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Impact of COVID-19 on Consumption Pattern of Vegetarians and Non-Vegetarians

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ABSTRACT

The aim of this study was to investigate the impacts of COVID-19 on the consumption patterns of vegetarians and non-vegetarian populations, mainly on animal-based products. A cross-sectional, questionnaire-based survey was conducted among the urban and peri-urban populations of Bengaluru, Karnataka during October to November of 2020 through electronic mode. The data was collected from 837 (54.2% non-vegetarian and 54.2% vegetarians) participants. Significant change in the number of family members before and during the COVID lockdown was observed. The egg and chicken consumption had drastically increased among the non-vegetarians whereas, among the majority of the vegetarians, no change in milk consumption but a considerable increase in curd and buttermilk, paneer/cheese, and ghee/butter consumption was observed. Both non-vegetarian and vegetarian consumers had shifted to online delivery apps for purchasing products during the pandemic. The majority of the non-vegetarians (80.84%) and vegetarians (55.09%) opined that the price of meat and milk products increased during the pandemic. The pandemic had an effect on consumption among non-vegetarian and vegetarian consumers but increased accessibility of products through deliveries or pick-up points at various locations might have reduced the price and also induce the consumption of these products.

INTRODUCTION

Every country in the world is facing unprecedented socio-economic challenges due to the spread of the novel SARS-Cov-2 or COVID-19 (Mulvaney et al., 2020; Pu et al., 2020). This pandemicrises the concern for the food and nutritional security of millions of people in low- and middle-income countries (LMICs) (Shankar et al., 2021) including India. To contain the virus spread, Government of India (GoI) initiated a nation-wide lockdown for21 days effective from the 25th March 2020 which later extended until May 2020 (Ministry of Home Affairs, GoI, 2020a; 2020b). It suppressed all the economic activities, including transportation of goods, except the essentials like food and medical supplies (Kanika & Shekar, 2020). Majority followed inappropriate practices and had few personal/familial/school related issues which needed immediate attention and help (Singh et al., 2021). Even the education system felt unaffordability of lockdown (Bhati et al., 2020). Stringent lockdowns or an extended epidemic affected food supply in many ways (Torero, 2020). Initially, it was food transportation and availability of packaged goods from food processing industries as manufacturing activity slowed down due to social distancing guidelines and labour shortages (Sharma, 2020). These concerns in a developing country are conspicuous, where food supply chains are long and fragile (Reardon et al., 2020).

India consists highest number of vegetarians in the world, with more than 400 million. Different surveys over a period of time showed that the estimated percentage of the vegetarian population is between 23 to 37 per cent (Roshni, 2021) with only 70 per cent

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of the Indian population aged over 15 consumed non-vegetarian diets in 2014. The vegetarian diets in India are mainly due to strong cultural and religious traditions. The meat consumption in India is very low (4.5 kg per capita) and it has grown by only 1 kg per capita in the last 20 years, but the per capita milk consumption in India is relatively better and stands at 58.70 litres in 2020. During the pandemic, the consumption of non-vegetarian products was affected as there were supply chain disruptions. The stakeholders in meat industries came across difficulty in production during the lockdown, affected by restricted movement of animals within and across the country. These conditions adversely affected meat production, processing, and distribution adversely (Ijaz et al., 2021).

The COVID-19 pandemic has already affected the human lifestyle, including our consumption patterns, especially during the lockdown period (Attwood & Hajat, 2020; Mayasari et al., 2020). Although, several factors have contributed to the changes in our dietary pattern during the COVID-19 lockdown, the most important reason which can be attributed to the restriction imposed on the movement of people during the lockdown (Attwood & Hajat, 2020). The food supply chain was hampered by the restrictions placed on movement during the lockdown, and the purchasing power of low-income households in urban areas decreased. Although, there are few studies on the impact of COVID-19 on consumption pattern of people in India, the quantification of socio-economic aspects on the consumption pattern of animal-based products among the vegetarian and non-vegetarian population is lacking.

METHODOLOGY

A cross-sectional, questionnaire based survey was conducted among urban and peri-urban population of Bengaluru, Karnataka. The survey was conducted during October 2020 to November 2020 through electronic mode. A *Google form* question naire link was circulated through WhatsApp and Email. The survey was voluntary, confidential and anonymous. Consent was obtained before proceeding in the survey. A total of, 1028 participants responded to the survey questionnaire, of which, 191 were discarded due to incomplete information and stopping non-vegetarians' consumption during the lockdown (as it is not fit for comparison). For final analysis the data collected from 837 participants were considered of which 454 (54.24%) were Non-vegetarians and 383 (45.76%) were Vegetarians. In the beginning of the survey, respondents need to choose whether they belong to non-vegetarian or vegetarian category and thereafter it will be directed to different set of questions for each of the category. Hence, in this study, non-vegetarians (NV) were defined as "the person who consumes meat (Chicken, Mutton, Pork), sea products (Fish/prawns) and eggs", whereas Vegetarians (V) as "the person who consumes Milk and associated milk products (Butter/Ghee, Curd, Cheese and Ice-cream)". A structured questionnaire was developed by consulting the academicians in the local settings. The questions were grouped into demographic characteristics, consumption frequency of the identified products, quantity consumed, expenditure on foods, source of purchase and problems faced in purchase during the COVID-19 lockdown. The data were coded and analysed with descriptive statistics viz., frequencies, percentages, means, standard deviations, etc. using Microsoft Excel 2019, and t test was performed using R version 4.0.3.

RESULTS AND DISCUSSION

The socio-demographic details of the respondents are quantified. Among the non-vegetarians, majority (59.3%) were male, belonged to 18-30-year age category (67.6%), postgraduates (74.2%), equally poised with 35, 33 and 32 per cent in private/ business or self-employed and government sector, urban (73.5%) and having less than Rs. 50,000 monthly income (57.3%). Similarly, majority (56.9%) of the vegetarians were males belonged to 18-30 age category (64.75%), having post-graduation (66.84%) working in private (30.8%)/ business or self-employed (37.6%) and government sector (31.6%) and living in urban area (76.76%) earning less than Rs. 50,000 monthly income (53%).

The number of family members are the key determinant factor for measuring the changes in consumption pattern during the lockdown. Among non-vegetarians and vegetarians there was a significant change in the number of family members before and during the COVID lockdown (Table 1). The family size of both the vegetarian and non-vegetarian respondents had increased considerably during the pandemic (Table 1). Globally, the COVID-19 pandemic has affected purchase and eating habits of food (UN, 2020 and FAO, 2020). Further, it is evident from the present study that the pandemic had an immediate impact on animal-based food products consumption among the vegetarian and non-vegetarian population. A significant increase in the family members during lockdown due to shutdown of various activities and resultant movement of people to their native places to stay with their families. This increase in number of family members directly contributed to the increase in food consumption and associated expenditure of the family during the pandemic. Further, the change in frequency of consumption of meat and milk products was observed non-vegetarians and vegetarians, respectively.

The change in quantity of consumption among the vegetarians and non-vegetarians during the lockdown is depicted in Table 2. A considerable increase in eggs (48.69%) and chicken (37%) and decline in fish/prawns (37.95%) was observed among the non-

Table 1. Change in number of family members

Change in number family members	Family Size							
	Vegetarians				Non-Vegetarians			
	Before COVID (%)	During COVID (%)	Changes (%)	Paired t test	Before COVID (%)	During COVID (%)	Changes (%)	Paired t test
≤ 5	43.87	18.28	-58.33	7.95**	57.49	43.61	-24.13	8.88**
≥ 6	56.13	81.72	45.58		42.51	56.38	32.64	

Note: The figures in the parenthesis indicates the percentage change; **Significant at 1% level

Table 2. Consumption quantity of consumers during COVID19 pandemic lockdown

Items	Non-Vegetarians			
	No of Consumers (No)	Increased (%)	Decreased (%)	No Change (%)
Chicken	399	37.09	34.09	28.82
Mutton	285	36.14	32.28	31.58
Fish/Prawns	195	23.08	37.95	13.33
Pork	43	48.84	51.16	23.26
Eggs	419	48.69	16.71	34.61
Vegetarians				
Milk	381	25.72	12.34	61.94
Curd/Buttermilk	362	40.88	23.20	35.91
Paneer/Cheese	305	18.03	45.90	36.07
Ghee/Butter	290	20.69	44.83	34.48
Ice-Cream	323	3.10	61.61	35.29

vegetarian respondents. Interestingly almost similar percentage of pork consumers increased (48.84%) and decreased (51.16%) their quantity consumption during quantity. Among the vegetarians, majority of the respondents didn't change the milk (61.94%) consumption levels but ice cream (61.61%), paneer/cheese (45.9%) and ghee/butter (44.83%) consumption had decreased and curd/ buttermilk (40.88%) consumption had increased during the pandemic (Table 2). The quantity of meat purchased had increased due to the higher consumption during the lockdown period (Rahman et al., 2020) and demand for staples and basic dairy products remained relatively steady, as milk consumption in India is relatively high (Sangeetha et al., 2018). However, the consumption of high-end dairy products dropped due to the collapse of the hospitality sector under lockdown. These changes consumption pattern can be attributed to the closures of schools, restricted socializing and lack of outdoor activities (Singh, 2021). Although the restrictions were lifted in the later phases of lockdown, likelihood of a household being food insecure is higher for households with fewer resources (Kumar et al., 2022).

The consumption frequency of vegetarians and non-vegetarians before and during COVID pandemic was quantified and presented in the Table 3. It was observed that, majority of the non-vegetarian respondents were consuming eggs (92.49%) followed by chicken (87.88%) and mutton (62.77%). The number of once in a week non-vegetarian products consuming respondent increased for all the five non-vegetarian products whereas fifteen-days- once non-vegetarian products consuming group declined for all products. Among the daily non-vegetarian products consuming households, no difference was observed across the products except chicken and mutton. Among vegetarians, majority (88.5%) consumed milk regularly before and during COVID-19 lockdown. And number of once-in-a-week paneer/cheese consuming respondents increased from 25.90 per cent to 29.18 per cent during lockdown. The curd/butter milk consumption among the vegetarians had increased during the lockdown in all the classified consumption frequencies.

The monthly expenditure pattern of vegetarians and non-vegetarians on food products before and during pandemic is presented in Table 4. Among the vegetarians, the number of respondents among the low expenditure group had declined after the pandemic, whereas it increased among the medium and high expenditure group, though not significantly. Similar pattern was observed among the non-vegetarian respondents. Uncertainty in the first phase of lockdown drove people to panic buying and stockpiling and to some extent due to increased family members during lockdown had resulted in demand-supply gap and price rise. The supply could not match with the sudden increase in demand left the price of meat skyrocketing in the market (DHNS, 2020) and caused burden on the planned food expenditure budget of the consumers. Furthermore, the increased demand for protein rich nutritious food like meat mainly among the high-income consumers, particularly in big cities have preferred nutritious food, caused a rise in demand for dairy-based products during the pandemic (Bhosale, 2020 & Knowland, 2020). The disruptions in transport, shutting down the animal markets reduced the availability of live animals resulted in the scarcity of meat and meat products in India (Rahman et al., 2020). Further, fake news on spreading of COVID through meat lead the non-vegetarians to depend on dairy products for their nutrition and it causes increased sale and consumption of dairy products during the lockdown period (Singh et al., 2021) by households.

Table 3. Consumption Frequency of the Vegetarians and Non-Vegetarians before and during lockdown

Products	Number of Consumers (No)	Consumption frequency of Non-vegetarians							
		Daily		Once in Week		Twice in a Week		Once in 15 Days	
		Before COVID (%)	During COVID (%)	Before COVID (%)	During COVID (%)	Before COVID (%)	During COVID (%)	Before COVID (%)	During COVID (%)
Chicken	339	6.51	2.75	34.58	45.11	38.10	35.09	20.80	17.04
Mutton	285	4.21	4.56	37.19	45.26	29.12	24.91	29.47	25.26
Fish/Prawns	195	10.77	8.72	23.08	26.67	22.56	23.59	43.59	41.03
Pork	43	0.00	0.00	32.56	39.53	32.56	34.88	34.88	25.58
Eggs	419	26.97	28.88	24.11	26.25	38.19	37.23	10.74	7.64
Consumption frequency of Vegetarians									
Milk	381	88.45	89.76	7.61	7.09	3.94	2.89	0.00	0.26
Curd/ButterMilk	362	65.75	67.96	6.08	7.73	24.86	22.93	0.55	1.38
Paneer/Cheese	305	3.93	4.26	25.90	29.18	22.62	22.95	47.54	43.61
Ghee/Butter	290	28.97	32.41	31.03	29.66	25.52	23.45	15.17	14.48
Ice-cream	323	9.60	7.43	31.89	19.50	34.67	28.17	23.84	44.89

Table 4. Monthly Expenditure Pattern of the Vegetarians and Non-vegetarians before and during lockdown (INR)

Monthly Expenditure of vegetarians and non-vegetarians (INR)	Vegetarians				Non-Vegetarians			
	Before COVID (%)	During COVID (%)	Changes (%)	Paired t test	Before COVID (%)	During COVID (%)	Changes (%)	Paired t test
≤1000	36.55	32.37	-11.42		26.87	20.26	-9.80	
1001-2000	50.39	52.21	3.62	1.35^{NS}	30.62	35.02	14.38	1.67^{NS}
≥ 2001	13.05	15.40	18.00		42.51	44.71	5.18	

Note: NS: Non-significant; INR: Indian Rupees

The respondents were asked about the purchasing sources of products before and after the start of COVID. Most of the non-vegetarians purchased the meat products from local retail shops before (64.54%) and during (54.85%) the pandemic, though frequency declined during the pandemic. Further, the meat purchase from super markets (5.29%) and online delivery apps (7.71%) had increased (Table 5). Before pandemic, vegetarians were purchasing the milk and milk products from various sources, of which, local provision stores (50.39%) were most preferred but it was decreased during the pandemic (46.78%). However, the increased purchase from local milk parlours (10.18%) and online apps (11.23%) was observed during the pandemic (Table 5). The barrier gestures, social distancing, as well as general hesitation to visit local retail shops, as a precautionary measure to prevent contracting the virus, this pandemic has transformed the consumers to depend on online delivery apps and super markets to get their food as they practice COVID appropriate behaviours. Further, consumers seem to be environment consciousness and were concerned about their consumption behaviour which may have a detrimental effect on the environment (Vivek & Sahana, 2021). To cater to the increasing number of daily online orders, most of the supermarkets and other stores in study area increased their delivery capacity with more delivery vehicles and crew to improve their service.

Table 5. Preferred source of purchase for consumers during lockdown

Sources	Non-vegetarians (n=454)		
	Before COVID (%)	During COVID (%)	Change (%)
Slaughter House	18.28	14.98	-3.30
Local Retail Shop	64.54	54.85	-9.69
Super Market	5.95	11.23	5.29
Online Delivery Apps	11.23	18.94	7.71
Vegetarians (n=383)			
Local Provision Stores	50.39	3.66	-46.74
Super Market	18.02	10.44	-7.57
Milk Parlours	27.15	37.34	10.18
Online Delivery Apps	4.44	15.67	11.23

The respondents faced several challenges in purchasing the animal-based food products during the pandemic. Majority of the non-vegetarians (80.8%) opined that meat products price had increased whereas, 55.1% vegetarians reported increase in price of the milk and milk products. It is interesting to note that non-vegetarians (68.06%) faced much difficulty in purchasing the food products than vegetarians (39.68%). Furthermore, both vegetarians and non-vegetarians faced time shortage for purchasing the food products followed by too much crowd at the shops. The other important factors in the ascending order for the non-vegetarians was the increase in prices, non-availability and transportation to access the items whereas it was non-availability, transportation and price hike for the vegetarians. Majority of the non-vegetarians (80%) opined that increase in the meat price was observed during lockdown and corroborates with the study by Akter (2020). Similarly, Falsu Rahman et al., (2020) reported an average 20-30 per cent increase in the price for meat throughout the country due to scarcity of stock. Further, the study by Sanjeev et al., (2021) reported that, increased price affected the consumption of meat and sea foods. The vegetarian consumers expressed that increase in the milk and milk products price due to disruption in supply (Harris et al., 2020), panic buying in the initial days and high input cost during the lockdown period (Khairnar, 2020).

Many challenges were faced by the consumers to get their food products during the initial lockdown period. The non-vegetarians were affected more compared to vegetarians, mainly due to steep hike in prices but both vegetarians and non-vegetarians opined that the less time allowed to purchase the products and crowd in shops. As a general observation, the threat of the pandemic and social distancing measures has transformed consumer demand and

Table 6. Challenges faced by the consumers during lockdown

S.No.	Questions	Non-Vegetarians		Vegetarians	
		Yes (%)	No (%)	Yes (%)	No (%)
1	Price increase during the COVID lockdown?	80.84	19.16	55.09	44.90
2	Challenges while purchase during the COVID lockdown?	68.06	31.94	39.68	60.31
	If Yes, Reasons*		Rank		Rank
a	Non-Availability	8.28	IV	10.99	III
b	Timing of the purchase was not sufficient	38.62	I	26.61	I
c	Hiked Price	9.52	III	1.90	V
d	Transportation	5.10	V	2.54	IV
e	Too much crowd at the shop	18.48	II	13.95	II

*Multiple Responses

business-customer interactions in urban areas and accelerated an ongoing process of digitalization. As more and more businesses are coping with the COVID-19 challenges, India has witnessed a growing use of digital technologies in various sectors such as health, finance, education, and retail. There are few limitations in the study that need to be noted. Since, the study is cross-sectional in nature and, thus, the findings are intermittent, subjective, and do not reflect the changes during the study period of partial and full lockdown in study area. Furthermore, the cross-sectional nature of this study does not allow us to confer causation.

CONCLUSION

In light of the growing uncertainty due to pandemic, the outcome of this study demonstrated a change in consumption and expenditure behaviour of the vegetarian and no-vegetarian consumers. However, the non-vegetarians were mostly affected than vegetarians and some were forced to change their diet due to non-availability of certain commodities. The sudden imposition of lockdown leads to panic buying and scarcity of the commodities which affect the change in price resulting more expenditure on the food products by consumers. This can be tackled with increasing the accessibility of essential produce through deliveries or pick-up points. With partial lockdown and many adults are still working from home it is imperative to circulate more accurate information on appropriate consumption behaviour. Further, longitudinal studies may provide greater insight on the long-term influence of the pandemic on consumer's food dynamics, and whether they will return to how they were before the pandemic.

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