

# The impact of the new crown epidemic on the fresh consumption behavior of Chinese residents

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**Abstract:** Under the global COVID-19 epidemic, consumers' behaviors of purchasing fresh products have changed hugely in many aspects. The changing consumer behaviors also affect the market of fresh products including the booming e-commerce. This investigation aims to discover the trends of consumers' behaviors under the pandemic and analyse the corresponding causes behind the phenomena. At the same time we try to provide some suggestions in order to improve the changing market and display the consumers' needs. Through the questionnaire survey on some Chinese consumers, we collected some data about the fresh product consumption and analysed them by Likert's 5-level scale. Based on our investigation, we found that during the pandemic Chinese consumers decreased their expenditures on fresh products as well as the frequencies on buying them. They paid more attention to the safety of the products compared to before. It is also very obvious that more consumers tended to use online shopping to purchase fresh products in this period, which is one of the most significant changes. Related suggestions encompassing standardization of the fresh industry, regulations on the firms and retailers and subsidies for the shops are also listed in the end.

**Keywords:** The new crown epidemic, Fresh consumption behavior, Chinese residents

## 1. Introduction

Since the end of 2019, people's ordinary lives, social order and commercial behaviors have been enormously influenced by the COVID-19 pandemic. Fresh products usually include fruits, vegetables, meats, eggs, milks and aquatic products. As necessities, the supply-demand relationship and consumer behaviors of the fresh products have also been affected hugely.

During the pandemic, since restrictions on going out and quarantine, the opportunities of purchasing fresh products personally outside reduced significantly. Meanwhile, traditionally physical markets (including agricultural markets, supermarkets, stores and groceries) that could provide consumers the chance of evaluating the real products on their own were requested to work shorter, stop opening or even quit from the competition permanently due to policies and smaller consumer flow rate. Some virus outbreaks were closely related to markets. Fresh products have much shorter quality guarantee period, high preservation requirements and strong timeliness. Because of those qualities, the conventional fresh industry was struck fiercely.

However, the rising e-commerce solved some of the problems to some extent. Browsing and buying remotely, combing express delivery, consumers could get satisfied partly under the epidemic prevention measures. Applications like Fresh Hema, Tmall fresh and JD fresh developed rapidly with surging downloads, registered users and orders. Benefited from the policies, the industry of e-commerce fresh products has been expanding with a fairly decent pace. The scale of Chinese e-commerce market of fresh products soared from 162 billion yuan in 2019 to 2638.4 billion yuan in 2020. Problems like cold-chain technology and consumer satisfaction rates also appeared although the industry has been improving for many years. Government also played an important role in leading consumers' decisions. In this period, many official guidance and suggestions were given to the consumers to encourage them to try online fresh shopping, while harsh limitations on traditional shopping were still threatening those traditional markets.

As people getting rid of the pandemic, the traditional fresh market is coming back quickly. It is

foreseeable that the new competition between the e-commerce and traditional markets has just started.

Under the collision of the two patterns and the influence of pandemic, consumers behaviors would change in terms of the factors which affect their decisions without doubt. The changes that might have effects on consumer behaviors include three main aspects: the market, the pandemic and consumers themselves. Miscellaneous factors such as demand, supply, policies and disposable incomes from the aspects are necessarily paramount to be considered. Rising price levels, lower incomes, less quantity supplied, uncertainties in the safety of products all make consumer behaviors instable and varying. In other words, consumers might be experiencing the switch of choosing channels of fresh products. During the stages of the pandemic, consumers' ideas have been changing continuously in this critical routine and will finally decide the trend of the market.

Apparently the changing trends of consumer behaviors could be explored and utilised after analysing the causes. The results might have great significance for the suppliers and the government altogether in order to improve the industry and serve households. The fresh industry is related to everyone's life, thus, extensive efforts are needed to strengthen it by three sides: consumers, suppliers and government. Starting from understanding the consumers, we are looking forward to make the relations clear. In order to have a deeper understanding and some novel insights of this market, through some knowledge and methods in statistics, psychology and economics, we are trying to observe, analyse and discuss the consumer behaviors and following eccentric facts. At the same time we will also make some predictions and suggestions on the future market and consumer behaviors based on our findings.

## 2. Related work

Many researchers have made numerous investigations on subjects related to the consumers and the fresh market under the virus outbreak. These studies mainly focus on the whole picture of the fresh industry in the pandemic and the changing consumer behaviors.

Some studies show that the dropping disposable income of the consumers is one critical factor that influence the behaviors. In one investigation about the changes of incomes and consumption of residents in Inner Mongolia presented by the State Statistical Bureau, there searchers Shen, Zhao and Liu used the Grey Model and Self-Organising Feature Map to determine the changes. The investigation discovered that the pandemic actually made the residents lost 1072 yuan on average, which then led to decrease in consumption including fresh products. Other studies like Wang and Yang's study in Hunan province also prove same trend in disposable income and consumption. Residents' income level and corresponding future expectations saw a downturn due to the pandemic, which directly led to the decline of consumption expenditure (Shi C.L., 2020). Obviously these changes would influence consumers' decisions in purchasing fresh products

Extensive studies concerning the surging online shopping of fresh products also provide us more information about consumer behaviors. Tang and Guo made a survey about the consumption of fresh products and consumer behaviors under the pandemic in 2021, which is quite related to our topic. Through the questionnaires, they discovered that 67.62% of the respondents preferred online fresh shopping due to the restrictions in pandemic. Respondents believe that online shopping will save more time in a fast-paced life, especially for the young. On the other hand, they are also dissatisfied with the online model encompassing long delivery time, high delivery fees and excessive packaging. The researchers mentioned that there would be more to improve. The pandemic would promote order quantity, new users and price of per bill effectively in short run. In medium term it might foster consumers' habit on shopping online for fresh products (Ma, 2020). It is evident that choosing online shopping for fresh products is one of the most significant changes and characteristics in this period.

Other researches provide a variety information in other areas about the consumer behaviors and the fresh market. For example, Tang and Guo also elucidated consumers' mental state when they are choosing the fresh products. They reckoned the reason why consumers were more attentive to the quality, safety and origins is that they were in a state of doubting caused by the fear of restrictions and virus. Thus, the following anxiety led to distrust of products and the picky consumers. The application of cold-chain technology in this industry and specific analysis of fresh market are discussed by Ma C.H. and Zou G.H. respectively, which also offer valuable insights for us.

### 3. Research methods

#### 3.1 Research content and research hypothesis

The purpose of this study is to explore the impact of the new crown epidemic on the fresh consumption behavior of Chinese residents, in terms of residents' consumption habits, perception of fresh products, perception of purchase channels, and attention to the development of the epidemic. Proceed to conduct in-depth research and analysis.

Therefore, this research makes the following research hypotheses:

H1: The new crown epidemic has a significant impact on residents' consumption of fresh products.

H2: Before and after the epidemic, there are significant differences in residents' consumption habits and purchase channels.

H3: Residents' concerns about fresh products and the development of the epidemic are positive.

#### 3.2 Research methods and routes

This research was carried out in the form of an online questionnaire survey, and the questionnaires were distributed and collected through the Wenjuanxing platform. The subjects of this study are Chinese residents, and the subjects need to meet the prerequisite of daily purchase of fresh food. The questionnaire requirements clearly stated the research purpose of this questionnaire, and each participant was required to fill in truthfully. After the questionnaire is submitted, in order to ensure the quality and reliability of the questionnaire survey, the effective questionnaires are screened according to the requirements, and statistics are performed, and the data is processed and analyzed.

The questionnaire mainly includes residents' consumption habits, perception of fresh products, perception of purchase channels, and attention to the development of the epidemic. The questionnaire is compiled using Likert's 5-level scale. The questionnaire is reasonably set up, has good reliability and validity, meets the standard, and can be used for measurement.

Table 1 Frequency analysis of demographic variables

X	options	frequency	percentage(%)	M	SD
gender	male	122	55	1.45	0.50
	female	100	45		
age	20 years old and below	5	2.3	3.77	0.99
	21~30 years old	22	9.9		
	31~40years old	44	19.8		
	41~50years old	100	45		
	over 50 years old	51	23		
education level	high school and below	44	19.8	1.87	0.51
	college or undergraduate	162	73		
	postgraduate and above	16	7.2		
number of family members	1	5	2.3	3.74	1.22
	2	18	8.1		
	3	88	39.6		
	4	53	23.9		
	5	40	18		
	6	13	5.9		
	7	5	2.3		
family monthly income	5,000 yuan and below	43	19.4	2.62	1.23
	10,000yuan and below	71	32		
	20,000yuan and below	62	27.9		
	30,000yuan and below	20	9		
	over 30,000 yuan	26	11.7		

A total of 254 questionnaires and 222 valid questionnaires were distributed. The effective response

rate of the questionnaires was 87.40%. Among them, 122 were males and 100 were females. The gender distribution of the sample was relatively even; the subjects were mainly residents aged 31 and above. And the majority of people in the age group of 41 to 50 years old, accounting for 45.05% (100 people); the subjects' education level is mostly college or undergraduate, accounting for 72.97% (162 people) (Table 1).

In this study, SPSS 26.0 software was used for data processing and analysis.

### 3.3 Research results

#### 3.3.1 The impact of the new crown epidemic on fresh consumption behavior

From the survey results, about 60.36% of residents believe that the new crown epidemic has affected their consumption of fresh food, and about 39.64% of residents believe that the new crown epidemic has not affected their consumption of fresh food. According to further investigation of the changes in the purchase volume of affected residents, about 94.03% of the residents' fresh purchases decreased, and only 5.97% of the residents' fresh purchases increased. Overall, about 56.76% of residents' purchases decreased, about 39.64% of residents' purchases remained unchanged, and about 3.60% of residents' purchases increased (Table 2). This shows that the new crown epidemic has affected residents' consumption behavior of fresh products, and has formed a trend of decreasing purchases of fresh products.

Table 2 Frequency analysis of the impact of the epidemic on fresh consumption behavior

<i>X</i>	options	frequency	percentage (%)	<i>M</i>	<i>SD</i>
Does the epidemic have an impact on fresh food consumption	yes	134	60.4	1.40	0.49
	no	88	39.6		
What is the impact on purchases	no change	88	39.60	-0.55	2.00
	decrease	126	56.80		
	addition	8	3.60		

#### 3.3.2 Consumption habits

Using a paired sample T test, the results show that the epidemic has a significant impact on residents' consumption habits; the frequency of purchasing fresh food after the epidemic is significantly lower than that before the epidemic ( $t = 8.00$ ,  $df = 221$ ,  $p < 0.05$ ); Residents' single purchase of fresh food was significantly lower than that before the epidemic ( $t = 3.84$ ,  $df = 221$ ,  $p < 0.05$ ); residents' fresh purchase channels before and after the epidemic were significantly different ( $t = 5.09$ ,  $df = 221$ ,  $p < 0.05$ ), the number of people choosing online shopping has increased significantly, but offline supermarkets/markets are still the main fresh purchase channels; the impact of the epidemic on fresh food preference is not significant, and vegetables and fruits are still used. The three main categories of meat and meat (vegetables:  $t = 1.21$ ,  $p = 0.23$ ; fruit:  $t = 1.42$ ,  $p = 0.16$ ; meat:  $t = 0.75$ ,  $p = 0.46$ ); the epidemic's concern for residents when purchasing fresh food. The impact is mainly reflected in the price, the attention to price is significantly reduced ( $t = 3.57$ ,  $df = 221$ ,  $p < 0.05$ ), and the impact on freshness and quality is not significant (freshness:  $t = 0.63$ ,  $p = 0.53$ ; Quality:  $t = 0.50$ ,  $p = 0.62$ ), but before and after the epidemic, the three factors that residents were concerned about when buying fresh food were freshness, price, and quality (Table 3).

#### 3.3.3 Perception of fresh products

Using a one-sample T test, the results show that residents' perceptions of the price, quality, and freshness of fresh fresh during the epidemic are all positive, and the results are significantly higher than the test value (test value=3), indicating that the residents' attitude is positive Concern (Table 4).

Using a one-way analysis of variance, the results show that residents' perception of prices is not significantly different at different household monthly income levels ( $F(4,217) = 0.76$ ,  $p = 0.55$ ) (Table 5).

Table 3 Analysis of differences in consumption habits and perceptions of purchase channels before and after the epidemic

		paired difference					<i>t</i>	<i>df</i>	Sig. (double tail)
		<i>M</i>	<i>SD</i>	<i>SE</i>	difference 95% confidence interval				
					lower limit	upper limit			
Pairing1	9.How often do you buy fresh food before the epidemic-10.How often do you buy fresh food after the epidemic	-0.43	0.80	0.05	-0.53	-0.32	-8.00	221	0.00
Pairing2	11.Before the epidemic, your single purchase of fresh food (consumer price)-12.After the epidemic, your single purchase of fresh fresh (consumer price)	0.30	1.15	0.08	0.15	0.45	3.84	221	0.00
Pairing3	13.Before the epidemic, when buying fresh products, your preferred purchase channel-14.After the epidemic, when buying fresh products, your preferred purchase channel	-0.14	0.42	0.03	-0.20	-0.09	-5.09	221	0.00
Pairing4	15.(vegetables) - 16.(vegetables)	0.06	0.72	0.05	-0.04	0.15	1.21	221	0.23
Pairing5	15.(fruits) - 16.(fruits)	-0.11	1.13	0.08	-0.26	0.04	-1.42	221	0.16
Pairing6	15.(meat) - 16.(meat)	0.10	1.89	0.13	-0.16	0.35	0.75	221	0.46
Pairing7	17.(freshness) - 18.(freshness)	0.04	0.96	0.07	-0.09	0.17	0.63	221	0.53
Pairing8	17.(price) - 18.(price)	0.45	1.88	0.13	0.20	0.70	3.57	221	0.00
Pairing9	17.(quality) - 18.(quality)	0.05	1.49	0.10	-0.15	0.25	0.50	221	0.62
Pairing10	22.1.Before the epidemic, I think the fresh food in offline supermarkets/markets is fresher-22.2.After the epidemic, I think the fresh food in offline supermarkets/markets is fresher	0.13	0.61	0.04	0.05	0.21	3.08	221	0.00
Pairing11	22.3.Before the epidemic, I think the prices of fresh produce in offline supermarkets/markets are more favorable-22.4.After the epidemic, I think the prices of fresh produce in offline supermarkets/markets are more favorable	0.12	0.81	0.05	0.01	0.22	2.16	221	0.03
Pairing12	22.5.Before the epidemic, I think the quality of fresh produce in offline supermarkets/markets is better-22.6.After the epidemic, I think the quality of fresh produce in offline supermarkets/markets is better	0.10	0.65	0.04	0.01	0.18	2.29	221	0.02
Pairing13	23.1.Before the epidemic, I think the fresh food purchased online is fresher-23.2.After the epidemic, I think the fresh food purchased online is fresher	-0.09	0.60	0.04	-0.17	-0.01	-2.23	221	0.03
Pairing14	23.3.Before the epidemic, I think the price of fresh food purchased online is more favorable-23.4.After the epidemic, I think the price of fresh food purchased online is more favorable	-0.05	0.60	0.04	-0.13	0.03	-1.34	221	0.18
Pairing15	23.5.Before the epidemic, I think the quality of fresh food purchased online is better-23.6.After the epidemic, I think the quality of fresh food purchased online is better	-0.11	0.51	0.03	-0.18	-0.04	-3.16	221	0.00

Table 4 Analysis of the current situation of fresh products and the perception of the development of the epidemic

	N	M	SD	t	Sig.(double tail)
19.1.During the epidemic, when you buy fresh products, pay attention to their prices	222	3.36	0.86	6.18	0.00
19.2.During the epidemic, the price increase of fresh products will affect your willingness to buy	222	3.34	0.91	5.55	0.00
19.3.During the epidemic, you will pay attention to price fluctuations in the fresh food market	222	3.34	0.87	5.85	0.00
20.1.During the epidemic, when you buy fresh products, pay attention to their quality	222	4.04	0.84	18.53	0.00
20.2.During the epidemic, you are willing to buy fresh products with high price but high quality	222	3.86	0.89	14.40	0.00
21.1.During the epidemic, when you buy fresh products, pay attention to their freshness	222	4.10	0.82	19.89	0.00
21.2.During the epidemic, you are willing to buy fresh products with high prices	222	3.91	0.88	15.36	0.00
24.1.Evaluation of the development of the epidemic-you are concerned about the development of the epidemic	222	4.25	0.78	23.80	0.00
24.2.During the epidemic, you note the quality and safety supervision procedures of fresh products	222	4.14	0.84	20.30	0.00
24.3.During the epidemic, you note the origin of fresh products	222	4.08	0.81	19.78	0.00

Table 5 Analysis of the differences in the monthly household income of each dimension

	options	N	M	SD	F	Sig.
19.1.During the epidemic, when you buy fresh products, pay attention to their prices	5,000 yuan and below	43	3.23	1.07	0.76	0.55
	10,000yuan and below	71	3.49	0.79		
	20,000yuan and below	62	3.29	0.69		
	30,000yuan and below	20	3.35	0.88		
	over 30,000 yuan	26	3.35	1.02		
19.2.During the epidemic, the price increase of fresh products will affect your willingness to buy	5,000 yuan and below	43	3.21	0.99	1.15	0.33
	10,000yuan and below	71	3.46	0.89		
	20,000yuan and below	62	3.29	0.78		
	30,000yuan and below	20	3.55	0.89		
	over 30,000 yuan	26	3.15	1.08		
19.3.During the epidemic, you will pay attention to price fluctuations in the fresh food market	5,000 yuan and below	43	3.21	1.08	0.85	0.50
	10,000yuan and below	71	3.46	0.89		
	20,000yuan and below	62	3.35	0.63		
	30,000yuan and below	20	3.15	0.81		
	over 30,000 yuan	26	3.35	0.98		

### 3.3.4 Perception of purchase channels

Using the paired sample T test, the results show that the impact of the epidemic on the overall fresh purchase channels is significant; residents' perceptions of the freshness, price, and quality of offline supermarkets/markets after the epidemic are significantly lower than those before the epidemic ( Freshness:  $t = 3.08$ ,  $p < 0.05$ ; Price:  $t = 2.16$ ,  $p < 0.05$ ; Quality:  $t = 2.29$ ,  $p < 0.05$  ); Residents' attitudes towards the freshness and quality of online shopping after the epidemic were significantly higher than those of the epidemic The previous perception attitude (freshness:  $t = 2.23$ ,  $p < 0.05$ ; quality:  $t = 3.16$ ,  $p < 0.05$ ), but the perception attitude towards quality is not significant ( $t = 1.34$ ,  $df = 221$ ,  $p = 0.18$ ) (table 3).

### 3.3.5 Attention to the development of the epidemic

Using the one-sample T test, the results show that the residents' attention to the epidemic situation is positive, and the results are significantly higher than the test value (test value=3), indicating that the

residents' attitude is positive attention (Table 4).

Using a one-way analysis of variance, the results show that residents' attention to the development of the epidemic is significantly different at different levels of education, and those with a college or undergraduate degree are significantly higher than those with a high school or below, and those with a postgraduate or above are significantly higher than those with a high school and below. (Table 6).

*Table 6 Analysis of the difference in education level of each dimension*

	options	N	M	SD	F	Sig.	multiple comparisons
24.1.Evaluation of the development of the epidemic-you are concerned about the development of the epidemic	high school and below	44	3.93	0.85	5.57	0.00	2>1,3>1
	college or undergraduate	162	4.31	0.76			
	postgraduate and above	16	4.56	0.63			
24.2.During the epidemic, you note the quality and safety supervision procedures of fresh products	high school and below	44	3.89	0.87	3.28	0.04	2>1,3>1
	college or undergraduate	162	4.18	0.83			
	postgraduate and above	16	4.44	0.63			
24.3.During the epidemic, you note the origin of fresh products	high school and below	44	3.75	0.89	5.33	0.01	2>1,3>1
	college or undergraduate	162	4.14	0.77			
	postgraduate and above	16	4.38	0.81			
<i>Note: 1 means high school and below, 2 means college or undergraduate, 3 means graduate student and above</i>							

## 4. Conclusion

### 4.1 Research conclusions and recommendations

After analyzing the above results, the following conclusions are drawn:

The new crown epidemic has affected the fresh food consumption behavior of Chinese residents. The most obvious impact is that most residents' fresh food purchases have decreased. The consumption habits of residents have undergone major changes due to the impact of the epidemic. The frequency of purchasing fresh food has decreased, and the amount of single fresh food consumption has decreased. This is due to the impact of the new crown epidemic. Fresh products are susceptible to virus infection, and consumers have generally begun to pay attention to the quality and safety of fresh food; during the epidemic, the output and variety of fresh products have decreased, and residents cannot choose enough fresh food as usual; at the same time, the income of many families has decreased, and the expenditure on fresh food has also decreased. At the same time, the purchasing channels of residents have gradually changed from offline supermarkets or markets to online shopping. Due to the short shelf life and perishable characteristics of fresh food, Chinese consumers tend to buy in physical stores during normal periods. The outbreak of the new crown epidemic has changed this way of consumption to a certain extent, and residents are affected by travel restrictions, and the behavior of buying fresh food online has gradually increased (Tang, JY & Guo, LX, 2021). During the epidemic period, when residents buy fresh products, they mainly focus on vegetables, fruits, and meat, and they have a high degree of attention to quality and freshness, but their attention to price has decreased, and most residents are willing to spend more. Price to buy good quality and fresh fresh products. Residents generally maintain a high degree of attention to the development of the epidemic. The degree of attention of the residents to the epidemic will affect the residents' understanding of the development of the epidemic, which will affect the behavior of residents to purchase fresh products. At the same time, it is found that the higher the education level of the residents, the higher the level of education. Pay

more attention to the development of the epidemic.

Therefore, the following suggestions are given:

During the epidemic, based on the level of awareness of the quality of fresh food, it will have an important impact on the residents' fresh food purchasing behavior. Residents pay more attention to the quality of fresh food, which requires the fresh food industry to ensure the quality of fresh food during the epidemic and improve the supply level. The government strictly controls imported fresh products, prevents fresh products with viruses from entering the market, and ensures that residents have sufficient and safe fresh products.

After the outbreak, the attention paid to the development of the epidemic significantly affected residents' fresh purchase behavior. If residents do not understand the situation of epidemic prevention and control, it may cause social panic, leading to fresh prices or chaotic supply order. It is necessary to disclose the progress of the epidemic prevention and control work in a timely manner, broaden the residents' information channels, and reduce the panic caused by information inequity (Qin, J. Q. et al., 2021). The government should improve the laws and regulations of the fresh food market as soon as possible, and regulate the business models of businesses to ensure the standardization of logistics processes. Merchants are required to transparently disclose to consumers relevant information such as the origin, production time, and virus detection of fresh products.

In order to reduce residents' outing activities, online shopping has become an important way to purchase fresh products (Qiu, LY et al., 2021). Therefore, it is necessary to expand the scale of fresh food e-commerce to ensure that residents can purchase "authentic" fresh products at a reasonable price. . At the same time, in order to prevent online shopping from monopolizing the fresh food market, it is recommended that the offline market can stimulate consumption through price-cutting and other means. It is also necessary to promote the integration of online shopping with offline markets, which will help promote residents' consumption and better serve consumers.

Fresh products have the characteristics of high storage conditions and strong timeliness. Therefore, merchants took a higher risk to sell. During the epidemic, most merchants suffered losses to varying degrees. The government should support the development of the fresh food industry as much as possible and provide appropriate subsidies.

## 4.2 Discussion

The value of this research lies in the in-depth analysis of the impact of the epidemic on the consumption of fresh products by Chinese residents, and corresponding suggestions to the fresh market to increase the purchase of fresh food and promote the development of the fresh food industry. So far, the epidemic situation has been in a relatively stable situation, and in-depth analysis should be combined with the current situation after the epidemic, combined with the prediction of the future market, in order to maintain the long-term development of the fresh food market.

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