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Impacts of the COVID-19 pandemic on food security and food consumption: Preliminary insights from the gulf cooperation council region

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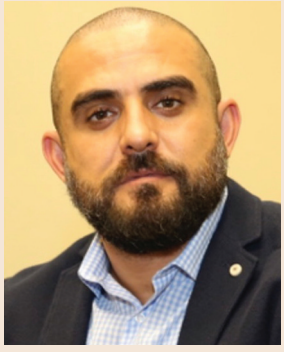
Abstract: As the coronavirus pandemic spreads, measures to contain it—such as home confinement, social isolation, closure of businesses and educational institutions, and remote work—have affected everyday life. Further, some voices were worried about these measures' psychological, social, and economic impacts on food-related activities and practices. These impacts are presumably context-specific and differ from one region to another. In this regard, the example of the Gulf Cooperation Council (GCC) region, a group of high-income and food-secure countries, is particularly intriguing. This narrative review aims to explore the psychological and socio-economic effects of the COVID-19 pandemic on food-related activities (e.g., food procurement, preparation, and consumption) in the GCC area. The review suggests that while the changes in lifestyle brought on by the lockdown/quarantine measures generated concern, boredom, sadness, stress, and anxiety



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PUBLIC INTEREST STATEMENT

Beyond its impact on health, COVID-19 has caused significant changes and affected all aspects of present-day society. Most governments took stringent measures, including quarantine, social distancing, education institutions, and remote work, to control COVID-19 transmission. While these measures are considered critical in minimizing the transmission of the virus, they have psychological, social, and economic impacts on food-related behaviors and activities (e.g., food shopping, preparation, and diet). These implications are likely context-dependent and vary by region. The Gulf Cooperation Council (GCC), a group of high-income and food-secure nations, is an interesting case study. This paper aims to analyze the psychological and socio-economic effects of the COVID-19 pandemic on food-related activities in the GCC region. Although lifestyle changes caused worry, boredom, tension, and anxiety in the GCC, the findings highlighted that these negative feelings did not influence food-related behaviors. The pandemic affected consumer-food interactions but did boost panic buying or stockpiling. The population's considerable buying power also helped alleviate the pandemic's economic and food security repercussions.

also in the GCC region, the impacts of these negative emotions on food-related activities have been rather limited. Indeed, the pandemic impacted the consumer-food interaction but did not boost panic buying and hoarding in the region. Furthermore, the high purchasing power of the population mitigated the economic impacts of the pandemic and its adverse effects on food and nutrition security in the region.

Subjects: Agriculture and Food; Food Laws & Regulations; Middle East Society

Keywords: COVID-19; food behavior; food consumption; diets; food policy; GCC; Qatar

1. Introduction

On 31 December 2019, Chinese officials warned the World Health Organization (WHO) of a new Coronaviruses family virus in Wuhan, subsequently named COVID-19 (COronaVIrus Disease-2019). On 11 March 2020, the WHO declared COVID-19 a pandemic (WHO, 2020b). Since then, the number of cases and fatalities associated with COVID-19 has been steadily increasing, putting an enormous burden on healthcare systems across the globe (Alandijany et al., 2020). More than 405 million confirmed cases and 5.8 million fatalities had been documented as of 13 February 2022 (WHO, 2022). Like any other pandemic, beyond its impact on health, COVID-19 has caused significant changes and affected all aspects of present-day society, thus creating a multidimensional global crisis. Most of the governments across countries took very stringent interventions, including quarantine, social distancing, closing of businesses and education institutions, remote work, suspension of all air travel, shutdowns of cities and towns as a public health intervention to control COVID-19 transmission (Flaxman et al., 2020; Fong et al., 2020; UNESCO, 2020). While these actions are considered critical in minimizing the transmission of the infection and flattening the incidence rate curve (Duerr et al., 2007), they have created tremendous harm to citizens' health, employment, and well-being (OECD, 2020). The unprecedented health emergency and economic crisis caused by the COVID-19 pandemic had chaotic social, economic, and psychological consequences for food consumption, food-related activities, and food security. Indeed, the pandemic has exposed significant fault lines and vulnerabilities in communities, institutions, and economies throughout the globe (United Nations, 2020). Before the COVID-19 pandemic, the worldwide food security and nutrition status were already concerning (FAO, 2020a). This situation is expected to aggravate due to the COVID-19 (HLPE, 2020). While the medium- and long-term impacts are challenging to predict, it is clear that COVID-19 has already affected food consumption patterns and diets in different aspects. In addition, the longer these measures are imposed, the heavier will be the socio-economic cost (ESCWA, 2020a). Further, COVID-19 jeopardized the implementation of the UN Sustainable Development Goals (SDGs), including SDG 1 (No Poverty), SDG 2 (Zero hunger), and SDG 3 (Good health and well-being; Leal Filho et al., 2020). Long before the COVID-19 pandemic, the world was already falling short of its goal of eradicating all types of hunger and malnutrition by 2030. With less than a decade before the end of the timeframe for achieving the SDGs, the pandemic has rendered them much more difficult to attain (FAO, 2021).

The severe changes in lifestyle imposed by the lockdown/quarantine are causing a significant increase of concern, boredom, sadness, stress, anxiety, and fear of sickness and death in the general population and specific groups, such as the elderly and those with underlying health issues (Wang et al., 2020). These emotions—that differ not only across countries but also among socio-economic groups within the same country and individuals in the same household—have affected the relationship between consumers and food. In addition, the essential protections measures had a significant impact on the economy (International Monetary Fund, 2020a). Despite several economic and fiscal measures, COVID-19 triggered a severe global economic and financial slowdown by 2020, increasing global unemployment and poverty rates (McKibbin & Fernando, 2020).

Nonetheless, it is challenging to predict the magnitude of the economy's downturn and its duration.

Additionally, the final COVID-19 results are expected to vary from country to country, depending not just on epidemiological variables but also, among other elements, on the baseline state and the performance of the nation's health systems (HLPE, 2020). In terms of economic and food security perspective, certain countries are more fragile than others, particularly low- and middle-income countries (World Food Programme, 2020b). Indeed, roughly two years after Coronavirus was first discovered, the pandemic is far from ending, and some countries still face substantial epidemics. However, even those who controlled the virus are concerned about incoming waves, particularly with developing more contagious variants, e.g., Delta, Omicron, etc. (WHO, 2021). The risk of new infections and waves might result in other lockdowns or the continuation of present restrictive restrictions in the coming months, causing more disturbance to economic activity and food security.

In this regard, the example of the Gulf Cooperation Council (GCC) region, a group of high-income countries and one of the world's most food-secure nations, is particularly intriguing. However, data about the impact of the COVID-19 pandemic on diets and food-related behaviors in the GCC region are scarce. Indeed, the academic research on the impacts of the COVID-19 pandemic on food systems and diet has been unevenly distributed across regions, with most studies focusing on Western and Southern Europe, North America, and China (Colafemmina et al., 2020). In contrast, developing countries in general, particularly those in the GCC region, have been neglected. As a result, this narrative review aims to look at the effects of the COVID-19 pandemic on diet and food-related activities (e.g., food procurement, preparation, and consumption), with a specific emphasis on the Gulf Cooperation Council (GCC) area. The paper combines academic literature review and grey literature (e.g., reports, books). Indeed, it comprises a review of academic, peer-reviewed scientific literature from the Scopus, Web of Science, and Google Scholar databases dealing with the relationship between COVID-19, diet, and food-related activities, such as food wastage, food shopping/procurement, online shopping, food preparation, etc. Grey literature includes reports, policy documents, and working papers produced by a variety of organizations, including international organizations [e.g., Food and Agriculture Organization of the United Nations (FAO), International Food Policy Research Institute (IFPRI), United Nations Conference on Trade and Development (UNCTAD), United Nations Development Programme (UNDP), Organisation for Economic Co-operation and Development (OECD), International Food Policy Research Institute (IFPRI), World Bank] and regional organizations [e.g., United Nations Economic and Social Commission for West Asia—ESCWA, Gulf Health Council, etc.]. The grey literature includes reports, policy documents/briefs, and working/discussion papers produced by international and regional consulting firms [e.g., Deloitte. KPMG, McKinsey, Oxford Business Group, IPSOS, Altios].

The paper examines the consequences of the COVID-19 pandemic on food-related awareness, attitudes, and behaviors. Second, it sheds light on the COVID-19 pandemic's influence on food attitudes and habits in the GCC region. Indeed, section 2 investigates how the psychological effects of the COVID-19 pandemic (e.g., worriedness, boredom, sadness, stress, anxiety, fear of the illness) have influenced the consumer-food relationship. Section 3 examines the socio-economic effects of the COVID-19 pandemic (e.g., severe global economic and financial crisis, increase in unemployment, and poverty) and their influence on global food consumption. Section 4 focuses on the effects of the COVID-19 epidemic on food consumption in the Gulf Cooperation Council (GCC) specifically.

2. Psychological impacts of COVID-19 pandemic on food consumption

While the measures implemented by governments worldwide were crucial to stop the spread of COVID-19, many voices came to warn of their psychological, social, and economic disorderly effects on food behavior and lifestyle. The drastic changes in lifestyle during isolation and self-

quarantine induce a considerable degree of worry, boredom, depression, stress, anxiety, and fear of the disease and death. These emotions have affected the relationship between consumers and food (WHO, 2020a).

Firstly, since consumer knowledge of the virus and its potential severity was limited at the outbreak's outset, consumers focused on impulsive buying and hoarding. Numerous instances of panic purchasing non-perishable food items (e.g., wheat, pasta, noodles, packaged meals, and rice) have been documented in numerous countries worldwide soon after announcing their first coronavirus cases. (Ben Hassen, El Bilali, Allahyari, Berjan, Fotina et al., 2021; Ben Hassen, El Bilali, Allahyari, Berjan, Karabašević et al., 2021). There are several possible explanations for such widely observed behavior. First, because food is clearly the most critical item for every human being, impulse buying is a typical human reaction to emergencies, triggered not by food scarcity, but by fear of running out of food (Grasso, 2020). This behavior is "transmissible", as demonstrated by Grasso (2020), the perception of scarcity is self-fulfilling, since the more individuals hoard, the more others get infected with the panic, and therefore the food runs out quicker. Second, there is additional evidence that this behavior responds to stressful or uncertain emotions. Throughout history, panic buying and stockpiling have happened in stressful unmet situations such as natural disasters, wars, epidemics, etc. It is a way to deal with an uncertain situation. Third, conforming to related patterns may result from losing control over the future and societal pressures (Sim et al., 2020). Consumers' perceived loss of control is an unpleasant feeling that encourages them to seek compensation by purchasing new products (Chen et al., 2017). However, panic purchasing behavior has several negative implications, including rising food prices and overconsumption of food supplies (Cranfield, 2020; WHO, 2020a).

Additionally, the assumption that shoppers stock up on non-perishable goods suggests that they are expected to substitute across food groups. Some replacement trends can inadvertently deter consumers from consuming the recommended fruit and vegetable portions (WHO, 2003, 2015). Furthermore, individuals who can afford to buy more food might stockpile more than they need, wreaking havoc on disadvantaged communities and populations (Naja & Hamadeh, 2020), preventing certain vulnerable groups (e.g., the elderly or the poor) from obtaining certain food items (Wesseler, 2020).

Secondly, at the individual, family, and national levels, COVID-19 altered people's eating patterns and diet consistency, resulting in lower nutritional and health status [For example, all kinds of malnutrition—undernutrition, micronutrient deficiencies, and overnutrition (cf. overweight/obesity)—as well as food-related non-communicable diseases rose worldwide] (UNSCN, 2020). The loss of daily habits exacerbated anxiety and disrupted a healthy diet due to lockdowns and quarantines. Uncertainty appears to be one of the drivers of this rise in anxiety, reducing plans for healthier eating. The enhanced anxiety and boredom will lead individuals to give up their safe eating behavior and snack more often (Naidoo, 2020). Indeed, negative emotions such as fear and anxiety lead to overconsumption, or "emotional eating", especially of "comfort foods" (e.g., sweets and junk food), which are heavy in fats, carbohydrates, salt, and calories (FAO, 2020e; Moynihan et al., 2015; Yılmaz & Gökmen, 2020).

Furthermore, due to psychological and physiological processes, changes in food consumption may be "normal" responses to stress and emotional states (Macht, 2008). Undeniably, many people find comfort in food during stress, leading to overconsumption. Consumers are now moving towards a greater intake of high-processed foods such as fast foods, junk foods, sweets, and ready-to-eat cereals. A decline in meat intake is also likely, due to concerns, not science-based, that livestock may be hosts of the virus (FAO, 2020f).

Diabetes and other nutrition-related non-communicable diseases (NCDs) increase the likelihood of more COVID-19 severe complications and mortality. (IPES-Food, 2020). A good diet is essential

for health, especially when the immune system is attacked (WHO, 2020a). No food or nutritional supplement will protect us against the COVID-19 virus, but a healthy diet may help boost our immune system (FAO, 2020e). In addition, COVID-19, via school closures, may worsen childhood obesity and create inequities in the risk of obesity. Children would lose out on school meals and structured activities if they stayed at home. They may also come into contact with longer-lasting foods. In the meantime, They were also less active (Rundle et al., 2020).

Consumers' purchasing habits are also being affected by COVID-19. With the closure of restaurants and cafés, many turned to grocery stores for their food needs (Goddard, 2020). Furthermore, their purchasing habits have shifted due to people's apprehensions about being among others while grocery shopping. Consumers cut down on the number of trips they made to the store and purchased more each trip than they usually would, lessening their perceived risk of exposure to COVID-19 (Ben Hassen, El Bilali, Allahyari, Morrar et al., 2021; Cranfield, 2020; McKinsey, 2020). Also, more and more people are purchasing online. COVID-19 has accelerated the shift to digital services, and digitization has become a vital necessity in today's world (Deloitte, 2020; Sneader & Sternfels, 2020).

3. Socio-economic impacts of COVID-19 pandemic on food consumption

The COVID-19 pandemic caused a severe global economic and financial recession for 2020, rising unemployment and poverty rates at a global scale, despite unprecedented policy support (Brodeur et al., 2020; McKibbin & Fernando, 2020). Restrictions on travel and social isolation have resulted in a shrinking workforce in all economic sectors and the loss of numerous employment. In addition, the demand for produced goods and commodities has fallen. (Nicola et al., 2020). Consequently, in April 2020, the International Monetary Fund (2020a) predicted that the world economy would shrink by 3% for 2020. In June 2020, it revised its prediction to a 4.9% shrinkage. The World Bank, 2020a) predicted a worldwide GDP decline of 5.2%. Global GDP is predicted to shrink by 6 to 7.6% by 2020, depending on the development of the second wave of COVID-19, as well, according to the OECD (OECD, 2020). The contraction is expected to be the deepest recession since the Second World War and of far greater magnitude than the global financial crisis of 2008–2009 (International Monetary Fund, 2020b). The economic recession is likely to severely affect food consumption, quickly affecting the overall diet quality and diversity. As highlighted by CIHEAM (2020, p. 13): "the greatest impact of the pandemic on demand will be much deeper and long-lasting. It results from drastic income reductions through multiple channels related to the major global economic crisis."

Firstly, the economic crisis resulting from the COVID-19 pandemic affected food access seriously (Laborde et al., 2020). If social and economic mitigating measures are not implemented, over 140 million people worldwide might slip into severe poverty in 2020, a 20% increase from 2019, mostly in sub-Saharan Africa and South Asia. Sumner et al. (2020) estimate that the COVID-19 economic shutdown will raise global poverty for the first time since 1990 by pushing 420–580 million people into poverty. Because of the recession, people's buying power would be significantly reduced, affecting food accessibility and increasing food insecurity, which, in turn, influenced overall diet (FSIN, 2020; Swinnen & McDermott, 2020). In 2020, the pandemic may increase the number of undernourished people by 83 to 132 million and the number of people facing acute food insecurity by 135 million (FAO, 2020a; World Food Programme, 2020a).

COVID-19 is also expected to have a considerable influence on unemployment, particularly in the informal economy (FAO, 2020c). Although lockdowns prohibit individuals from moving about and from working, they also result in a loss of revenue and livelihoods, especially for those in the informal sector (ILO, 2020). COVID-19 is projected to increase severe poverty and food insecurity in low- and middle-income countries as it expands throughout these areas, with extensive informal economies (FAO, 2020c). Further, as Laborde et al. (2020) highlighted, there has been a negative

impact on the economies of poor and middle-income nations due to the economic consequences of the epidemic in the first epicenters (China, Europe, the United States).

Even in the developed countries, with this rise in unemployment, consistent access to nutritious food became an issue for many people, and the number of people who experience food insecurity grew. In Europe, the COVID-19 crisis has brought a new food emergency, increasing the demand for food assistance up to 50% compared to the pre-coronavirus period. More than 90% of European food banks are seeing a rise in demand for emergency food relief due to the increase in the number of people in need of food. (European Food Banks Federation, 2020).

It is also important to note that nutritious meals were already prohibitively expensive for many people before COVID-19. COVID-19 pandemic is predicted to exacerbate this issue. Income shock may not always lead to a decrease in total caloric consumption but rather a decrease in the nutritional content of a person's food intake. As highlighted by Headey and Ruel (2020: p. 1): "The COVID-19 economic crisis will affect diets primarily through declining demand for vegetables, fruits, and animal-sourced foods, which are the main sources of essential micronutrients in diets." In the face of drastic declines in income and with smaller food budgets, some consumers may shift more costly and more nutritious foods (e.g., fruits, vegetables, meats, and dairy products) to less expensive staples (e.g., grains, sugar, or roots and tubers) to maintain calorie intake, thus affecting diet quality (FAO, 2020a). As a matter of fact, according to the last State of Food Security and Nutrition in the World report, healthy diets are considered to be five times more costly than diets that merely fulfill dietary energy demands with a starchy staple. A nutritious diet costs more than the international poverty line (set at USD 1.90 purchasing power parity (PPP) per person per day), making it too expensive for the poor (FAO, 2020a, p. xvii). This shift limited calorie intake declines but increased micronutrient consumption deficiencies, increasing the risk of adverse health consequences. Food insecure people are more prone to suffer from chronic diseases like diabetes, directly linked to their diet (Seligman et al., 2010).

Thirdly, the COVID-19 economic crisis may influence diet due to interruptions in nutrient-rich food supply chains. "The bulk of nutrient-dense foods are perishable, resulting in vulnerable supply chains. Any breakdown in the supply chain, from farmers to merchants, transporters to retailers, can destabilize the whole system (Headey & Ruel, 2020). Also, movement restrictions prevented farmers from accessing markets, purchasing inputs, and selling products and led thus to a waste of food at the production level (Galanakis, 2020). Several food supply networks have failed, as food is abandoned to decay in fields or burnt due to transportation limitations (FAO, 2020d).

Fourthly, compared to the 2007–2008 crisis, decreased food prices on international markets should alleviate global food security worries. However, given the frequent and severe depreciation of currencies against the US dollar, they cannot always stop local disruptions in food supply chains or pricing in local currencies (FAO, 2020b). Exchange rate fluctuations may affect the quantity and price of foods available domestically (FAO, 2020a). In addition, shortages of workers due to sickness, quarantine restrictions restricting market access, and logistical disruptions might artificially raise food prices despite current availability due to strain on the supply chain (HLPE, 2020). These factors result in raw material prices rising (Petetin, 2020). In addition, in some countries, school closures have reduced access to food for children. Children who received meals through school feeding programs were less likely to suffer malnutrition. Many children miss out on the only chance to eat because of school closures (Mkandawire, 2020).

Finally, COVID-19's final results will likely differ from country to country based on the epidemiological circumstances, socio-economic development, and the efficacy of local health care systems, among other factors (HLPE, 2020). In this regard, the Gulf Cooperation Council (GCC) region, one of the world's wealthiest and most food-secure regions, is especially intriguing.

4. Impacts of the COVID-19 pandemic on food consumption in the GCC

The Gulf Cooperation Council consists of six Arab Middle East nations (Saudi Arabia, United Arab Emirates—UAE; Kuwait; Oman; Qatar; and Bahrain) with a combined population of 57,694 million and a GDP of US$ 1.647.893 in 2019 (World Bank, 2020a). The vast hydrocarbon resources (30% of the world's proven oil reserves and 22.2% of the world's proven natural gas reserves) have made the area one of the wealthiest in the world. Oil and natural gas earnings dominate the economies of the GCC countries. In 2019, oil accounted for up to 50% of the GDP and 90% of the export and fiscal income of the GCC nations (World Bank, 2020c).

On 29 January 2020, the UAE confirmed the first case of COVID-19 in the GCC countries and the Middle East (CNBC, 2020). Later during February and March, Bahrain, Kuwait, Oman, Qatar, and Saudi Arabia, reported their first cases. Since then, the GCC governments have adopted proactive strategies and procedures, including travel bans and curfews in key cities, as well as free treatment for patients (Alandijany et al., 2020; Gulf Health Council, 2020). While these measures were vital to stop the spreading of COVID-19, they have also had a significant impact on domestic economic activity (El-Saharty et al., 2020). In addition, lockdowns imposed to curb the pandemic drastically cut the global oil demand, resulting in a sharp decline in oil prices, and disruptions in trade and tourism added further headwinds (International Monetary Fund, 2020c). As highlighted by El-Saharty et al. (2020, p. 40), in the GCC region, "COVID-19 has caused negative supply and demand shocks, and the oil price drop has hit fiscal revenues hard and weakened external balances". Because of their exposure to oil and gas exports, COVID-19 and its significant decline in oil prices are expected to be the most important channel through which effects of the COVID-19 are felt in GCC countries (Arezki & Nguyen, 2020). Indeed, despite OPEC+ efforts, overall oil consumption decreased 10% to 94,7 million barrels per day in 2020, compared with average oil prices dropped 33%, from 61,41 dollars a barrel in 2019 to 41,26 dollars a barrel in 2020 (World Bank, 2021). The International Energy Agency (2020) reported that "Road travel in areas with lockdowns fell by 50 to 75 %, with worldwide average road transport activity dropping to less than half of what it was in 2019. Aviation travel had reduced by 60% by the end of Quarter 1 in 2020 (IEA, 2020). For the GCC, which is still heavily dependent on hydrocarbons—an average of 40% of GDP, 70% of government income, and 75% of exports—the fall in global oil demand and prices worsened the 2020 economic slump. As a result, GDP in the GCC nations would fall by 4.8 % in 2020, surpassing the results in the worst years of the global financial crisis in 2008–09 and the oil price drop in 2014–17

Secondly, COVID-19 containment measures are creating more significant disturbances in the tourism, transport, and retail sectors than anticipated (International Monetary Fund, 2020c). Given the vast numbers of workers (both citizens and expatriates) in the services sector in the GCC region, there will be vast repercussions if unemployment rises and wages fall (Telci, 2020). Accordingly, most GCC applied plans to reduce the workforce in several sectors, especially oil and gas (Tahir & Bhatti, 2020). To support citizens and strengthen businesses, several GCC countries have as well provided stimulus measures. For example, Kuwait provided an extra $16.5 billion in financing for small and medium businesses. Bahrain launched an $11.4 billion package of reforms (ESCWA, 2020a).

The COVID-19 pandemic also influenced GCC food consumption habits and food security. Indeed, how people eat, purchase, and interact with food has changed significantly. Several studies and analyses have identified several consumer trends influencing food and health habits in the Gulf Cooperation Council (GCC).

Firstly, since going to the grocery store is associated with risk (fear of the virus, lengthy lines), lockdowns change how people buy food. Since the epidemic's beginning, online shopping has grown tremendously in the region, and local delivery applications have followed suit (e.g., Talabat, Uber Eats, Instashop; Altios, 2020). According to a study published by IPSOS, a multinational market research firm, on the impact of COVID-19 on consumer habits in six markets in the

Middle East and North Africa (MENA) region [namely, Morocco, Tunisia, Algeria, Egypt, Saudi Arabia, and UAE], online grocery shopping has increased across the region, with 33% shopping online more frequently 2020 . Choueiri Group (Food Navigator, 2020) reported that 55% of Saudis bought groceries online in April 2020, compared to only 6% before COVID-19. Consumers across all age groups have begun shopping online to escape long lines and crowds at supermarkets. Demand for food and groceries has increased significantly in the United Arab Emirates. In the first half of March, several retailers witnessed a 20–40% increase in sales compared to 2019. There has been a massive increase in online stores selling groceries, with delivery times ranging from two to 10 days and minimum order quantities increasing (KPMG, 2020). According to InstaShop, a supermarket delivery service in the United Arab Emirates, app downloads increased by 70%, daily orders increased by 50%, and basket value increased by 60% by March 2020 (Khaleej Times, 2020). In Qatar, Ben Hassen et al. (2020) outlined a surge in online grocery shopping, with 35.35% of the respondents indicating that they ordered more groceries online. Choueiri Group (Food Navigator, 2020) thinks that the fast expansion of the eGrocery sector in the region would likely continue beyond the epidemic and eventually lead to a significant change in consumer behavior. A study conducted by Alhusseini and Alqahtani (2020) showed that the percentage of Saudis who purchased groceries online increased from 3 % to 28.6 % during the COVID-19 period. Previously, most respondents (93 %) purchased goods from the market, but this percentage decreased to 66.7 % during the COVID-19 period. According to AlTarrah et al. (2021), p. 73 % of the respondents reported changing their food shopping behaviors in Kuwait, with 44% shopping less than usual. A third of respondents favored shopping online, 25.6% spent less time shopping, and 27.6% bought more food (in quantity) each time they shopped.

Secondly, as a result of COVID-19, as seen globally, people in the region changed their diet and lifestyle. While certain changes have been welcomed owing to their proclivity to improve health and lessen the risk of severe illness, others have been labeled maladaptive and seen as impending dangers to the pandemic and many public health advances in various countries. Indeed, on the one hand, the region's inhabitants have had to rethink their lives and become more aware of their diet. In order to improve their immune system to combat COVID-19, eating healthy became a concern for individuals around the GCC (Altios, 2020). Indeed, in the IPSOS survey, 54% eat healthier, and 45% eat more balanced meals (IPSOS, 2020b). In Qatar, Ben Hassen et al. (2020) underlined a change to a healthier diet after the COVID-19 pandemic. Consumers decreased their unhealthy food intakes, such as fast food, sweets, and desserts. Meanwhile, they consumed more healthy food such as fruits and vegetables. In Oman, Ben Hassen et al. (2022) discovered that 54.5% of their cohort increased their water intake, 45.5% raised their fruit and vegetable consumption, and 42.4% increased their consumption of healthy meals. Meanwhile, 43 % of participants reduced their intake of unhealthy snacks, 53.1% reduced their intake of unhealthy meals, and 35.6 % reduced their intake of frozen items.

This constitutes a positive shift because GCC nations confront a wide range of health issues, including growing obesity rates and unhealthy diets and lifestyles (Samara et al., 2019). Several reports before the pandemic revealed the high frequency of lifestyle-related diseases in the GCC region. For example, in the UAE, cardiovascular disease (CVD), cancer, diabetes, and chronic respiratory illness were responsible for 77% of all fatalities, and the likelihood of dying prematurely from one of these diseases was estimated to be 17%. Also, in Qatar, according to Al Thani et al. (2018), more than 83 % did not meet the recommendations for vegetables, fruits, whole grains, legumes, and high-fiber intakes, % were overweight or obese, 50–72 % consumed sweetened beverages and sweets frequently, and nearly a half consumed fast foods frequently. Simultaneously, the frequency of obesity in Qatar's adult population has grown since 2000 (Al Thani et al., 2018). According to a 2017 survey conducted by the Ministry of Health, 69.3% and 63.3% were overweight or obese in Oman. It also detailed a significant increase in adult obesity since 1991 (Ministry of Health of the Sultanate of Oman, 2017). As in the whole GCC region, Oman has among the highest rates of child obesity (World Obesity Federation & The Gulf & Lebanon Recommendations Expert Group, 2020). Consequently, the Omani population has a high burden of non-communicable diseases (NCDs), notably type 2 diabetes and

renal and heart disease (Ministry of Health Sultanate of Oman, 2014). Moreover, in 2017, 57.3% of women and 63.9% of men ate less than five servings of fruit and vegetables daily (Ministry of Health of the Sultanate of Oman, 2017).

However, some other research highlighted a shift toward unhealthy lifestyles. Indeed, during the pandemic in the UAE, Cheikh Ismail et al. (2020) highlighted in their research that 31% of the participants reported weight increase, and 72.2 % reported drinking fewer than eight glasses of water daily. Furthermore, the food habits of the participants were found to be farther from the principles of the Mediterranean diet and more similar to "unhealthy" dietary patterns. Furthermore, 38.5% did not participate in any kind of physical exercise, and 36.2% spent more than five hours each day on screens for entertainment. Participants who experienced physical tiredness, mental exhaustion, irritation, and stress "all of the time" during the pandemic reported much greater rates of these symptoms than those who reported them before the pandemic. In the UAE, Radwan et al. (2021)identified various unhealthy lifestyle changes, including an increase in food consumption (31.8%), a reduction in physical activity (30%), an increase in weight (29.4%), a reduction in sleep (20.8%), and a rise in smoking (21%). These eating patterns and lifestyles raise the likelihood of developing long-term illnesses, including obesity, heart disease, stroke, diabetes, some cancers, and chronic renal disease because of their associated risk factors. In Kuwait, Salman et al. (2021) outlined that over a third of participants (34. 3%) reported eating more than before the COVID-19 pandemic, and 35.8% thought they had gained weight since March 2020.

Thirdly, many more consumers across the region are personally preparing their meals (57%), and 81% are trying new recipes and looking for instruction and inspiration from online and TV chefs (49%). In reality, the COVID-19 epidemic heightened culinary skills. With the closure of restaurants and coffee shops, entertainment alternatives were limited, and dining with family and cooking became new enjoyable hobbies. (Ben Hassen et al., 2020).

Fourth, despite the GCC nations' high reliance on food imports, COVID-19 had little impact on food supply or prices. While panic purchasing occurred in several GCC nations, it was not as widespread as Europe or the USA. Indeed, the GCC has escaped some of the world's most acute problems (Ghazaly et al., 2020). This might be explained by the multiple government strategies and plans to counteract the impact of the COVID-19 epidemic on food supplies. For instance, in Kuwait, according to AlTarrah et al. (2021), most participants (91.7%) were "confident" or "somewhat confident" that the food supply and safety offered fulfilled their needs. The nation's faith in the government's rapid response to the pandemic and the implementation of considerable public health measures to limit viral transmission might explain these outcomes. Kuwaitis may perhaps have felt safer since the government provides food subsidies. The GCC governments have also taken quick measures to protect local food supply chains and imports by granting agricultural workers temporary movement waivers, assisting manufacturing and delivery operations, and supporting farmers and agribusinesses (Oxford Business Group, 2020; Soubrier, 2020). In addition, several government officials adopted clear and intense communication strategies to reassure their citizens. For example, in March 2020, the UAE Ministry of Economy announced that it had enough food to cover the needs of its inhabitants for at least six months, despite fears about the new Coronavirus (COVID-19; Yu Lim, 2020). Also, in March 2020, the Omani government hastened to create food reserves and proclaimed in October 2020 that critical food products would be exempt from VAT to prevent inflation and household costs from rising (Oman Observer, 2020). In addition, to reassure its citizens, the Omani government implemented explicit and intensive communication initiatives. Furthermore, in response to worries about COVID-19-related trade disruptions, the GCC endorsed a Kuwaiti initiative on April 17 to establish a joint food supply network throughout the region. Member nations agreed as part of the agreement to set up specific procedures at border control and Customs checkpoints to enable the transfer of essential food and medical supplies within the six-member alliance (Oxford Business Group, 2020).

Table 1. Ranking of the GCC countries in the global food security index in 2021

Country	Global Rank	Rank in the Arab world
Qatar	24	1
Kuwait	30	2
UAE	35	3
Oman	40	4
Bahrain	43	5
Saudi Arabia	44	6

Source: The Economist Intelligence Unit (2021)

Moreover, GCC nations have long developed reliable supply networks and prioritized food security (Ben Hassen & El Bilali, 2019). During the COVID-19 crisis, the food systems of the Arab Gulf nations have so far functioned well in terms of maintaining enough food supplies for the population. Compared to traditional and transitional value chains that predominate in developing countries, their modern value chains are more resilient (Woertz, 2020). In fact, during the past food crisis, GCC countries have maintained fiscal surpluses, raised public sector wages, and implemented large food subsidy programs despite high food prices (Lampietti et al., 2011). As a result, the Gulf markets have been better able to withstand the Coronavirus's interruptions. In light of the GCC members' dependence on food imports, the stability and availability of food security are critical concerns and have historically been given significant attention by governments (McLoughlin, 2020). As highlighted by Lippman, 2010) "no product or commodity carries the immediacy or political sensitivity of food". Overall, policymakers and governments across the GCC region rate food security as a grave concern that they are actively working to address (Babar & Kamrava, 2014). The GCC nations are also capital-rich; therefore, food imports are not subject to any restrictions on the use of foreign currency (Ben Hassen & El Bilali, 2019). Consequently, these nations have been less exposed to price risk than other food importers; and have been able to bridge the deficit in domestic production owing to their strong fiscal position (Efron et al., 2018). Consequently, in 2021, the six GCC nations have been classified as the most food-secure in the Arab world and among the most food-secure countries globally in the Global Food Security Index (The Economist Intelligence Unit, 2021; (Table 1).

5. Conclusion

This study aimed to look at the effects of the COVID-19 pandemic on consumer awareness, attitudes, and actions about food purchase, preparation, and consumption. Negative feelings like anxiety, boredom, depression, tension, anxiety, and fear have resulted from the lockdown and confinement measures to halt the spread of the virus. The pandemic's psychological effects, such as panic buying and hoarding, have also changed the connection between consumers and food.

People's attitudes on food and health have shifted dramatically, as they spend more time at home and find dining out less convenient. The way people consume, purchase, and engage with food has improved significantly. It has already influenced the four pillars of food security (i.e., availability, access, utilization, and stability) in various ways via COVID-19. COVID-19 is projected to have far-reaching effects on the global economy, financial markets, and food security for billions of people worldwide. Aside from these patterns, the study identified some important consumer trends that now impact the GCC nations' food and health habits.

First, the epidemic has led to a substantial increase in online shopping in the region, and local delivery apps have followed their counterparts in other parts of the world. Secondly, many individuals have been more aware of their eating patterns after COVID-19 pushed them to re-evaluate their overall health practices. To eat better, many consumers decrease their fast-food and unhealthy snacks intake. Thirdly, the COVID-19 epidemic unlocked culinary talents, with many

more consumers throughout the region cooking their meals and experimenting with new recipes. Fourth, despite the GCC nations' substantial dependence on food imports, COVID-19 had little effect on food availability or pricing. GCC nations escaped some of the more severe conditions that other regions of the globe encountered due to the various government measures and policies taken to reduce the impact of the COVID-19 pandemic on food supplies.

Finally, the results of this review support that data about the impact of the COVID-19 pandemic on diets and food-related behaviors in the GCC region are scarce. Indeed, the academic research on the impacts of the COVID-19 pandemic on food systems and diet has been unevenly distributed across regions, with most studies focusing on Western and Southern Europe, North America, and China (Colafemmina et al., 2020). In contrast, developing countries in general, particularly those in the GCC region, have been neglected. The COVID-19 situation has also brought to light the fact that nutrition security is more important than everything else when it comes to food security. It may allow the Gulf nations to take a more aggressive stance against food-related diseases, such as obesity and diabetes. Policy measures might vary from carbohydrate and sugar-rich food taxation and reporting requirements to school meals and awareness campaigns (Woertz, 2020).

This review was not without limitations. The main limitation is that research on the effects of the COVID-19 pandemic is very new and evolving rapidly. This, in turn, has two main implications. Firstly, the present review focuses on the short- and medium-term effects of the pandemic. Secondly, the review cannot grasp the whole literature on the subject matter, although it also covers the grey literature. Another limitation is that the literature on the GCC region is rather scarce. Therefore, systematic reviews that deal with the medium- and long-term effects of the COVID-19 pandemic on food-related activities, practices, and behaviors in the GCC region are highly needed. Furthermore, while the present review deals separately with the psychological and socio-economic impacts of the COVID-19 pandemic on food consumption, due to the limited scholarly and grey literature at disposal, for the time being, a more holistic and systematic view on the impacts of the pandemic on food systems as a whole in the GCC is highly needed to be able to inform more effectively and efficiently future policies and strategies to foster sustainable and resilient food systems in the region.

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