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ABSTRACT:
Corona Virus Disease 2019 (COVID – 19) has affected Pacific Island Countries (PICs), despite the small number of cases recorded so far. To curb the effects of COVID-19, various countries imposed varying degrees of lockdowns. This triggered rapid changes in the food environment and affected diverse dietary habits in the population, as well as job losses. As a result of COVID-19, unhealthy food choices have led to changes in the dietary habits of some people in various communities. The aims of this situation analysis report was to review and explore the Impact of COVID – 19 on Fiji's food security and nutritional status of the people; and also establish how it may contribute towards the rise of Non communicable diseases (NCD) in the country. The literature search was done using Medline, Embase, Scopus, and Proquest databases, and relevant keywords were applied to find studies which have been conducted in the field of COVID – 19 specifically looking at food security and nutrition in the Pacific and in Fiji. In addition, local media reports and press releases from Fiji's Ministry of Health and Medical Services and Ministry of Education, Heritage and Arts were also used. Most of the studies pertaining to the topic, published in 2020 in English language were reviewed and the main themes were identified. Our findings showed that COVID – 19 impacted Fiji's food and nutritional status via: food insecurity, malnutrition in children, and rise in NCD. This report concluded that the COVID – 19 pandemic has impacted Fiji's food and nutritional status. We propose that relevant research needs to be done to explore how the diet of Fijians will be affected as the pandemic worsens. Such a research if conducted will provide inputs to better prepare Fiji in terms of food system security, should another pandemic occur in future.

Keywords: Food Security, Malnutrition, Non-communicable Diseases, COVID-19

INTRODUCTION:

In January 2020, the Chinese Centre for Disease Control and Prevention (CCDCP) announced that a coronavirus, Severe Acute Respiratory Syndrome (SARS)-CoV-2, was the causative pathogen in a series of novel pneumonia cases in Wuhan, Hubei Province. The virus was later named Coronavirus virus disease of 2019 (COVID-19) by the World Health Organization (WHO) [1]. Within a few months, COVID-19 had spread globally. The WHO declared COVID-19 as a controllable pandemic disease on the 11th of March 2020 [2-3]. COVID-19 is currently one of the leading causes of death in most countries, with prevalence rates exceeding those of diabetes and other diet-related Non-communicable Diseases (NCDs) [4]. As of 21st January 2021, 96.4 million cases of COVID – 19 have been recorded globally, with 2.07 million deaths [5]. Although the mortality associated with COVID-19 is low, it has a high spreading potential [6], and this characteristic of the virus has influenced every aspect of life [7]. In order to mitigate the spread of this virus, multinational and multi-continental measures have been introduced, such as: reducing non – essential services, social gatherings, quarantine and many other actions [8]. Although effective in controlling the spread of this virus, these methods have triggered rapid changes in the food environment and affected diverse dietary habits in the population [9]. Furthermore, many individuals have lost their source of income due to COVID – 19 related movement restrictions, and do not have any access to social protection to properly support them during this crisis [10]. Ultimately, further vulnerabilities to food insecurity, malnutrition, and obesity imposed by the COVID-19 pandemic are anticipated. These are likely to magnify inequalities in healthy living behaviors in a world that operates with an already strained food security environment, perpetuating a viscous synergy of complex but preventable nutrition conditions that may lead to the creation of diet-related NCDs [11].

The Pacific region is not immune to the current global scenario, and Pacific Island Countries (PICs) are striving to ensure that COVID – 19 does not evolve into a health crisis. Some measures have been adopted to mitigate the risk, such as, restriction of movement of people within and among countries have had severe impacts on tourism, international trade and, remittance [12]. Furthermore, the COVID-19 pandemic has exposed the vulnerability of the Pacific food system to externalities and has had far-reaching impacts; despite the small number of COVID-19 cases recorded thus far [12]. Fiji for instance, recorded its first case of COVID – 19 on 19th March, 2020, and thereafter implemented: border restriction to high risk countries, lockdown, and self – quarantine measures [13]. On 5th June 2020, Fiji declared itself COVID free, after clearing its last active COVID – 19 patients [14]. Currently, Fiji is classified as a COVID contained nation with 4 border quarantined cases [15]. Although, the

people of Fiji are safe from any immediate threat of COVID - 19, the measures enacted to contain the virus have had substantial impact on the economy. This is because; Fiji is heavily reliant on income from tourism [16], which accounts for about 40% of its Gross Domestic Product (GDP) and approximately 37% (direct and indirect) of all employment [17]. As a consequence of tourism cessation, unemployment is rising [18], and other sectors that support tourism including agriculture, transportation, retail, lodging, food, and recreation, are also being affected [19]. Such ramifications pose a serious health concern, particularly the interplay between loss of incomes and the availability and affordability of local and imported foods [12].

The prevalence of diet – related NCD is particularly high in Fiji, with the 2011 STEP survey revealing that 1 in 3 Fijians are diagnosed with diabetes [20]. With loss of income, rising unemployment, and COVID – 19 measures in place, it is expected that the diet of Fijians may change, and this will have an impact on the incidence rate of NCDs.

Thus, this literature review aims to explore the impact of COVID- 19 pandemic on food security and nutritional status of the people especially children, and how it has contributed towards the rise of NCDs in Fiji.

METHODOLOGY:

This literature review focused on several aspects related to COVID – 19 and its impact on nutrition in Fiji. Four databases were used to search for publications on relevant studies: Medline, Embase, Scopus, and ProQuest. The keywords used included: (Factors OR Conditions OR Component) AND (COVID-19* OR “Coronavirus”) AND (“Nutrition” OR “Diet”), AND (“Fiji” OR “Pacific”). Additionally, local media reports and press release statements by the Fiji’s Ministry of Health and Medical Services (MoHMSs) and Ministry of Education, Heritage and Arts (MoEHA) were also used. The focus of the search was studies and media reports published in 2020 in English language. The titles of all the studies were scanned by two independent researchers and those not relevant were excluded. The abstracts of the remaining studies were reviewed and 17 full text articles that met the study inclusion criteria were printed for future review and to formulate the themes that are discussed below.

FINDINGS:

This study found three themes that determine the impact of COVID – 19 on nutrition in Fiji these are: food insecurity, malnutrition in children and increase in NCD rate. These themes are presented and discussed below:

***Theme 1: Food insecurity*:**

A person is food-insecure when they lack physical, social, and economic access to enough safe and nutritious food to meet their nutritional needs and food preferences to lead an active and healthy lifestyle [21]. The COVID-

19 pandemic is undermining efforts to achieve the sustainable development goals (SDG) 2 which is "Zero Hunger" [22]. Already, before the pandemic, according to the latest State of Food Security and Nutrition report, about two billion people faced food insecurity at the moderate or severe level [22].

The Pacific region, characterized by a strong dependence on tourism revenues has suffered immensely from border closures and lockdowns, with knock-on effects for overall economic activity, supply chain disruptions and job losses. Dampened economic activity and consumer spending has serious repercussions on the development outcomes of PICs and their ability to achieve the SDGs [23].

The Food and Agriculture Organization (FAO), mention that imported foods make up half of a person's food intake in many Pacific Small Island Developing States (SIDSs) [23]. The FAO further predicts that if the pandemic were to continue then the regions food systems would be immensely affected because of supply chains both globally and local. Pacific SIDS rely on cargo shipment for food imports, and the shipping industry has been experiencing halted movements due to port closures or gaining access to ports with projections that this impact can be long lasting [23]. Furthermore, food prices have also been affected as in Fiji, it was seen that after the lockdown in Fiji's capital, Suva, the costs of the most consumed vegetables increased between 11 to 36 percent, in some cases up to 75 percent [23]. This may have had great impact on the nutrition of many people, because they would not be able to feed their families. A study conducted by Kent et al., [24] looking at the prevalence and socio-demographic predictors of food insecurity in Australia during the COVID19 Pandemic. They reported that between late April and early June 2020, a time when widespread social distancing restrictions were in place, more than 1 in 4 (26%) respondents had experienced food insecurity to some degree. Alarmingly, 14% of respondents experienced more severe food insecurity, which meant they were regularly going hungry and were unable to afford balanced meals over the previous month.

The study conducted by Wolfson and Leung [25] presented results from a national survey of low-income adults in the USA during COVID - 19 found that food-insecure adults were more likely to report that they had already been laid off and that their income would go down substantially. More than half (54%) of food secure adults reported they expected their income would remain the same compared to 23% of adults with very low food security. Food insecurity is associated with a range of negative health outcomes over the short and long term, including poor mental health outcomes such as depression, stress, and anxiety, poor diet quality, high rates of chronic diseases such as diabetes and obesity, and lower overall health status [25].

In the Pacific, the FAO reports that the rural population of the pacific tends to grow and

consume their own food, but the setback is that fertilizers and livestock feed are imported from other countries. Thus, due to COVID-19, the domestic production may be affected in the long run, which would also cause domestic prices of fruits and vegetables to increase causing more food insecurity issues [23].

Furthermore, at the recent world food day celebration in Fiji, the Minister for Health & Medical Services, mentioned, that the COVID-19 pandemic exposed the vulnerability of the island country's food systems with a potential impact on food security.

In mitigating this impact the minister stated that a new policy on food and nutrition security of Fiji had been developed and has been tabled in cabinet for approval to address the situation and cushion the effects of this pandemic on food insecurity [26].

***Theme 2: Malnutrition in children*:**

Malnutrition, in all its forms, includes under and over nutrition. Wasting, stunting, underweight, vitamin or mineral deficiencies are a result of under nutrition while the consequences of over nutrition include overweight, obesity, and diet related NCDs [27]. The unprecedented global, social, and economic crisis, triggered by the COVID-19 pandemic poses grave risks to the nutritional status and survival of young children in Low-income and Middle-income Countries (LMICs) [28]. The most damaging impact of the complex food insecurity phenomenon on individual health is the increased likelihood of malnutrition [28]. Nearly half of all deaths in children under 5 are attributable to under nutrition, which puts children at greater risk of dying from common infections which increases the frequency and severity of such infections, and delays recovery [29].

In Fiji, the Permanent Secretary for the Ministry of Health & Medical Services, in a press statement, stated that COVID-19 has affected the ability of many Fijians to access healthy food as COVID-19 had resulted in job losses, which has led to a reduction in peoples' ability to afford nutritional food. He also anticipates that diet related illness would be seen in hospitals as the pandemic worsens over the months and years [30]. According to FAO, the increase in the Prevalence of Under Nutrition (PoUN) is more pronounced for those countries with both high exposures to climate extremes and high levels of vulnerability. It also states that countries that highly dependent on agriculture show the highest level of PoUN [22].

Headey et al., [28] looked at the impacts of COVID-19 on childhood malnutrition and nutrition-related mortality. Their particular concern was an expected increase in child malnutrition, including wasting, due to steep declines in household incomes, changes in the availability and affordability of nutritious foods, and interruptions to health, nutrition, and social protection services. During the COVID-19 pandemic, parents might use controlled feeding practices more often, because of higher levels of stress, fewer resources, and less access to food

(real or perceived) [31]. At the same time, malnutrition (including obesity) may increase vulnerability to COVID-19 patients [28].

According to a report by the High-Level Panel of Experts on Food Security and Nutrition (HLPE), 2020; Impacts of COVID-19 on food security and nutrition include: people's inability to earn a living and buy adequate food, maintain adequate nutrition for disease resistance, disruptions to food supply chains, a widening of inequality; disruptions to social protection programs, altered food environments and uneven food prices [32].

A cross-sectional, observational study by Adams et al., [31] used an online survey to measure parent-reported food security status, the home food environment, and parent feeding practices before the COVID-19 pandemic (retrospective report) and during the COVID-19 pandemic (at the time of survey completion). The authors ascertained that more than half (60.1%) of families experienced a decrease in income, of those that did, most had low food security (23.4%) or exceptionally low food security (42.5%). One third of the families reported to have an increase in unhealthy foods. Over 30 million children in the USA rely on the national school lunch program and school breakfast program, and meals and snacks from schools fulfill up to two-thirds of children's daily nutritional needs [33]. Without access to school meals (or a replacement meal provided by the school) during the pandemic, low-income families have the financial burden of providing additional meals for their children contributing to low intake of micronutrients such as iron, calcium and vitamins A and D which results in micronutrient deficiencies in children [33]. The Ministry of Education, Heritage and Arts (MoEHA) in Fiji had observed, that when schools resumed after the lockdown, many students did not bring lunch to school because their parents had suffered job losses due to the pandemic. The MoEHA stated that it would work with faith-based organizations in looking at how affected students could be assisted, so that their nutritional needs are met [34]. As a result, organization, such as, the Arya Pratinidhi Sabha of Fiji is assisting about 330 students at 35 of the Sabha run institutions with lunch as their parents are facing financial difficulties. The organization in a media report also mentioned that many students' parents were put on reduced working hours or were made redundant [35]. Furthermore, the south Indian body in Fiji, Sangam mapped out that close to 8000 students in their various schools would need to be provided with lunch when schools resumed.

This was again attributed to the fact that many parents of the students were left jobless and this had a direct effect on the students in meeting proper nutrition [36].

***Theme 3: Increase in NCD rate*:**

NCDs kill 41 million people each year, which is equivalent to 71% of all deaths globally [37]. Preliminary evidence indicates essential services have been directly and indirectly

disrupted due to COVID-19 globally [38]. In the preliminary results of a rapid assessment of service delivery for NCDs' during COVID-19 by WHO; 120 countries reported that NCD services were disrupted, particularly rehabilitation services, hypertension management, diabetes and diabetic complications management, asthma services, palliative care services and urgent dental care [39]. The primary causes of NCD service disruption included a decrease in inpatient volume due to cancellation of elective care and closure of population-level screening programs, and government or public transport lockdowns hindering access to health facilities [38]

Diabetes makes the patients more prone to develop infectious diseases due to the dysregulation of the immune system and is considered as a risk factor for the progression and poor prognosis of COVID-19 [40]. People with diabetes are bound to miss physician's appointments and routine clinic visits for fine-tuning of anti-diabetic medications among other things, due to the imposed lockdowns caused by COVID-19. This can result in sustained periods of unattended to hyperglycemia and probably hypoglycemia [40].

In Fiji, 32 fever clinics were established around the country when the COVID-19 community spread cases started to escalate, which lead to lockdowns and stringent measures whereby many patients who needed to attend constant weekly or monthly clinics for adjustments to their medications based on their health condition could not go to the hospitals or health centers because of these measures. A lot of staff from these clinics was re-deployed to operate the fever clinics which caused many NCD related problems for people already suffering from diabetes and hypertension [41]. Restriction in food supplies during the lockdown might force people with diabetes to alter their dietary habits that were earlier associated with good glycemic control. Attention to nutrition and adequate protein intake becomes important during these times as generally high consumption of carbohydrate rich foods take place in resource limited settings [42].

Additionally, self-isolation measures adopted in some countries have directly impacted food consumption at this time of anxiety, restricted mobility, and physical activity. Thus, the effects of increased overweight and obesity may persist for an extended period, even considering the alternating isolation [43]. This increase may be especially true in vulnerable populations that already presented food and nutritional insecurity as social-health issues, and may worsen even more with the progression of the COVID-19 pandemic [43].

Furthermore, long- term quarantine may add to unhealthy behaviors including unhealthy eating practices and may increase the risk of non-communicable diseases [44]. Overweight and obesity are on the rise in all regions, particularly among adolescents and adults [45]. As per COVID-19 internet updates, the COVID-19–associated hospitalization rate is 4.6 per

100,000 populations; higher rates have been noted with increased age, the highest among patients ≥65 years old [46]. Approximately 90% of the hospitalized patients had one or more underlying conditions. The common comorbidities identified are obesity, hypertension, chronic lung disease, diabetes mellitus, cardiovascular disease, and malignancies [46].

CONCLUSION:

COVID – 19 has brought the world to its knees and Fiji is no exception to this, because its economy heavily relies on international trade. The pandemic has not only caused many job losses in Fiji but is affecting the health of people, because many of them are unable to afford quality foods from the three food groups to have a balanced meal on a daily basis. The health authorities are also trying to come in terms with this and have tabled contingency plans to curb the issue of food insecurity for the duration of the pandemic.

More research needs to be done in this area to explore further how the diet of the people of Fiji is affected as the pandemic progresses. Such a research if conducted will provide inputs to better prepare Fiji in terms of food system security, should another pandemic occur in future.

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