed a significant risk to global public health and the global economy. Countries around the world took appropriate measures to contain the virus, such as closing borders, home confinement, quarantine, and social distancing. Despite the obvious benefits to people's health and safety, these measures have had a significant impact on lifestyle and food consumption behaviour.

During the implementation of the home confinement policy, people were severely panicked about infection and turned to all the possible sources of information to search for the contagious fatal infection and its precautionary measures. Added to this was the government machinery & messaging applications that had added to home remedies & methods to improve immunity. Having a balanced and healthy diet routine can help in boosting the human body's immune system, which is essential in fighting viruses. Healthy diets can protect the community from an excessive inflammatory response to coronavirus, according to the World Health Organization (WHO).

Due to the lack of movement and transportation, there is food insecurity, which resulted in the non-availability of food items in the initial phases of the lockdown, leading to in a rise in the price of food products which eventually increased the expenditure of the public.

Despite the increase in food prices, people in some regions preferred fresh foods with health benefits (vegetables, fruits, milk, and meat products) and preferred to eat home-cooked meals with a balanced diet because there was a lot of free time during the lockdown. As a result, consumption of essential food commodities increased when compared to the pre-lockdown period.

Various comparison studies conducted around the world observed that there were significant changes in food consumption practices and positive cooking-related practices were observed with an increase in intake of fruits, vegetables and fats when compared to pre-Covid consumption (Murphy *et al*., 2021).

Gonzalez-Monroy *et al.* (2021) findings reported that modified eating behaviours were characterized by an increased snack frequency and a preference for sweets and ultra-processed food rather than fruits, vegetables,

and fresh food. Increased alcohol consumption has also been found to be associated with a decrease in adherence to healthy diets.

Vadlapatla (2021) conducted a research study on the changes in eating patterns caused by Covid-19, and he reported that there was an increase in rice consumption in rural areas (3-15%) and urban areas (4-10%). Pulse consumption has decreased in rural areas while increasing (17%) in urban areas. It was also discovered that respondents in cities consumed more sugar (33%) and tea (24%). In light of this, a study was carried out in Telangana state to map changes in food consumption at the household level and to assess the percentage change in the consumption of essential food items.

Skotnicka *et al.* (2021) investigated the changes in dietary habits during Covid-19. The study's findings revealed a decrease in overall shopping frequency, followed by an increase in online shopping. The findings also revealed an increase in the consumption of food items such as dairy, grains, fats, vegetables, and sweets. A rise in the purchase of frozen foods and foods with a longer shelf-life period was also observed.

Janssen *et al*. (2021) analysed the change in consumption that occurred during the outbreak through their study on "change in food consumption during the Covid-19 pandemic". A cross-sectional online survey was conducted to collect the data among 2680 respondents. The results shown that at least 40 % of respondents changed their consumption frequency when compared to pre-pandemic mainly the highest rate of change was seen in frozen food, canned foods and cookies. It was seen that there was a major reduction in consumption of fresh foods and increase in consumption of foods with longer shelf-life period. The author described the main reason for this change was due to factors that include restrictions, income loss and also some socio-demographic factors.

MATERIALS AND METHODS

An exploratory research study was adopted. By using multi-stage sampling technique, 200 respondents were selected in the state of Telangana state, of which 100 were from rural (Undavelli and Kadukuntla), 100 were urban (Jogulamba Gadwal and Wanaparthy). The required data regarding the quantities of essential food items consumed were collected by incorporating a structured questionnaire and an interview schedule.

RESULTS AND DISCUSSION

The intended results regarding the quantities of essential foods consumed and the percentage changes occurred over lockdown period were discussed in following tables:

Table 1: Distribution of quantities of cereals and pulses consumed.

		Rural						Urban					
Sr. No.	**Food items**	**2019 (Kg/Gm/Lt)**			**2020 (Kg/Gm/Lt)**			**2019 (Kg/Gm/Lt)**			**2020 (Kg/Gm/Lt)**		
	Cereals and pulses	Min	Max	**Mean**	Min	Max	**Mean**	Min	Max	**Mean**	Min	Max	**Mean**
1.	Rice	5	60	22.28	5	60	23.24	5	60	21.97	6	60	21.83
2.	Wheat	1	30	2.5	2	15	1.85	1	10	2.46	2	10	2.47
3.	Atta	2	15	4.20	1	20	4.78	1	15	4.13	1	10	4.23
4.	Gram dhal	1	10	1.03	0.5	10	0.77	0.5	15	1.14	0.5	10	1.12
5.	Arhar dhal	0.5	8	2.53	0.5	6	2.41	0.5	8	2.17	2	6	2.27
6.	Urad dhal	0.5	3	0.9	0.5	4	1.19	0.5	2	0.97	0.5	4	1.06
7.	Moong dhal	0.5	2	0.26	0.5	2	0.25	0.5	1	0.13	0.5	2	.15

Table 2: Percentage change in consumption of cereals and pulses.

	Rural	**Urban**
Cereals and pulses	**% Change from 2019-2020**	**% Change from 2019-2020**
Rice	4.3	-0.64
Wheat	-26.0	0.41
Atta	13.8	2.42
Gram dhal	-25.2	-1.75
Arhar dhal	-4.7	4.61
Urad dhal	32.2	9.28
Moong dhal	-3.8	15.3

From Table 1 and 2 it can be observed that in rural area, the highest percentage increase was observed in urad dhal (32.2%) with an average consumption of 0.9 kg in 2019 and 1.19 kg in 2020 followed by atta (13.8%) with 4.28 kgs and 4.78 kgs of average consumption in 2019 and 2020 respectively and a negligible proportion of increase was observed in rice (4.3%) and its average consumption more or less same in 2019 (22.28 kgs) and 2020 (23.24). However, a decrease in consumption was observed in wheat (-26%) with a reduction in average consumption from 2.5 kgs in 2019 to 1.85 kgs in 2020 followed by gram dhal (-25.2%), arhar dhal (-4.7%) and moong dhal (-3.8%) whose average consumption was more or less same in 2019 and 2020.

In urban, the highest increase in the percentage of consumption was observed in moong dhal (15.3%) with an average consumption of 0.13 kg and 0.15 kg in 2019 and 2020 (pre and during Covid). Urad dhal has also shown an increase of 9.28 percent in consumption during lockdown with an average of 0.97 kg in 2019 and 1.06 kg in 2020. About 4.6 percent of increase was observed in arhar dhal with consumption of 2.17 kgs in 2019 and 2.27 kgs in 2020. However, a decrease in the trend of consumption was observed in rice (-0.64%)

with 21.97 kgs and 21.93 kgs in 2020 and gram dhal (-1.75%) with average consumption reducing from 1.14 kg in 2019 to 1.12 in 2020 *i.e*., during the first phase of lock-down. Respondents have reportedly said that they have decreased the consumption of rice during lockdown as they felt that eating rice in two meals may cause obesity and diabetes due to physical inactivity. In a similar research Schmidt *et al.* (2021) discovered a 20% decrease in urban rice consumption and a 17% decrease in rural rice consumption.

Table 3: Distribution of quantities of milk and meat consumed.

		Rural						Urban					
Sr. No.	Food items	2019 (Kg/Gm/Lt)			2020 (Kg/Gm/Lt)			2019 (Kg/Gm/Lt)			2020 (Kg/Gm/Lt)		
	Milk and meat	Min	Max	Mean	Min	Max	Mean	Min	Max	Mean	Min	Max	Mean
1.	Milk	7	90	20.48	7	90	25.49	5	45	20.13	5	60	23.93
2.	Chicken	1	10	3.00	1	16	4.07	1	10	2.71	1	10	3.72
3.	Eggs	0.5	15	2.45	1	20	3.24	0.5	15	2.44	1	10	3.21

Table 4: Percentage change in consumption of milk and meat.

	Rural	Urban
	% Change from 2019-2020	% Change from 2019-2020
Milk	24.5	18.88
Chicken	35.7	37.27
Eggs	32.2	31.56

Table 3 depicts the results regarding the quantities of milk and meat consumed by respondents during the lockdown, where the average consumption of milk was observed to be 20.48 litres in 2019 and 25.49 litres in 2020 followed by chicken which recorded an average consumption was 3 kgs and 4.07 kgs in 2019 and 2020 respectively and more or less an equal quantity of consumption was observed in eggs with an average of 2.45 dozen and 3.24 dozen in pre and during Covid *i.e*., 2019 and 2020.

With regard to the urban area, the average consumption of milk was 20.13 lites and 23.93 litres (pre and during Covid), nearly 2.71 kgs and 3.72 kgs of average consumption was noted in chicken and an almost equal quantity of consumption was recorded in eggs *i.e*., 2.44 dozen 2019 and 3.21 dozen in 2020.

Whereas from table 1.4 it is observed that more or less an equal percent of change in consumption was observed in chicken in both rural (35.7%) and urban areas (37.27%) followed by eggs which showed a 32.2 percent increase in rural and 31.56 in urban area. About 24.5 percent of the increase in consumption in rural and 18.88 percent in urban was observed in milk. Research conducted by Sato *et al.* (2021) suggested an increase in the consumption of dairy products during the pandemic.

Table 5: Distribution of quantities of fruits consumed.

		Rural						Urban					
Sr. No.	Food items	2019 (Kg/Gm/Lt)			2020 (Kg/Gm/Lt)			2019 (Kg/Gm/Lt)			2020 (Kg/Gm/Lt)		
	Fruits	Min	Max	Mean	Min	Max	Mean	Min	Max	Mean	Min	Max	Mean
1.	Banana	0.5	5	1.10	0.5	10	1.46	0.5	5	1.13	0.5	10	1.58
2.	Guava	0.5	3	0.47	0.5	4	0.62	0.5	2	0.48	0.5	3	0.73
3.	Apple	0.5	3	0.75	0.5	5	1.08	0.5	3	0.77	0.5	3	0.88
4.	Grapes	0.5	1	0.29	0.5	20	0.49	0.5	10	0.57	0.5	20.0	0.61
5.	Dry fruits	0.25	1	0.34	0.5	5	0.58	0.1	1.0	0.35	0.1	4	0.63
6.	Papaya	1	4	0.12	1	6	0.15	1	1	0.14	1	2	0.20
7.	Oranges	0.5	3	0.58	0.5	6	0.73	0.5	3	0.64	0.5	5	0.87

Table 6: Percentage change in consumption of fruits.

	Rural	Urban
Fruits	% Change from 2019-2020	% Change from 2019-2020
Banana	32.7	39.82
Guava	31.9	52.08
Apple	44.0	14.29
Grapes	71.9	35.96
Dry fruits	70.6	76.47
Papaya	25.0	42.86
Oranges	25.9	35.94

From Tables 5 and 6, it is evident that in rural area, the average banana consumption was 1.10 dozen in 2019 and 1.46 in 2020 which constitutes for 32.7 percent increase in quantity consumption over lockdown. Apple showed an average consumption of 0.75 dozen and 1.08 dozen in 2019 and 2020 respectively with a 44 percent increase in consumption, whereas, the orange consumption averaged 0.58 kg in 2019 and 0.73 kg in 2020. More or less an equal quantity of consumption was observed in guava and dry fruits.

The change in urban consumption pattern revealed that during the pandemic, dry fruits showed the highest increase in consumption (76.47%) with an average of 0.35 kg (pre-Covid) and 0.63 kg (during Covid), while guava consumption increased by more than half a percent with an average of 0.48 kg and 0.73 kg in 2019 and 2020. Bananas (39.82%), grapes (35.96%), and oranges (35.94%) all saw a similar percentage increase in consumption. A similar trend was also observed in research conducted by Wang *et al.* (2021), which showed an increase in the consumption of fruits, vegetables and sugary beverages during the pandemic.

Table 7: Distribution of quantities of vegetables consumed.

		Rural						Urban					
Sr. No.	Food items	2019 (Kg/Gm/Lt)			2020 (Kg/Gm/Lt)			2019 (Kg/Gm/Lt)			2020 (Kg/Gm/Lt)		
	Vegetables	Min	Max	Mean	Min	Max	Mean	Min	Max	Mean	Min	Max	Mean
1.	Potato	1	5	1.29	1	5	1.35	0.5	2	.74	0.5	4	.78
2.	Onion	1	15	4.64	2	20	4.68	0.5	10	4.01	0.5	67	4.66
3.	Tomato	2	15	4.39	2	20	4.26	2	10	4.10	1	10	3.87
4.	Carrot	0.5	5	0.38	1	10	.47	0.5	6.0	.74	0.5	6.0	.945
5.	Brinjal	1	10	1.82	1	20	1.73	0.5	7	1.52	0.5	6	1.57
6.	Ladies finger	0.5	10	1.47	1	10	1.66	0.5	4	1.11	0.5	4	1.29
7.	Beans	0.5	4	0.27	0.5	5	.35	0.5	2	.28	0.5	3	0.29
8.	Green leafy vegetables	1	10	2.49	1	30	2.68	1	10	1.83	1	10	1.62

Table 8: Percentage change in consumption of fruits.

	Rural	Urban
Vegetables	% Change from 2019-2020	% Change from 2019-2020
Potato	4.7	5.41
Onion	0.9	16.21
Tomato	-3.0	-5.61
Carrot	23.7	27.70
Brinjal	-4.9	3.29
Ladies finger	12.9	16.22
Beans	29.6	3.57
Green leafy vegetables	7.6	-11.48

The data in Table 7 reveals the information about the consumption of vegetables in rural and urban areas. It is evident from Tables 7 and 8 that in rural area, the average consumption of all vegetables had shown an increase except for brinjal. The highest increase in consumption over lockdown was observed in beans with an average consumption of 0.27 kg and 0.35 kg in 2019 and 2020 followed by carrots (23.7%) with an average consumption of 0.38 kg and 0.47 kg during pre and lockdown period, about 12.9 percent increase of consumption was observed in lady's finger which recorded an average consumption of 1.47 kg and 1.66 kg in 2019 and 2020 respectively. However, the present study recorded a decrease in consumption of brinjal (-4.9%) where average consumption reduced from 1.82 in 2019 to 1.73 in 2020 followed by tomato (-3%).

Whereas the data in the urban area reports that except for green leafy vegetables and tomatoes, all other vegetables have recorded an increase in consumption during the pandemic. The highest increase in consumption was observed in carrots (27.7%) with an average consumption of 0.74 in 2019 and 0.94 in 2020. More or less an equal percentage of increase was observed in onion (16.21%) and ladies' fingers (16.22%). However, the reason for the decrease in the consumption of green leafy vegetables may be due to unavailability in that region. A study conducted by Jordan *et al*. (2021). Revealed that there is no change in the consumption of vegetable intake during the pandemic. however, significant reductions in diversity were detected within all vegetable groups.

Table 9: Distribution of quantities of fats and sugars consumed.

		Rural						Urban					
Sr. No.	Food items	2019 (Kg/Gm/Lt)			2020 (Kg/Gm/Lt)			2019 (Kg/Gm/Lt)			2020 (Kg/Gm/Lt)		
	Fats and sugars	Min	Max	Mean	Min	Max	Mean	Min	Max	Mean	Min	Max	Mean
1.	Sun flower oil	2	15	3.12	2	15	3.30	2	15	3.05	2	15	3.09
2.	Palm oil	1	7	0.69	1	7	.73	2	5	.25	3	6	.28
3.	Ground nut oil	0	0	0.00	0	0	.00	2	5	.32	2	5	.32
4.	Sugar	0.5	8	1.57	0.5	10	1.53	0.5	5	1.13	1	5	1.15
5.	Jaggery	0.5	4	0.50	0.5	4	0.51	1	1	0.01	1	1	0.01

Table 10: Percentage change in consumption of fats and sugars.

Fats and sugars	Rural	Urban
	% Change from 2019-2020	% Change from 2019-2020
Sun flower oil	5.8	1.31
Palm oil	5.8	12.0
Ground nut oil	0.0	0.0
Sugar	-2.5	0.88
Jaggery	2.0	0.0

The comparative studies regarding the quantities consumed during 2019 and 2020 were indicated in Table 11 and 12. The results indicate that the average consumption of sunflower oil was 3.12 litres and 3.30 litres in pre and during pandemic. Whereas, palm oil has an average consumption of 0.69 litres in 2019 and 0.73 litres in 2020. However, the average consumption of sugar was 1.57 kgs and 1.53 kgs in 2019 and 2020 respectively, which showed a -2.5 per cent decrease in consumption followed by jaggery increased by 2 per cent with average consumption of 0.50 kg and 0.51 kg in 2019 and 2020 respectively in rural area.

Whereas in urban area, the data regarding the consumption of oil and sugars showed that the average consumption of sunflower oil was 3.05 litres and 3.09 litres in pre and during pandemic, the consumption of

ground nut oil has seen no change with average consumption being equal (0.32 kg) for both 2019 and 2020. The quantity of palm oil consumed was increased by 12 per cent with an average consumption of 0.25 litres in 2019 and 0.28 litres in 2020. However, the average consumption of sugar 1.13 kgs and 1.15 kgs which showed a 0.88 per cent decrease in consumption followed by jaggery, which has same average consumption in both years (0.01 kg).

It was found that, the consumption of ground nut oil was almost zero in rural area. This may be because people in rural area thought that usage of sunflower and palm oil is good for health and also the promotion of those brands has also significant impact on people.

Table 11: Distribution of quantities of spices and condiments consumed.

		Rural						Urban					
Sr. No.	**Food items**	**2019 (Kg/Gm/Lt)**			**2020 (Kg/Gm/Lt)**			**2019 (Kg/Gm/Lt)**			**2020 (Kg/Gm/Lt)**		
	Spices and condiments	**Min**	**Max**	**Mean**	**Min**	**Max**	**Mean**	**Min**	**Max**	**Mean**	**Min**	**Max**	**Mean**
1.	Salt	0.5	4	1.07	0.5	4	1.08	0.5	3	.94	0.5	3	.80
2.	Pepper	0.05	0	0.06	0.2	1	0.10	0.05	0	.06	0.1	1	0.11
3.	Mustard	0.05	.5	.059	0.05	.5	.059	0.05	0	.05	0.05	0	0.05
4.	Chilli powder	1	3	1.27	1	4	1.30	1	3	1.36	1	4	1.34
5.	Turmeric	0.1	0	0.09	0.15	2	.12	0.25	0	.10	0.15	0	0.10

Table 12: Percentage change in consumption of spices and condiments.

Spices and condiments	% Change from 2019-2020	% Change from 2019-2020
Salt	0.9	-14.89
Pepper	66.7	83.33
Mustard	3.0	0.00
Chilli powder	2.4	-1.47
Turmeric	33.3	0.00

The table regarding the consumption of spices and condiments showed that the average consumption of pepper was 0.06 kg and 0.10 kg before and after the lockdown with more than half percent (66.7%) increase in consumption followed by turmeric which recorded more than one-third percent (33.3%) increase in consumption with an average of 0.09 kg in 2019 and 0.12 kg in 2020. A negligible percentage of increase was observed in mustard (3%), chili powder (2.4%) and salt (0.9%).

Whereas in the urban area, the average consumption of pepper was 0.06 kg and 0.11 kg before and after the lockdown with more than half (83.3%) increase in consumption. There is no change in consumption was observed in mustard and turmeric with an average consumption being equal for both years (2019 and (2020). However, items like salt (-14.8%) and chilli powder (-1.47%) observed a decrease with an average of 0.94 kg and 0.80 kg for salt and 1.34 kg and 1.36 kgs for chilli powder in 2019 and 2020 respectively.

CONCLUSION

The present study analyses the changes in the consumption of essential food items that occurred during the lockdown. The results of this study found that people have observed changes in consumption patterns of essential food items during the pandemic. This pattern varied across rural and urban areas as the food availability and people's perceptions were different in the prescribed regions. Based on influential factors like price, accessibility or availability of preferred foods in the respective region and income of the family, people altered their consumption patterns and behaviour. The change in essential food items was observed more in food items like fresh vegetables (roots and tubers, green leafy vegetables), fruits (citrus fruits, dry fruits, grapes), chicken and milk which showed an increase in consumption during Covid in both rural and urban areas. However, some respondents had reported that they had willingly decreased the consumption of foods due to lack of appetite due to infection and also due to physical inactivity during the lockdown period.

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Conflict of Interest. None.

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