A Cross-sectional Study on Nutritional Status and Factors Associated With Malnutrition Among School-Age Children in Hyderabad

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Abstract

Malnutrition among children is one of the greatest public health problems in India. School age is the active growing phase of childhood and primary school age is the period of physical growth as well as mental development of the child. The present nutritional status of School age children in India is unsatisfactory. 1) To assess the nutritional status of children between 5-15 years of age. 2) To analyse the factors associated with malnutrition among school-age children.

Introduction

Malnutrition, in all its forms, includes undernutrition (wasting, stunting, underweight), inadequate vitamins or minerals, overweight, obesity, and resulting diet-related noncommunicable diseases. Malnutrition is a major public health problem resulting from faulty nutrition which weakens the immune system and causes significant growth and cognitive delay. In developing countries, 52% and 34–62% of the school-age children are stunted and underweight, respectively. 2 School age is the active growing phase of childhood and primary school age is the period of physical growth as well as mental development of the child. Malnutrition is usually caused by inadequate dietary intake and infection. Children who have been exposed to poor nutrition since early childhood are likely to be stunted at school age. Malnutrition, especially undernutrition causes various health problems in school-age children resulting in low school enrolment, high absenteeism, early dropout

and unsatisfactory academic performance. Malnutrition increases health care costs, reduces productivity, and slows down economic growth, which can perpetuate a cycle of poverty and ill-health. Hence combating malnutrition is one of the greatest global health challenges.There are four sub-forms of undernutrition. It includes wasting, stunting, underweight, and deficiencies in vitamins and minerals. Undernutrition makes children more vulnerable to disease and death. Low weight-for-height is known as wasting.1 It usually indicates recent and severe weight loss, because a person has not had enough food to eat and/or they have had an infectious disease, such as diarrhoea, which has caused them to lose weight. A young child who is moderately or severely wasted has an increased risk of death, but treatment is possible.1

Low height-for-age is known as stunting.1 It is the result of chronic or recurrent undernutrition, usually associated with poor socioeconomic conditions, poor maternal health and nutrition, frequent illness, and/

or inappropriate infant and young child feeding and care in early life.1 Stunting holds children back from reaching their physical and cognitive potential.1

Children with low weight-for-age are known as underweight.1 A child who is underweight may be stunted, wasted, or both.1

Stunting has declined steadily since 2000 – but faster progress is needed to reach the 2030 target. Wasting persists at alarming rates and overweight will require a reversal in trajectory if the 2030 target is to be achieved.3

The present study conducted in the urban slums of Hyderabad aimed to assess the nutritional status and factors associated with malnutrition among school-age children so that necessary measures can be taken to correct the nutritional deficit of the vulnerable population group.

Objectives

To study the stress among parents during COVID-19 pandemic and worry experienced regardless the children' age or gender and find the relation between stress and other risk factors.

Study design

A cross-sectional survey of stress during Covid-19 pandemic in Egypt that target on parents' response.

Methods

The author designed Online Google forms and hard copies which contain demographic data, perceived stress scale, risk factors which may increase the perceived stress during COVID 19 outbreak. The online forms were launched through social media also, hard copies were designed to be filled by parents who are attendants to pediatric clinic and psychiatry clinic, Fayoum University Hospitals with the a total of 1265 valid forms collected. All parents who have children (0-18years) were eligible to fill the form. Both forms were available to be filled by the participants through the period from first of October 2020 till first of November 2020. The designed period was associated with the decision of the Egyptian ministry of Education about return to nurseries, kindergarten, schools, and universities.

Informed consent was included at the beginning of the form and approval is mandatory to fill the form. The questionnaires were anonymous to ensure the confidentiality and reliability of the data.

The study and the consent were approved from by the ethical committee, Faculty of Medicine Fayoum University, (no. 126). Forms contained demographic Data data (Parents' age, whether father or mother, and their jobs), past history of experiencing life trauma (loss, accidents or abuse), history of COVID 19 infection, multiple choice question about the most suggested causes of stress during this period, items of the perceived stress scale and open-ended question inquiring the parents' point of view about how to accept and overcome their perceived stress.

Psychometric tool

The Perceived Stress Scale (PSS) (Cohen, Kamarck, & Mermelstein, 1983) is a tool for measuring psychological stress during the previous month. It is a 10-item scale in which each item has graded from 0 to 4, 0 means never experienced while 4 means very often experienced. We used the scale in Arabic version; this was validated in Arabic among pregnant and postpartum women (Chaaya, Osman, Naassan, & Mahfoud, 2010) Scores ranging from 0-13 would be considered low stress, scores ranging from 14-26 would be considered moderate stress, and scores ranging from 27-40 would be considered high perceived stress.

Statistical analysis of the collected data

An IBM compatible personal computer with SPSS statistical package version 23 was used to analyze Data (SPSS Inc., 2015. International Business Machines Corporation (IBM) SPSS statistics for windows, Armnok, NY, version 23.0). The variables were expressed in: Number (No), percentage (%) mean ($\bar{x}$) and standard deviation (SD). Association between qualitative variables was assessed using Chi-square test ($\chi2$). Fischer's Exact test was used in the case that any of the expected cells were less than five. A logistic regression was performed to ascertain the effects of possible risk factors on depression, anxiety and other outcomes. Two-sided P value <0.05 was considered statistically significant.

Results

The study included 1265 valid questionnaires. About two thirds (70.6%) of the participants were in the age group of 31-40 years and their vast majority (93.9%) were mothers. More than half of them (53.1%) did not have any history of psychic trauma and only 5.1% had history of COVID-19 infection (Table 1).

Table 1: participants' characteristics: (Arrange a new table as a standard format)

Character	No. (%)
Age category	
20-30	255 (20.2)
31-40	893 (70.6)
41-50	110 (8.7)
51-60	7 (0.6)
Parenthood	
Mother	1188 (93.9)
Father	77 (6.1)
History of psychic trauma	
Absent	672 (53.1)
Present	593 (46.9)
COVID history	
Absent	1191 (94.2)
Present	65 (5.1)

The mean score of the PSS was 21.79 (ranging from 4.0 to 36.0). Most of the participants (70.3%) had a moderate grade of stress, while 21.1% had the high grade and only 8.6% had low grade of stress (Table 2)

Table 2: PSS mean score and grades.

Variable	Mean ±SD, range
PSS	21.79 ± 5.67, 4.0-36.0
PSS grades	No. (%)
Low	109 (8.6)
Moderate	889 (70.3)
High grade	267 (21.1)

The mean PSS varied significantly among different age groups (P 0.001), as it was significantly lower in the age group of 41-50 y than the mean PSS in both age groups of 20-30 y and 31-40 y (p <0.001 and 0.002 respectively) The mean PSS was significantly higher among mothers than fathers (p <0.001), among participants with history of psychic trauma (p <0.001) or history of COVID -19 infection (0.041) (Table 3).

Table 3: mean PSS scores and possible risk factors:

Risk factors	PSS (mean)	PSS (SD)	P value
Age category			
20-30	22.53	5.45	0.001
31-40	21.81	5.63	0.002
41-50	20.00	6.12*	
51-60	19.71	7.01	
Parenthood			
Mother	21.94	5.62	<0.001
Father	19.46	6.01	
History of psychic trauma			
Absent	21.15	5.80	<0.001
Present	22.51	5.43	
COVID-19 history			
Absent	21.74	5.68	0.041
Present	23.21	5.32	

* The PSS in the age group of 41-50 was significantly lower than the PSS in the age group 20-30 (P <0.001) and the age group 31-40 (p=0.002)

Among all age categories, moderate grades of PSS was most prevalent, this was followed by the high grades except for the age category of 41-50y (p 0.007). The low grade of PSS was lowest in prevalence. This difference in prevalence was significant among age category of 20-30 and 41-50 y. (Table 4) In any of the parents, low grades of PSS were significantly lower than moderate or high grades (P 0.005). Among participants with and without history of psychic trauma, moderate grades of PSS were significantly higher and low grades of PSS were significantly lower than other grades (p 0.001). History of COVID-19 infection was not significantly related to the grade of PSS (P 0.179) (Table 4).

Table 2: ADHD Score of SNAP-iv scale by parents and teachers.

Risk factors	PSS grade			P value
	Low (n=109) No. (%)	Moderate (n=889) No. (%)	High (n=267) No. (%)	
Age category				
20-30	17 (6.7)	171 (67.1)	67 (26.3)*	0.007
31-40	73 (8.2)	636 (71.2)	184 (20.6)	
41-50	18 (16.4) †	78 (70.9)	14 (12.7)	
51-60	1 (14.3)	4 (57.1)	2 (28.6)	
Parenthood				
Mother	95 (8.0) †	837 (70.5)	256 (21.5)	0.005
Father	14 (18.2) †	52 (67.5)	11 (14.3)	
History of psychic trauma				
Absent	74 (11.0) †	475 (70.7)*	123 (18.3)	0.001
Present	35 (5.9) †	414 (69.8)*	144 (24.3)	
COVID-19 history				
Absent	104 (8.7)	839 (70.4)	248 (20.8)	0.179
Present	3 (4.6)	43 (66.2)	19 (29.2)	

† Significantly lower, * significantly higher than their corresponding in the other categories

Linear regression model for predicting PSS was significantly related to the age category, parenthood, history of psychic trauma and history of COVID-19 infection (p <0.001, <0.001, <0.001 and 0.041 respectively). By multivariate regression, all of these factors remained significant except COVID-19 infection history (p <0.001, 0.001, <0.001 and 0.102 respectively) (Table 5)

Table 5: Univariate and multivariate regression analysis of possible risk factors.

Risk factors	Univariate			Multivariate		
	Unstandardized B	Standardized B	P value	Unstandardized B	Standardized B	P value
Age category	-1.095	-0.106	<0.001	-1.029	-0.099	<0.001
Parenthood	-2.474	-0.104	<0.001	-2.243	-0.095	0.001
History of psychic trauma	1.366	0.120	<0.001	1.362	0.120	<0.001
COVID his-tory	1.474	0.058	0.041	1.169	0.046	0.102

Discussion

This study reflected the increased degree of distress a mong parents during the period of COVID pandemic. The majority of parents experienced moderate degrees of stress, which increased more among those with past history of psychic trauma and history of COVID infection. A review of literature revealed that high stress in general is a common reaction to pandemics also; stress is common among

parents than non-parents (American Psychological Association, 2020), though the nature of the current pandemic is totally different with the great restrictive measures, social distancing, wearing masks, school closure, rapid deaths, rapid mutation, vague nature.. etc. Our work revealed that mothers were significantly higher is perceiving stress as previously reported by Bjørknes et al. (2022) in one year follow up study; sensitive and caring nature of mothers may support this result. contrary Contrary to authors' expectations, the age group (41-50 years) was the highest in stress. The point is this age group may have more coping strategies, more financial stability. However, participants of this age in Egypt may have grandchildren not only children which may raise fear about the pandemic.

However multiple factors may contribute to increased level of stress among parents during COVID stress, a study of Norwegian parents found that mothers with more than one child and parents with a psychiatric diagnosis reported greater levels of parental stress, more burnout, and more anger towards their children, as well as less social support (Johnson, Skjerdingstad, Ebrahimi, Hoffart, & Johnson, 2022) In our study, Linear regression model for predicting PSS was significantly related to history of psychic trauma and history of COVID-19 infection and in accordance with this Marzilli et al. (2021) found that Parents' past traumas significantly predicted peritraumatic distress due to COVID-19 and children's psychological difficulties. Research by Demir et al. (2020) has shown that having experienced previous trauma may raise the possibility to the adverse effects of subsequent traumatic experiences when the prior traumatic exposure sensitize the autonomic nervous system with subsequent adverse mental and physical effects (18). History of COVID infection may booster the adverse mental effect due to the acknowledgment of being in danger which may constitutes constitute a traumatic experience itself. However, survivors of this infection at the time of pandemic were expected to gain more resilience. Cusinato et al. (2020) showed that certain variables regarding socio-demography affected parental stress, changes in working conditions, younger children, and parental psychological, physical, or genetic problems appeared to be linked to lower levels of

psychological well-being in parents during the COVID-19 lockdown. Family structure, the number, and the presence of children with psychological, physical, or genetic diseases are all risk factors for high parental stress. As a response to a multiple choice question concerning causes of stress which may be experienced by parents in the period of the pandemic, the most suggested causes were worry about infection of their children during the school attendance, uncertainty about the available protocol of management of COVID, the uncertainty about the efficacy of the available vaccines, and the affection of their offspring with psychiatric disorders as a result of the stress during the period of COVID pandemic. While (Fiese et al., 2002) reported a change in children's daily structure and routines as the most stressful factors for parents during the pandemics as it makes children feel more insecure with more problematic behavior. Other reports found that online learning and deprivation from friends were important stressors for children and their parents during the pandemic (Covid et al., 2020; Centers for Disease Control and Prevention, 2020) Hearing and reading about the severity and contagiousness of COVID were found to be another important stressor which may increase the negative psychological impact among parents (Park et al., 2020; Adams, Smith, Caccavale, & Bean, 2021)

In this study parents reported that praying with their children, infection control measures, and staying at home were the most used coping strategy among them in a trial to reduce their stress and anxiety about the pandemic. Achterberg, Dobbelaar, Boer, & Crone (2021) studied the longitudinal effect of COVID related stress on parents and children wellbeing and found that online schooling, working remotely or being unable to work at all, financial and health concerns for the family were risk factors related to increased depression, anxiety, hostility and interpersonal sensitivity among both parents and children. Also, the previously mentioned factors affected the parents and children bonding with increased risk of internalizing and externalizing disorders among children. The aforementioned study found that the poor family wellbeing prior COVID stress and poor coping (parental over reactivity) during COVID period were related to poor coping.

High levels of positive parental coping (positive reappraisal) and reflection could have positive consequences by increasing family bonding and improve parent–child relations Achterberg et al. (2021). In accordance with our results Brown, Doom, Lechuga-Peña, Watamura, & Koppels. (2020) studied stress and parenting during COVID pandemic among 183 participants who were parents of children under 18 years old, in which mothers were 89.6 % and fathers were 10.4% and found the mean and standard deviation of the perceived and stress scale was 19.14 (6.59), with range (0-37). The latter study found that most of parents experienced mood changes, anxiety, stress, and sleep problems and this was mostly because their children experienced changes in learning and health. Also, the author found the relation between the parental stress and increased child abuse Brown et al. (2020). Also, a Chinese study designed online questionnaire to measure students' parents stress during COVID outbreak with 1163 valid questionnaires collected, 80.2% were mothers and 19.8% were fathers (Zimmermann & Curtis, 2020). In the aforementioned study no gender difference was found in contrary to our results, this is may be due to low number of fathers participants in our representative sample. In our study stress level was significantly lower in parents aged 41-50 years old despite their offspring age or grade as our study didn't include the age of them while in a study by Wu et al. (2020), anxiety, depression and stress were significantly lower in parents of college students being more socially supportive to their parents.

Different studies addressed different factors related to stress perceived during COVID pandemic according to their studied variables and tested their correlations using regression analysis. In a Chinese study, which tested 1163 valid online questionnaire to study students' parents stress during COVID, in which regression analysis results showed that perceived stress, social support, marital satisfaction, family conflicts, child's learning stage as well as parents' history of mental illness had significant effects on parents' anxiety and depression (27) where social support and satisfying marriage were protective factors against stress. In a study on Italian sample Giannotti, Mazzoni, Bentenuto, Venuti, & de Falco

(2021) studied parental stress and externalizing behavior among children during the COVID lockdown to find that, in the final regression model, there was a significant effect of parent gender, child age, time dedicated by the parent doing activities with the child, and quality of co-parenting relationship. Also, Giannotti et al. (2021) found that distant learning and workload were significant predictors of parental stress in parents whom their children were involved in distant learning. Regarding risk predictors and protective factors of parental stress related to COVID among parents with children who have special conditions like CP, ADHD and other neurodevelopmental disabilities different studies were done. Montirosso et al. (2021) studied stress and resilience among 1,472 parents (83.1% mothers) of children and adolescents with neurodevelopmental disorders to find that stepwise regression analysis revealed that perception of self, planned future, family cohesion were protective factors buffering parental stress during COVID period.

Limitation of the study

The study wasn't limited to certain child age group also, the childrens' age wasn't included in the forms. Only one valid psychometric tool was used to measure the perceived stress which may not draw a well conclusive data. Response options for questions designed by the researchers may not have encompassed all possible stressors. Stress measured only once and wasn't reassessed again. Fathers as participants were much lower in number than mothers and this gender difference may constitute a confounding factor.

Conclusion

Majority of parents experienced moderate to high grades of stress. The perceived stress was more evident in mothers, also affected by other factors which affect resilience like age, past history of previous psychic trauma, history of COVID infection. This study revealed how far the mental health of parents could be affected hence lead to poor quality of life and poor parenting.

Recommendation

Evidence based resources for supporting parents are mandatory for providing them with information about culture-based stress coping skills. Already efforts were done from organization like center for disease control and prevention (CDC) and world health organization (WHO) to provide online coping with stress resources for parents (Parenting for Lifelong Health, 2020; World Health Organization. Looking after our mental health. 2020).

Declaration

Ethics approval and consent to participate:
This study was approved by the Research Ethics Committee, Faculty of Medicine, Fayom University. The number of approval is (r 126). Contents of consent were clarified and written at the start of the online questionnaire and approval was necessary to complete the form.

Consent for publication: Not applicable.

Availability of data and materials: Not applicable

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Authors' contributions
RY prepared the main idea, distributed the forms both online and in the clinics and contributed in writing the manuscript. MD prepared the Google form, analyzed and interpreted the patient data regarding the clinical data and psychometric tools and was a major contributor in writing the manuscript. SS was the major contributor in statistical analysis. All authors read and approved the final manuscript

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