EFFECT OF COVID-19 PANDEMIC ON MARKET PRICE OF POULTRY AND POULTRY PRODUCTS IN BANGLADESH

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ABSTRACT

The aim of the study was to investigate how the COVID-19 pandemic has impacted the wholesale price of chicken and chicken products. Data of one year were collected from online database of poultry news portal from which 6 months of pre-covid and 6 month of covid period. A structured questionnaire was prepared to put market price of chicken and chicken products from eight divisions of Dhaka, Khulna, Barishal, Mymensingh, Sylhet, Rangpur, Rajshahi and Chattogram of Bangladesh. Secondary data were collected for 12 months from each divisions for all parameters. The results showed that the average wholesale price of broilers, culled white chicken and Sonali chicken, shell eggs (brown and white) and day-old-chicks (brown chicks, white layer chicks and broiler chicks) were fluctuated due to COVID-19 pandemic, but no significant (p>0.05) difference was found in prices except live culled red chicken. The average wholesale price of culled red chicken in Chattogram was 171.12±19.67Tk/kg on July to December 2019 and 195.34±35.70Tk/kg on July to December 2020. In Khulna and Rajshahi the wholesale price of brown shell eggs has descending order whereas in Dhaka, Barishal and Chattogram the price has a accending order, but it remain unchanged in Mymensingh, Sylhet and Rangpur during COVID pandemic. The wholesale price of white shell eggs in Dhaka, Khulna and Rajshahi showed decreasing trend during pandemic but increasing trend in Chattogram. The wholesale price of white layer chicks was lowered by 21.43Tk, 23.79Tk and 31.03Tk/chick in COVID period than pre-COVID period in Dhaka, Barishal and Rangpur, whereas minor price fluctuation was observed in brown layer and broiler chicks. The extreme wholesale price of a Sonali chick was 15.67±3.50/chick in Rangpur only during pandemic. The study concluded that the COVID-19 pandemic had a negative impact on the poultry industry.

Keywords: poultry industry, COVID-19, wholesale price, poultry and poultry products⁷

INTRODUCTION

Poultry business is a promising sector for reducing poverty in Bangladesh. The majority of the poultry produced in Bangladesh is chicken. There are about 311.8 million chicken and 63.84 million ducks in Bangladesh (DLS, 2022). Now the available meat consumption is 147.84g/day/head (DLS, 22) where as the people of developed country consume above 200g (UFAPRI, 2019). Same time our egg consumption is 136.01Nos./vear/head (DLS, 2022) and the people of developed country intake above 250 eggs/year (The Business Standard, 2020). About 3.5 to 4.0 crore eggs are required daily to meet national demand (BEPA, 2022). The primary animal industry in Bangladesh is poultry, which plays a significant role in the nation's overall food security and economic growth (Hamid et al., 2017). This industry employs more than 8.5 million people, making it the second-largest employer behind the apparel sector. Poultry meat alone contributes 37% of the total meat (Hamid et al., 2017). In Bangladesh Contribution of livestock in national GDP is 1.9% and share of livestock in Agricultural GDP is 16.52% (DLS, 2022). One of the important livestock sub-sectors dedicated to giving the country cheap access to animal protein in the form of eggs and protein is the poultry business (Das et al., 2008). According to the BPICC, Bangladesh has 18 grandparent and 216 parent stock corporations of which one hundred certified (BPICC, 2022). Bangladesh reported its first COVID-19 case on March, 2020 (WHO, 2020). The government implemented a statewide lockdown (known as the "General Holiday" from 26 March and 30 May as part of its efforts to stop the virus spread. Meanwhile the market of poultry products has fallen dramatically as a result of the corona virus. In addition, the output

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of eggs has significantly decreased (Sattar *et al.*, 2021). In the meantime, more farms sold their older birds without bringing in a fresh batch of chicks. As hotels, restaurants, bakeries, and fast food outlets have been shut down since March 26 to stop the spread of the corona virus, the demand for poultry meat and eggs has continued to decline and about 50-60% of chicken farms have been temporarily closed (BPICC, 2020). More than half of the nation's poultry farms and hatcheries were forced to close as a result of the avian influenza epidemic in 2007. At the beginning of coronavirus, spread of this disease (COVID-19) among human population is witnessed in India (Kolluri *et al.*, 2020). It seriously threatened the livelihoods of millions Bangladeshi backyard chicken raisers and small traders (Mahmud, 2020). If the supply chain for the poultry business is disrupted for an hour, a week, a day, or a month, it can have major economic repercussions, as it was happened pandemic time. A few studies on COVID-19 and poultry have been conducted. Taking into account the aforementioned concerns, the research project set out to determine the market fluctuation scenario for poultry and poultry products.

Objectives

The present study has been taken to investigate the market fluctuation scenario of poultry and poultry products of Bangladesh before and during pandemic situations. However, the specific objectives are as follows:

- To find out the fluctuation of wholesale price of broilers, culled birds, shell eggs and day-oldchicks and
- To compare pandemic market price of chicken and chicken products with Pre-COVID and COVID market.

MATERIALS AND METHODS

Study area

The study has been conducted in Bangladesh. The country has eight administrative divisions. The study covered all division of Bangladesh.

Type and sources of data

In the present study, secondary data were used only from wholesale market. The data were collected from relevant online database of poultry news portal Agricare24.com (2017) and Agrinews24.com (2017).Data of one year were collected of which six months from pre-COVID period (July-December/2019) and six months from COVID period (July-December/2020) to conduct the experiment.

Preparation of questionnaire

A structured questionnaire was prepared to collect market price of live chicken and chicken products which includes the following products.

- A.Wholesale price of Live Birds: Broiler chicken, Culled red chicken, Culled white chicken and Sonali chicken.
- B.Wholesale price of eggs: Brown shelled eggs and White shelled eggs.
- C.Wholesale price of day-old-chicks: Brown layer chicks, White layer chicks, Broiler chicks and Sonali chicks.

Selection of months to collect the data

The first known outbreak of COVID-19 started in Wuhan, Hubei, China, in November 2019. Many early cases were linked to people who had visited the Huanan Seafood Wholesale Market there, but it is possible that human-to-human transmission began earlier. However, in Bangladesh it was confirmed the first coronavirus case on 8 March 2020. In response to the COVID-19 pandemic, the Government of Bangladesh (GoB) declared special "general leave" from 26 March in the name of "lockdown" and extended it up to 30 May 2020 in seven different time slots. So, although it is COVID-19, but 2019 was totally free from COVID pandemic in Bangladesh. Therefore, last six months of 2019 i.e. July to December month was selected to collect pre-COVID data for the study. In Bangladesh lockdown

affects the poultry market seriously since July 2020. This is why July- December/2020 month was selected to collect data during pandemic.

Data collection

Data were collected from eight divisions (Dhaka, Khulna, Barishal, Mymensingh, Sylhet, Rangpur, Rajshahi and Chattogram) of Bangladesh. To collect the data 4 days of a month were considered randomly taking a day from each week. A Total of (4 days x 6months) 24 days from pre-COVID and 24 days from COVID period i.e. 48 days data were collected from each division for each parameters for the study.

Collection of wholesale price data of live birds

All categories of data were not available in all divisions for pre-COVID and COVID period. Only those divisions' data were considered which were available in the both period. In case of live broiler, Khulna and Rangpur division's data were not available during pre-COVID and COVID period. For culled red birds Khulna, Mymensingh, Sylhet, Rangpur's data were not available. For culled white only Dhaka (Gazipur), Khulna and Rajshahi's data were available in both period. Khulna, Sylhet and Rangpur divisions' data were not available for Sonali chicken.

Collection of wholesale price data of eggs

In case of brown shelled eggs all data were available in all divisions during COVID and pre-COVID period. But in case of white shelled eggs the divisions of Barishal, Mymensingh, Sylhet and Rangpur's data were not available in both period.

Collection of wholesale price data of day-old-chicks

Wholesale price of chicks were available in four divisions, Dhaka, Barishal, Rangpur and Chattogram for brown, white and day-old-broiler chicks. Day-old-Sonali chicks' wholesale price was not available in all divisions of Bangladesh during pre-COVID period except Rangpur division.

Statistical analysis

The collected data and information were scrutinized, classified, edited and coded. Information of questionnaire was transferred into a master sheet for entering the data in the computer. Microsoft Excel computer software package programs were used to find out average data of live birds, eggs and day-old- chicks. Finally the SPSS computer package program was used for data analysis. To compare the data of two period of same divisions paired t-test was used.

RESULTS AND DISCUSSION

Wholesale Price of Live Birds

Generally the price of live birds varied in different market place of Bangladesh. This is due to production cost, seasons, festival and demand of the customers. But during current pandemic it was seriously affected poultry industry and as well as price of live birds.

Wholesale price (Taka/Kg) of broiler chicken in different divisions in Bangladesh

Table 1 gives the mean wholesale price of broiler chicken that was delivered by several agricultural marketplaces of different divisions both before and during COVID-19. Data from 12 months were used in the analysis, representing 6 divisions. In most cases the data were gathered from 6 months prior to COVID and 6 months during COVID. The mean wholesale price has increased trend during the COVID-19 period as compared to the same period last year. No statistical (p>0.05) difference was found in the wholesale price of broiler chicken before COVID in 2019 and during COVID in 2020. But, during COVID 2.0 to 3.35Tk were increased in Barishal, Dhaka and Chattogram; the price was unchanged in Sylhet; 1.0Tk difference was observed in Mymensingh and Rajshahi division. The findings of the current analysis indicated that 2020 was seeing a modest increased in wholesale prices compared to 2019. The Business Standard (2020) reported that monthly broiler production fell to COVID-19 pandemic. Furthermore, Berkhout (2020) reported that these production levels decreased by at least 50% after March 2020.

Division	Pre-COVID Period (July-Dec/19)	During COVID Period (July-Dec/20)	Level of significance		
	Mean ±SD	Mean ±SD			
Dhaka	93.80±7.64	96.88±6.12	0.516^{NS}		
Barishal	92.92±3.93	95.00±7.52	$0.565^{ m NS}$		
Mymensingh	96.63±8.60	97.18±5.31	0.907^{NS}		
Sylhet	97.91±7.21	97.33±6.48	0.888^{NS}		
Rajshahi	98.55±9.04	97.98±4.60	0.899 ^{NS}		
Chattogram	96.87±6.22	100.22±6.13	0.433 ^{NS}		

Table 1. Average wholesale price (Taka/Kg) of broiler chicken in different divisions

Here, SD = Standard Deviation; NS = Non-significance; Tested at 5% level of significance (p<0.05)

Average whole price (Taka/Kg) of culled red chicken in different divisions

Table 2 gives the mean wholesale price of culled red chicken of Dhaka, Barishal, Rajshahi and Chattogram that was delivered by several agricultural marketplaces of different divisions both before and during COVID-19. The results revealed that there was no significant (p>0.05) difference between the wholesale price of culled red chicken in 2019 and 2020 at Dhaka, Barishal and Rajshahi divisions, but at Rajshahi 22.0Tk was increased/kg, whereas 4.0Tk was at Barishal. At Chattogram division 24.0Tk was increased significantly (p<0.05) per kg of culled red chicken during COVID than pre-COVID period.

Division	Pre-COVID Period (July-Dec/19) Mean ±SD	During COVID Period July-Dec/20) Mean ±SD	Level of significance		
Dhaka	157.86±10.21	172.83±31.92	0.160 ^{NS}		
Barishal	178.12±10.89	182.08±29.22	0.659 ^{NS}		
Rajshahi	160.05±19.77	182.08±31.09	0.083 ^{NS}		
Chattogram	171.12±19.67	195.34±35.70	0.044*		

Here, SD = Standard Deviation; NS= Non-significance *means significant at 5% level of significance (p<0.05).

Disruption of poultry supply chain and state lockdown severely affects poultry industries and this is the main cause of increasing price of culled red chicken during COVID in 2020 compared to pre-COVID. Another reason of increasing price of culled red chicken is only the rich persons (Sattar *et al.* 2021) purchase it. The distribution of chicken and poultry products is hampered by market risks such value chain fragmentation and high intermediation costs (MoF, 2020).

Average wholesale price (Taka/Kg) of culled white chicken in different divisions

From Table 3, it is noted that the mean wholesale price of culled white chicken increased 15.0Tk at Dhaka division and decreased 10.0Tk at Khulna, but it remain unchanged at Rajshahi division during COVID period. The result revealed that the wholesale price of culled white chicken was fluctuated between pre-COVID and during COVID period, but, there was no significant (p>0.05) difference between the wholesale price of culled white chicken in 2019 and 2020.

This finding was an agreement with Sattar *et al.* (2021); a notable COVID-19 effect on the poultry industry was a change in live chicken and egg prices before, during, and after the lockdown from January to June 2020. As a major factor in the decline in consumer demand, the rumors were also cited in other news papers (Sharma *et al.*, 2020).

Division	Pre-COVID Period (July-Dec/19) Mean ±SD	During COVID Period (July-Dec/20) Mean ±SD	Level of significance	
Dhaka	115.34±12.12	130.56±26.25	0.09 ^{NS}	
Khulna	146.64±13.28	136.69±25.72	0.310 ^{NS}	
Rajshahi	135.77±12.92	135.91±27.09	0.988 ^{NS}	

Table 3. Monthly average whole price (Taka/Kg) of culled white chicken in different divisions

Here, SD = Standard Deviation; NS= Non-significance; Tested at 5% level of significance (p<0.05)

Average wholesale price (Taka/Kg) of Sonali chicken in different divisions

The wholesale price of Sonali chicken is presented in Table-4, which was not significantly (p>0.05) different. Compared to broilers, Sonali chickens make up a lower percentage of the chicken marketed in Bangladesh, and its producer fetch a higher price from (mainly) richer buyers (Sattar *et al.*, 2021). It is observed that in COVID period its wholesale price at Barishal, Rajshahi and Chattogram division declined to 7.0, 32.0 and 7.0Tk respectively compared with pre-COVID price; although its price remains unchanged at Dhaka and Mymensingh division.

Division	Pre-COVID Period (July-Dec/19)	During COVID Period(July-Dec/20	Level of	
	Mean ±SD	Mean ±SD	significance	
Dhaka	171.32±15.19	171.04±30.45	0.988 ^{NS}	
Barishal	173.12±7.57	166.66±24.48	0.621 ^{NS}	
Mymensingh	173.96±14.15	173.29±30.17	0.970^{NS}	
Rajshahi	175.79±15.61	143.33±75.53	0.412^{NS}	
Chattogram	184.79±14.99	176.09±29.11	$0.608^{ m NS}$	

Here, SD = Standard Deviation; NS= Non-significance; Tested at 5% level of significance (p<0.05)

The result is an agreement with Sattar *et al.* (2021) and showed that Sonali's price swings were noticeably less pronounced than those of broilers, and they remained at or below pre-lockdown levels even throughout lockdowns.

Wholesale Price of Shell Eggs

The devastating impact of COVID-19 on poultry industry, specially egg supply chain seriously disrupted and egg price fluctuated after and before COVID pandemic. The fluctuation of the wholesale price of shell eggs has been studied here.

Average wholesale price (Taka/Piece) of brown shell eggs in different divisions

The mean wholesale price of brown shell eggs at Dhaka, Khulna, Barishal, Mymensingh, Sylhet, Rangpur, Rajshahi and Chattogram is presented in Table 5. Although the wholesale price of brown shell eggs little bit fluctuated between after and during COVID-19 but there were no significant (p>0.05) difference of the wholesale price of brown shell eggs between pre-COVID and during COVID pandemic. It is revealed from the findings that in Khulna and Rajshahi the wholesale price was decreased. Mahmud (2020) noted similar opinion that people have started avoiding consumption of chicken and eggs. But in Dhaka, Barishal and Chattogram the price was upward, but it was remain unchanged in Mymensingh, Sylhet and Rangpur divisions during pre-COVID and COVID pandemic period. According to BPICC (2020) due to the closure of 32–35% egg-producing farms, egg output had also dramatically decreased during the pandemic.

Division	Pre-COVID Period (July-Dec/19)	During COVID Period (July-Dec/20)	Level of significance
	Mean ±SD	Mean ±SD	-
Dhaka	7.28±0.54	7.39±0.76	0.496^{NS}
Khulna	7.61±0.71	7.45±0.96	0.438^{NS}
Barishal	7.01±0.78	7.31±0.85	0.10^{NS}
Mymensingh	7.37±0.53	7.37±0.79	0.988^{NS}
Sylhet	7.50±0.57	7.53±0.81	0.896 ^{NS}
Rangpur	7.17±0.49	7.17±0.66	0.964^{NS}
Rajshahi	7.11±0.51	7.03±0.60	0.566^{NS}
Chattogram	7.46±0.61	7.55±0.81	0.476^{NS}

Table 5. Monthly average wholesale price (Taka/Piece) of brown shell eggs in different divisions

Here, SD = Standard Deviation; NS = Non-significance; Tested at 5% level of significance (p<0.05)

Average wholesale price (Taka/Piece) of white shell eggs in different divisions

The mean wholesale price of white shell eggs at Dhaka, Khulna, Rajshahi and Chattogram is displayed in Table 6. The results revealed no significant difference (p>0.05) of wholesale price of white shell eggs between pre-COVID and COVID period. The wholesale price in the division of Dhaka, Khulna and Rajshahi were decreasing trend during pandemic, but it was observed to increase only at Chattogram division.

Division	Pre-COVID Period (July-Dec/19)	During COVID Period (July-Dec/20)	Level of Significance	
	Mean ±SD	Mean ±SD	U	
Dhaka	7.05±0.56	7.01±0.84	0.885 ^{NS}	
Khulna	7.42±0.67	7.23±0.74	0.369 ^{NS}	
Rajshahi	6.88±0.64	6.48±0.63	0.067^{NS}	
Chattogram	7.12±0.60	7.43±0.92	0.119 ^{NS}	

Here, SD= Standard Deviation; NS= Non-significance; Tested at 5% level of significance (p<0.05)

The findings of this study in an agreement with the researcher (Kolluri *et al.* 2020) reported that the lowest egg prices were observed during the COVID-19 pandemic at USD 2.04 compared to a USD 5.0 manufacturing cost. Furthermore, Egg prices are an indirect indicator of the supply-demand situation in the market, and examining their trajectory in relation to time series offers a chance to adapt to shifting market conditions (Yuhuan and Fu, 2018). Bangladesh Poultry Industries Central Council President told (Dhaka Tribune, 2020) that the consumers cannot go to the kitchen markets due to the government-imposed lockdown, significantly bringing down the demand for meat, egg, and other processed food.

Wholesale price (Taka/chick) of day-old-chicks

People avoided consumption of chicken and egg as the COVID-19 outbreak had started. Besides, consumers were unable to go to the markets due to the lockdown which significantly reduced demand for meat, egg, and other processed food. As a result, a large number of poultry farmers shuttered down their poultry farm which effected on the price of day-old-chicks.

Average wholesale price (Taka/chick) of brown layer chicks in different divisions

From the Table 7, it is illustrated that the non- significant (p>0.05) mean of wholesale price of brown layer chicks at Barishal, Rangpur and Chattogram were decreased to 36.20 ± 7.54 , 36.91 ± 5.90 and 35.31 ± 6.60 Tk during pandemic from pre-pandemic price of 37.00 ± 7.06 , 38.70 ± 6.90 and 41.58 ± 12.04 respectively. The minor price hike (1.59Tk) was found at Dhaka division during COVID period. According to FAO (2020) reports, the prices of day-old layer chicks dropped by 75% and 40-50% of newly born DOCs get unsold due to COVID-19 pandemic.

Table 7. Monthly	average	wholesale	price	(Taka/chick)	of	brown	layer	Chicks	in	different
divisions										

Division	Pre-COVID Period (July-Dec/19)	During COVID Period (July-Dec/20)	Level of Significance	
	Mean ±SD	Mean ±SD		
Dhaka	38.12±9.70	39.71±6.60	0.476^{NS}	
Barishal	37.00±7.06	36.20±7.54	0.748^{NS}	
Rangpur	38.70±6.90	36.91±5.90	0.559 ^{NS}	
Chattogram	41.58±12.04	35.31±6.60	0.223^{NS}	

Here, SD= Standard Deviation; NS= Non-significance; Tested at 5% level of significance (p<0.05)

The number of day-old chicks produced has decreased by the breeders. According to the report (BPICC, 2020) over 50% of hatcheries have reportedly ceased production.

Average wholesale price (Taka/chick) of white layer chicks in different divisions

The mean wholesale price of white layer chick in Dhaka, Barishal and Rangpur division were about 66.00Tk in pre-COVID time but it fall down to 35.0 to 44.0 Tk during pandemic period. The values showed no significant (p>0.05) difference between in pre-COVID and COVID period (Table 8). In COVID-19, it was a great impact on poultry industry, basically on the price of white layer chicks. Due to COVID-19 pandemic the wholesale price of white layer chicks was decreased dramatically in different division of Bangladesh.

Division	Pre-COVID Period (July-Dec/19)	During COVID Period (July-Dec/20)	Level of Significance	
	Mean ±SD	Mean ±SD		
Dhaka	66.41±12.98	44.98±7.27	$0.08^{ m NS}$	
Barishal	66.14±14.20	42.35±5.41	0.08^{NS}	

35.52±6.68

 0.05^{NS}

Table 8. Monthly average wholesale	nrice (Taka/chick	c) of white laver chicks in	different divisions
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Here, SD= Standard Deviation; NS= Non-significance; Tested at 5% level of significance (p<0.05)

66.55±19.23

Rangpur

The result is an agreement with the previous researcher Sattar *et al.* (2021) showed that March and April, 2019 was a beneficial time of year for chicks traders and producers, because chicks prices are often slightly higher during these months. The situation, however, dramatically changed on March 26 when the pandemic hit the nation and the authorities declared a state of lockdown.

Average wholesale price (Taka/chick) of broiler chicks in different divisions

No significant (p>0.05) difference was observed in wholesale price of broiler chicks between pre-COVID and COVID period among different divisions (Table 9). The wholesale price of Dhaka, Barishal, Rangpur and Chattogram was lower in 2020 than 2019 by difference of 2.62Tk, 4.89Tk, 7.92Tk and 5.38Tk, respectively. Many poultry farmers shuttered down their broiler farms due to decline of consumers demand in COVID period were the main cause of decreasing the price of broiler chicks. The study is an agreement with the report of IDLC (2020) that for many farmers, the business was unprofitable due to the difference between production costs and wholesale prices.

Division	Pre-COVID Period (July-Dec/19)	During COVID Period (July-Dec/20)	Level of Significance	
Dhaka	Mean ±SD 25.96±4.80	Mean ±SD 23.34±4.02	0.269 ^{NS}	
Barishal	26.27±5.12	21.38±4.47	0.139 ^{NS}	
Rangpur	31.25±7.73	23.33±3.77	0.079^{NS}	
Chattogram	27.90±6.17	22.52±3.08	0.135 ^{NS}	

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Table 9. Monthly	y average wholesale	price (Tal	ka/chick) of	t broiler c	chicks in	different divisions

Here, SD= Standard Deviation; NS= Non-significance; Tested at 5% level of significance (p<0.05)

Ali (2020) also reported that the production of chicken meat dropped quickly from 90,000 to 25,000 tons/month with small-scale farms being particularly badly impacted while many large-scale farms cut their flock size. So at that time demand of chicks naturally decreased as well as chick's price was decreased.

Average wholesale price (Taka/chick) of Sonali chicks in different divisions

The data of the wholesale price of Sonali chicks was not available in poultry web portal on 2019 at different divisions of Bangladesh, but it was available only at Rangpur division in 2020. So the value was not statistically comparable. However, in Rangpur the average mean wholesale price of Sonali chicks was only 15.67±3.50Tk/chick on July to December 2020. Islam *et al.* (2021) also found day-old Sonali chick at low cost of 17.73 Tk/chick in winter season at Rajshahi division.

CONCLUSION

Poultry sector play an important role in the economy of Bangladesh. Many people maintain their livelihood through involve this sector. This study attempted to assess the effect of COVID-19 pandemic on market price of poultry and poultry products. It was observed that the price of poultry and poultry products varies division to division a bit. There was no significant difference between before and at the time of COVID pandemic regarding poultry and poultry products price. However, people involved with this sector greatly hampered due to COVID-19 pandemic. The policymakers should consider the facts and take measures to improve the sector.

Acknowledgement: The authors are grateful to the Sher-e-Bangla Agricultural University Research System (SAURES) autharity for providing finincial support to complete the research work

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