

## Children Dietary Habits and Quality of Sleep during COVID-19 Pandemic

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### Abstract Background& Aim:

Background& Aim: Lack of outdoor activity, school closure during COVID-19 pandemic, are likely to disrupt children's usual dietary habits and quality of sleep, so the aim of the study was to assess children dietary habits and quality of sleep during COVID-19 pandemic. Materials and method: A cross-sectional study was performed from 17 June 2020 until 1 July 2020. Children and adolescent aged from 8-18 years who were able to provide informed consent were included in the study (83) using convenience and snowball sampling methods. An online questionnaire was used by the researchers to obtain the necessary data. This tool comprises five parts. Part 1; Socio-demographic questionnaire. Part 2: Pittsburgh Sleep Quality Index (PSQI). Part 3: assess the changing in daily dietary habits. Result: The Median and quartiles of Pittsburgh Sleep Quality Index is 11(7- 15). Nearly three quarters (73.5%) of the children had changes in their daily dietary habits. Conclusion: Children had poor sleep quality during COVID-19 pandemic. Nearly three quarters of the children had changes in their daily dietary habits. Recommendation: Establishing healthy sleep practices is important. A well-balanced diet is needed to increase children immunity during COVID-19 pandemic.

**Key words:** COVID-19, Pandemic, Children, Quality of sleep, Dietary Habits.

### 1. Introduction

The outbreak of coronavirus disease (COVID-19) in late December 2019 in China, which later developed into a pandemic, has forced different countries to implement strict sanitary regimes and social distancing measures. Globally, at least four billion people were under lockdown, working remotely, homeschooling children, and facing challenges coping with quarantine and the stressful events (1,2). In January 2020, a new virus was obtained from respiratory samples and was a beta corona virus (3). After that the virus denominated SARS-CoV-2, has spread all over the world. Millions of people have been diagnosed with SARS-CoV-2 infection and hundreds of thousands have died of COVID-19, the disease caused by SARS-CoV-2. SARS-CoV-2 has resulted in a long- lasting pandemic with high fatality rates. The World Health Organization (WHO) declared COVID-19 a pandemic (4).

Eating a balanced diet can benefit both children physical and psychological health. Children and adolescent eating behavior is influenced by what they know and what they can do (capability); the people around them and their physical environment (opportunity); and their beliefs, what they want, how they see ourselves, how they regulate their emotions, and their habits (motivation) (5).

Eating a balanced diet based on the Eat well Guide is important for optimal health and wellbeing. The British Dietetic Association recommends eating food in moderation and consuming a varied diet from a range of foods. This includes five portions of fruits and vegetables per day, and reducing intake of energy-dense foods containing high levels of fat, salt and sugar. Meals should be based around starchy carbohydrates and contain lean sources of protein. Drinking enough fluids (6–8 cups/glasses) to stay hydrated is also promoted (6-8).

A healthy balanced diet is an integral part of a children risk management strategy during pandemics, such as the one of COVID-19. Pandemic-related quarantine can be classified as a stressful event, and in general such events are known to affect eating patterns. Prolonged staying at home may also support eating palatable meals, snacking. It may further affect children choices to buy prepared food more often (9).

At the same time, nationwide lockdown due to disease outbreak may potentially alter dietary habits, as it forces the majority of individuals to stay at home for a prolonged period of time, often with unlimited access to

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food and lower physical activity. This is of particular concern in the case of children with pre-existing nutritional issues (9).

As schools close and at-home learning begins in earnest for children because of the coronavirus (COVID-19) pandemic, it's important to maintain a consistent schedule that includes healthy sleep habits. Some children and adolescents may actually be getting more sleep, or better sleep, while others are struggling with disrupted routines, anxiety and electronics, sometimes all at the same time. Even for those who have settled into new schedules that leave them reasonably well rested, back-to-school season may mean a possibly problematic reset (10).

Although medical literature illustrates that children are less likely susceptible to Corona virus disease, they are facing the hardest by psychosocial impact of this pandemic. Being stayed at homes, school closure, lack of outdoor activities during COVID-19 pandemic, are likely to disrupt children's usual dietary habits and quality of sleep. Also, it can result in distress, impatience, annoyance and different neuropsychiatric manifestations. Incidence of domestic violence, child abuse is increased. Parents, pediatricians, psychologists, social workers, hospital authorities, government and non-governmental organizations should play an important role to decrease the psychosocial ill-effects of COVID-19 on children and adolescents (11). COVID-19 is a novel disease and its quarantine effects on children dietary habits and quality of sleep during COVID-19 pandemic is not investigated in Tanta city, so the aim of the study was to assess the assess children dietary habits and quality of sleep during COVID-19 pandemic.

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### 3. Materials and Methods

3.1 Research design: A cross-sectional study was performed from 17 June 2020 until 1 July 2020.

3.2 Subjects: Children and adolescent aged from 8-18 years who were able to provide informed consent were included in the study (83) using convenience and snowball sampling methods. Additionally, they were required to be living in Tanta city preCOVID-19 and during COVID-19 periods. Also children should be free from any chronic disease which can increase the burden in the child quality of life.

3.4 Tools of the study: an online questionnaire was used by the researchers to obtain the necessary data. This tool comprises the following parts:

Part 1: - Socio-demographic questionnaire such as sex, age, level of education, and place of residence.

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Part 2: Pittsburgh Sleep Quality Index (PSQI) is used to assess children and adolescent sleep quality and disturbances during COVID-19 pandemic. The PSQI was developed by Daniel J. and Buysse, M.D. (1989) to measure the complex multidimensional phenomenon of sleep quality and address the components of what constitutes sleep including: sleep quality, sleep latency, sleep duration, habitual sleep efficiency, sleep disturbances, use of sleep medications, and daytime dysfunction in the past month (12). The PSQI is composed of 19 self-rated questions and five questions rated by a bed partner or roommate. Only the self-rated items are used in scoring the scale. In scoring the PSQI, seven component scores are derived, each scored 0 (no difficulty) to 3 (severe difficulty). The component scores are summed to produce a global score (range 0 to 21). Higher scores indicate worse sleep quality.

Part 3: it is composed from 8 questions to assess the child nutrition during COVID-19 pandemic. It is assess the changing in daily dietary habits and the changing in the amount of food from all food categories.

3.5 Method: Before conducting the study, a written permission letter was obtained from the Faculty of Nursing Tanta University to obtain an approval to carry out the study. Medical ethics: Informed oral consent was obtained from children and their parents to participate into the study. Then the researcher stated that when they complete the questionnaire and make submit, this consider an agreement to participate in the study. Confidentiality was assured. The questionnaire was translated into Arabic language by the researchers and disseminated to the participant through social media (Facebook, what sap, and so on). At the start of the questionnaire the purpose of the study and the confidentiality of data are stated. A pilot study was done before embarking in the field of work on 10% from total subjects to ascertain the clarity and applicability of the study tools. The pilot subjects were excluded from study sample.

3.6 Statistical analysis: The data were coded, entered and analyzed using SPSS (version 20). Descriptive statistics (frequency numbers and Percentages) identified demographic characteristics and parents' responses to the questionnaire. The mean and standard deviation were calculated for children and parents quality of life. Paired t tests were used to analyze the relationships; statistical significant was set at P value < 0.05% results of tests of significance.

### 4. Results

Table (1) represents the characteristics of the studied children. As regards their sex, it was found that nearly three quarters of them (74.7%) were females and only one quarter of them (25.3%) were males. In relation to their age, it was clear that 25.3% had 8-10 years and 10.8% had 14-16 years old with the mean age as  $12.8 \pm 1.5$ . Regarding their education, it was evident that more than half of those children (51.8%) were primary educated and 19.3% of them were in secondary school, While only 28.9% were in high school education.

Table (2) explains children and adolescent sleep quality and disturbances during COVID-19 pandemic using Pittsburgh Sleep Quality Index. It was obvious that more than half of the studied children (57.8%) had very good sleep quality compared to 21.7% who reported very bad sleep quality. It is also clear that 45.8% of those children slept more than 7 hours per day while 37.3% slept about 6-7 hours per day and few percentages (12%) slept about 5-6 hours per day. Regarding their sleep efficiency, about 37.3% of those children had effective sleep more than 85% and 45.8% had effective sleep by 75-84%. On the other hand, only 4.8% of the studied children had less effective sleep pattern as the actual sleep hours were less than 5 hours.

Table (3) reveals the sleep quality and disturbances of children and adolescents during COVID-19 pandemic. In relation to sleep disturbances, the result of the table illustrates that one quarter of the studied children (25.3%) didn't have sleep disturbances during the past month while 14.4% of them had sleep disturbance less than once per week. On the other hand, nearly other quarter (24.0%) already had sleep disturbance once or twice per week and the highest percentage of those children (36.1%) had sleep disturbance three or more times a week. It is also clear from the table that 81.9% of the children didn't take any sleep medication in the past month and only 8.4% of them took sleep medication less than once per week to get into sleep despite 4.8% of the children who took sleep medication once or twice a week and the same percentage. Regarding daytime dysfunction, more than two thirds (62.7%) of the children didn't have any problems through their daytime compared to one third (20.5%) of them who had very slight problem regarding their daytime and only 9.6% of them had a very big problem with their day time. The Median (Q1-Q3) is 11(7- 15) which means that the studied children had poor sleep quality during COVID-19 pandemic.

Table (4) represents the changes in daily dietary habits of the children and adolescents during COVID-19 pandemic. The table explains that nearly three quarters (73.5%) of the children had changes in their daily dietary habits and 26.5% of them didn't have changes in their daily dietary habits. In addition, about one quarter (24.0) of those children consumed less than three meals per day and more than two thirds (65%) of them consumed 3-4 meals per day. The table also demonstrated that half of the studied children (50%) reported eating more fruits and vegetables than usual during the covid19 pandemic and nearly the other half (49.4) reported that they were eating the same amount of fruits and vegetables as before without changes in the amount. In relation to eating milk and its products, it is evident that (30.1%) of the children reported increased their consumption of milk and milk products despite 69.9% who reported consuming the same amount of milk and milk products as before. As regards eating meat and sweets, there is 32.5% of the studied children reported increased their eating of both meat and sweets respectively, and more than two thirds (67.5%) of those children declared no changes in their consumption of both meat and sweets respectively. This result is controversial with eating fish where more than two thirds (67.5%) of the children said that they were eating fish more than usual during covid19 pandemic and 32.5% of them approved that they were eating fish as the same as before the covid19 pandemic. According to eating fast foods outside home, the result of the table announces that 22.9% of the children were eating fast foods more than usual outside home during covid19 pandemic while more than three quarters (77.1%) of them agreed that their eating of fast foods outside home was decreased during the covid19 pandemic.

**Table 1: Characteristics of the Studied Children**

Characteristics of the studied children	studied children No= 83	
	No	%
<b>Sex:</b>		
Males	21	25.3
Females	62	74.7
<b>Age in Years:</b>		
8 ->10	21	25.3
10 ->12	18	21.7
12 ->14	16	19.3
14 ->16	9	10.8
16 -18	19	22.9
Range	8-18	
Mean±SD	12.8 ± 1.5	
<b>Place of residence:</b>		
Urban	35	42.2
rural	48	57.8
<b>Education level:</b>		
- Primary	43	51.8
- Secondary	16	19.3
- High school	24	28.9

Table 2: Sleep quality, Sleep latency, and Sleep efficiency among children during COVID-19 Pandemic

Pittsburgh Sleep Quality Index (PSQI)	Studied children	
	No	%
<b>Subjective sleep quality</b>		
Very good	48	57.8
Fairly good	7	8.4
Fairly bad	10	12.0
Very bad	18	21.7
<b>Sleep latency (Median and quartiles (first-third quartile))</b>	5 (3-6)	
<b>Sleep duration</b>		
> 7 hours	38	45.8
6-7 hours	31	37.3
5-6 hours	10	12.0
<b>Sleep efficiency</b>		
> 85%	31	37.3
75-84%	38	45.8
65-74%	10	12.0
< 5 hours	4	4.8

Table 3: Sleep Disturbance among children during COVID-19 Pandemic

Pittsburgh Sleep Quality Index (PSQI)	Studied children	
	No	%
<b>Sleep disturbance</b>		
Not during past month	21	25.3
Less than once a week	12	14.4
Once or twice a week	20	24.0
Three or more times a week	30	36.1
<b>Use of sleep medication</b>		
Not during past month	68	81.9
Less than once a week	7	8.4
Once or twice a week	4	4.8
Three or more times a week	4	4.8
<b>Daytime dysfunction</b>		
No problem at all	52	62.7
Only a very slight problem	17	20.5
Somewhat of a problem	6	7.2
A very big problem	8	9.6
<b>Total PSQI Score( 21 point)</b>	Median(Q1-Q3) 11( 7- 15)	

Table 4: Changing in daily dietary habits

Changing in dietary habits	Studied children	
	No	%
<b>Changing in daily dietary habits</b>		
- Yes	61	73.5
- No	22	26.5
<b>Numbers of diet in the day</b>		
- < 3	20	24.0
- 3-4	54	65
- > 4	9	10.8
<b>Eating fruits and vegetables</b>		
- Increased	42	50.6
- The same as before	41	49.4
<b>Eating milk and its products</b>		
- Increased	25	30.1
- The same as before	58	69.9
<b>Eating meat</b>		
- Increased	27	32.5
- The same as before	56	67.5
<b>Eating fish</b>		
- Increased	56	67.5
- The same as before	27	32.5
<b>Eating sweets</b>		
- Increased	27	32.5
- Decrease	56	67.5
<b>Eating fast food ( outside home)</b>		
- Increased	19	22.9
- Decrease	64	77.1

## 5. Discussion

Despite less susceptibility of children to 2019-Corona virus disease (COVID-19), they are facing the hardest impact of this pandemic. Being quarantined in homes may produce greater psychological burden than the physical sufferings caused by the virus. Lack of outdoor activity, school closure, aberrant dietary and sleeping habits are likely to disrupt children's usual lifestyle and can potentially promote distress, impatience, annoyance and varied neuropsychiatric manifestations (13).

The current study revealed that the children and adolescents dietary habits were changed through COVID 19 pandemic and they ate about three to four meals during the pandemic. This may be due to prolonged home stay, lack of physical activities and spending more time on technology device so they eat more than usual. This is supported by Panahi et.al (2018) (14), who declared that low physical activity levels have been suggested to interact both with body fat and appetite dysregulation. This result is also in an agreement with Laura et.al (2020) (15) who reported in their study that during the COVID-19 lockdown, the sense of hunger and satiety changed for more than half of the population: 34.4% of responders increased appetite. A great problem from increasing the number of children meals during COVID19 with decreasing their activity level is increasing the chance for obesity which in turns makes them vulnerable to many diseases.

According to the study results more than three quarters of children declared that their eating of fast foods outside home was decreased during COVID19 pandemic. Also, their consuming to sweets was decreased. Prolonged staying at home may affect children choices to buy or sweets. This the good thing of COVID 19 quarantine where children consumption to fast food is unhealthy for them. Furthermore, another good thing, that children consuming to vegetables and fruits increased during COVID19 pandemic. This also benefits for children health as vegetables and fruits rich in vitamins and fibers which increase children immunity during COVID 19 pandemic.

According to the World Health Organization diet and nutrients play an important role in immune function. WHO highlights that eating a balanced diet can help to maintain a healthy weight; reduce the risk of conditions including obesity, diabetes, heart disease, stroke, cancer and osteoporosis (weak and brittle bones), and can help with the management of these long-term conditions (16) .

The study results presented that more than one third of studied children and adolescents had sleep disturbances three or more times per week and they rated their sleep quality bad. This may be a result of long period of home stay, lack of physical activities, spending more times on front of TV and technology devices all interfere with regular sleep habits. This explanation is in the same line with Rundle et.al, (17) who agreed that exposure of the children to long-term physical inactivity, irregular sleep patterns, un favorable diet plans, sedentary life style, longer smart-phone/television screen time that are being practiced during lockdown and school-closure will result in child hood obesity and reduced cardio-respiratory fitness. The result of the current study was in agreement with Zhijun Liu et.al, who found that the prevalence of overall sleep disturbance for the COVID- 19 sample was 55.6% (18).

Becker and Alice M. Gregory discussed possible impacts of the Covid-19 pandemic on children's sleep, arguing that because of the importance of sleep for many aspects of children's well-being, ranging from mental health to immunological well-being and disease resistance, it would be important to look closely at how sleep might be changing, for children and for adolescents, at whether those changes are problematic when children have to return to school, and at which factors are associated with better and worse sleep (19).

In conclusion, as this pandemic unfolds, there remains great uncertainty and risk to the health and well-being of children and adolescents. Supporting children and adolescent to get a good night's sleep is just one way that we can help them to cope with the uncertain days ahead.

The limitation of our study is that it is conducted on small number of children, so that the study needed to be conducted on larger number. There are a number of important implications of children and adolescent sleep and nutrition during and after the COVID-19 crisis for research and practice. Perhaps, most fundamentally, studies will be needed to examine whether, and if so how, the COVID-19 crisis and associated physical distancing impact child and adolescent sleep over time. For example, Are changes in sleep temporary, or will lead to longer-term sleep disturbances that originated during the COVID-19 pandemic? Also if the pandemic affects children nutrition and normal weight.

## 6. Conclusion:

Conclusion: Establishing healthy sleep practices for children and adolescents is important during COVID-19 pandemic as the most of children in our study had poor sleep quality during COVID-19 pandemic. Nearly three quarters of the children had changes in their daily dietary habits, they needed a well-balanced diet to increase their immunity during COVID-19 pandemic.

## 7. Recommendation

Based on the results of the current study the following recommendations are suggested:

1. To mitigate the psychosocial ill-effects of COVID-19 on children and adolescents proactive and targeted interventions can be proposed by parents, pediatricians, psychologists, social workers, hospital authorities, government and nongovernmental organizations have important roles.
2. Parents need to respect their identity, free space, special need in addition to monitoring child's performance, behavior and self-discipline skills.
3. Friendly interaction and communication between parents and children may help soothing their pandemic-related anxieties and other physical and mental issues.
4. Establishing healthy sleep practices is important.

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