Research Article

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Virtual Class and Children Food Patterns during Pandemic: A Review

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Abstract

The new normal due to COVID-19 has changed the dynamics of every aspect of on life, be it household, professional life, finances, education or the food patterns. There has been lack of a fixed routine in the lives of children because of closure of schools, therefore the routine of wake up, sleep, time food timings have gone haywire. Children are indirectly affected by the pandemic, through poor diet, mental health effects, social isolation, screen addiction, unhealthy and irregular food habits. This paper is aimed at discussing the potential effect of pandemic on nutritional status of children; especially when children are indulged in continue classes for long hours, sitting one place. Data from various research papers have been discussed in this review paper, highlighting the impact of the new normal health of covid-19 on the nutritional health of children this situation requires effective and practical measures which can be adopted at the home setting to enhance the nutritional status and overall wellbeing of the children.

Keywords: *Children, Food Patterns, Lifestyles, Online Class*

1. Introduction

The health authorities in December 2019, in the Hubei province of China identified many problems (Lake, 2020). Within a limited period of time, pneumonia cases of initially unknown causes, linked to Wuhan's South China Seafood Market an alarming number of patients admitted to local hospitals with serious and, in some cases, fatal pneumonia, often including pyrexia, radiological signs of acute respiratory distress syndrome, lymphopenia, and failure to overcome this illness over 3–5 days of antibiotic treatment also (Guan et al., 2020; Huang et al., 2020; Lake, 2020). Further investigations identified it as novel corona virus, SARS-CoV-2 (severe acute respiratory syndrome corona virus (Huang et al., 2020), as the causative factor or agent that originated in bats and was further transmitted to human beings through yet unknown intermediary animals in the Chinese city of Wuhan (Lake, 2020; Singhal, 2020). The number of deaths spiked up, and on January 30, 2020, the World Health Organization officially declared the novel corona virus as a pandemic, a public health emergency of international concern (Huang et al., 2020; Guo et al., 2020). After that, The local Wuhan and national Chinese governments took emergency steps in response to this outbreak (Chen,Yang, Yang, Wang, & Bärnighausen, 2020; Prem et al., 2020; Xiao & Torok, 2020). Schools, markets were shut and employees were given work from home facility. Furthermore, the local government enacted social distancing, containment of communities, and crowded places to be avoided (Prem et al., 2020; Wu & McGoogan, 2020). The Chinese government further stopped public activities to prevent the infection's spread (Wang, Zhang, Zhao, Zhang & Jiang, 2020). Public transportation was restricted, including trains and buses, within Wuhan and other prevention and control measures were also adopted in the city, such as isolation and quarantine (Wang et al., 2020; Wu & McGoogan, 2020). 11 million citizens were quarantined at Wuhan, a key transport hub located 4 hours from Beijing by train, when it was shut down (Lake, 2020).

2. Gaps in Researches

Recent times the covid-19 situation creates a burden on the children food patterns, nutritional health and there are lots of issues related to the online class and nutritional health. But there is need to understand the evidence based research on these areas so that the nutritional issues of children affected which are affected by online classes during this current COVID-19 Pandemic can be studied. Since, the children are facing a lot of problems and uncertainty about their career and also about their higher studies because of their multiple issues the pandemic situation that creates burden on them. Therefore, the current article was planned.

3. Objectives

The major aim of this current article is to relate the food patterns and life styles issues and online class during this pandemic time of COVID-19. The article also relates the review of related studies with the mentioned objective.

4. Children Food Patterns and Life Styles Issues Due to Online Classes

There are many observations reported by the parents and teachers about the food patterns and life styles issues among children because of the online classes attending at home and lack of sensory, Physical and motor activity, brain storming activity and cognitive processes which generally happen in the face-to-face classes and overall psychological environment of the school premises. Not only the teacher and parent's observation rather as a researcher we have also observed certain issues during individual counselling session as well as in related studies among children, it may be because of online classes or long-time screen sitting. The issues are as under with relevant evidence.

4.1 Childhood obesity

Obesity has been emerged lately as global public health challenge in latest decades (Foss &Dyrstad, 2011). And this has increased all over the globe since the past five decades (Bradley, 2019), reaching pandemic levels which shows the intensity of its spread (Blüher, 2019). It has been estimated that all over the world there are, more than 600 million people who are obese and another 2 billion are there who come in the bracket of overweight (Bradley, 2019). It has been seen that children are more prone to be overweight, and its prevalence has spiked up exponentially in recent decades (Di Cesare et al., 2019; Kumar & Kelly, 2017; Llewellyn, Simmonds, Owen, & Woolacott, 2016). Furthermore, it has been observed generally that obese children are likely to grow as obese adults, probably due to the chronic unhealthy habits which continues all through the childhood to adulthood (Di Cesare et al., 2019; Freedman, Khan, Dietz, Srinivasan & Berenson, 2001; Llewellyn et al., 2016). Therefore, for public health authorities, controlling obesity has become a prime concern and priority and community-based approaches are the most potential approaches probably of many health interventions, including obesity (Walls, Peeters, Proietto &McNeil, 2011). However, the current COVID-19 pandemic, is been seen as a potential hindrance in the implementation of such interventions and constitute an unforeseen stoppage in the global battle against obesity. Children's physical and mental health has been impacted negatively due to school closures and lockdown (Wang et al., 2020). It can be said that childhood obesity will be increased due to pandemic and physical and social confinement, by creating an unprecedented obesogenic environment for children because of less or no scope of physical activity and probably more food intake. There could be Psycho-social factors are the driving force behind this concern because children might indulge in overeating as an escape to the unpleasant isolation.

4.2 Unprecedented obesogenic environment

There had been many epidemics and their control measures like traditional outbreak responses have been successfully employed in the past; however, they have never been executed on such a large scale, which has been employed in response to COVID-19 (Wu & McGoogan, 2020). As per the studies, over 91% of the global student population has been impacted by school closures (UNESCO, 2020). In another study, Rundle, Park, Herbstman, Kinsey &Wang (2020) anticipated that out-of-school time for many children in the United States in 2020 would be doubled out due to pandemic. Children are being forced for the isolation at their homes and they are exposed to confinement and a different environment altogether.

This unprecedented situation may carry a series of further negative ripple effects or repercussion that warrant further investigation. Several studies have put this point that it has been seen that when children are less physically active and experience unhealthy weight gain when they are out of school in summer break (Ghosh, Dubey, Chatterjee, & Dubey, 2020; Wang et al., 2020; Rundle et al., 2020a). It happens probably because, almost all sorts of supervised sources of physical activity are lost in off days as a result of school closures which may contribute to weight gain (Rothstein &Olympia, 2020). Studies have shown that obesity that develops at early age (age 5 years) is usually associated with both significantly higher fat mass because of accumulated fat throughout childhood to adulthood and a higher body mass index (BMI) at age 50 years, therefore this issue is of a great concern. This statement is being supported in one of the studies done by Rundle et al., (2020b) who emphasized that participants who were obese at 5 years of age had BMI scores at 50 years of age that were 6.51 units higher than those with a normal weight at 5 years of age, this is in alignment with the fact that childhood obesity may lead to adulthood obesity as well.

As per a study done by Brazendale et al., (2017), various factors that come into play when children are in isolation that could be termed as Obesogenic behaviours are sedentary behaviour, increased screen time, a poor diet, and irregular sleep. Although emergency home schooling plans have been implemented by various governments (Wang et al., 2020), during these unprecedented

times, it has become difficult to set a fixed routine or structure for children. Irregular sleep patterns and extensively prolonged screen times due to online class and lecture offerings (in addition to leisure screen time), may be seen, which could be the contributors of weight gain and decreased Cardiorespiratory fitness levels (Wang et al., 2020). A concern has been raised by Dunton, Do &Wang, (2020) that the current negative short-term changes in sedentary behaviour and physical activity may seep into the lifestyle of children, becomes their habit and may lead to permanent lifestyle from childhood through adulthood. Overweight and obesity in children could be aggravated by prolonged screen times, which mean prolonged sitting and inactivity (Fang, Mu, Liu &He, 2019; Nagata, Abdel Magid & Pettee Gabriel, 2020; Robinson et al., 2017). As per a study done by Fang et al., (2019), the risk of overweight and obesity in children was increased among those whose screen time was more than or equal to 2 hours as compared to a screen time of <2 hours per day. Recent studies reveal that obesity due to increased screen media exposure along with the factor of eating while viewing could leads to obesity in children (Robinson et al., 2017).

It has been seen that less favourable diets are being available to children during quarantine (Calcaterra, Vandoni, Pellino &Cena,2020), Many people for food security, has to rely on highly processed and non-perishable foods (Weaver et al., 2014). And these foods which are highly processed are generally high in saturated fat, sugar, and salt (Poti, Braga &Qin, 2017). The consumption of such foods and its association with adverse health outcomes, including obesity and metabolic syndrome has been seen in many studies by researchers (Lawrence &Baker, 2019; Laster & Frame, 2019; Louzada et al., 2015; Monteiro, Moubarac, Levy, Canella, Louzada, & Cannon, 2018). The intakes of potato chips, red meat, and sugary drinks increased to great levels during the quarantine as per a study done (Pietrobelli et al., 2020). Various other recently published international investigations reported similar findings of increased consumption of junk food and inactivity in lockdown (Ruiz-Roso et al., 2020).

Furthermore, negative psychological impact on children and their families have been there in quarantine and isolation times (Hawryluck, Gold, Robinson, Pogorski, Galea & Styra, 2004; Liu, Bao, Huang, Shi, & Lu, 2020; Yeasmin, Banik, Hossain, Hossain, Mahumud, Salma & Hossain, 2020; Wang et al., 2020). Various unprecedented stresses including a lack of in-person contact with classmates, friends, and teachers, feelings such as frustration and boredom, and a possible lack of personal space at home has lead to such disrupted psychological and psycho-social health (Brooks et al., 2020; Ghosh, Dubey, Chatterjee & Dubey, 2020; Wang et al., 2020). Pandemic disasters and subsequent disease containment responses create traumatic conditions according to a study done in this area in 2013 (Sprang &Silman, 2013). Unhealthy food intake through stress-related eating, leading to obesity and other health problems could happen due to the result of physical and social isolation (Rasheed, 2017; Torres & Nowson, 2007). One study revealed that stress-related eating is highly common and spread among 16-year-old girls (Jääskeläinen, Nevanperä, Remes, Rahkonen, Järvelin & Laitinen, 2014) and the reason could be the current pandemic, however studies are limited in this field.

Financial losses or even existential threats are being experienced by many households as a consequence of the pandemic (Hossain, Sultana &Purohit,2020; Wang et al., 2020). In these pandemic dynamics, children are mainly affected in 2 ways. One being, families are facing difficulty affording fresh and unprocessed whole foods due to financial losses and reduced income. As per a study done by Headey and Alderman (2019), what and how much food poor households can buy is controlled by the limited family finances. Fresh and healthy plant-based food options might not be affordable by the families who have limited income; instead children will be fed calorie-dense processed foods that are often cheaper to fill their tummy because parents have limited income (Headey &Alderman, 2019), and the risk of obesity and other metabolic disorders would be increased directly as previously explained (Laster & Frame, 2019; Louzada, et al., 2015). Second being, the potential economic or job losses have put the families in the situation of emotional coping. Major increases in unemployment and job insecurity rates have been seen in COVID-19 (Pérez-Escamilla, Cunningham, & Moran, 2020; Wilson, Lee, Fitzgerald, Oosterhoff, Sevi, &Shook, 2020). As per assessed by World Health Organization, the current crisis will likely lead to an increase in domestic

violence because family members are living with close contact with each other for prolonged times (Storz, 2020; WHO, 2020). Domestic violence cases have seen a spike as per the reports from several countries, including China, Germany, Italy, and Brazil (Graham-Harrison, Giuffrida, Smith & Ford, 2020; WHO, 2020).

4.3 Dietary and lifestyle habits

Dietary and lifestyle habits of many families have been changed in the pandemic time, additionally, the major economic confusion of many communities and society has created problems in their livelihood all over the globe, and especially those working in the informal economical activities have suffered the most. It has been witnessed shocking scenes of thousands of desperate persons, even of the wealthiest countries, generally belonging to migratory groups or low income groups, queuing for long hours, week after week, to receive free food parcels. Millions of children are exposed to food insecurity because closed down of School which create problems among the children's specifically the children who are coming from poor families because their lunch and food is thoroughly depends on the school such as mid day meals or hot cooked meals or dry ration (Dooley, Bandealy & Tschudy, 2020; Fore, Dongyu, Beasley, & Ghebreyesus,2020; Raman et al., 2020). Disruptions in nutrition assistance programs and health services by government and non government organisations has add to deep-rooted poverty, as can be seen in various studies done at different places (Headey et al., 2020; Naja & Hamadeh, 2020; Panthi, Khanal, Dahal, Maharjan & Nepal, 2020).

4.4 Unhealthy lifestyle

Unhealthy life style is also observed during this online class and pandemic time, some of significant studies mentioned here. An Italian survey, studying the association between unhealthy lifestyle during pandemic and obesity (Pietrobelli et al., 2020). The results showed that during the quarantine period, the intake of potato chip, red meat and sugary drinks increased to a great extent contributing to obesity, there was observed a significant consumption and sweet foods increases among adolescents (Ruiz-Roso et al., 2020). In a research, 3533 respondents aged between 12 and 86 years, during confinement were studied in an Italian survey (Di Renzo et al., 2020) and it was found out that the population group aged 12–17 years showed low levels of Mediterranean diet as the other counterpart group 18–30. The program in the US covering 4 geographic areas, responded to an electronic survey and it was revealed that (Sharma, Chuang, Rushing, Naylor, Ranjit, Pomeroy &Markham, 2020). Food insecurity was faced by 93.5% of respondents in April 2020 compared to 71.5% in fall 2019, and reduced availability of fresh fruits and vegetables was reported by 41.4% respondents (Sharma et al., 2020).

A survey conducted online in Poland; on the other hand, among 2448 15-20 aged adolescents in May 2020 suggested that positive changes promoting the intake of a better diet may have been brought up by the pandemic conditions (Głąbska, Skolmowska & Guzek, 2020). It revealed that the food choices should be healthy and should not increase weight, and not giving the primary importance to the sensory appeal of food or just the desire or mood to eat. The NutriNet-Sante cohort study, which is one of the largest studies in this area, surveyed French adults, a sample of 37.252 and households between March and May 2020 (Deschasaux-Tanguy et al., 2020). The findings of this cohort study reveals that a significant part of the sample which is unhealthy patterns of nutrition and lifestyle behaviours decreased physical exercise (53%), in activity and screen time (63%), gobbling on snacks increased (21%), consumption of fresh foods and unprocessed foods increased (27%), consumption of sugary items and sweets increased (22%), mood eating or eating just when feeling bored increased (18%) or anxiety (10%) on average for 35% of the respondents, had a weight gain of 1.8kgs. On the other hand, few people saw this pandemic as an opportunity to improve their lifestyle behaviours, which included home-made cooking increased to a certain level (40%) and exercise and physical activity also increased (19%). In addition to that, persons were more likely to

have lower incomes with less favourable nutritional trends, to have children age of less than 18 years, to be in overweight or obese category, to have any kind of anxiety or depressive symptoms (Deschasaux-Tanguy et al., 2020).

5. Potential Consequences on Children's Nutritional Health and Required Actions

Even if the exact impact of COVID-19 on the nutritional status of children is yet to be studied completely, the estimates from many international organizations and first available data have given us a primary picture of how this crisis could impact the nutrition and lifestyle of children. Primarily, the main red flag is the increased paediatric obesity which has been observed mainly in middle- and high-income countries which can arise the new pandemic which is termed as "obesity pandemic" while in poor countries, under-nutrition is expected to increase further and deepen, and fear of getting the end of years of progress to prevent the hunger stricken deaths in children and increased child mortality due to hunger (Headey et al., 2020). In fact, underweight and overweight coexisting in low-income countries, there has been an additional 6.7 million children in the category of 'underweight' in 2020, and the most affected regions are the ones which got impacted by humanitarian crisis, in addition to children under 5 suffering from wasting, which are nearly 47 million, and children who are affected by stunting mostly in Asia and Africa to be 144 million (Headey et al., 2020)child deaths per month are expected during this period are more than 10,000 (Fore, Dongyu, Beasley &Ghebreyesus,2020). The major risk factor for poor results in poor and rich countries is social and income inequalities, and in the current health crisis, this fact has been evidently highlighted. During the pandemic, the poor diet and unhealthy lifestyle habits which got acquired, is not something which can be reversed easily by children and their parents, reason being, the foundation periods for learning healthy eating habits are formed during the period of infancy and early childhood, that are imbibed in us throughout our lives and into adulthood. Additionally, there could be life-long repercussions of under-nutrition during any stage or period of development. There has been a direct relation of immune system and disease susceptibility with the nutrition. Health and human lives pay huge cost because of poor diet (Panthi et al., 2020); while there is an increased risk of death from infectious diseases in wasted children (Headey et al., 2020), obesity place a heavy burden on public health being linked to non-communicable diseases (Ruiz-Roso et al., 2020). Although in the COVID-19 pandemic, the main susceptible groups are children, migrated and refugees children. Dual burden of malnutrition is faced by migrants, and when arrival in the host country, there is increased risk of malnutrition and once settled in a westernized environment, facing increased risk of overweight/obesity (Knob &Gehri, 2015). A prospective study, done in 2015, migrant children followed in our migrant clinic, with a sample size of 29 at Lausanne University Hospital, with an objective to assess the eating habits and adaptation process of the subjects (Knob &Gehri, 2015), and it was revealed in the study that after immigration, the consumption of unhealthy food and sugary drinks got tripled while there was a decline in the consumption of fruits and vegetables. Majority of these migratory kids were from Middle East (Syria, Irak), Kosovo and Africa. These nutritional trends due to the economic burden could be exaggerated due to COVID-19 crisis. The nutritional problem and life styles of the children is required to be studied further. The studies should be focused on whether unhealthy nutritional habits are carried along in the long term or do they get improve with time, and children's nutritional parameters should be objectively assessed and compared to the pre pandemic era. The changes in body mass index or other growth parameters are not assessed and are not available in the current studies up to our knowledge. A call of action has been issued for several international and paediatric organizations to find out the potential impacts and inequities prevailing in the shadow of COVID-19 and to take care upon the global right of child to receive optimal nutrition and overall healthy development in conducive environment. Social-protection programs, public awareness campaigns and nutrition education programs focusing on vulnerable groups should be included in response plan actions. Key players in terms of prevention and education of families are paediatrician and child health professionals. Appropriate food and

finical problems and healthy diets that remain out of reach for numbers of families; financial assistance to needy households is a must. The various forms of malnutrition along with the battle of inequalities are a public health issue common to all countries.

6. Conclusion

The world has witnessed the emergence of a new pandemic in the year 2019-2020, with the Corona virus Disease, called COVID-19, which has turned the world upside down and disrupted to a great extent, the major contributor to health. Specifically the children are the most affected population during this current situation, the collateral and indirect damages and not those of the disease itself. Inadequate and inappropriate nutrition with a risk of both overweight and underweight is one of them, other being, increased screen time and its addiction, lacking in discipline and schooling, impact on mental health issues like socially isolated, issue related to child abuse, violence and decreasing rates of health care literacy. The decades of hard-won progress in paediatrics is being threatened by the COVID-19 pandemic, because its fallout went far beyond just the viral infection. Along with the importance of known direct link which really affect the children in significant way, the collateral damages that this pandemic could have on many children should be studied as well. One of the submerged parts of this iceberg with potential inter-generational consequences is the impact on nutrition and lifestyle. Decreased time spent doing outdoor activities are one of the consequences of the lockdown. The extent to which the COVID-19 pandemic will affect childhood obesity will be revealed by future only. Nevertheless, the future planning to prepare for the pandemic must address this concerning scenario now, and involved stakeholders (including governments, schools, and families) should focus on making all possible efforts that effect on children's health and nutritional status to have minimum impact of the COVID-19. Particularly for the marginalized groups, Nutrition and lifestyle are considering major factors to this current pandemic. It is yet to be unveiled what are the true effects of pandemic are there on nutritional health of children in long run.

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