

Food and COVID-19

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Abstract *The recent outbreak of COVID-19 has pushed the entire economy and trade on backfoot with global economy facing the worst crisis scenario after World War-II. Tourism and hospitality industry is recorded as one of the most affected industry, food being an inseparable component of tourism and hospitality industry is facing challenges in form of misconception leading to food being the source of COVID-19 transmission. The misconception about food had drastically affected the food and beverage industry specifically raw meat suppliers. The partial or complete lockdown in many countries has forced many small and medium scale food and beverage outlets to shut down and even multinational outlets are either laying off the jobs or practising pay cuts. The aim of the present study is to identify the origin and source of transmission for COVID-19. The study has adopted a descriptive research design based on secondary data. The findings of study describe the origin and source of the pandemic alongside clarifying the misconceptions about the food and highlighting the role of immunity booster foods in preventing the spread of coronavirus. Furthermore, the study compiles suggestions for food handlers to develop Standard Operating Procedures for food handlers.*

Keywords: Food, COVID-19, Transmission, Immunity, Prevention

INTRODUCTION

The world is struggling to find its way out of the current crisis faced by COVID-19 pandemic outbreak in 216 countries since the first cases were reported in Wuhan, China in December 2019 to the writing of this paper in May 2020. Within the duration of less than five months more than 4.7 million corona infected cases has been confirmed, while 117021 confirmed deaths are reported around the world, the pandemic was declared world health emergency in January 2020 which was later announced as pandemic in March 2020 (World Health Organization, 2020). Starting from China the most effected region was Europe by the start of March 2020 while in April 2020 the numbers of infected cases are increasing in the United States. Noticing the high potential of transmission of COVID-19 many countries are under complete or partial lockdown keeping a fifth of the global population in complete lock down, while other countries have imposed strict restrictions on travel. Same has adversely affected the Global economy. According to Congressional Research Services (2020) the COVID-19

outbreak will result in a decrease of global economic growth by a minimum of 0.5% to 1.5% with forecasted loss of 13% to 32% in global trade, further stating that overall impact may not be estimated before crisis reaches at its peak however the global trade and GDP is forecasted to decline abruptly in the first half of 2020. UNWTO (2020) in its report "Tourism and COVID-19" mentioned that Tourism and Hospitality sector is one of the sectors that are most affected by COVID-19 as tourism is different than the other economic activities related to social impact because the tourism sector directly depends on interaction and movement amongst people.

Shereen et al. (2020) identified in their work on origin and transmission of COVID-19 infection that the infection was first reported when a group of people from Wuhan, China were found to have viral infection later identified as COVID-19. The authors further reported that this group of people were visitors of local sea food market where live animals were sold and might have got the disease from the use of infected animal as a source of food. Disagreeing with the opinion Guo. Et. al. (2020) in a similar type of study

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highlighted that bat is suspected to be the host of virus origin whereas the source of transmission for COVID-19 from bat to humans is via an unknown intermediate host. While in a different research conducted on COVID-19 in Singapore it was concluded that the disease can be transmitted through shared food (Pung. Et. al., 2020). World Health Organisation (2020) in the report on COVID-19 and food safety advised that while it is vital to continue the supply of food in food chain, the safety of food, food handler and ultimate consumer is equally crucial.

Looking at the arguments about food being the source of COVID-19 and understanding the importance of food and food industry the present research is completed on the topic "Food and COVID-19". The author attempts to find the answer to the following objectives through this descriptive study.

O1: To explore and describe the origin and transmission of COVID-19

O2: To explore food as a source of Transmission for COVID-19

O3: To explore food as a prevention for COVID-19

Other than the stated objectives the author also suggests precaution while handling food, based on the guidelines issued by various Government bodies, involved in food safety and food handling, since the identification of Corona Infection.

The author has adopted a descriptive research design which is based on secondary data available in the form of research papers, articles, press releases, reports and surveys available. A total of 39 documents were reviewed from various sources including Journals, Magazines, official websites of organisations like, WHO, WTTC, UNWTO, FSSAI, FCI etc.

COVID-19 ORIGIN

COVID-19 (Corona Virus Disease 19), earlier known as Novel Coronavirus-Infected Pneumonia (NCIP), is the name given to the disease, by International Committee on Taxonomy of Viruses (ICTV), while the virus responsible for the disease is named Severe Acute Respiratory Syndrome Coronavirus 2 (SARS-Cov-2), commonly referred to as corona virus, by the same committee on 11 February 2020. The virus is called corona because of crown like spikes in its morphology (Shereen et al., 2020). While Daga et al. (2020) highlighted that the virus was provisionally named 2019-NCov- novel-beta-corona virus. The author has further stated that the disease is zoonotic in nature that means the disease is found in animal or birds, in this case bats, but humans can also be infected by the same and the transmissibility of the virus amongst humans is very high. While agreeing to the fact of the disease being zoonotic Guo et. al. (2020)

elaborates that SARS-Cov-2 is not the first corona virus the world has seen there are four taxonomic groups of corona virus referred to as α - Alpha, β - Beta, γ - Gama and δ - Delta corona virus, each group consisting of various coronaviruses known to men (SARS-Cov, MERS-Cov, H1N1 and bat-Cov etc.), as identified by the Coronavirus Study Group (CSG) of ICTV. The authors continue to state that Alpha and Beta coronavirus exists in mammals while the Gama and Delta coronavirus is common in birds and the present SARS-Cov-2 shares a genome (hereditary information) is 96.2 % similar to bat-Cov and 79.5 % similar to SARS-Cov. Agreeing with the same Bodbey and Ray (2020) Opined that COVID-19 is a Beta coronavirus that shares similarities with a bat corona virus. Based on the results and analysis of genome sequencing it is suspected that bat is the natural host of the virus, which has transmitted to humans from an unknown intermediary source which has not yet been identified.

COVID-19: TRANSMISSION

Biswas and Sen (2020) in their work on transmission of COVID-19 stated that the disease belongs to group of Susceptible-Infected-Removed (SIR) disease which means that if the person is infected there are equal chances of death and recovery as the disease can only be contracted for one time, the authors further state that the virus has shown a pattern where initially the number of infections appears to slow down after the primary peak in China however in later stages a secondary growth is observed for both China and rest of the world, indicating a high probability of transmission. It was assumed that the infection can only be transmitted to nearest person or in random cases to other persons with overall decrease in number of infections. Counter to the outcomes (Biswas and Sen, 2020), Pung et al. (2020) in their study on COVID-19 recorded that as the disease outbreak in rest of the world through the people having a travel history to China or other infected regions, the disease spread a lot quicker than expected and cases were found in people without any travel history. The authors concluded, after field investigations of infections cases in Singapore, that the virus is directly transmitted after a prolonged connection with the infected however some cases also disclosed a probability of indirect transmission resulting from sharing of objects. Explaining the spread of COVID-19, Peeri et al. (2020) stated that partial reporting of infection lead to speedy spread of the disease in China and world whereas Wuhan being a huge connecting hub with rest of the China through rail network and couple international airports made it more easy for the virus to spread, also highlighting that the spread of COVID-19 is much more rapid than the spread of SARS and MERS. Further highlighting the sources of transmission, Ward and Wu (2020) stated that the disease is not airborne rather it is droplet-borne, indicating that the disease is transmitted via breathing only if a infected person

has coughed or sneezed nearby. It was further indicated that the virus in droplets can survive up to 72 hours, without the host body, on surfaces like stainless steel.

COVID-19: PRECAUTIONS

World Health Organisation (2020) on the official website published the advice for public for prevention COVID-19 stating that one should frequently wash the hands with alcohol-based hand wash/ sanitizer or with soap also maintaining a gap of 1 meter between people referred to as social distancing. It is also advised that one should avoid touching own eyes, nose and mouth, practicing respiratory hygiene of covering the mouth and nose while sneezing. The person experiencing fever, cough and breathing difficulty are advised to seek medical care and follow the advice of medical expert. Further if any person has a recent travel history to any infected region should self-quarantine and in case any symptoms like cough, fever and breathing difficulty is observed medical attention should be asked. In continuation of the same Pung et al. (2020) suggested that authorities should focus on surveillance of local infected cases and people with travel history to infected regions in order to avoid community transmission. Well over 100 countries all over the world are observing complete or partial lockdown as precautionary measure to prevent the spread of COVID-19 and control the situation (BBC, 2020).

Food and COVID-19

Tourism and hospitality sector is reported to be one of the most affected industry by outbreak of COVID-19 pandemic with all the world imposing strict travel restriction. While the sector was forecasted to grow by 3% to 4% in the year 2020 now it is predicted to register a decline of 1% to 3% during the same period (UNWTO, 2020). Food and cuisine are inseparable parts of the tourism and hospitality sector as food has always been the basic necessity of the tourist, now with the change in eating habits and evolving life styles and increasing interest in gastronomic needs food has been identified as important part of Tourism (Hall & Mitchel, 2007), with evolution of concepts like culinary tourism, Gastronomic tourism, Food Tourism etc. Furthermore, Robinson and Novelli (2007) stated that food is rather a very important part for niche tourism destination mix.

Food as Source of COVID-19

There has been a constant effort by the researchers in identifying the source of transmission of COVID-19 from its natural host (bat) to humans. Researchers like Pung et al. (2020) claimed that the virus must have transferred from the natural host to humans when the people amongst the first few

cases reported from Wuhan, China consumed the infected bird (bat) as food. In the same line Daga et al. (2020) agrees to fact along with Guo et al. (2020) that bats are the natural host of SARS-Cov-2 the virus responsible for COVID-19, still there are no evidence of how the virus got transmitted to humans. Still the hypothesis of the disease being Food-borne cannot be ruled out (Dhama et al., 2020). Zu et al. (2020) in the working paper stated that while the initial host of the virus is bat but the transmission of the virus could be caused by pangolin or other animals sold at the Hunan sea food market in Wuhan. Dietz et al. (2020) in their study stressed that the link of initial cases with seafood market gives a strong indication of transmission through food. Another study conducted by Kakimoto et al. (2020) for finding out the transmission of COVID-19 in the crew member of a quarantine cruise ship explored that the dining area of the crew was the main area for gathering of the members from where the virus would have transmitted, the research further pointed out that out of 20 infected crew members 15 were involved in preparation of food for all the crew members while one more infected crew of housekeeping team lived on the same deck where food service crew used to stay, out of the remaining 4, 3 were stewards of food service team. The research concluded that all the infected crew members were living on the same deck and most of them were working in the food service department. In continuation of establishing the relationship amongst food and COVID-19 Pung et al. (2020) also concluded in their study that sharing of food with infected person can be a cause for transmission of the infection.

Rumours were taking a place in the communities around the world creating misconceptions for food being a source for transmission of COVID-19. World Health Organisation (2020) has to step in with food safety guidance stating that there are negligible chances of a person getting corona infection via food or food packaging and clarified that there is no evidence of food being the source of transmission. In addition to the same The Times of India (2020) in the press release presented a statement of Dr. G. S. G. Ayyangar, Chief Executive Officer (FSSAI) mentioning that the assumptions about spread of coronavirus via chicken, mutton and other non-vegetarian food items, even seafood, are just mere misconception there is no scientific proof of this. Agreeing with Ayyangar, Giriraj Singh, Union Minister for animal husbandry, dairying and fisheries, in another press release of FSSAI stated that no evidence of corona infection is found in lab tests hence district magistrates should not ban the non-veg food items as it will lead to a loss of revenue in live-stock sector and country as a whole (The Times of India, 2020). FSSAI (2020) in another press release addressing the issues related to corona infection in food items imported from infected countries, clarified that the imported food even from affected countries is good to be used in meals as it is safe for consumption.

Food for Prevention of COVID-19

While some researchers and authorities are trying to establish that food is not the source for transmission of COVID-19 including all types of non-veg food items, some researches are conducting their studies suggesting food items as potential cure and prevention of COVID-19. When most of the developed countries in the world are finding it extremely difficult to handle outbreak of COVID-19 India has been able to handle the pandemic quite well (Table 1) Supporting the fact Basiri (2020), established that bloated herbs like thyme, marjoram and hollyhock along with fish, meat, soups and broth made from birds such as quails and pigeons can help in recovery of corona patients. The author also pointed that India has lower number of infected cases because Indian diet includes spices that have high number of antioxidants thus a better immunity. Table 1 Represents the list of top five countries compared to India on the basis of confirmed number of COVID-19 cases as recorded by WHO alongside the population. The table clearly indicates that despite having the largest population among the countries mentioned in the list India has been able to contain the crisis pretty well. Though another research by Tanne et. al. (2020) disagreed to the fact and hypothesized that due to limited testing facilities India is focusing on suspects with travel history eliminating random checks to ensure the actual status of confirmed cases.

Table 1: Number confirmed COVID-19 cases and Confirmed Deaths due to COVID-19 till 14th April 2020

Sr. No	Country	Population*	Confirmed Cases
1	United States of America	331002651	1477516
2	Russian Federation	145934462	299941
3	The United Kingdom	67886011	246410
4	Brazil	212559417	241080
5	Spain	46754778	231606
6	India	1380004385	101139

Source: WHO (2020), (*population count is taken from <https://www.worldometers.info/world-population/population-by-country/> on 14th April 2020)

In continuation to the observations made by Basiri, (2020) another work done by Goothy et. al. (2020) on management of COVID-19 recommended that traditional remedies of Ayurveda, especially *Tulsi* (*Ocimum tenuiflorum*) can be used to manage the disease. The author has used earlier references of *Tulsi* being able to alleviate the symptoms of other deadly viruses like pneumonia. Agreeing to the same

Goyal (2020) in his editorial for AyuJournal suggested the scope of Ayurveda in prevention of emerging viral diseases suggested that the unhealthy lifestyle and eating habits of the modern men has resulted in a decreased immunity and frequent changes in weather with increasing pollution has given rise to new viral diseases these disease can either be prevented or cured which is only possible by good eating habits and disciplined life style. The author has also recommended using *Neem* (*Azadirachta indica*) in various forms (leaves, bark, powder) to boost immunity. Dharmshaktu (2020) ex principal advisor to Ministry of Health and Family Welfare Government of India in his editorial for Epidemiology International suggested that countries with high density of people along with habits of consuming undercooked food, precooked/ quick cooking food or frequent eating out practices are coming up with more number of infections. It was also recommended that country like India with high density of population should avoid rituals and gatherings at worship places and should focus on home cooked meals.

Shi et al. (2020) in their study on immune responses and COVID-19 infection, analyzed over 1000 patients in Wuhan, noticed that some patients develop serious infection while others do not which was later related to immunity of the patients, the patients with high immunity tend to recover faster while patients with low immunity move towards severe phase unless immunity is boosted using different strategies. The study further highlighted that Vitamin B3 is an effective component to stop lung damage thus this food supplement is recommended for COVID-19 patients. Food items like liver, yeast, poultry, lean meats, nuts, legumes contain the required amount of B3 while alcoholism is known to be the main cause of deficiency, that is why people are advised to avoid consuming alcohol during this time of crisis as it undermines the immune system opposing to the myth of alcohol preventing the vulnerability to the infection (World Health Organisation, 2020). Magarita Restrepo in Naked Food, (2020) described the epidemiology of corona cases in China indicates immunity deficiency being one of the prime reasons for spread of the disease along with the deaths caused by it, furthermore it was advised that consuming plant based food including leafy greens, fibrous food, legumes, grains, beans and vegetables along with yogurt and probiotic drinks are vital in boosting immunity.

GUIDELINES PRECAUTIONARY MEASURES FOR FOOD HANDLERS

Looking at severity of the COVID-19 and in order to reject the myths and misconception alongside ensuring food safety various authorities and governing bodies have released guidelines for food handlers at various levels of supply

chain (production, transport, delivery, retail, open food displays and staff canteens). World Health Organisation (2020) along with Food and Agriculture Organization of the United Nations released guidance for food businesses has advised food handlers to practice personal hygiene, undergo training for food hygiene principles, use personal protective equipment (mask, glove, head gear), physical distancing, frequent hand washing, sanitation at different stages, awareness about COVID-19 and its symptoms, written manual for preventing the spread of COVID-19, reporting of illness, high level of security and management of staff, respiratory hygiene, disinfecting surfaces, FSMS (Food Safety Management System), safe transport and delivery of food products, develop food delivery to restrict physical contacts. In alignment to the same IFAS (2020) University of Florida in its communication with food banks regarding FAQs for COVID-19 agreed that best practices should be followed for hygiene, distancing and personal protective equipment must be followed and if any staff experiences symptoms of the disease should reach out for medical care. Food Corporation of India (2020) via office memo advised that only 50 % of the staff should attend office on rotational basis while others should work from home. Furthermore FSSAI (2020) suggested that consumption of raw, undercooked, and unprocessed food must be avoided, additionally FSSAI proposed to start hygiene ratings for meat and fish shops. Washington Department of Health (2020) issued guidance for food establishments stressing upon review of health and sick leave policy, offering paid sick leaves, increasing hand hygiene, cleaning and sanitizing. Multnomah County Health Department (2020), advised restaurants and food service to practice routine cleaning with bleach and water, surface sanitizing, proper handwash and employee health guidelines. In addition to this Dalton et. al. (2020) suggested that sharing of food should be avoided in workplace. In continuation Food Standards Australia Newzealand (FSANZ, 2020) issued advice for food businesses asking for personal hygiene, frequent hand wash, avoiding undercooking of meats, respiratory hygiene and distancing.

DISCUSSION

After extensive review of literature the study has found following answers to the objective of the study.

O1: To explore and describe the origin and transmission of COVID-19.

The origin of COVID-19 virus shares its epidemiology with Beta-Cov and SARS along with similarities to a bat coronavirus, as specified by various authors the origin is centred to Hunan sea food market of Wuhan China with natural host being bat however the source of transmission from initial host to human is not yet identified by researchers

(Pung et al., 2020; Guo et al., 2020; Shereen et al., 2020; Daga et al., 2020).

O2: To explore food as a source of Transmission for COVID-19.

No scientific evidence neither any claim from any part of the world is reported for transmission of COVID-19 via food however few scientists claim that shared food might be source for transmission among humans and the probability of food-borne transmission cannot be neglected (Dhama et al., 2020; Pung et al., 2020; Guo et al., 2020).

O3: To explore food as a prevention for COVID-19.

After identifying immunity as one of the vital factors responsible for the infection various authors have recommended change in eating habits and consumption of immunity booster foods for prevention of COVID-19 including yeast, fish, meat, soups and broths, tulsi, neem, legumes, fibrous vegetables, leafy grains, grains nuts and spices etc. (Basiri, 2020; Goothy et al. 2020; Goyal 2020; Dharmashaktu, 2020).

SUGGESTIONS FOR FOOD HANDLERS

The study presents following suggestion to be practised by food handlers at different levels during the COVID-19 outbreak.

- Personal hygiene
- Frequent hand wash
- Respiratory hygiene
- Personal protection equipment
- Sanitize surfaces
- Avoid touching eyes, nose and mouth frequently
- Report illness and symptoms of COVID-19.
- Physical distancing
- Do not serve or consume under cooked or unprocessed food
- No sharing of food at work place
- Staff health care
- Training of staff for awareness and precautions of COVID-19
- Standard operating procedures and manuals for staff
- Provision for paid sick leaves

The food production section in various food businesses follows an underlined statement of clean as you go the author recommend an updated statement “Clean and Sanitize as you go”.

LIMITATIONS AND FUTURE RESEARCH

The main limitation of the study is that it is a secondary data-based research though a sea of literature is available but the most of the literature is focused on medical implications.

However, the future research on the topic can be conducted for developing of standard operating procedures for food handlers during pandemic.

CONCLUSION

Food is a major and vital factor in Tourism and Hospitality sector while it is very prone to outbreak of various forms of disease and infections it is the responsibility of food handlers to take care of colleagues and consumers (guests) from any type of contamination or infection. When the unethical practices can lead to the crisis situation at the same time holistic approach can be used for revival of the sector as whole.

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