

RESEARCH ARTICLE

Influence of Corona Virus Disease (COVID-19) on Consumption and Purchasing Patterns of Poultry Products from Three Selected Districts in Sri Lanka

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ABSTRACT

The study reported herein investigated the effects of COVID-19 pandemic on purchasing and consumption patterns of poultry products among the communities in Kandy, Gampaha and Galle districts of Sri Lanka. A pre-tested questionnaire was used to collect data from 629 respondents. The questionnaire explored different socio-economic and health factors affecting on consumption and purchasing frequencies of chicken meat, meat products and eggs before and during the pandemic. The results revealed that the pandemic has made an impact on consumption frequencies of chicken or processed chicken products. Weekly purchasing amount of chicken or processed chicken products has been declined during the pandemic. Many respondents increased their egg consumption during the pandemic. Stocking poultry products during the pandemic has also increased. The study concluded that though the purchasing frequencies and the amount of chicken or processed chicken products have been changed consequently to the pandemic, neither the purchasing method nor purchasing brand has been changed. The pandemic had no influence on buying patterns for eggs but has contributed to increased egg consumption frequency among the public.

Keywords: *Chicken, COVID-19, Eggs, Meat, Pandemic*

INTRODUCTION

Livestock sector is one of the major pioneers contributing to food security in Sri Lanka. Of different entities representing the livestock sector in Sri Lanka, a significant contribution (0.68%) came from poultry to nominal gross domestic production (GDP), which is 65% of the total contribution of Sri Lankan livestock in 2020 (DAFH, 2022). The most recent data suggests that the poultry meat and egg production in Sri Lanka in 2021 was 236.67 ('000 MT) and 2934.55 million, respectively (DAFH, 2022).

Sri Lanka ranked 79th among 113 countries in the Global Food Security Index (GFSI) where the ranking is focused on affordability, quality, safety and availability of food (Global Food Security Index, 2022). Moreover, child malnutrition has been recognized as one of the longstanding issues in Sri Lanka. Sri Lanka also has been identified as one of the top ten countries with the highest

number of malnourished children and these figures are expected to increase in future (Ministry of Environment, 2021; UNICEF, 2022). It is well known that over 30% of the Sri Lankan population or 6.3 million people do not have access to nutritionally rich food and are food insecure (Sri Lanka Annual Country Report, 2022). According to the Demographic and Health Survey (DHS) conducted by the Department of Census and Statistics (DCS) in 2016, stunting (17.3%), wasting (15.1%) and poor weight (20.5%) are common among children aged around 5 years or below.

Among different protein-originated food commodities, poultry eggs and meat are renowned for their high protein content, availability, affordable price and for having minimum cultural taboos. Therefore, poultry eggs and meat have become the most consumed animal protein sources in Sri Lanka. The current annual per capita consumption of chicken meat and eggs in Sri Lanka is 10.68 kg and 132 eggs, respectively (Annual Statistical Bulletin, 2021). Therefore, poultry products have a very good potential to make a significant contribution to uplifting the nutritional status of the Sri Lankan community by fulfilling the nation's protein requirement.

Severe acute respiratory syndrome coronavirus 2 or SARS-CoV-2 is a positive-sense single-stranded RNA virus, which was first isolated in late December, 2019 from Wuhan city of Hubei province, China (Martin, 2020). Though COVID-19 pandemic has been elucidated mainly as a community health crisis, it caused a substantial impact on global economies, leading to socio-economic crisis and disruption of the food supply chain. Within two months the pandemic spread throughout the world and caused disturbances in the global economy and the food supply chain. This unprecedented global emergency made the year 2020 to be recognized as one of the toughest years for the poultry industry and for the Sri Lankan community.

The government implemented a variety of disease prevention and control measures in response to the spread of COVID-19 disease across the nation, notably during its first wave. Suspension of live animal imports, restrictions on raw material importation, imposing of curfew and restricting all kinds of movements directly influenced the production and consumption of poultry products. (DAFH, 2021). However, COVID-19 pandemic has created a significant impact on the supply and demand of food products. Pandemic-induced economic collapse which could be observable in Sri Lanka's economy may make it more difficult for people to get a nutritious diet, especially for the poor. Demand for essential food items has increased significantly due to panic buying and hoarding of food during the pandemic. Under this situation, a group of people who could not get essential food was also created. Furthermore, people's perceptions of the mode of disease spread also had a significant influence on the amount and type of food that they consumed during the pandemic. This was obviously noted in fish and meat products in which the demand was declined in 2020, particularly during the second wave of the pandemic.

Considering the aforementioned facts, we assumed that there is a significant impact of COVID-19 pandemic on the consumption and purchasing patterns of poultry products which may possibly lead to malnutrition as a future consequence. Therefore, this study aimed to assess the impact of COVID-19 pandemic on consumption patterns (or frequency or ways with which the consumers habitually consume) and purchasing behaviour (or decision processes and acts of customers involved in buying) of poultry products by the communities in selected districts of Sri Lanka.

METHODOLOGY

Study location

The present study was conducted covering the period from July 2021 to September 2021. Three districts in Sri Lanka, namely Kandy, Gampaha and Galle were chosen to collect data considering the highest population and the locality.

Sample profile

The sample consisted of a total of 629 respondents who were selected using a simple random sampling technique. The data were collected from 206 respondents residing in Gampaha district, 204 respondents from Galle district, and 219 respondents from Kandy district.

Data collection

A pre-tested interviewer-administered questionnaire prepared in a Google form was used as the key data-collecting tool. The questionnaire was designed to investigate the consumption pattern and purchasing behaviour of (i) poultry meat (ii) poultry-derived value-added products (sausages, nuggets etc.) and (iii) eggs before and during the COVID-19 pandemic by the communities. The questionnaire also explored different socio-economic and health factors affecting on consumption and purchasing frequencies of poultry products before and during the pandemic. The research approach was deductive and both primary and secondary data were obtained for research.

A cross-sectional study was conducted to investigate the influence of the COVID-19 pandemic on the consumption and purchasing patterns of poultry products. A comprehensive questionnaire consisted of 47 questions. The survey instrument was constructed using the Google Forms platform. The questionnaire was disseminated through diverse electronic channels.

Data analysis

Data were analysed using SPSS (Statistical Package for Social Sciences) version 22 software, Python pandas software version 2.2.1 and Microsoft Excel 2016. To analyse the collected data, descriptive statistics such as frequencies and percentages analysis were used.

RESULTS AND DISCUSSION

The demographic profile of the respondents

The demographic profile of the respondents and the descriptive statistics of socio-economic variables and consumption variables are presented in Figure 1 and Table 1, respectively. The demographic data suggests that the majority of the respondents were from the Kandy district (34.8%). The percentages representing Gampaha and Galle districts were 32.4% and 32.8%, respectively (Figure 1A). The majority of the respondents were Sinhalese (90.6%) and were Buddhists (86.5%). As revealed 64.4% of the sample were representative of 18-30-year age category (Figure 1B) and were females (61.8%). The majority of the respondents were unmarried (74.9%). The majority of the respondents were rural dwellers (56.4%) while the rest (43.6%) were from urban areas (Figure 1C). Among 629 respondents, 50.4% were higher education degree bearers while the rest had only secondary (41.0%) and primary (8.59%) education (Figure 1D). The income status of the respondents varied as participants had zero income (51.9%) while 16.5% of them had an income lesser than 25,000 Sri Lankan rupees. The zero-income reported resulted primarily from the presence of university students among the survey respondents, many of whom are not currently earning income.

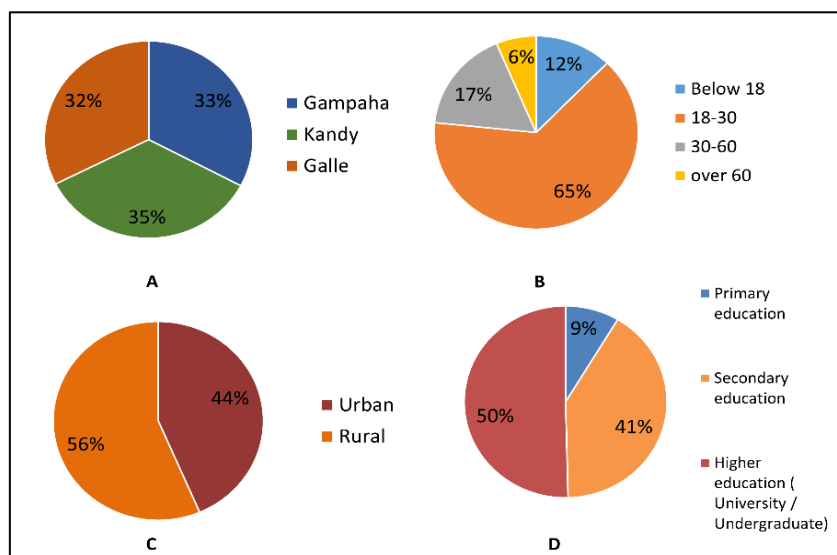


Figure 1: Demographic profile of the respondents: by district (A); age (B); locality (C) and education (D)

Table 1: Descriptive statistics of socio-economic variables and consumption variables

Variable	Weighted Mean	Weighted SD ²	Minimum Value	Maximum Value
1. Age	2.17	10.38	Below 18	Over 60 years

2. Gender	1.62	7.01	Male	Female
3. The highest education level	2.42	9.28	Primary Education	Higher Education
4. Profession	3.94	22.61	Semi-government	Unemployment
5. Income level	1.94	16.66	No income	>Rs.100,000 per month
6. Most consume meat type	2.32	14.25	Mutton	Chicken
7. Consumption frequency of chicken/processed chicken before COVID-19	1.55	14.56	One to two days per week	Daily
8. Reasons for increased consumption frequency of chicken/processed chicken during COVID-19	1.99	15.60	High income	Lockdown and travel restrictions
9. Most consume egg-type	1.21	17.53	Duck eggs	Chicken
10. Consumption frequency of chicken eggs before COVID-19	2.06	15.51	One to two days per week	Daily
11. Reasons for increased consumption frequency of chicken eggs during COVID-19	1.89	15.98	High income	Concern on better health

Sample size (N): Gampaha = 206, Kandy = 219, Galle = 204.

SD=Standard deviation.

Consumption demand for protein sources

The preference for different poultry products by the respondents before the COVID-19 pandemic is presented in Figure 2. Of the total respondents, the majority consume eggs (41.2%) as their main protein source while 27.9% and 22.4% do consume fish and meat/processed meat products, respectively as their main protein source. Of the respondents who eat different meat types, 75% were reported to consume chicken. Among those who consume processed meat products, 87% were reported to consume processed chicken food such as processed meatballs and sausages.

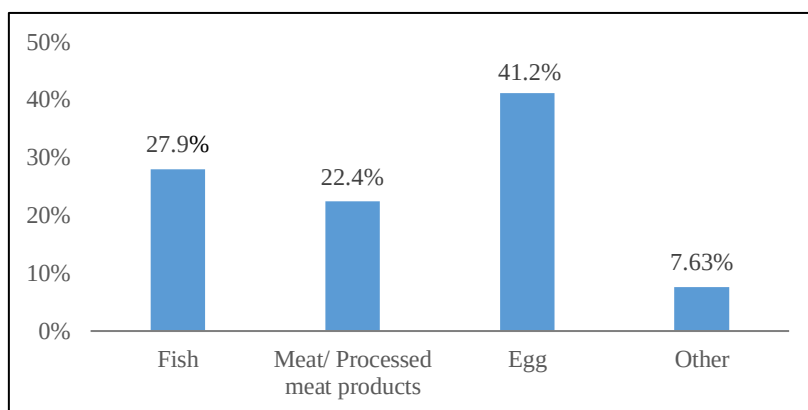


Figure 2: Preference for different animal protein sources by the respondents before the COVID-19 pandemic

Effect of COVID-19 pandemic on purchasing and consumption patterns of chicken and processed chicken products

According to the analysis, 44.7% of the respondents consumed chicken meat in a frequency of 1 to 2 days per week during the pandemic while only 25.1% of them showed daily consumption. Approximately, 9.54% and 2.07% of the respondents consumed chicken meat in a frequency of 3 to 4 days per week and 5 to 6 days per week, respectively. As demonstrated by the results, 36.9% of the respondents consumed processed chicken meat products during the pandemic in a frequency of 1 to 2 days per week. Only 24.3% of them showed daily consumption of these products. Of the remaining, 6.68% and 2.07% of respondents consumed processed chicken meat products at a frequency of 3 to 4 days per week and 5 to 6 days per week, respectively.

However, before the pandemic, 44.9% of them consumed chicken/processed chicken products in a frequency of 1 to 2 days per week and the number is comparatively higher when compared with the same frequency during the pandemic. Also, 24.2% consumed chicken/ processed chicken products daily and the percentage of respondents who consumed chicken/chicken products

daily is more or less similar to the percentage reported during the pandemic. 8.27% and 3.97% of the respondents consumed chicken 3 to 4 days per week and 5 to 6 days per week, respectively before the COVID-19 pandemic.

28.5% of the respondents believed that their consumption frequencies for chicken and/or processed chicken products were increased as a result of COVID-19 Pandemic, while 31.8% believed that their consumption frequencies decreased. Moreover, 26.3% believed that their consumption frequencies for chicken / processed chicken products did not change as a result of COVID-19 pandemic (Figure 3).

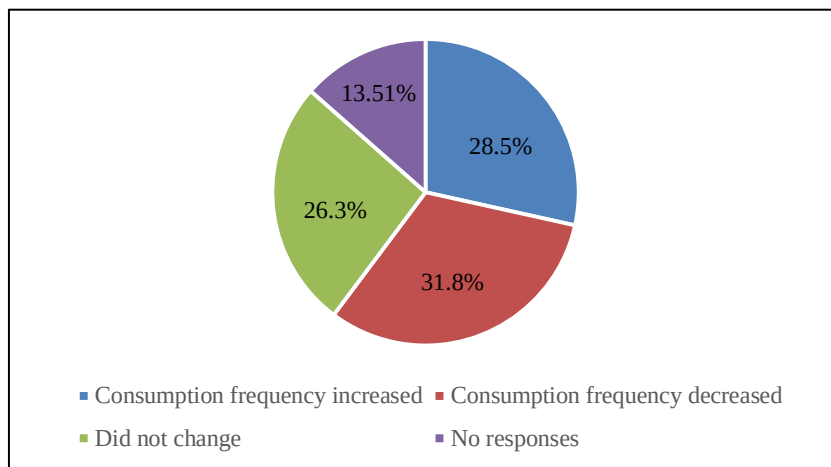


Figure 3: Consumer responses indicating the changes in consumption frequencies of chicken/processed chicken products as a result of COVID-19 pandemic

Among the respondents who increased their consumption frequency, 6.70% have increased the frequency due to quarantine. However, 15.6% increased their consumption frequency due to lockdown and travel restrictions. Only 0.56% increased consumption frequency due to their high income while 5.03% have increased the frequency due to the myths linked with consumption of other protein sources during the pandemic. Also, 7.82% have increased their meat consumption due to the concept of better health concerns and also the limited access to other protein sources (Figure 4).

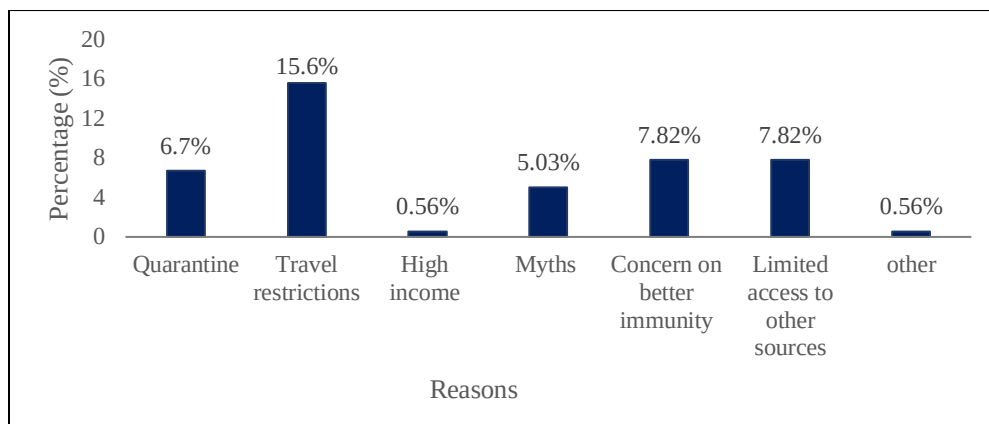


Figure 4: Reasons for increased consumption frequency of chicken/processed chicken products during COVID-19 pandemic

Among the respondents who deducted their consumption frequency, 10% let down their consumption due to the quarantine. 60% reduced their consumption frequency as a result of lockdown and travel restrictions imposed during the pandemic. Due to low income, 28% decreased their consumption. 15.5% let down their consumption due to the myths linked with the consumption of other protein sources. Also, 26.5% deducted their consumption due to the unavailability of chicken or processed chicken products during the pandemic. 24.5% of them have decreased their consumption due to high price rates existed (Figure 5).

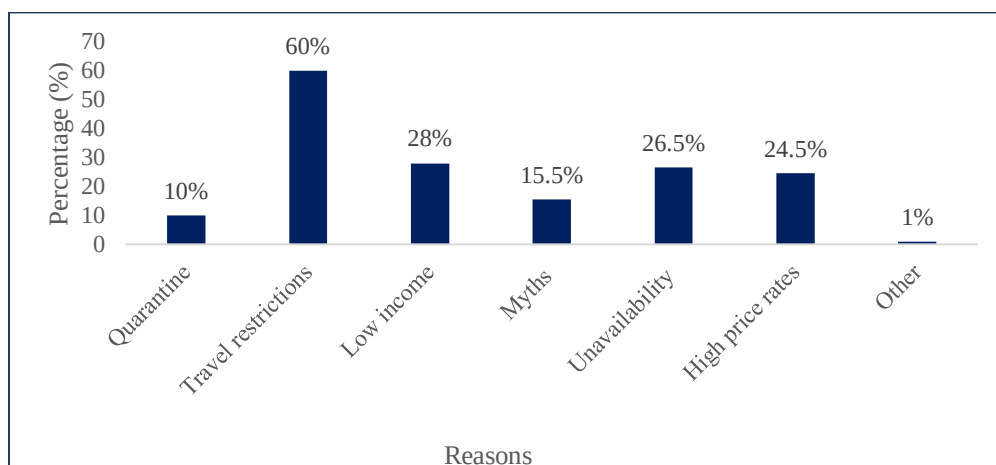


Figure 5: Reasons for reduced consumption frequency of chicken/processed chicken products during COVID-19 pandemic

Among the respondents who eat chicken and/or chicken products, products are purchased from small-scale farmers (13.2%), medium-scale farmers (24.0%) and large-scale farmers (15.9%). Some respondents (31.2%) had no idea about the purchasing farm scale.

Some respondents (22.1%) stated that their purchasing brand/s were changed as a result of COVID-19 pandemic whereas 62.3% of respondents stated that they did not change their purchasing brand during the pandemic (Figure 6).

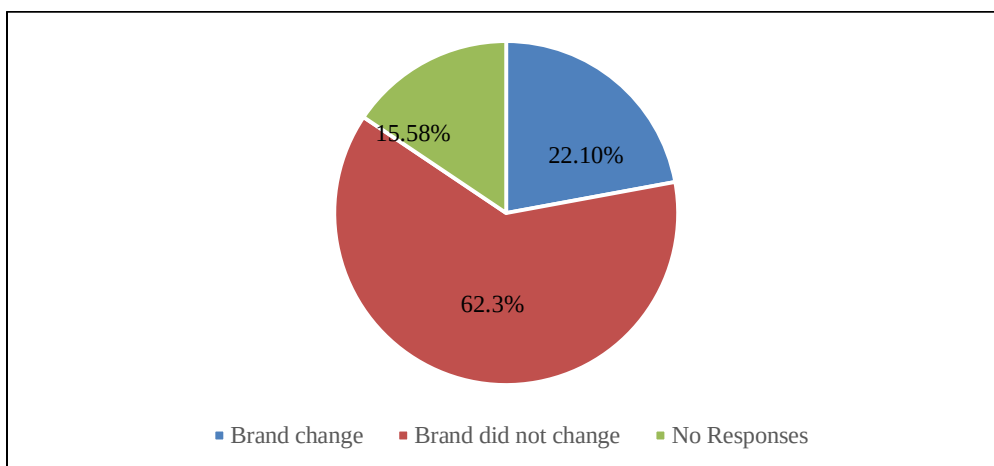


Figure 6: Consumer responses indicative of changes in purchasing brand of the products as a result of COVID-19 pandemic

Among the respondents who believed that their purchasing brand/s were changed as a result of COVID-19 pandemic, only 4.45% of them had changed their purchasing brand as a result of the quarantine. The other reasons those were influenced on changing purchasing brand include lockdown and travel restrictions (16.5%), low income during the COVID-19 period (7.2%), high price rates (5.4%) and limited availability to the brand previously used (10.3%) (Figure 7)

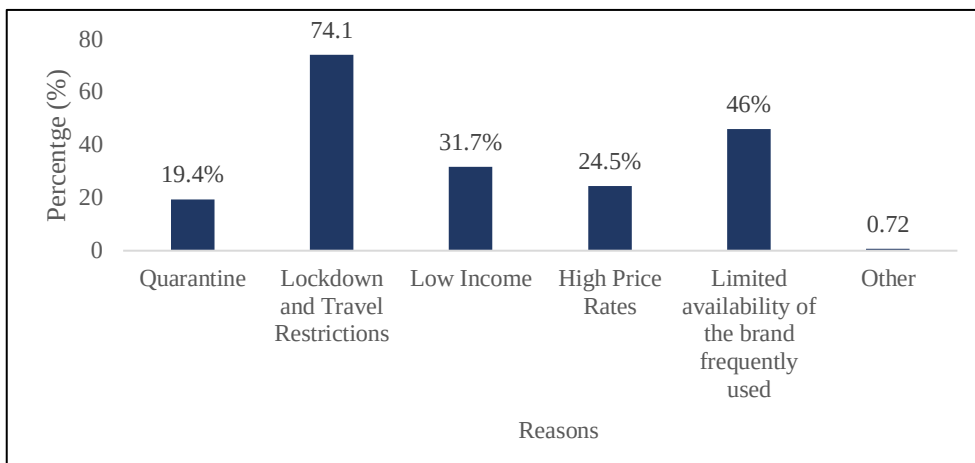


Figure 7: Reasons for changing the purchasing brand

When purchasing method is concerned, 1.59% of the respondents raise chicken from their own and the others purchase chicken from farm shops (18.9%), purchase chicken from supermarkets (41.49%), retail grocery shops (53.4%), online (12.4%) and mobile vehicles (12.9%), respectively (Figure 8). Among the respondents, 31.3% believed that their buying method had changed as a result of COVID-19 Pandemic while 53.4% did not change their buying method.

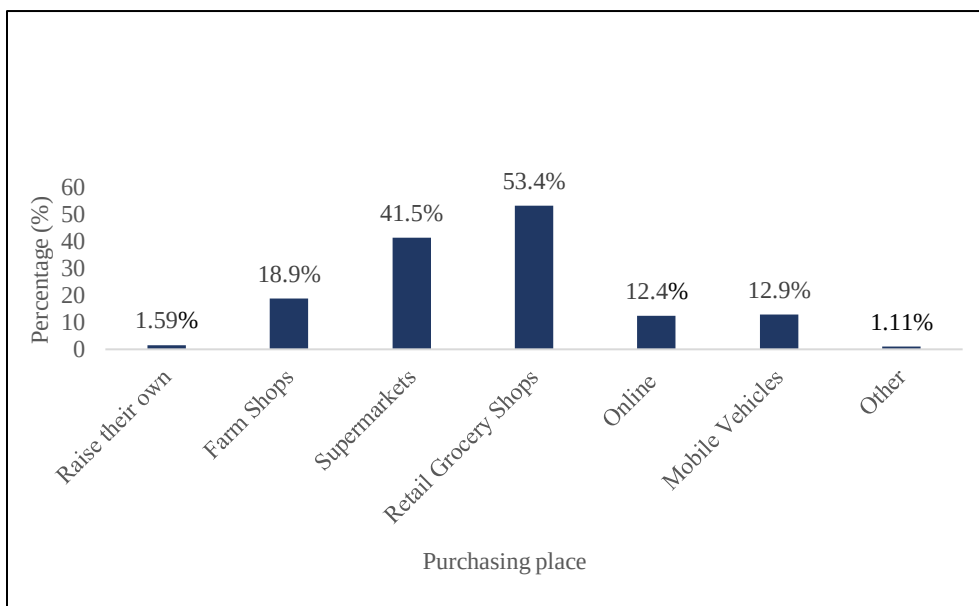


Figure 8: Purchasing places of chicken and processed chicken products

The routine buying method of respondents was influenced during the pandemic by many reasons such as quarantine (5.88%), lockdown and travel restrictions (23.4%), low income during COVID-19 period (10.3%), limited availability of the brand frequently used (12.08%) and convenience (10.97%) (Figure 9).

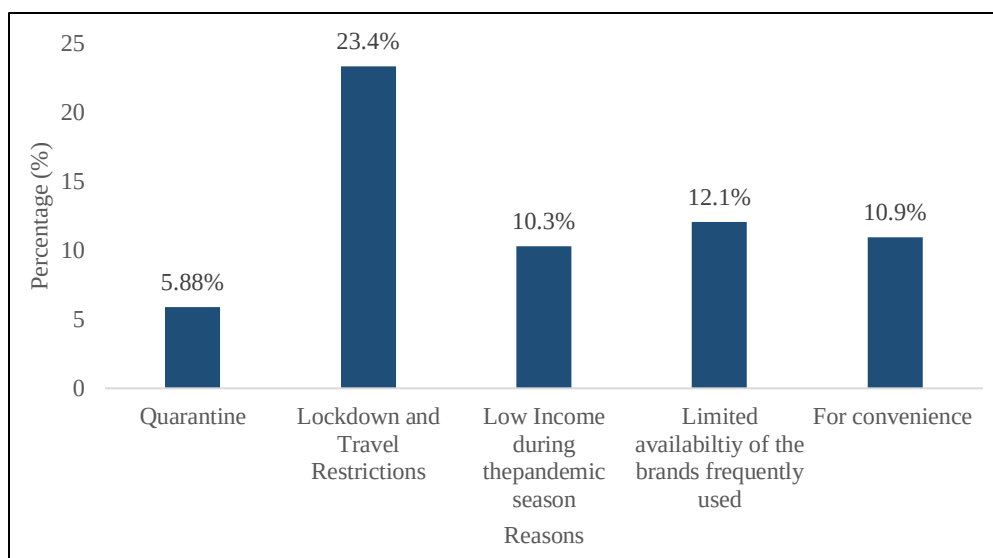


Figure 9: Reasons for changing buying method of chicken and processed chicken products during COVID-19 pandemic

Of the respondents, 9.22% had increased their weekly purchasing amount of chicken meat / processed meat products as a result of the COVID -19 pandemic while 34.7% reduced their weekly purchasing amount. However, 39.8% did not increase their weekly purchasing amount of chicken meat / processed meat products as a result of COVID-19.

Effect of COVID-19 pandemic on purchasing and consumption patterns of chicken eggs

Of the total respondents who participated in the survey the majority were reported to be consumed chicken eggs (85.1%) while the others consumed quail (0.95%), duck eggs (0.16%), and turkey eggs (5.56%). When consumption frequencies are concerned most have consumed (40.2%) eggs in a frequency of one to two days per week. Of the respondents, 31.9% ate eggs at a frequency of three to four days per week. Only 7.15% exhibited daily egg consumption while 5.88% ate eggs at a rate of five to six days per week during the pandemic. During the period before the pandemic is concerned, 45.2% of the respondents ate eggs at a rate of one to two days per week, while the others ate three to four days per week (28.9%), five to six days per week (5.72%), and daily (5.25%).

According to the respondents, 23.1% believed that their egg consumption frequency was increased due to the pandemic while 19.9% believed that their consumption frequency was reduced. According to the survey results, 42.6% did not change their egg consumption frequency as a result of COVID-19 (Figure 10).

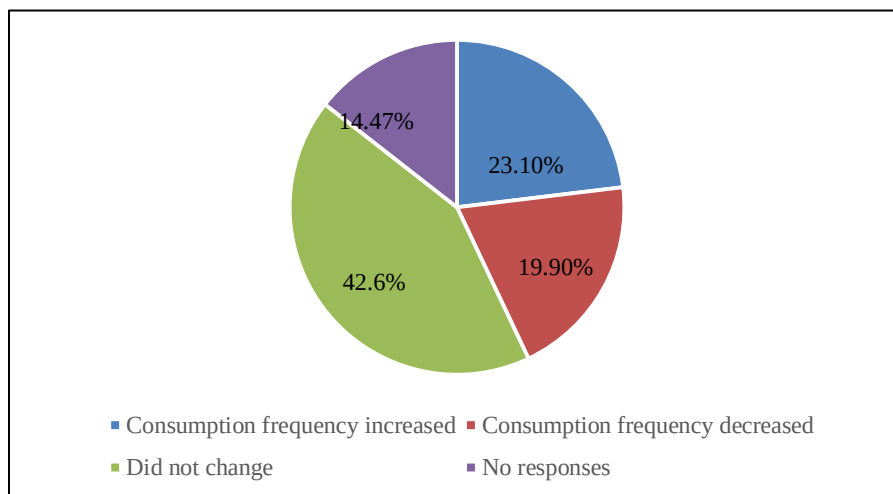


Figure 10: Consumer responses indicative of changes in consumption frequencies of chicken eggs as a result of COVID-19 pandemic

Number of reasons that influenced on increased egg consumption frequencies. Among the respondents who believed that their egg consumption frequency had increased as a result of the pandemic, 10.3% increased as a result of quarantine. The other reasons for increased egg consumption frequencies include lockdown and travel restrictions (41.38%), high income (4.83%), myths linked with consumption of other protein sources (38.62%), concern about better health (58.6%) and limited access to other protein sources (37.2%) (Figure 11).

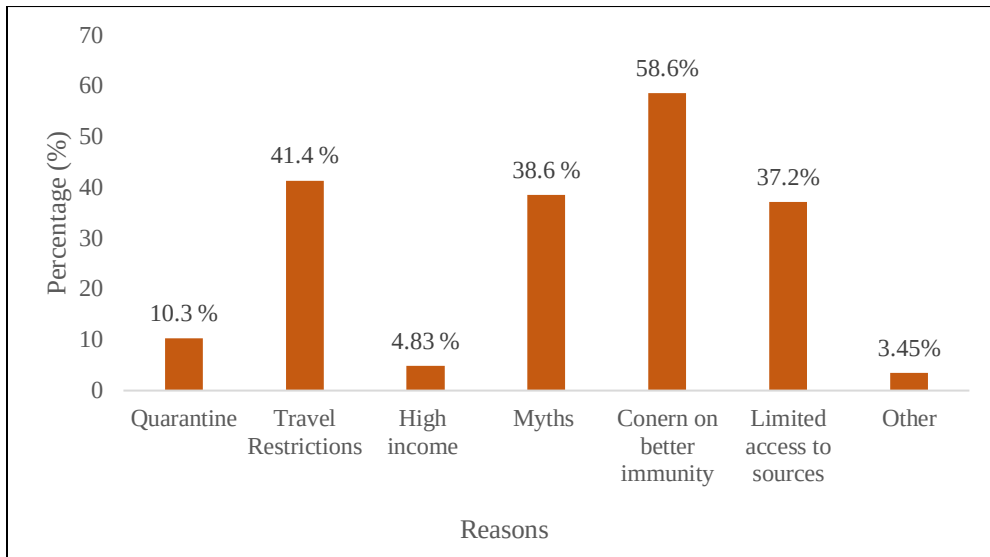


Figure 11: Reasons for increased egg consumption frequency during COVID-19 pandemic

Among the respondents who reduced their egg consumption frequency has happened as a result of quarantine (12%), existed lockdown and travel restrictions (65.6%) low income (42.4%), myths linked with consumption of other protein sources (10.4%), concern on better health (36.8%) and limited access to other protein sources respectively (22.4%) (Figure 12).

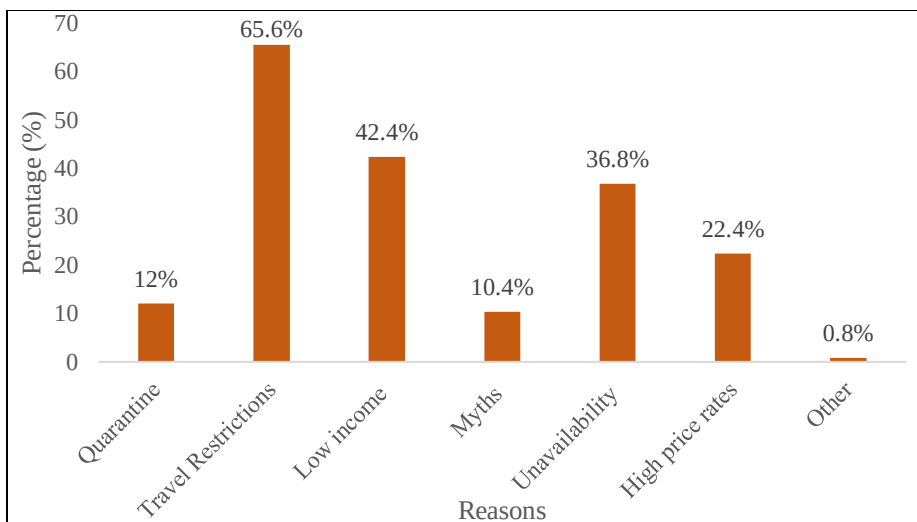


Figure 12: Reasons for reduced egg consumption frequency during COVID-19 pandemic

When purchasing channels available for eggs are concerned, around 22.1% purchase eggs from the small-scale farmers, while the others purchase eggs from the medium-scale (28.6%) and the large-scale farmers (6.36%). Of the respondents who participated in the survey, 24.9% mentioned that their egg-purchasing channel was changed as a result of COVID-19 pandemic. The reasons for changing egg purchasing channels included quarantine (17.2%), lockdown and travel restrictions (81.5%), low income (27.4%), high price rates (18.5%) and changed due to unavailability of eggs used to purchase (27.4%) (Figure 13). Only a few of the respondents raise poultry for their own eggs (5.09%) while the others purchase eggs from farm shops (19.1%), supermarkets (31.6%), and retail grocery shops (63.4%), online (12.08%) and from mobile vehicles (18.3%). 27.50% believe that they changed their buying method as a result of COVID-19 while the majority of 58.03% did not change their buying method.

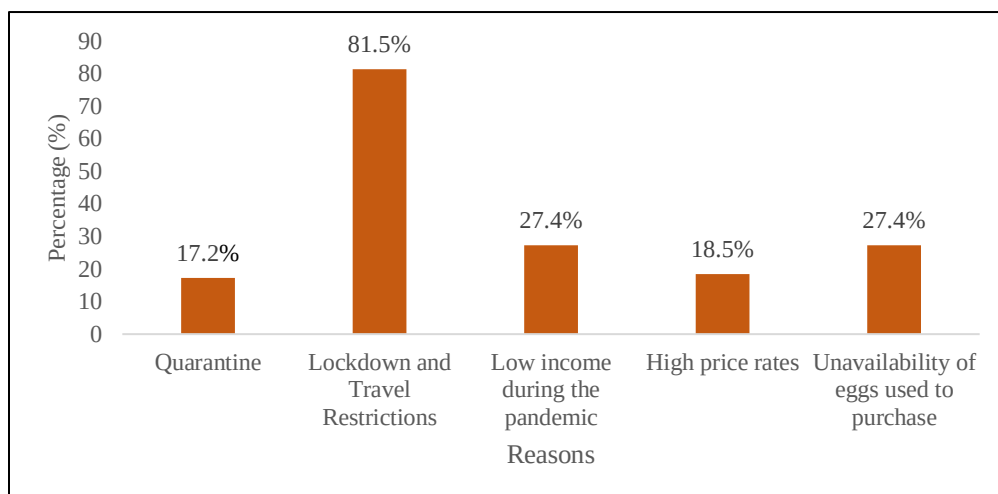


Figure 13: Reasons for changing egg purchasing channel during COVID-19 pandemic

According to the respondents' number of reasons were responsible for changing their egg-buying method. The reasons include quarantine (16.2%), lockdown and travel restrictions (80.9%), low income (24.3%), limited availability of eggs (24.3%) and convenience (40.5%) (Figure 14). Of the respondents, 26.4% increased the number of eggs that they purchase per week as a result of COVID-19 pandemic while 18.6% of them reduced their egg-purchasing amount. However, the majority (40.2%) did not change their egg-purchasing frequency during the pandemic.

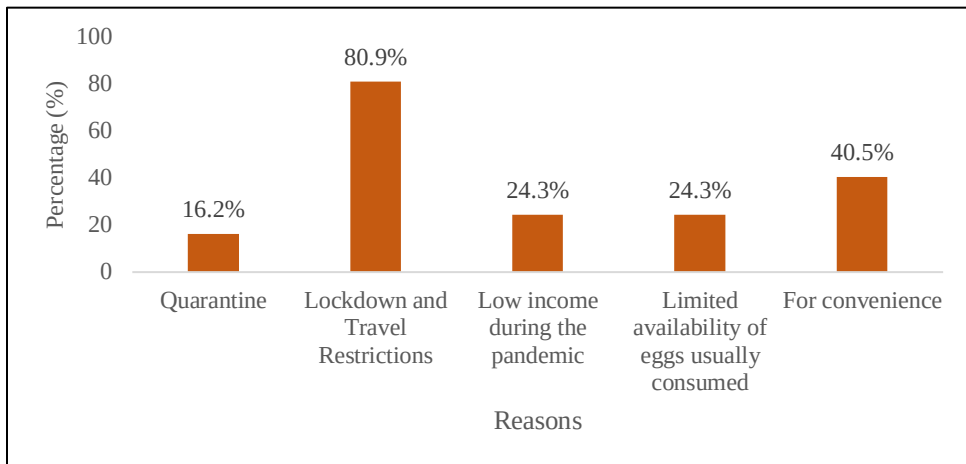


Figure 14: Reasons for changing the egg-buying method during COVID-19 pandemic

Stocking poultry products during the pandemic was evident. According to the survey, 55.3% of the respondents stated that stocking poultry products at their homes was practised while 36.1% did not stock poultry products during the pandemic period. The reasons for stocking poultry products were highlighted as due to the fear of possible quarantine (28.5%), due to travel restrictions (23.6%), due to uncertainty about food security (25.3%) and avoiding multiple contact times with the community (64.9%) (Figure 15). Of the participants, 33.6% were aware of the fact that the COVID-19 virus can be destroyed by cooking chicken products to a temperature above 70°C. But the majority (42.6%) were not aware about it. The data analysis also revealed that the respondents (17.8%) who were aware of this cooking temperature changed their cooking methods for chicken, processed chicken products and eggs to what they have used in the past.

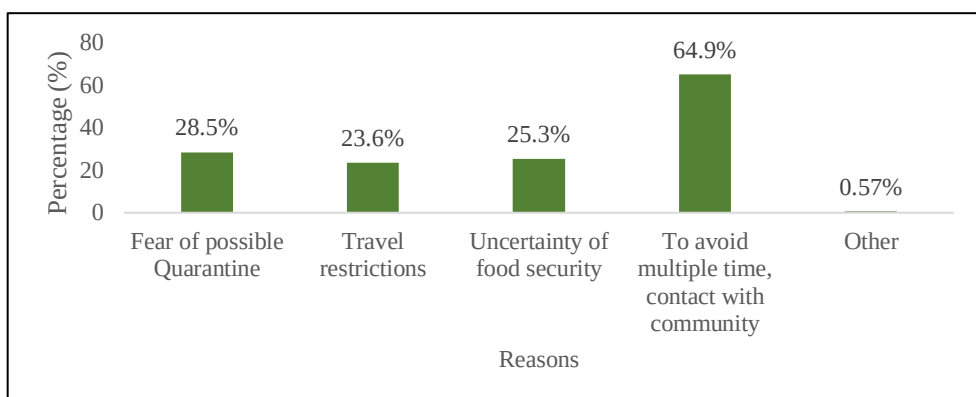


Figure 15: Reasons for stocking poultry products at home during COVID-19 pandemic

The COVID-19 pandemic is a serious epidemic that has been spread around the world and impacted the lives of numerous individuals. The pandemic affected

not only the economy of people and countries but also threatened food security and health. According to the results of the present study, chicken meat and processed chicken products consumption has decreased during the COVID-19 pandemic while chicken egg consumption has increased. The reason for this trend may be perhaps the consumer's intention to maintain better health and immunity during the pandemic period. Hafez *et al.* (2021) also noted a similar trend, attributing the rise in egg consumption during the pandemic primarily to consumers' increased reliance on eggs as a more affordable protein source, stemming from reduced income following job losses related to COVID-19. The results also revealed that the chicken meat/ processed chicken products and poultry eggs purchasing channels and buying methods have changed tremendously. Furthermore, the majority of the respondents were used to stocking poultry products in their homes during the COVID-19 pandemic and the reason identified for that is to avoid multiple-time contact with the community. A similar trend has been observed in a study conducted by Hafez *et al.* (2021).

When consumption patterns and buying behaviour of poultry products during the pandemic are concerned several similarities and dissimilarities can be observed between Sri Lanka and other countries. According to Haskaraca *et al.* (2021), who investigated the effects of COVID-19 pandemic on the eating and meat consumption habits of Turkish adults mentioned that their poultry meat consumption declined due to economic reasons. However, in Sri Lanka lockdown and travel restrictions mainly affected on observed decline in the consumption frequency of poultry meat and processed products. However, a study conducted by Gamage *et al.* (2022) reported that a higher proportion of the community they tested kept their intake pattern unchanged in terms of their consumption of meat other than chicken. As some researchers highlighted increased public awareness of the zoonotic risk of COVID-19 has led to short-term modifications in meat consumption (Attwood and Hajat, 2020). When considering Sri Lankan situation, 15.5% of the respondents from Kandy, Gampaha and Galle districts have mentioned the fact that the myths linked with consumption of protein sources during COVID-19 pandemic have led to a reduction in meat consumption. However, according to the results of the present study, only 7.82% of the respondents stated that they increased meat consumption to obtain better immunity and health. But according to the latest Global Data report on worldwide opportunities in the meat sector indicates that the total value share of meat sales as a percentage of the global food industry is expected to decline through 2024, because of increasing consumer concern about health risks associated with consuming meat and its environmental impact (GlobalData, 2019).

In 2019, the global meat sector was valued at 1,267.2 billion USD, and is expected to reach 1371.5 billion USD by the year 2024 (GlobalData, 2020). The unfounded claim that associates the origin of the novel coronavirus with animal meat has negatively affected the demand for meat, as the fear of getting the virus

from eating animal flesh has somehow affected consumers' shopping behaviour. According to Nawarathne and Galdolage (2021), fear of out-of-stock items and physical risks such as fear of illness could be some of the factors influencing panic buying. Temporary closures of meat processing plants because workers were infected with COVID-19 also caused temporary issues in meat supply which finally led to escalated price hikes at retail stores.

Poultry eggs are one of the most consumed animal protein sources in the Sri Lankan community and there is a significant impact on consumption patterns of poultry eggs due to the COVID-19 pandemic. During the months of January and February of year 2020, egg demand declined worldwide due to the Bird flu outbreak (Business Standard, 2021). However, that situation bounced back with a rise in the consumption of key poultry commodities to boost immunity amid the second wave of the COVID-19 pandemic (Business standard, 2021). The study shows that 58.6% of respondents increased consumption frequency of eggs to concern better health and immunity during the pandemic season. Among total respondents, 19.9% implied that their egg consumption frequency decreased due to the COVID-19 pandemic and the majority of them (65.6%) mentioned lockdown and travel restrictions as reasons to that reduction. Furthermore, such survey conducted in India has revealed the consumption of poultry meat and poultry eggs has decreased by 26.9% and 28%, respectively (Kumar *et al.*, 2020).

CONCLUSION

The present study concluded that the majority of the respondents (31.8%) reduced chicken meat and processed meat consumption frequency during the COVID-19 pandemic period. As the majority stated (60%) lockdown and travel restrictions were the major reason for reduced chicken meat and processed meat consumption period during the pandemic. However, purchasing methods or brand preferences for poultry products were not influenced by the pandemic. The main reason for the increased consumption frequency of poultry eggs during the COVID-19 pandemic, as stated by the majority (58.6%) was linked with the objective of improving health and immunity. Myths about other protein sources have also influenced the observed changes in the consumption pattern of poultry products among the public during the pandemic. The study observed an increased tendency among people to stockpile poultry products. The reason was cited as to minimize contact with the community. Ensuring adequate supply, storage facilities, and distribution channels during such periods can be a priority. Policy interventions may focus on ensuring the availability of poultry products during emergencies to meet increased demand. Providing accurate information to consumers about the safety of poultry products during pandemics can alleviate fears and promote informed decision-making.

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