

Research Paper

Impact of COVID-19 on Consumption of Fish and Other Meats in NE Region of India

A.D. Upadhyay^{1*}, P. Pal¹, Pramod Kumar Pandey² and Jackie Singh¹

¹College of Fisheries, Central Agricultural University (I), Lembucherra, Tripura, India

²Director, ICAR-Directorate of Coldwater Fisheries Research, Bhimtal, Uttarakhand, India

*Corresponding author: ad_up@rediffmail.com (ORCID ID: 0000-0003-2420-7543)

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ABSTRACT

The COVID-19 pandemic has caused unprecedented stresses on food supply chain in the country, with bottlenecks in processing, transportation and logistics, as well as momentous shifts in consumption pattern and demand for fish and other meat. In this study, the impact of COVID-19 pandemic on consumption pattern of fish, chicken, egg, mutton, beef and pork, market availability and as well as prices in North Eastern Region of India was analysed in this study. The study based on primary data collected through online survey method for which a questionnaire framed in Google Form. The sample comprises of total 104 respondents. The Wilcoxon signed-rank test for repeated measure differences between before COVID-19 and during COVID-19 levels of consumption of fish and other non vegetarian food items and quality of fishes supplied during two periods were analysed. It was found that the reduction in consumption of fishes, chicken and beef, during COVID-19 pandemic, were statistically significant. Whereas, the Wilcoxon signed rank test statistics for mutton and pork turned out to be insignificant. During COVID-19 the consumption of local fishes increased due non availability and distortion of fish supply chain. The quality of fishes in terms of freshness, size and odour were also impacted. Due poor availability of fishes, prices of fish increased during COVID-19. The increase in fish prices and poor availability of fishes resulted to shift in purchase of processed fish products in the North Eastern Region in India. The disruption in transportation, logistics, lockdown, etc during COVID-19 impacted trade of fishes as well as its consumption in the region. Hence, efforts for increasing of local supply of fishes as well as the development of resilient supply chain with sufficient storage facilities is needed to cope up under such unprecedented situation.

HIGHLIGHTS

- The COVID-19 pandemic impacted significantly the consumption of fishes, chicken and beef in NE Region of India.
- During the period, the consumption of local fishes increased due non availability and distortion of fish supply chain.
- The quality of fishes in terms of freshness, size and odour were also impacted.
- The increase in fish prices and poor availability of fishes resulted to shift in purchase of processed fish products in the North Eastern Region in India.

Keywords: COVID-19, impact, fish, meats, consumption, quality, price, North Eastern Region

The COVID-19 pandemic, started from China, around December 2019, has immobilized the world by its health and economic shock. The World Health Organization (WHO) declared COVID-19 as a global emergency on January 30, 2020 Sohrabi *et al.* (2020). The countries would had not even

foreseen the situation, posed by the COVID-19

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for which there was no full proof solution or even mechanism to cope up with the pandemic situation. To deal with the emergent situation countries adopted complete lockdown with available medical facilities at the top priorities to save the life of the people. The prolonged lockdown, thereafter unlock in phased manner completely distorted the economies of the world. Like other countries of the world, Indian economy was also impacted badly by this pandemic. The International Monetary Fund (IMF) growth forecasted for India that the country's economy would contract 10.3% in 2020-21 Economic Times (October 2020). The Centre for Monitoring Indian Economy (CMIE) also reported that the unemployment rate in India might spike to 23 percent India Today (2020). As per a report of International Labour Organization, in India, with a share of almost 90 per cent of people working in the informal economy, about 400 million workers in the informal economy were at risk of falling deeper into poverty during the COVID-19 crisis ILO (2020).

Fishes are one of the major nutritious parts of the global food chain and key source of employment generation among the rural coastal people. Fish and fish products are one of the most traded food products throughout the world, involving 38 percent international trade FAO (2020). Decreased consumer demand, lower supplies, and interference in supply chains directly affect the people engaged in the industry such as fisherman, fish processor, fish vendors, suppliers and transport workers Purkait *et al.* (2020). The COVID-19 pandemic might negatively affect livelihoods, food security and nutrition for populations that rely on aquatic animals as a source of food or income Bondad Reantaso *et al.* (2020). The severity of impacts on commodities for domestic markets depends on local consumers' purchasing power and food substitution for farmed products. Unemployment has affected incomes and consumption patterns. People might find products such as eggs and canned fish more affordable than farmed fish FAO (2020). The Southeast Asian region has been a major contributor to the world's total fish production, and most of the region's fish and fishery products are traded in the international markets as well as in the domestic/local markets. However, the spread of the COVID-19 throughout the world, impacted on the region's fish production from marine capture and aquaculture

as well. Fishing operations at sea had encountered difficulties due to the national lock-down measures in many countries that prohibited fishers from going out to sea for catching fishes. The Indian shrimp industry would incur an approximate economic loss to the tune of 1.50 billion USD for this year alone Kumaran *et al.* (2020) .

India is the second largest fish producing country in the world, with 6.56percent of global production GoI (2019). Around 14.5 million people are engaged in fisheries and its allied activities NFDB (2019) in India, and it has been estimated that around 60percent of the total population consume fish Shyam (2016). Fisheries sector of the country contributes about 1.1 percent to the overall GDP and 5.23 percent to the Agricultural Gross Value Added (GVA). The fish is a main source of protein for the people of north eastern region of the country. Also the small scale fish production, fishing operations, and fish and fish products trading are very important economic activities supporting livelihood to large number of households in rural as well as urban areas. The north eastern region of the country is highly dependent on imported fishes from other part of the country to meet the high demand of fishes in the region. Due to disruption in transportation, logistics and trade of fishes in the region, supply as well as consumption of fishes might also be impacted. Hence, an attempt was made to examine the potential impact of COVID-19 pandemic on the availability and consumption of the fishes and their close substitutes of animal sources of protein such as chicken, mutton, beef and pork in the region.

MATERIALS AND METHODS

Sampling and data collection: This study covered all the states of North Eastern Hill states such as Manipur, Tripura, Meghalaya, Mizoram, Arunachal Pradesh Nagaland and Sikkim. Keeping in view the limitations of personal interview method for data collection due to pandemic COVID-19, online survey method was used to collect primary data during September-October, 2020. A structured questionnaire including closed and open ended questions was framed using Google Form. A total of 104 responses from all the states of North East Region were received. The data pertaining to consumption pattern of fish, chicken, mutton, beef

and pork, market availability and as well as prices in North Eastern Region of India were collected and analysed in this study.

Statistical analysis: Further, the responses in the Google forms were converted to the numeric values and analysed it using MS Excel and SPSS-22. We used the Wilcoxon signed-rank test for repeated measure differences between before COVID-19 and during COVID-19 levels of fish and other non vegetarian food items and quality of fishes supplied during two periods. The Wilcoxon signed rank is more powerful than the sign test because it considers the magnitude of the difference while the sign test does not. It uses more information from the sets of scores than the simple sign test Whitley and Ball (2002) .

RESULTS AND DISCUSSION

An online survey based study was conducted on 'Impact of COVID-19 on Consumption of Fish and Other Meats in NE Region of India' and the results of the study have been presented under the following subheads.

Socio-economic profile: The socio-economic profile of the respondents, including percentage of families belonging to different family size categories Yadav (2017) and income groups were analysed. It was found that about 54.46% households belonged to the medium family size category, whereas 42.42% households had small family with one to four members and only 3.96% family were found to have large family size (>8 members) (Fig. 1).

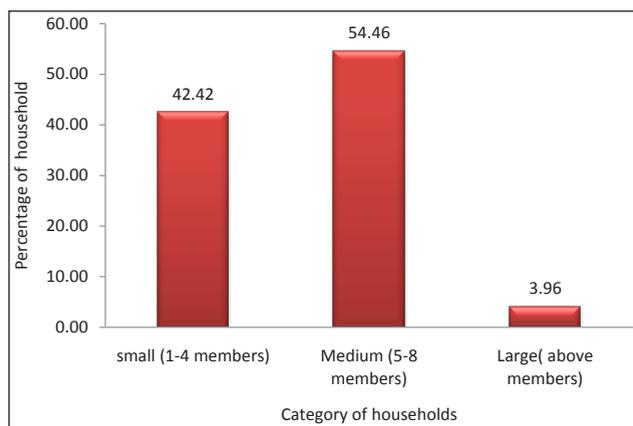


Fig. 1: Percentage of households belonging to different categories

Based on the monthly family income, respondents were classified into three categories such as low

income group (<₹ 33097.93), medium income group (₹ 33097.93 to ₹ 68712.57) and high income group (>₹ 68712.57). The distribution of the households is represented in Fig. 2. Amongst the respondents, proportion of the medium income group was high (42.27%), followed by the low income group (34.02%) and high income group (23.71%).

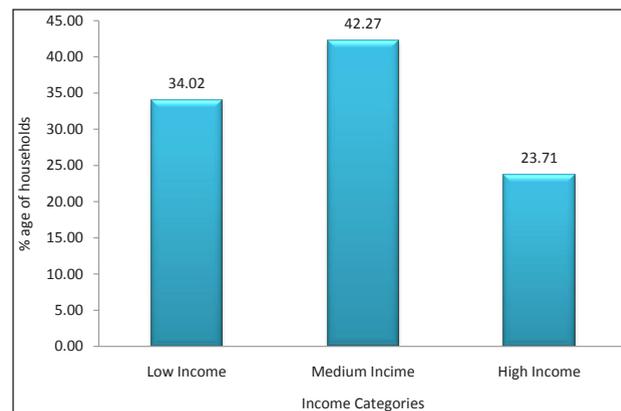


Fig. 2: Distribution of household based on monthly family income

Impact of COVID-19 on consumption, quality of products and prices of fish and other meats

Consumption of fish and other meats: The fish and fish products are the key components to a healthy diet and are safe to eat. In north-eastern region of the country, fish and fish products are the main source of protein and other micro nutrients. In addition to fish and fish products, consumption of other non-vegetarian food items is also high in the region. In view of the impact on healthy diet during pandemic of COVID-19, this study was planned to examine status of availability and consumption and also the perceptions of the people about these sources of protein in north eastern region of India. Normally fortnightly consumption pattern of fish, chicken, mutton, beef and pork were reported to be 1.52, 1.44, 1.16, 1.43 and 1.42 kg per family, respectively (Table 1). However, level of fortnightly consumption of fish, chicken and beef during COVID-19 were reduced to 1.43, 1.35, and 1.41 kg per family, respectively. The difference in fortnightly consumption fish, chicken, mutton, beef and pork before COVID-19 and during COVID-19 was statistically tested using the Wilcoxon Signed rank test. The results obtained shows that the reduction in consumption of fishes, chicken and beef, during COVID-19 pandemic, were statistically

Table 1: Effect of COVID-19 on the consumption pattern of non-vegetarian food items in North East Region of India

Sl. No.	Food items	Fortnightly Consumption Pattern			
		Before Covid-19 (in Kg/family)	During COVID-19 (in Kg/family)	Wilcoxon Z	Asymp. Sig. (2 tailed)
1	Fish	1.52 (0.713)	1.43(0.741)	-2.095	0.036
2	Chicken	1.44(0.727)	1.35(0.705)	-2.225	0.026
3	Mutton	1.16(0.699)	1.2(0.661)	-0.760	0.447
4	Beef	1.43(0.638)	1.41(0.695)	-2.083	0.037
5	Pork	1.42(0.724)	1.45(0.906)	-0.048	0.962

Figures in parentheses indicates SD.

significant (Table 1). Whereas, the Wilcoxon signed rank test statistics for mutton and pork turned out to be insignificant. The reduction in consumption of fishes, chicken and beef might be due to distortion of supply chains, market availability, price, as well as peoples’ fear for corona virus through food chains of these items. The lower impact of COVID-19 on consumption of mutton and pork might be due to less frequency of consumption and also local and short supply chain were relatively less impacted and also the availability as well as consumers considered it safer.

Further, the buying behaviour of household for fish, chicken, mutton, beef and pork were also changed during COVID-19 (Fig. 3). Before COVID-19, 88, 89, 30, 37 and 46 per cent households were used buy fish, chicken, mutton, beef and pork, respectively, but during pandemic of COVID-19, 84, 86, 24, 29 and 46 per cent households purchased fish, chicken, mutton, beef and pork, respectively. Hence, during COVID 19, reduction in quantity of consumption for fish, chicken and beef as well as proportion of households buying of these items were recorded.

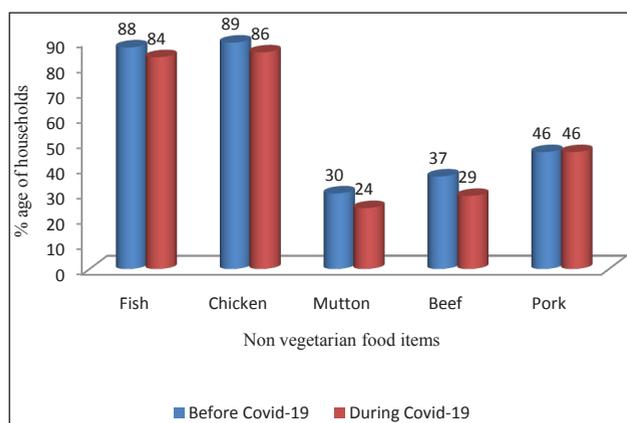


Fig. 3: Change in households’ purchases for fish and other meats before and during COVID-19

Consumption of local and imported fishes: The perception of respondents towards toward fresh fish consumption categories during COVID-19 was also sought and analysed. It is clearly visible from the Fig. 4 that during the COVID-19, the consumption of local fresh fishes increased.

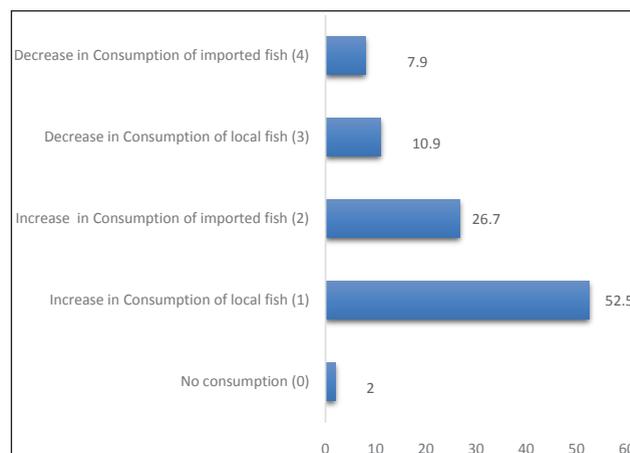


Fig. 4: Perception of respondents toward fresh fish consumption categories during COVID-19

This is mainly because of reduction in availability of imported fishes and the people hesitation for health hazard during COVID-19. Due to complete lockdown in view of pandemic of COVID-19, transportation of even essential food commodities in the north-eastern region of India was highly affected. The supply of food and non food items from the other parts of the region is crucial for the sustainability of region. The large quantities of fresh fishes are imported in the region on daily basis from the Andhra Pradesh, other states and also from Bangladesh and other Neighbouring Countries. Further, blockages to transport routes were particularly obstructive for fresh food supply chains that increased the levels of food loss and

waste. Fresh fish and aquatic products, which are highly perishable and transported to long distance with ice pack, were more at risk. The migration of labourers, engaged at various stages of supply chain of fresh fish, affected the availability of imported fishes in the fish markets of the north-eastern region.

Market availability of quality of fishes: The effect of COVID-19 on the quality of fish available in the markets of NER was analysed using the Wilcoxon Signed rank test. It was found that the freshness of fish, size and odour were affected significantly due to COVID-19 pandemic, coupled with the lockdown which affected the supply chain of fishes in NER (Table 2).

Table 2: Effect of COVID-19 on the quality of fish available in the markets

Sl. No.	Quality variables of Fish	Wilcoxon Z	Asymp. Sig. (2 tailed)
1	Freshness	-4.795	0.000
2	Size	-5.520	0.000
3	Odour	-3.257	0.01

The ongoing pandemic of COVID-19, led to short and irregular supply of fishes in the Market, as a result the fish wholesalers and retailers were managing their sale through stored fish. The elongation of storage period, lack of cold chain for fresh fishes and poor availability of ice and other packaging materials during COVID-19 led to the availability of poor quality of fish to the consumers in the region.

Price of fish: In this study, information on the fish prices during the COVID-19 was sought from the respondents and the majority of the respondents (84.2%) reported increase in the prices during COVID-19 (Fig. 5).

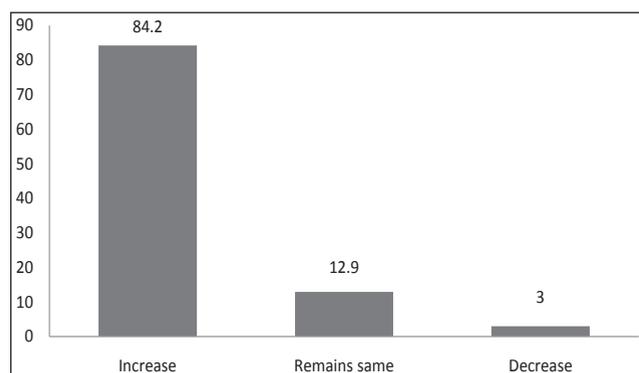


Fig. 5: Percentages of perceived response in fish price during COVID-19

The increase in fish prices could be attributed to disruption in supply of fishes from outside the states. Increase in prices of fish impacted the poor people from accessing the fresh fish.

Consumption of processed fish products: The disruption of transport facility during COVID-19 and poor infrastructural facilities for storage and handling of fresh fish, led to poor availability of fresh fish to the people. Whereas, processed fish products like dry fish, fermented dried fish (*Shidal*), smoked fish and canned fish are also in good demand in the north-eastern region of the country and the shelf life of these products differs. Though it is observed from Fig. 6 that higher proportion of respondents indicated no change in the consumption pattern of processed products during COVID-19, still a significant proportion of respondents were in opinion of little increase in consumption of dry fish, fermented fish smoked fish and canned fish during COVID-19. It was also reported by the Indian Express, 19 October 2020 that in Tripura, sale of fermented fish rose amid COVID-19 as people preferred fermented fish assuming it as natural immunity boosters.

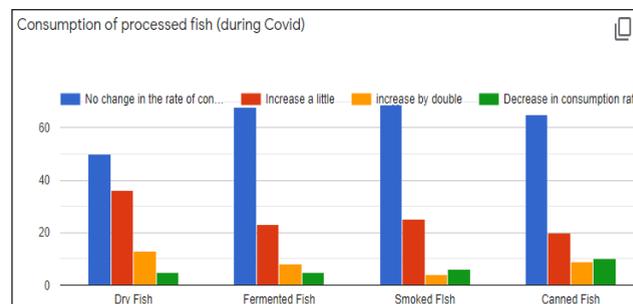


Fig. 6: Consumption of processed fish in North East Region of India

CONCLUSION

It is concluded from the above findings that the COVID-19 pandemics not only impacted consumption of fishes but also affected the market availability, quality of fishes, prices of fishes. The respondents were also perceived that during COVID-19 they shifted their purchase and consumption for processed fish products in the North Eastern Region in India. The disruption in transportation, logistics, lockdown, etc during COVID-19 impacted trade of fishes as well as its consumption in the region. Hence, efforts for increasing of local supply of fishes as well as the

development of resilient supply chain with sufficient storage facilities is needed to cope up under such unprecedented situation.

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