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Food intake pattern before and during COVID-19 lock down period

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Abstract
The survey on food intake pattern before and during Covid 19 lock down period revealed that the lock down period given changes in food intake pattern. The consumption of cereals and pulses was almost similar in both the periods. Though almost all types of vegetables and green leafy vegetables consumption was observed during lock down period, slight reduction was observed during lock down period compared to before lock down period. Lock down period carried an increased intake of fruits and water among the respondents. Because covid 19 has widened the peoples thought towards fruits consumption for improving the immunity levels. In both the periods' curd, milk and butter milk and ghee/butter were the major milk and milk products consumed by the majority of the respondents. But a slight increase in consumption of butter milk and ghee / butter as found during lock period. Most of the respondents consumed meat, poultry and fish foods weekly once before lock down period, were shifted to consume it weekly twice, weekly thrice or occasionally during lock down period. No specific spice and condiments was found to be increased in use during lock period as compared to before lock down period. Lock down period caused reduced the consumption of Ready To Eat foods by the majority respondents and no change in use of oils and fats was observed during lock down period as compared to before lock down period. Lockdown period did not affected the expenditure on foods but the expenditure on water was increased, since the most of the people preferred the purified and filtered for consumption during lock down period.

Keywords: Food intake, pattern, COVID-19, before and during lockdown

Introduction

On December 12th 2019, a new coronavirus (SARS-Cov2) emerged in Wuhan, China, sparking a pandemic of acute respiratory syndrome in humans (COVID-19). On the 24th of April 2020, the number of COVID-19 deaths in the world, according to the COVID-Case Tracker by Johns Hopkins University, was 195,313, and the number of COVID-19 confirmed cases was 2,783,512. On the same day lock down was announced by Prime Minister of India (Renzo Di *et al.* 2020) [1].

The COVID-19 pandemic represents a massive impact on human health, causing sudden lifestyle changes, through social distancing and isolation at home, with social and economic consequences. Optimizing public health during this pandemic requires not only knowledge from the medical and biological sciences, but also of all human sciences related to lifestyle, social and behavioral studies, including dietary habits and lifestyle (Renzo Di *et al.* 2020) [1]. A sudden and radical change in the habits and lifestyles of the population has occurred as a result of the COVID 19 with a drastic reduction of any form of socialisation. Physical distancing and isolation have a significant impact on residents lives, particularly on eating habits and everyday behaviours.

At the same time staying at home (which includes digital-education, smart working, and limiting outdoor and in-gym physical activity) and hoarding food owing to supermarket shopping restrictions are the two key effects. Furthermore, the disruption in work routine produced by the quarantine may lead to boredom, which is linked to increased energy consumption. (Moynihan *et al.* 2015) [2]. In addition to boredom, hearing or reading about the COVID-19 from the media on a regular basis can be upsetting. Stress causes people to overeat, especially sugary "comfort foods," which is referred to as "food craving." Yılmaz *et al.* 2020 [3] and Rodríguez-Martín *et al.* 2015) [4].

These foods, which are mostly high in simple carbohydrates, can help to relieve stress by promoting serotonin synthesis, which has a beneficial influence on mood (Ma *et al.* 2017) [5]. Beyond a chronic state of inflammation, which has been shown to increase the risk for more severe COVID-19 complications, this food craving effect of carbohydrates is proportional to the

glycemic index of foods, which is associated with an increased risk of developing obesity and cardiovascular diseases. Wu *et al*. 2020 [6] and Muscogiuri *et al*. 2020) [7]

Materials and Methods
A Google form questionnaire was developed on food intake pattern before and during Covid 19 lock down period contained inquiries related to personal details, food intake pattern, precautions, expenditure pattern etc both before and during lock down period. The Google form questionnaire was pretested before circulating to contact persons. Total 54 members were filled the questionnaire and the data tested for frequencies, percentages using excel software. (Renzo Di *et al*.

2020) [1].

General information
Total 54 respondents were filled the questionnaire out of which 15.1% are males and 84.9% are females. The age of respondents is ranged from 20 years to 54 years. Majority of the respondents aged between 40 to 43 years (48.2%) followed by 37 to 40 years (37.2%), 43 to 46 years (10.5%) and < 24 years (4.6%) respectively. 69.8% of the respondents were married (26.4%) and remaining were unmarried and widow or separated (3.7%). Personal details of respondents are given in Table 1 and fig 1.

Table 1: Personal details of respondents (N=54)

Details	Number	%
Gender		
Males	8	15.1
Females	46	84.9
Age		
40 to 43 years	26	48.2
37 to 40 years	20	37.2
43 to 46 years (10	6	10.5
< 24 years	2	4.6
Marital Status		
Married	38	69.8
Un married	14	26.4
Widow	2	3.7
Residence		
District or state head quarters	30	54.7
Town	18	34
Village	6	11.3
Educational qualification		
Doctorate	12	22.6
Post Graduate	8	15.1
Graduates	34	62.3
Monthly Income		
<Rs. 15000/-	14	26.8
Rs. 15000/- to Rs. 45000/-	26	48.8
≥ Rs.100000 /-	14	25
Family size		
2-3 members	14	26.2
4 members	28	51
≥ 5 members	12	22.8
Food Habits		
Vegetarians	11	20.8
Non-vegetarians	38	69.8
Ova vegetarians	5	9.4

Maximum percentage (54. 7%) of respondents is resided at district or state headquarters followed by 34% of respondents are at town and 11.3% are at villages. The education qualifications of respondents followed as 22.6
% are Doctorate in Agriculture and Allied sciences; 15.1% are Post Graduates and remaining 62.3% are graduates. All the respondents are working in private and government offices as temporary and permanent employees. Monthly income was ranged between 15,000/- to 45,000/- for 48.8% of respondents, ≥ Rs.100000 /- for 25.0% of respondents, and remaining 26.8% respondents are not mentioned their income.

Family size
Around 51% of respondent's families consist of 4 members and 22.8% respondents families consist of ≥ 5 members and remaining respondent's families have 2-3 members.

Food Habits
With respect to food habits 69.8% of respondents are non-

vegetarians followed by 20.8% are vegetarians and remaining 9.4% are ovo - vegetarians.
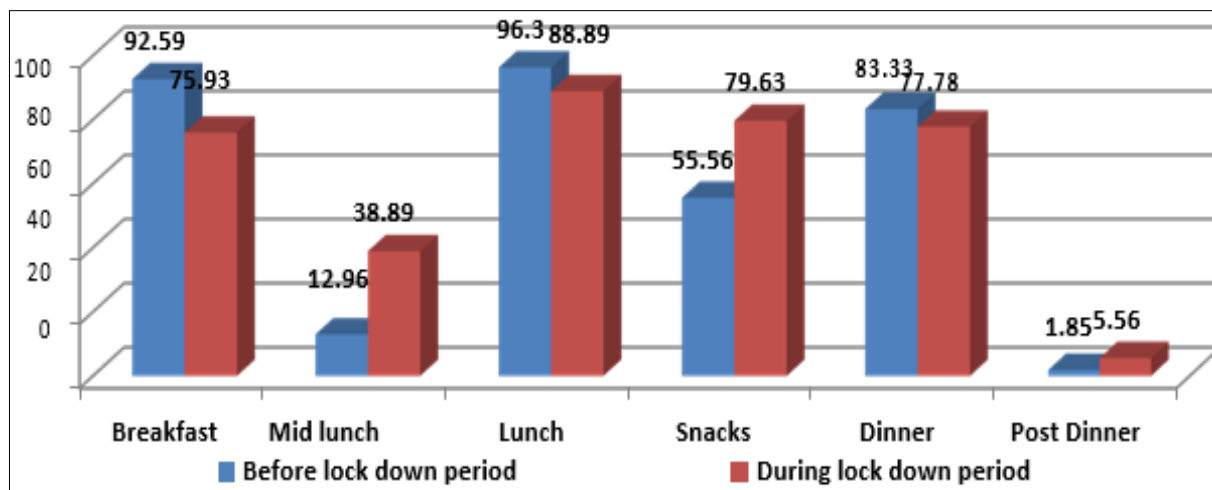
Meal pattern
Table 2 and Fig 2 give the information on meal pattern of respondents before and during lock down period. The meal pattern followed by the respondents before lock down period was Breakfast (92.59%), mid lunch (12.96%), Lunch (96.30%), snacks (55.56%), Dinner (83.33%) and post (1.85%). Lesser percentage of respondents followed meal pattern of mid lunch and post dinner both before and during lock down periods. During lock down period the followers of breakfast, lunch and dinners was reduced to 75.93%, 88.89% and 77.78% respectively as compared to before lock down period. Whereas the mid lunch, snacks and post dinners followers are increased from 12.96% to 38.89%, 55.56% to 79.63% and 1.85% to 5.56% during lock period.

Table 2: Meal pattern of the respondents before and during lock down period (N=54)

Meal pattern	Before lock down period		During lock down period	
	Number	**Percentage**	**Number**	**Percentage**
Breakfast	50	92.59	41	75.93
Mid lunch	7	12.96	21	38.89
Lunch	52	96.30	48	88.89
Snacks	30	55.56	43	79.63
Dinner	45	83.33	42	77.78
Post Dinner	1	1.85	3	5.56
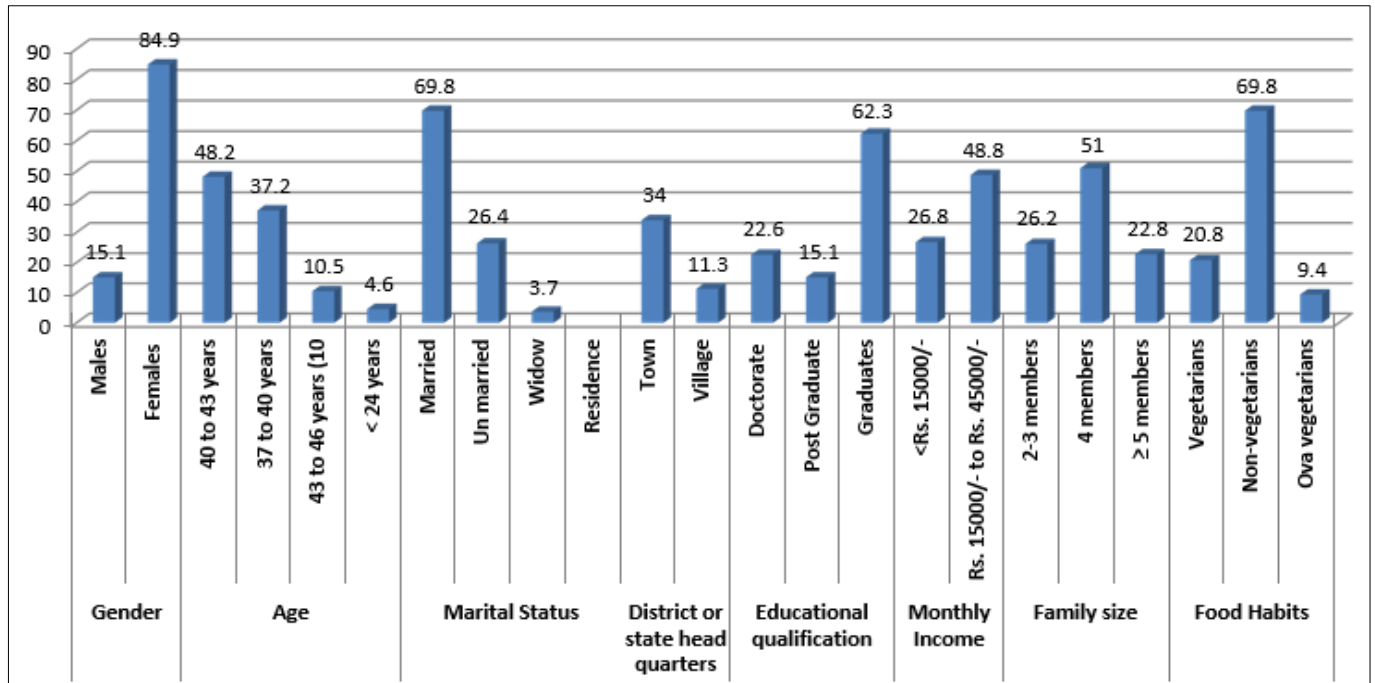
Fig 1: General information of study respondents

Fig 2: Meal pattern of the respondents

Change in food portion size of meals

Majority of the respondents answered that the portion size of food in the meals like breakfast (53.70%), lunch (53.70%) and dinner (40.74%), post dinner (3.7%) is same as before lock down period. While some of the respondents revealed that they increased food portion sizes with more pronounced in mid lunch (22.22%), lunch (33.33%), and snacks (50%) during lock down period when compared with before lock period. However, less percentage of respondents stated that they reduced food portion size especially in breakfast (18.52%) and dinner (22.22%) during lock down period when compared to before lock down period (Table 3 & Fig 3).
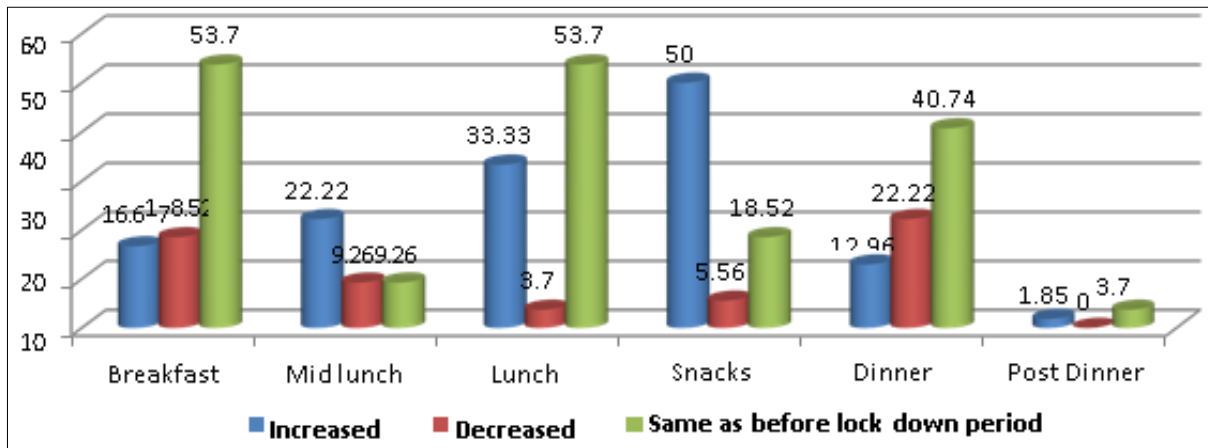
Fig 3: Food portion sizes in each meals of respondents during lock

Table 3: Food portion sizes in each meals of respondents during lock down period (N=54)

Meal pattern	Increased		Decreased		Same as before lock down period	
	Number	Percentage	Number	Percentage	Number	Percentage
Breakfast	9	16.67	10	18.52	29	53.70
Mid lunch	12	22.22	5	9.26	5	9.26
Lunch	18	33.33	2	3.70	29	53.70
Snacks	27	50.00	3	5.56	10	18.52
Dinner	7	12.96	12	22.22	22	40.74
Post Dinner	1	1.85	0	0.00	2	3.70

Table 4: Intake of supplements by the respondents before and during lock down period (N=54)

Intake of Supplements	Before lock down period		During lock down period	
	Number	Percentage	Number	Percentage
Yes	17	31.5	23	42.59
No	42	77.8	34	62.96

Table 5: Reasons for intake of supplements by the respondents before and during lock down period (N=54)

Reasons for supplements	Before lock down period		During lock down period	
	Number	Percentage	Number	Percentage
Doctor prescribed	2	3.70	4	7.41
To Improve immunity levels	6	11.11	7	12.96
To meet daily requirements	7	12.96	6	11.11
Regular habits	2	3.70	0	0.00
To protect from Covid 19	0	0.00	5	9.26
Others	0	0.00	1	1.85

Intake of supplements
The number of respondents taking supplements and type of supplements are presented in Table 4 & 5. The results showed that the habit of taking supplements was not found by the majority of the respondents both before (77.8%) and during lock down period (62.96%). While the intake of supplements was increased (42.59%) during lock down period when compare to before lock down period (31.5%).

The main reasons for taking supplements before lock down and during lock down period mentioned by the respondents are doctor prescription to meet the daily requirements and to improve the immunity levels as well as to protect form Covid-19.

Eating practices
The table 6 represents the eating pattern of the respondents. Before lockdown period most of the respondents (25.93%) was eating alone as well as with family members and eating fruits and vegetables followed by maintaining strict timings for meals, while 20.37% respondents reported rapid eating, followed by skipping of one meal per day(18.52%) and eating healthy diet (18.52%). whereas during lock down period, eating with family members (68.52%), eating favorite items (29.63% and motivated their self and family members to eat to eat fruits and vegetables (37.04%) were selected by high percentage of the respondents (Fig 4). However, eating with family members (68.52%), eating favorite items (31.48%) and eating healthy diet (29.63%) was increased during lockdown period.

Table 6: Eating practices of respondents before and during lock down period (N=54)

Descriptions	Before lock down period	%	During lock period	%
Skip one meal per day	10	18.52	7	12.96
Reported often eating	2	3.70	3	5.56
Rapid eating	11	20.37	2	3.70
Eating until uncomfortably full	2	3.70	3	5.56
Eating alone	14	25.93	1	1.85
Eating with family members	14	25.93	37	68.52
Eating with favorite items	10	18.52	17	31.48
Eating whenever felt hungry	9	16.67	10	18.52
Maintained strict timings for meals	11	20.37	11	20.37
Eating healthy diet	10	18.52	16	29.63
Make you feel guilty not eating a healthy diet	7	12.96	4	7.41
Encouraged yourself and family members to eat fruits and vegetables	14	25.93	20	37.04
Followed special diet for every family member	7	12.96	7	12.96
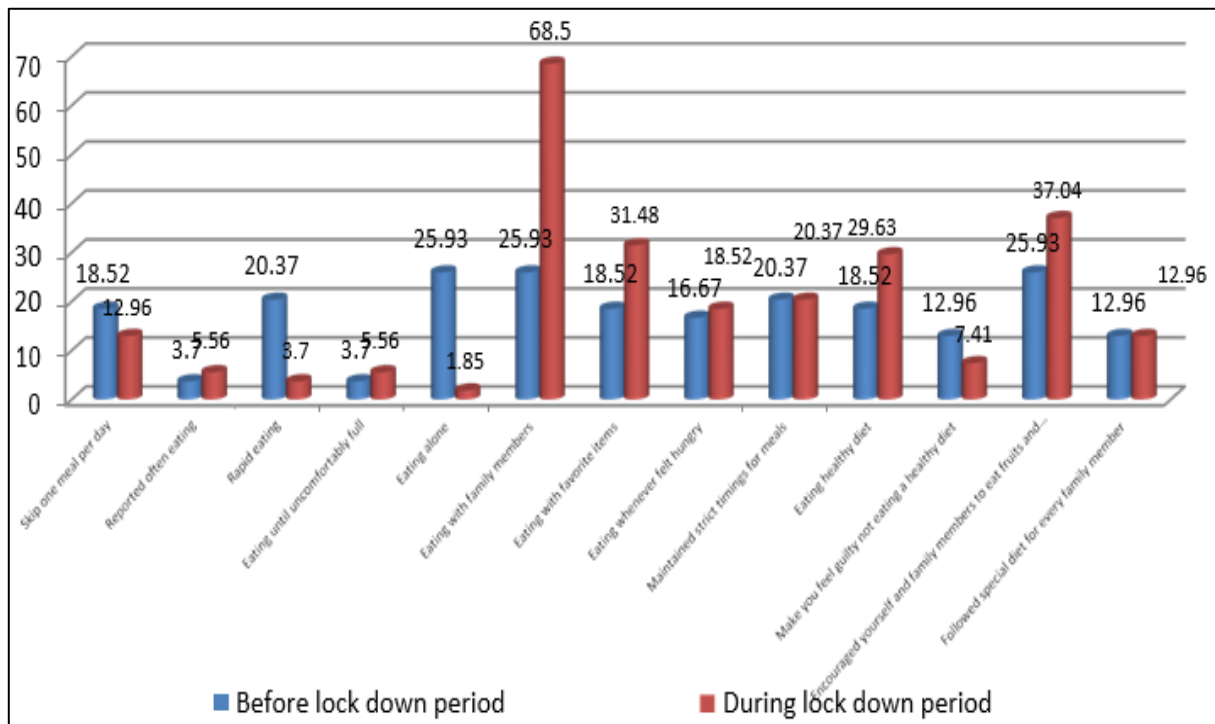
Fig 4: Eating practices of respondents

Frequency of consumption of foods from different food groups
I. Cereals and millets

Table 7: Consumption pattern of cereals and millets (N=54)

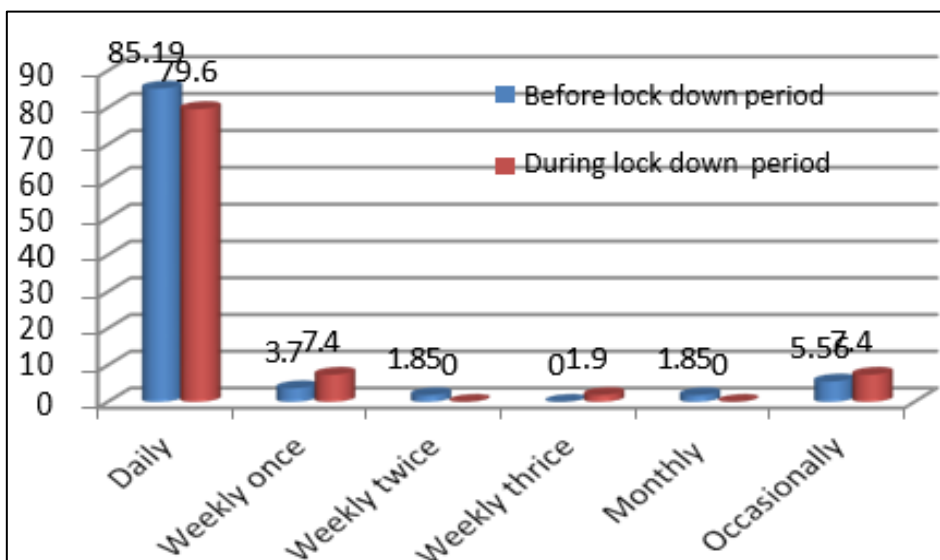| Food Frequency	Before lock down period		During lock down period	
	Number	Percentage	Number	Percentage
Daily	46	85.19	43	79.60
Weekly once	2	3.70	4	7.4
Weekly twice	1	1.85	0	0.0
Weekly thrice	0	0.00	1	1.9
Monthly	1	1.85	0	0.0
Occasionally	3	5.56	4	7.4

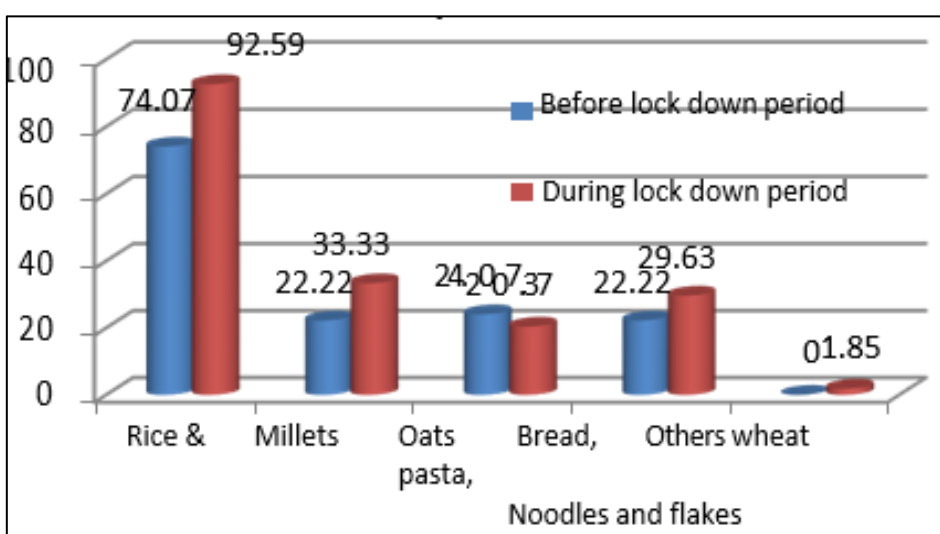**Fig 5:** Consumption pattern of cereals and millets

Fig 6: Type of cereals consumed by respondents

The results of frequency intake of cereals and millets shown that (Table 7 & Fig 5), 85.19% respondents found to be consumed cereals and millets daily before lock down period and that reduced to 79.60% during lock down period. The respondents (3.5%) who found to consume millets weekly once (3.705%) and occasionally (5.56%) were increased during lock down period by 7.4% and 7.4% respectively.

Table 8: Type of cereals consumed by respondents before and during lock down period (N=54)

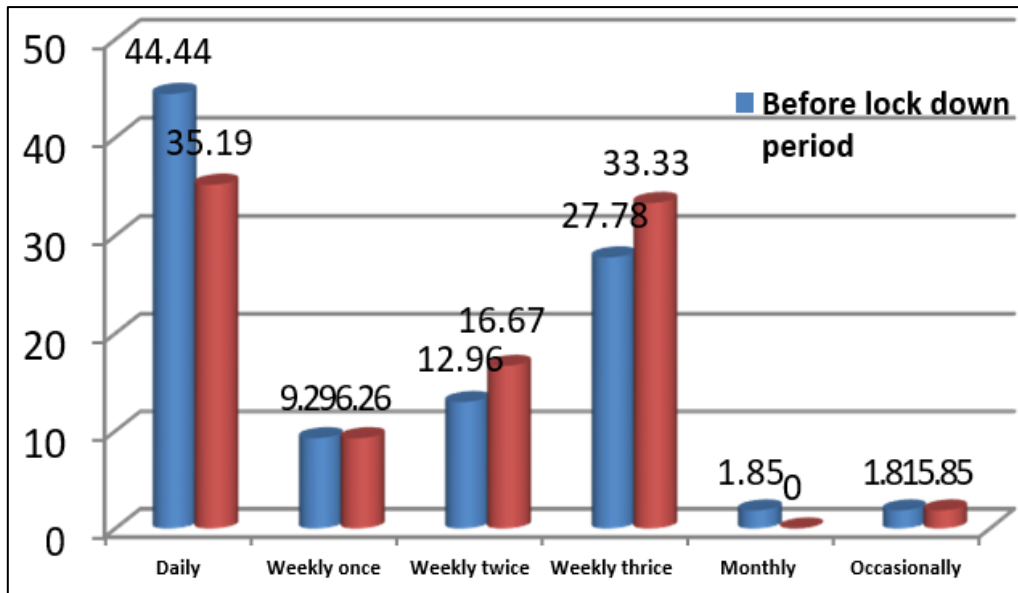| Cereals	Before lock down period		During lock down period	
	Number	**%**	**Number**	**%**
Rice & wheat	40	74.07	50	92.59
Millets	12	22.22	18	33.33
Oats	13	24.07	11	20.37
Bread, pasta, noodles and flakes	12	22.22	16	29.63
Others	0	0.00	1	1.85

In terms of type of cereals consumed by the respondents from Table 8 & Fig 6 revealed that rice and wheat are cereals consumed by majority of the respondents both before and during lock down period. The cereals and wheat consuming group was increased during lock period (92.59%) when compared with before lock down period (74.07%). The respondents consumed foods like millets, bread, pasta, noodles and flakes before lock down period were 22.22%, 22.22% and 0% and found to be increased to 33.33%, 29.63% and 1.85% respectively during lock down period.

II. Legumes and pulses
Frequency of consumption of pulses results (Table 9) revealed that majority of the respondents were found to be pulses consumption was daily (44.44%) followed by weekly thrice (12.96%) before lock down period. Whereas during lock period the respondents reported that daily pulses consumption was reduced from 44.44% to 35.19% and increased at weekly thrice consumption frequency pattern from 12.96% to 16.67%.

Table 9: Consumption pattern of pulses (N=54)

Food frequency	Before lock down period		During lock down period	
	Number	Percentage	Number	Percentage
Daily	24	44.44	19	35.19
Weekly once	5	9.26	5	9.26
Weekly twice	7	12.96	9	16.67
Weekly thrice	15	27.78	18	33.33
Monthly	1	1.85	0	0.00
Occasionally	1	1.85	1	1.85

Fig 7: Consumption pattern of pulses
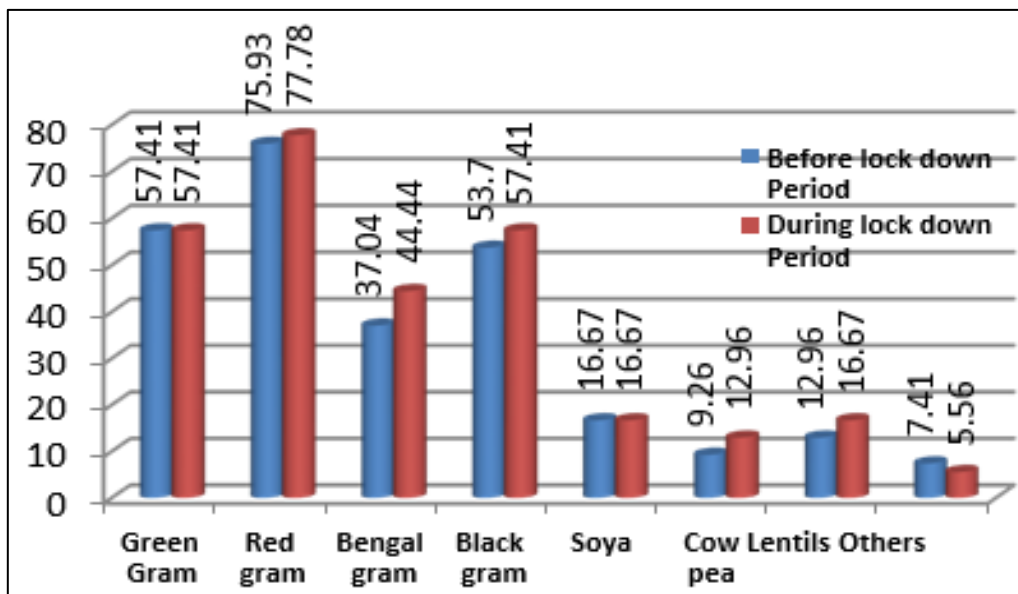
Fig 8: Type of pulses consumed by the respondents

Table 10: Type of pulses consumed by respondents before and during lock down period (N=54)

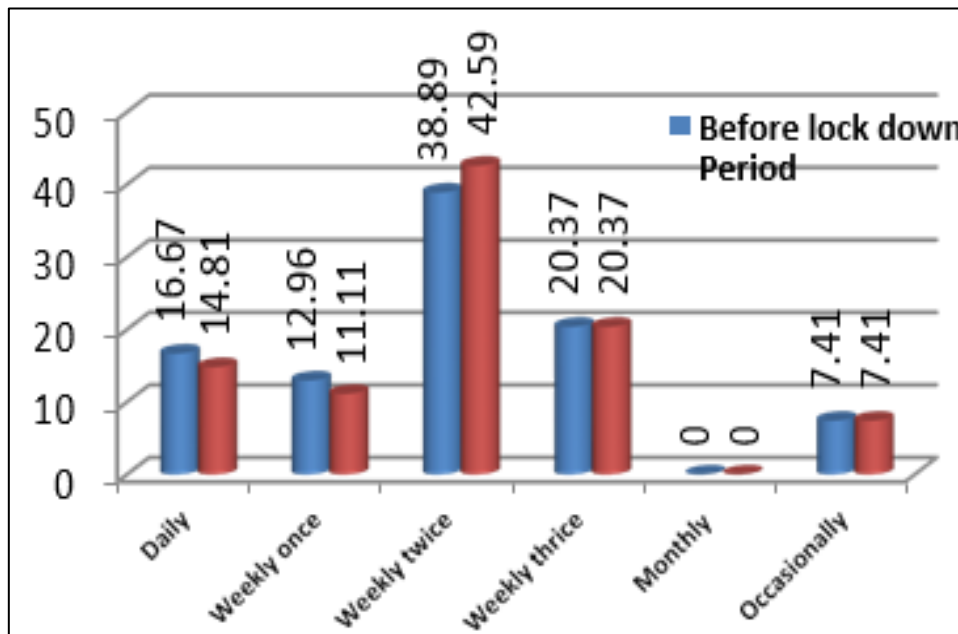| Pulses	Before lock down period		During lock down period	
	Number	Percentage	Number	Percentage
Green gram	31	57.41	31	57.41
Red gram	41	75.93	42	77.78
Bengal gram	20	37.04	24	44.44
Black gram	29	53.70	31	57.41
Soya	9	16.67	9	16.67
Cow pea	5	9.26	7	12.96
Lentils	7	12.96	9	16.67
Others	4	7.41	3	5.56

Before and during lock down periods majorly consumed pulses were Black gram, green gram and red gram dhals. While the consumption pattern of these dhals were increased during lock down period. i.e. red gram dal 75.93% to 77.78%, bengal gram dal 37.04% to 44.44%, black garm dal 53.70 to 57.41, cow pea 9.26% to 12.96% and lentils 12.96% to 16.67%). The results are depicted in Table 10 and Fig 6.
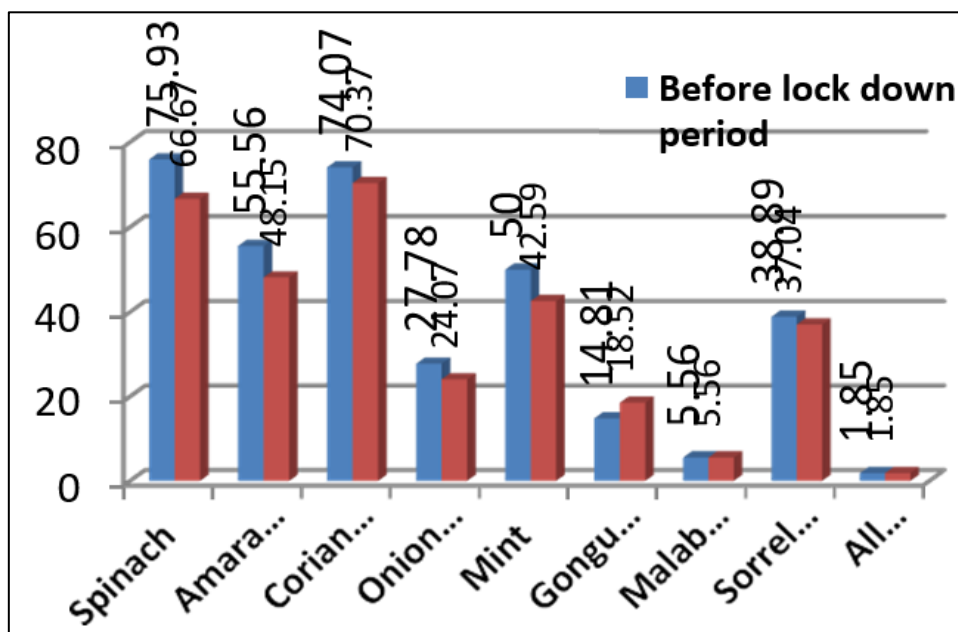
III. Green Leafy Vegetables

The green leafy vegetables consumption frequency was found to be weekly twice by the majority of the respondents both before (38.89%) and during lock down period (42.59%) (Table 11). While the daily and weekly once consumption pattern of green leafy vegetables were reduced from 16.67% to 14.81% and 12.96% to 11.11% respectively, during lock down period.

Table 11: Consumption pattern of green leafy vegetables (N=54)

Food frequency	Before lock down period			During lock down period		
	Number	Percentage	Frequency	Percentage	Number	Frequency
Daily	9	16.67	3	8	14.81	3
Weekly once	7	12.96	4	6	11.11	4
Weekly twice	21	38.89	1	23	42.59	1
Weekly thrice	11	20.37	2	11	20.37	2
Monthly	0	0.00	6	0	0.00	6
Occasionally	4	7.41	5	4	7.41	5

Fig 9: Consumption pattern of green leafy vegetables

Fig 10: Type green leafy vegetable consumed by the respondents

Table 12: Type of green leafy vegetables consumed by respondents before and during lock down period (N=54)

| Green Leafy Vegetables	Before lock down period		During lock down period	
	Number	Percentage	Number	Percentage
Spinach	41	75.93	36	66.67
Amaranths	30	55.56	26	48.15
Coriander	40	74.07	38	70.37
Onion leaves	15	27.78	13	24.07
Mint	27	50.00	23	42.59
Gongura	8	14.81	10	18.52
Malabar leaves	3	5.56	3	5.56
Sorrel leaves	21	38.89	20	37.04
All types	1	1.85	1	1.85

As per the table 12 and fig 10 it revealed that, the type of leafy vegetables consumed majorly by the respondents were Spinach, coriander, amaranth and mint both before and during lock down period. Majority of respondents (75.93% & 66.67%) consuming spinach, followed by Coriander (74.07% & 70.37%), Amaranth (55.56% & 48.15%), mint (50% & 42.59%) and sorrel leaves (38.89% & 37.04%) before and during lock down period. However, the consumption of all green leafy vegetables by the respondents was slightly reduced except gongura compared to before lock period (Table 12 & Fig 10).

IV. Vegetables and Roots & Tubers

Table 13: Consumption pattern of vegetables, roots & tubers (N=54)

Food frequency	Before lock down period		During lock down period	
	Number	Percentage	Percentage	Number
Daily	45	83.33	44	81.48
Weekly once	0	0.00	1	1.85
Weekly twice	1	1.85	0	0.00
Weekly thrice	5	9.26	5	9.26
Monthly	0	0.00	0	0.00
Occasionally	0	0.00	1	1.85
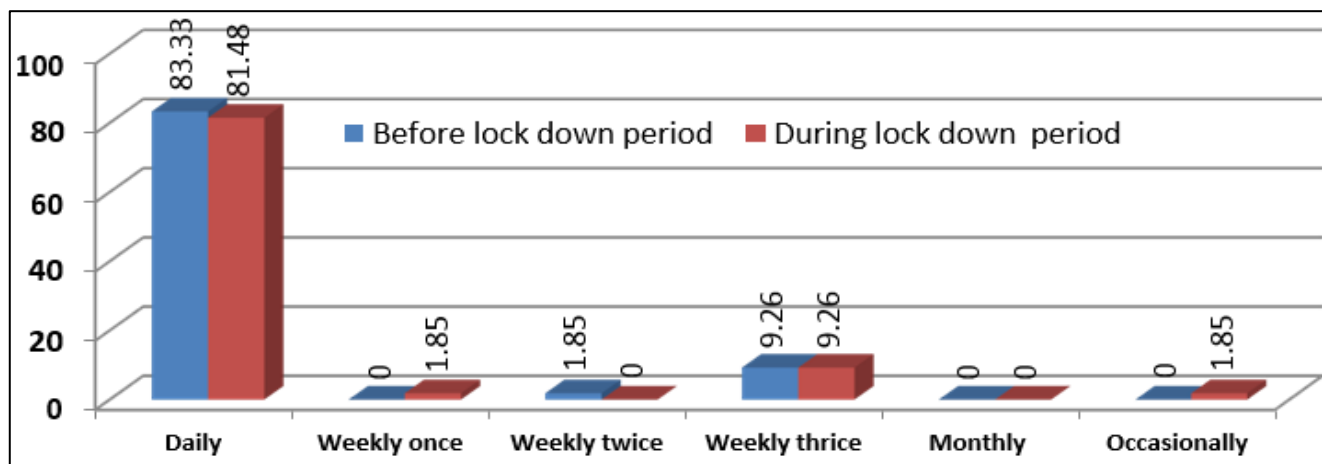
Fig 11: Consumption pattern of vegetables and roots & tuber

The results of frequency and type of consumption of vegetables, roots and tubers are presented in Table 13 & 14. Daily consumption pattern of vegetables was reported by the majority respondents before (83.33%) as well as during (81.485) lock down period. However, daily consumers of vegetables were found to be reduced during lock period. Meager percentage of respondents were observed consume vegetables at weekly once, weekly twice, weekly thrice, monthly and occasionally (Fig 11) both before and during lock down period.
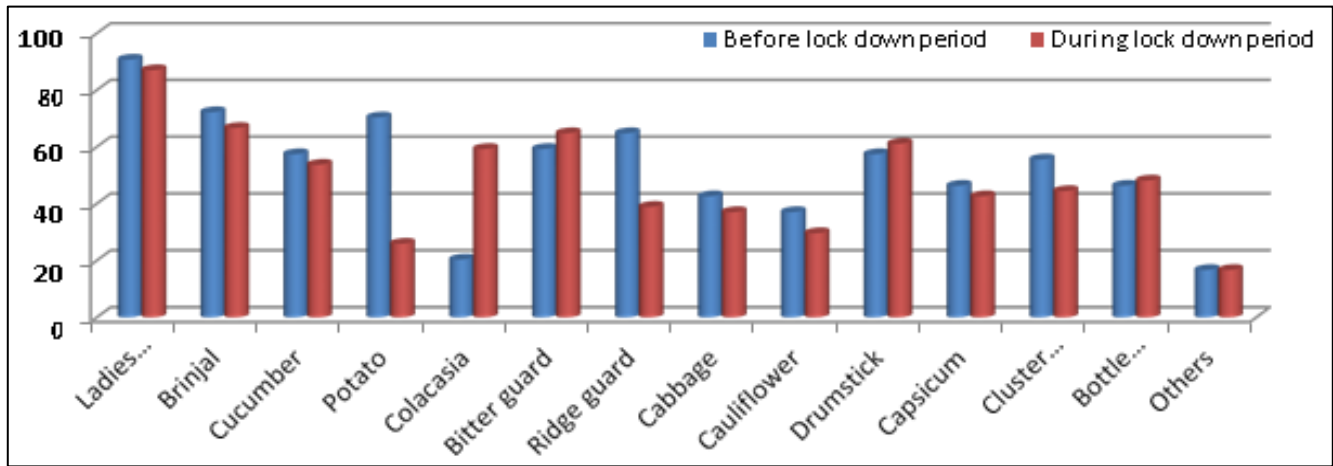
Fig 12: Type vegetables, roots & tubers consumed

Table 14: Type of vegetables consumed by respondents before and during lock down period (N=54)

Vegetables	Before lock down period		During lock down period	
	Number	Percentage	Number	Percentage
Ladies finger	49	90.74	47	87.04
Brinjal	39	72.22	36	66.67
Cucumber	31	57.41	29	53.70
Potato	38	70.37	14	25.93
Colacasia	11	20.37	32	59.26
Bitter guard	32	59.26	35	64.81
Ridge guard	35	64.81	21	38.89
Cabbage	23	42.59	20	37.04
Cauliflower	20	37.04	16	29.63
Drumstick	31	57.41	33	61.11
Capsicum	25	46.30	23	42.59
Cluster beans	30	55.56	24	44.44
Bottle guard	25	46.30	26	48.15
Others	9	16.67	9	16.67

The table 14 clearly indicates that, Majority of the respondents were consuming ladies finger (90.4% & 87.04%), brinjal (72.22% & 66.67%) before during lock down period, whereas ridge gourd (64.81%), followed by bitter gourd (59.26%), drumstick (57.4%), cluster beans (55.56%), bottle gourd (46.30%), capsicum (46.30%) cabbage (42.59%) and other vegetables (16.67%) were consumed before lockdown period (Table 14). However, during lock down period 64.8% respondents revealed that, they were consuming bitter gourd (64.81%) followed by cucumber (53.7%), bottle gourd

(48.15%), cluster beans (44.4%), ridge gourd (38.89%) and cabbage (37.04%). While the consumption of colo cassia was found be highest (59.26%) during lock down period when compare to before lockdown period.

However, the use of all the vegetables by the respondents was reduced during lock down period when compared to before lock down period (Fig 12).

V. Fruits consumption

Table 15: Consumption pattern of fruits (N=54)

Food frequency	Before lock down period		During lock down period	
	Number	Percentage	Percentage	Number
Daily	27	50.00	39	72.22
Weekly once	4	7.41	2	3.70
Weekly twice	6	11.11	5	9.26
Weekly thrice	9	16.67	4	7.41
Monthly	1	1.85	1	1.85
Occasionally	5	9.26	1	1.85

The consumption frequency of fruits results is presented in Table 15 and Fig 13. The results revealed that, the daily consumption pattern of fruits were increased (50% to 72.22%).

Whereas consumption pattern weekly twice (11.1% to 9.26%) and weekly thrice (16.67% to 7.41%) was decreased during lock down period compare to before lock down period.

Table 16: Type of fruits consumed by respondents before and during lock down period (N=54)

Fruits	Before lock down period		During lock down period	
	Number	Percentage	Percentage	Number
Watermelon	38	70.37	48	88.89
Mango	23	42.59	47	87.04
Guava	31	57.41	22	40.74
Grapes	27	50.00	35	64.81
Sweet lime	14	25.93	20	37.04
Muskmelon	17	31.48	22	40.74
Apple	31	57.41	25	46.30
Banana	39	72.22	36	66.67
Papaya	27	50.00	27	50.00
Dates	19	35.19	20	37.04
Others	7	12.96	9	16.67

As per the table 16 it clearly indicates that, the consumption of watermelon was increased 70.37% to 88.89% followed by Mango (42.59% to 87.04%), grapes (50% to 64.81%), muskmelon (31.48% to 40.74%), sweet lime (25.93% to 37.04%), dates (35.19% to 37.04%) and other fruits (12.96% to 16.67%) during lock down period. Whereas the consumption pattern of apples were decreased 57.41% to 46.30% followed by Guava 57.41% to 40.74%. While there was no change was observed in case of papaya both before and during lock down period (Fig 14).
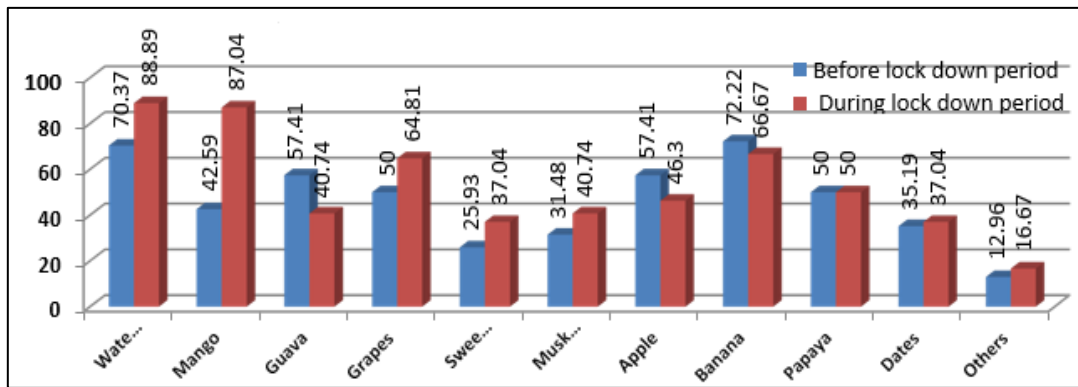
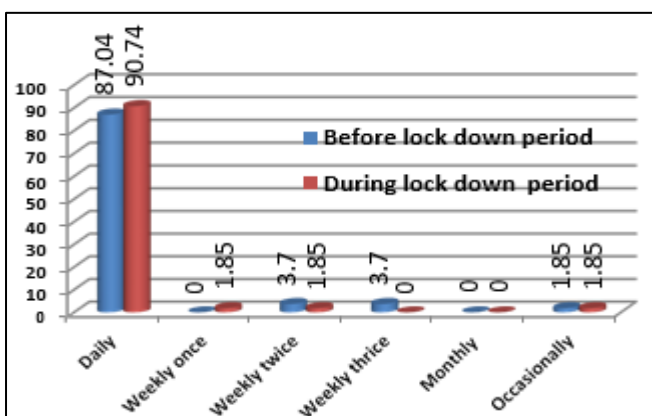**Fig 13:** Type of fruits consumed by respondents

VI. Milk & Milk products

The frequency of consumption of milk and milk products is presented in Table 17. The results revealed that the daily consumption of milks and milk products was found to be increased from 87.04% to 90.74% during lock down period when compare to before lock down period. (Fig 15).

Table 17: Consumption pattern of milk and milk products (N=54)

Food Frequency	Before lock down period		During lock down period	
	Number	Percentage	Percentage	Number
Daily	47	87.04	49	90.74
Weekly once	0	0.00	1	1.85
Weekly twice	2	3.70	1	1.85
Weekly thrice	2	3.70	0	0.00
Monthly	0	0.00	0	0.00
Occasionally	1	1.85	1	1.85

Fig 14: Consumption pattern of milk and milk products
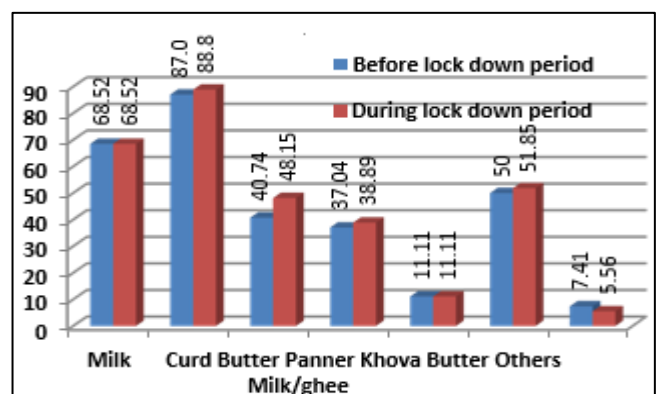
Fig 15: Type of milk and milk products consumed by the respondents

Table 18: Type of milk and milk products consumed by respondents before and during lock down period (N=54)

Milk & Milk products	Before lock down period		During lock down period	
	Number	Percentage	Percentage	Number
Milk	37	68.52	37	68.52
Curd	47	87.04	48	88.89
Butter milk	22	40.74	26	48.15
Panner	20	37.04	21	38.89
Khova	6	11.11	6	11.11
Butter /ghee	27	50.00	28	51.85
Others	31	7.41	3	5.56

Before and during lock down periods highest percentage of respondents were found to consume curd (87.04% -88.89%), followed by milk (68.52%), butter milk (40.74% -48.15%), butter/ghee (50% - 51.85%) and paneeer (37.04% - 38.89%). From table 18 it clearly indicate that, among the milk products buttermilk, paneer, butter and ghee consumption was drastically increased by the respondents during lock down period compared to before lock down period.
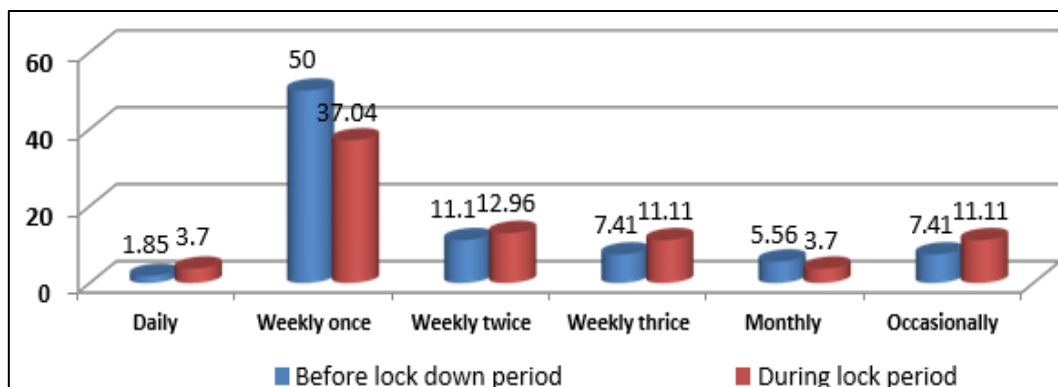
VII. Meat and poultry foods

Table 19: Consumption pattern of meat and poultry foods (N=54)

Food Frequency	Before lock down period		During lock down period	
	Number	Percentage	Percentage	Number
Daily	1	1.85	2	3.70
Weekly once	27	50.00	20	37.04
Weekly twice	6	11.11	7	12.96
Weekly thrice	4	7.41	6	11.11
Monthly	3	5.56	2	3.70
Occasionally	4	7.41	6	11.11

Table 19 and Fig 17 gives information on consumption pattern of meat and poultry foods by the respondents. Majority of the respondents opined that they consumed meat and poultry foods weekly once (50% & 37.04%) during both periods. However, weekly consumption of meat and poultry foods were drastically reduced from before lock down period (50%), to during lock down period (37.04%) (Fig 17). Similarly, an occasional consumption of meat and poultry food group was increased (11.11%) during lock down period compare to before lock down period (7.41%).

All the meat and poultry products were used by the respondents in both periods. However, mutton and fish consumption was slightly reduced during lock down period as compared to before lock down period (Table 20).

Fig 16: Consumption pattern of meat and poultry foods

Table 20: Type of meat and poultry foods consumed by respondents before and during lock down period (N=54)

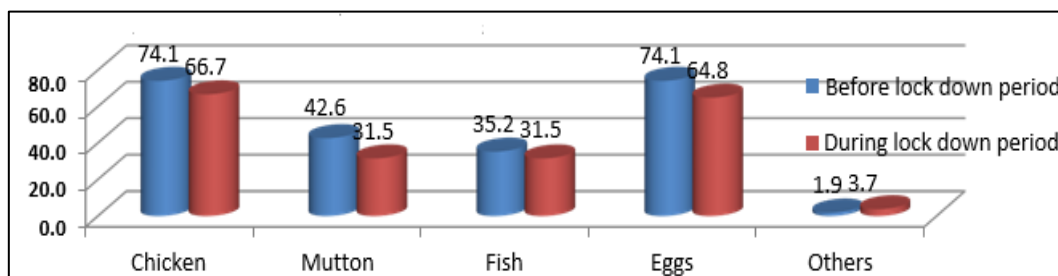| Meat & poultry products	Before lock down period			During lock down period		
	Number	Percentage	Frequency	Percentage	Number	Frequency
Chicken	40	74.07	1	36	66.667	1
Mutton	23	42.59	2	17	31.481	3
Fish	19	35.19	3	17	31.481	3
Eggs	40	74.07	1	35	64.815	2
Others	1	1.85	4	2	3.704	4

Fig 17: Type of meat and poultry foods consumed by respondents

VIII. Spices and condiments

Table 21: Consumption pattern of spices and condiments (N=54)

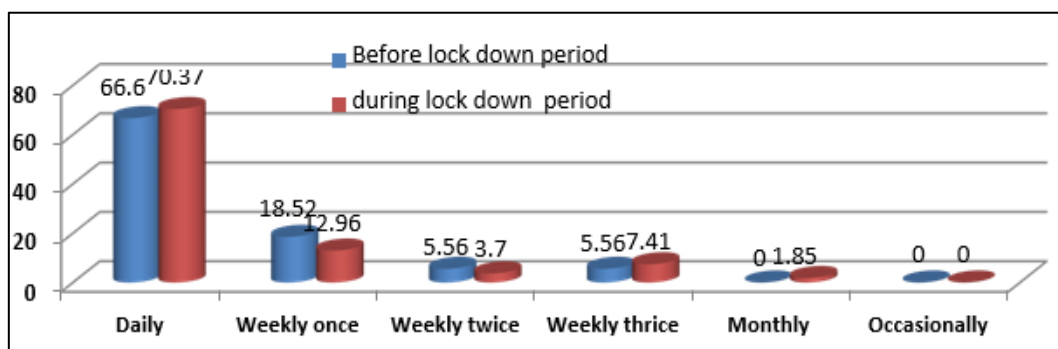| Food Frequency	Before lock down period		During lock down period	
	Number	**Percentage**	**Number**	**Percentage**
Daily	36	66.67	38	70.37
Weekly once	10	18.52	7	12.96
Weekly twice	3	5.56	2	3.70
Weekly thrice	3	5.56	4	7.41
Monthly	0	0.00	1	1.85
Occasionally	0	0.00	0	0.00

**Fig 18:** Consumption pattern of spice and condiments

From the table 21 clearly indicate that, the daily consumption of Spices and condiments are found to be increased 66.67% to 70.37% during lock down period compare to before lock down period. (Table 21). While, weekly once consumption of spices was decreased 18.52% to 12.96% during lock down period when compared to before lockdown period.

Table 22: Type of spices and condiments consumed by respondents before and during lock down period (N=54)

Spices and condiments	Before lock down period		During lock down period	
	Number	**Percentage**	**Number**	**Percentage**
Turmeric	50	92.59	45	83.33
Ginger	49	90.74	46	85.19
Garlic	47	87.04	45	83.33
Salt	48	88.89	46	85.19
Chilli powder	44	81.48	40	74.07
Pepper	32	59.26	33	61.11
Cardamom	32	59.26	36	66.67
Cinnamon	33	61.11	36	66.67
Asafetida	18	33.33	18	33.33
Others	6	11.11	6	11.11

The intake of spices was showed not much difference
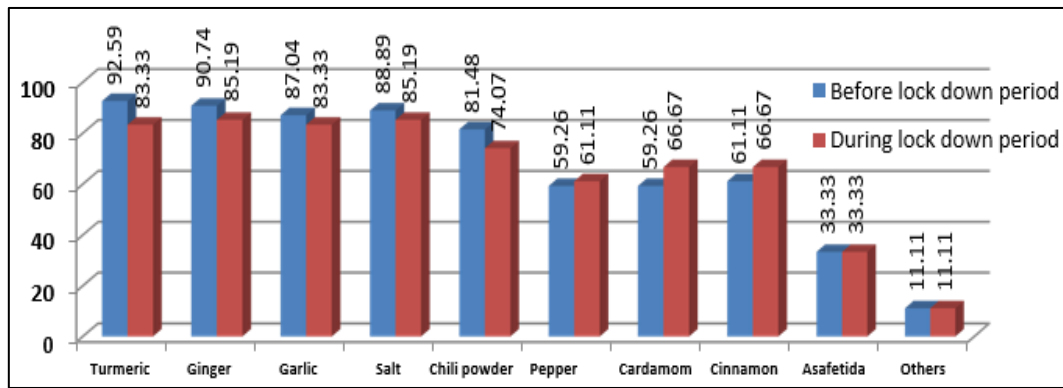
Fig 19: Type of spice and condiments used by the respondents

The intake of spices and condiments like turmeric (92.59%), ginger (90.74%), garlic (87.04%), salt (88.89%), Chilies powder (81.48%), pepper (59.26%), cardamom (59.26%), cinnamon (6111%), were found as high by the respondents before lock down period. The consumption of all the spices was reduced during lock down period except cardamom and cinnamon. Cardamom and cinnamon use was increased from 59.26% to 66.67% and 61.11% to 66.67% respectively during lock down period (Fig 20).
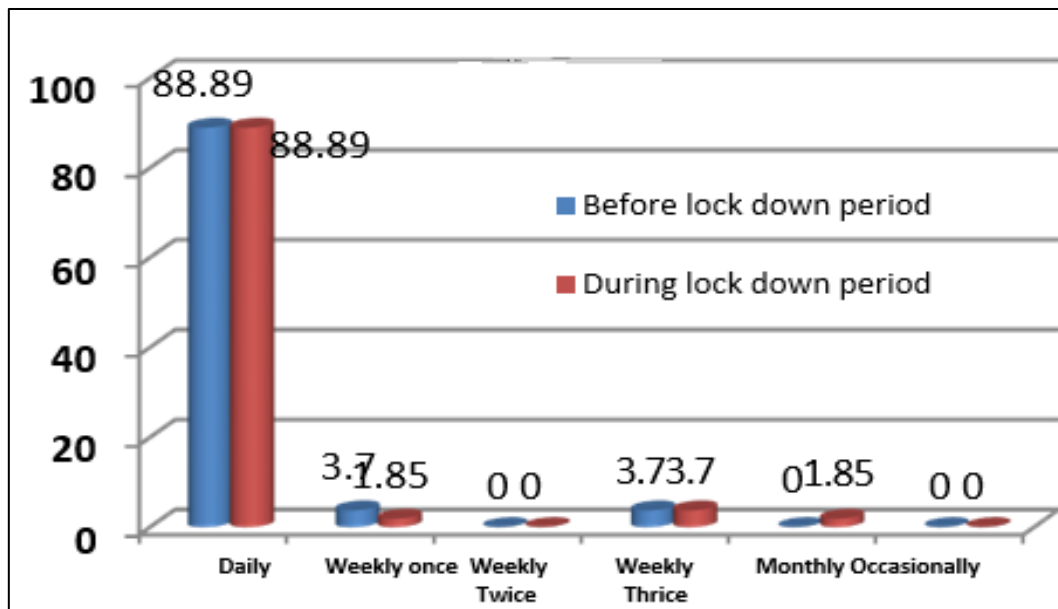
IX. Fats and oils

Table 23: Consumption pattern of fats & oils (N=54)

Food Frequency	Before lock down period			During lock down period		
	Number	Percentage	Frequency	Percentage	Number	Frequency
Daily	48	88.89	1	48	88.89	1
Weekly once	2	3.70	2	1	1.85	3
Weekly twice	0	0.00	3	0	0.00	4
Weekly thrice	2	3.70	2	2	3.70	2
Monthly	0	0.00	3	1	1.85	3
Occasionally	0	0.00	3	0	0.00	4

As per the table 23, it indicates that majority of the respondents (88.89%) consuming fats and oils daily (Fig 21) both before and during lockdown period.

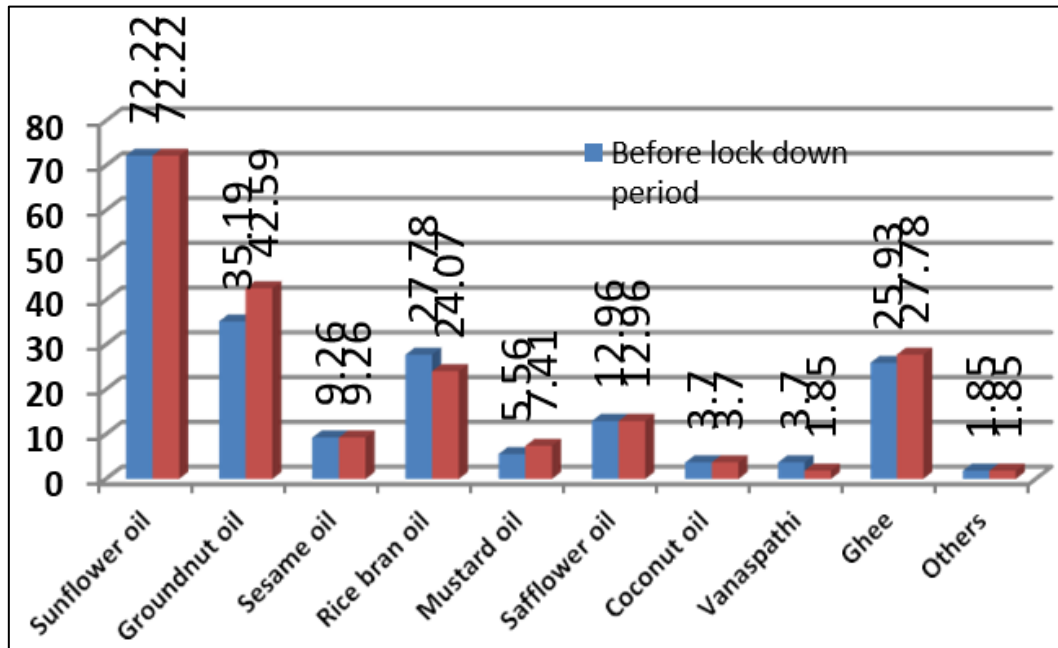**Fig 20:** Consumption pattern of oil and fats

Fig 21: Types fats and oils used by the respondents

Table 24: Type of fats & oils consumed by respondents before and during lock down period (N=54)

Fats & oils	Before lock down period		During lock down period	
	Number	Percentage	Percentage	Number
Sunflower oil	39	72.22	39	72.22
Groundnut oil	19	35.19	23	42.59
Sesame oil	5	9.26	5	9.26
Rice bran oil	15	27.78	13	24.07
Mustard oil	3	5.56	4	7.41
Safflower oil	7	12.96	7	12.96
Coconut oil	2	3.70	2	3.70
Vanaspathi	2	3.70	1	1.85
Ghee	14	25.93	15	27.78
Others	1	1.85	1	1.85

The table 24 revealed that, majority of the respondents consuming Sun flower oil (72.22%) and rice bran oil before and during lockdown period. Whereas 42.59% of respondents consuming groundnut oil followed by Vansapathi oil (27.78%) and ghee (27.78%) during lockdown period and there is no difference (12.96%) was found in safflower oil consumption both before and during lockdown period.

X. Ready to eat foods

Table 25: Consumption pattern of Ready to Eat foods (N=54)

Food Frequency	Before lock down period		During lock down period	
	Number	Percentage	Percentage	Number
Daily	4	7.41	6	11.11
Weekly once	12	22.22	8	14.81
Weekly twice	10	18.52	4	7.41
Weekly thrice	6	11.11	4	7.41
Monthly	8	14.81	6	11.11
Occasionally	10	18.52	19	35.19

The frequency of consumption of ready to eat foods was found to be weekly once (22.22%), weekly twice (18.52%), occasionally (18.52%), monthly once (14.8%) and weekly thrice (14.81%) by majority of the respondents before lock period (Table 25 & Fig 23). However, the consumption of ready to eat foods was increased at daily (from 7.41% to 11.11%) and occasionally (from 18.52% to 35.19%) by the respondents during lock down period. The weekly and monthly users of Ready To Eat foods was reduced during lock down period compared to before lock down period.
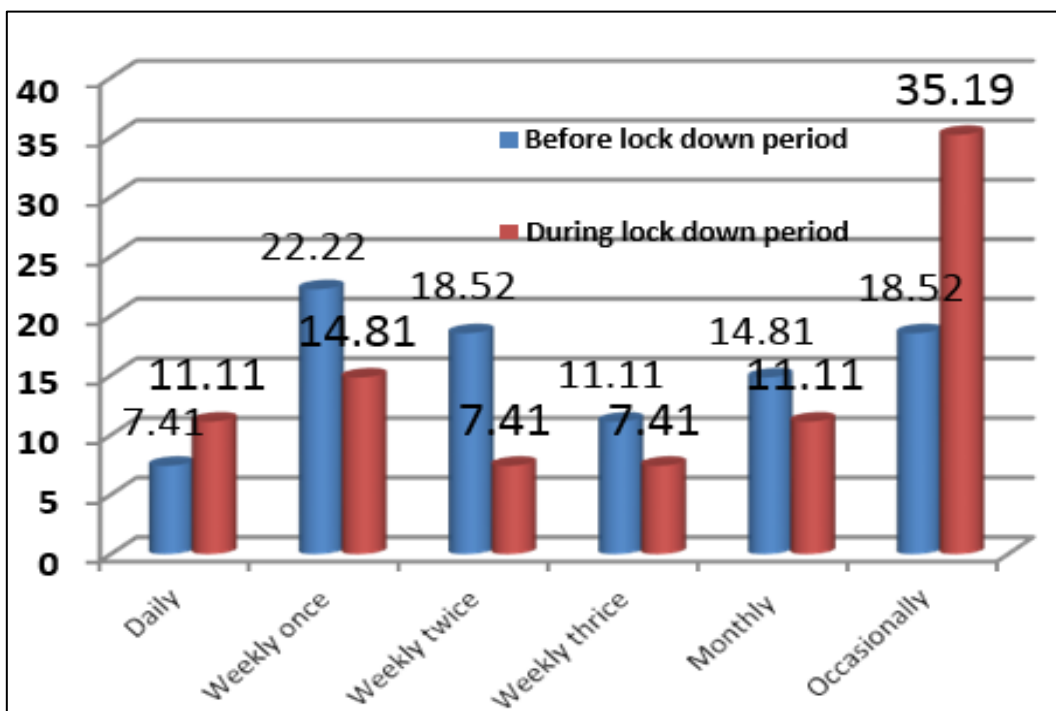
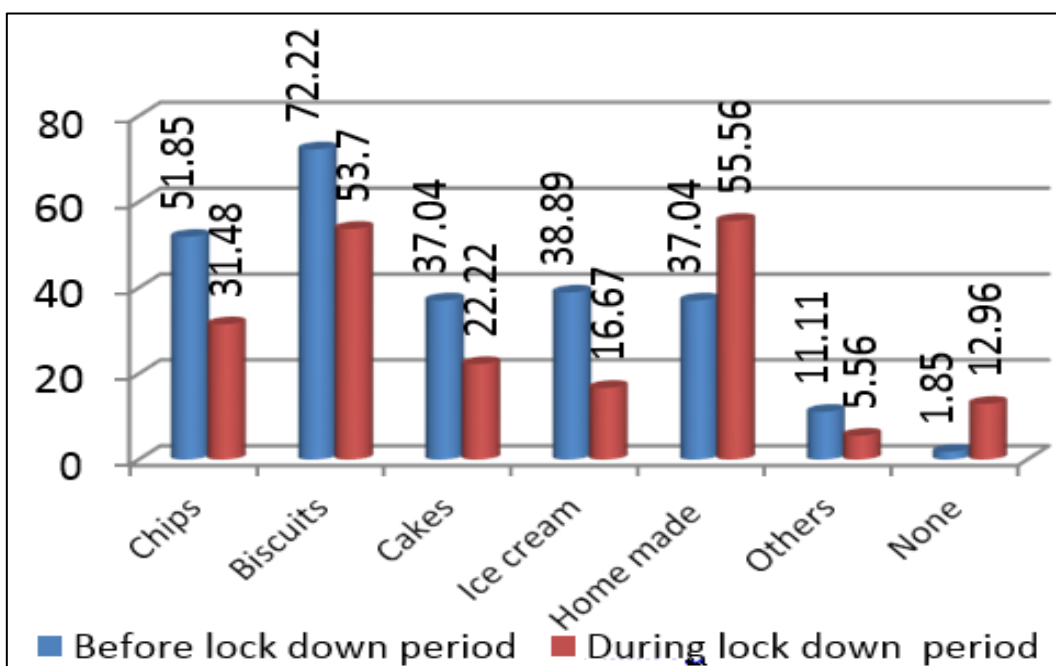**Fig 22:** Consumption pattern of ready to eat

Fig 23: Type of ready to eat foods consumed by the respondents

Biscuits (72.22%) and chips occupied first place among the Ready To Eat foods before lock down period whereas biscuits (53.70%) as well as homemade recipes (55.56%) were majorly consumed ready to eat foods during lock down period. The foods like cakes and ice cream consumption is reduced during lock down period (53.7% and 16.67%) compared to before lock down period (72.22% and 38.89%) (Table 26 & Fig 24).

Table 26: Type of ready to eat foods consumed by respondents before and during lock down period (N=54)

Ready to eat foods	Before lock down period		During lock down period	
	Number	**Percentage**	**Number**	**Percentage**
Chips	28	51.85	17	31.48
Biscuits	39	72.22	29	53.70
Cakes	20	37.04	12	22.22
Ice cream	21	38.89	9	16.67
Home made	20	37.04	30	55.56
Others	6	11.11	3	5.56
None	1	1.85	7	12.96

XI. Water consumption

Daily consumption of water was 8-10 glasses (42.59%) followed by 5 to 7 glasses (37.04%) and 10-15 glasses (9.26%) and > 15 glasses (5.56%) by the majority of the respondents before lock down period (Table 27). During lock down period the percentage of respondents drinking 10-15 glasses is drastically increased from 9.26% to 25.93% and 5 – 7 glasses

is reduced to 37.04% to 12.96% whereas the respondents drinking 8-10 glasses water per day was not changed during lock down period (Table 28). The preference for cool water is high before lock down period whereas preference for warm water is more by the respondent's during lock down period. In lock down period; purified or filtered water in separate bottles was preferred by all the respondents.
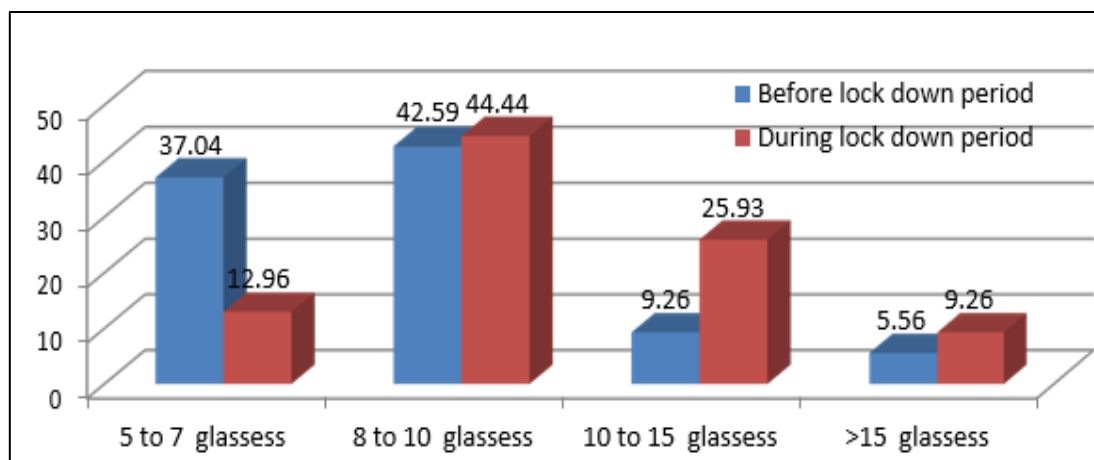

Fig 24: Consumption pattern of water

Table 27: Consumption pattern of water (N=54)

Number glasses	Before lock down period		During lock down period	
	Number	Percentage	Number	Percentage
5 to 7	20	37.04	7	12.96
8 to 10	23	42.59	24	44.44
10 to 15	5	9.26	14	25.93
>15	3	5.56	5	9.26

Table 28: Type of water consumed by the respondents before and during lock down period (N=54)

Type of water	Before lock down period		During lock down period	
	Number	Percentage	Percentage	Number
Hot	2	3.70	1	1.85
Cool	29	53.70	17	31.48
Warm	20	37.04	33	61.11

Table 29: Expenditure pattern on food before and during lock down period (N=54)

Expenditure	Decreased	Percentage	Increased	Percentage	Same as before	Percentage
Cereals & cereal products	4	7.41	15	27.78	30	55.56
Pulses & Legumes	6	11.11	19	35.19	26	48.15
Roots & Tubers	11	20.37	10	18.52	28	51.85
Vegetables	4	7.41	24	44.44	24	44.44
Green Leafy Vegetables	9	16.67	19	35.19	23	42.59
Fruits	6	11.11	31	57.41	14	25.93
Milk and milk products	5	9.26	22	40.74	24	44.44
Nuts & Oil seeds	10	18.52	15	27.78	23	42.59
Meat, poultry and fish	14	25.93	18	33.33	15	27.78
Ready to Eat Foods	25	46.30	9	16.67	12	22.22
Drinking water	1	1.85	24	44.44	21	38.89

XII. Expenditure pattern on food:

The expenditure pattern on foods during lock down period is presented in Table 29. The results revealed that majority of the respondents mentioned that the expenditure pattern is same as before lock down period for cereals (55.56%), legumes and pulses (48.15%), roots and tubers (51.85%), milk and milk products (44.44%) and nuts and oil seeds (42.59%). Majority of the respondents mentioned that the expenditure pattern towards fruits (57.41%) and meat, poultry and fish foods (33.33%) and drinking water was increased (44.44%) whereas

the expenditure pattern towards ready to eat foods (44.44%) was reduced during lock down period.

Conclusion

The results of the survey on food intake pattern before and during Covid 19 lock down period revealed that the lock down period shows a significant difference before and during Covid 19 lock down period. The food intake pattern of respondents shows that the consumption of cereals and pulses, oils and fats remains same before and during Covid 19, consumption of

Green leafy vegetables and Ready-to-eat has reduced during Covid 19 and the consumption of Fruits and water, butter and ghee, meat, fish and poultry usage was increased during Covid 19 lock down period. This could be due to awareness of importance of food groups.

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