Analytical statistical study on various aspects of covid-19 among pediatric age group in Kirkuk-Iraq.

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Abstract

The study was conducted on (41) pediatric patients, attending both Azadi and pediatric governmental hospitals for the period from 1st March to 1st of July; their age was ranging from 1 year to 14 years of both genders. All cases were presented by their parents being contact with at least a family member with confirmed COVID-19; they were admitted to hospital, the relevant investigations were applied for them and had been followed up till the outcome. Full history and investigations were applied for each case with important, serious and relevant questions according to a prepared questionnaire that was reviewed by peer review of three consultants in the field. Following the finalization of the history, full clinical examination was performed and the positive findings were recorded at the time of examination.

According to the findings, investigations were set up to confirm the diagnosis of positive cases per WHO criteria, there was a significant difference among symptoms in critical and mild or moderate cases, as most cases had fever and cough, while the critical once had severe respiratory symptoms; and both of them had congenital heart disease. The vast majority had mild to moderate symptoms and had favorable outcome (cure); 39141 (95%); while only two of the total patients had negative endpoint (death) 2141 (4.8%) as both of them had congenital heart disease. It is concluded that most pediatric age group had mild to moderate severity and didn't require hospitalization, while those who died were critical and had congenital heart disease.

Introduction

As it is obvious most children infected with COVID 19 are either asymptomatic or have mild symptoms, it is suggested that the differences in age-related infection by COVID 19 may be explained by the interaction between the virus and the host immune response,and documented the ACE 2 receptors infection are the main receptors,its expression will decrease with age leading to more severe symptoms and outcome, elucidating the increased level of ACE2 receptors in lung pneumocytes in children may play a protective role of infection. According to the findings, investigations were set up to confirm the diagnosis of positive cases per WHO criteria in avoidance of sever form of COVID 19 [1].

Along the last year it has been noticed that fever and cough were the most predominated symptoms among covid19 infected children, in some children gastrointestinal manifestation was observed while few children showed skin manifestation as rashes urticaria, blisters and frostbite skin changes [2]. In a study done on 23 children; 14 infants were under 2 years old and none of them requiredadmission to ICU; one child of 2 months old has invasive aspergillosis infection while all other infants had favorable outcomes; finally study concluded the wide spectrum of COVID19 expression in children [3]. Usually it was noticed that children had lower risk of infection due to the absence of chronic diseases which regarded as the most common parameter affecting the severity of COVID-19 [4]. Thymus gland being active in childhood the key value in immunity against COVID19 in plasma cells thymus acts as reactive cells to popular viral proteins [5].

A recent study carried in Wuhan showed the strong evidence of human to human transmission of COVID19 [6]. A recent review on large amount of data from WHO-China join mission on Corona Virus Disease 19 (COVID-19). They have estimated that the mortality rate was 0.2%-0.4% among 10-40 years of age and the death rate was zero among patient<9 years of age [7]. Although fever, cough and diarrhea the commonest symptoms among pediatric age group but sever form requiring oxygen were documented in less than 1% and less than 1% were critically ill and they rarely developed uncommon manifestations as myocarditis, respiratory and renal manifestations, coagulopathy and multi-system failure in Europe this entity was defined as predominant inflammatory multi system syndrome (MIS-C) [8].

An important aspect of etiology in pediatric age group is that C-XRAY and CT scan are different in children than adults and they were often looks normal, occasionally mild bilateral ground glass appearance may be obvious but they are less predominant than adults [9]. A comparative epidemiological

study was carried out in Brazil, showed that hospitalization rate of patients of age group 0-4 years was above 17/100,000 patients [10]. The study was carried out to determine various aspects of COVID-19 outcome among pediatric age group.

Materials and Methods

The study was conducted on (41) pediatric patients, attending both Azadi and pediatric governmental hospitals for the period from 1st March to 1st of July; their ages were ranging from 1 year to 14 years of both gender. All cases were presented by their parents being contact with at least a family member with confirmed COVID-19; they were admitted to hospital, the relevant investigations were applied for them and had been followed up till the outcome. Full history and investigations were applied for each case with important, serious and relevant questions according to a prepared questionnaire that was

reviewed by peer review of three consultants in the field. Following the finalization of the history, full clinical examination was performed and the positive findings were recorded at the time of examination. According to the findings, investigations were set up to confirm the diagnosis of positive cases per WHO criteria. The statistical analysis was applied using SPSS, and P value was regarded significant of level P=0.05.

Results

A total of 41 pediatric age group (less than 1 year up to less than 15 years) were included in the study. Table 1 shows the relation between age and severity, as there was significant difference regarding the severity while was obvious among the age group below 5 years; while most of mild and moderate cases were among the group of <10 years.

Severity/age	Asymptomatic	Mild	Moderate	Severe	Critical	Total
Below 5	1	9	4	0	2	17
5 ≤ 10	0	12	2	0	1	15
10 ≤ 15	0	5	4	0	1	9
Total	1	26	10	0	4	41

Table 1. The relation between age and severity of COVID-19 among the studied sample. P-value=0.05.

While Table 2 illustrates the distribution of cases among gender, it is clear that male is affected more than female in a ratio of 2:1.

Severity/gender	Asymptomatic	Mild	Moderate	Severe	Critical	Total
Male	1	15	9	2	1	28
Female	0	11	1	0	1	13
Total	1	26	26	2	2	41

Table 2. Gender distribution of COVID-19 among studied groups. P-value=0.34.

In linking the severity to outcome Table 3 showed that critical cases were dead; had negative end point 4.8%, while all mild and moderate cases were cured.

Severity/ Outcome	Asymptomatic	Mild	Moderate	Severe	Critical	Total
Cured	0	27	10	2	0	39
Relapsed	0	0	0	0	0	0
Crippled	0	0	0	0	0	0
Death	0	0	0	0	2	2
Total	0	27	10	2	2	41

Table 3. Outcome of studied cases in relation to severity. P-value=0.28.

Regarding Table 4, there was a significant difference among symptoms in critical and mild or moderate cases, as most cases had fever and cough, while the critical once had severe respiratory symptoms; and both of them had congenital heart disease.

Severity/symptoms	Asymptomatic	Mild	Moderate	Severe	Critical	Total
Cough	*1	20	6	1	2	29
Fever		20	6		2	28
Respiratory		16	4	2	2	24
GIT+others		11	3	1	0	15

Table 4. Symptoms distribution in relation to severity of COVID-19. *: One case was asymptomatic; P-value=0.000.

Regarding Table 5 the diagnosis, it is clear that most cases were diagnosed by rapid test in addition to symptoms 95%.

Symptom/diagnosis	Mild	Moderate	Severe	Critical	Total
PCR	10	1	2	1	15
Rapid test	20	6	2	0	37
CXray	6	4	2	1	13
CT scan	0	2	1	1	4

Table 5. The appropriate available diagnosis of COVID-19 cases. P-value=0.081.

Discussion

An important difference was discovered in age dependent levels of biomarkers in the lungs among patients with ARDS; as the level of IL-6, IL-10 were higher by aging while intercellular adhesion molecule 1 was higher in neonates this may explain the nature of COVID-19 variability in different ages depending on immunosenescence phenomenon [11]. COVID-19 was declared by WHO As a novel pandemic on 11th March, 2020 at the beginning of that disaster the age-related vulnerability was still query. Following the literature reviews of morbidity and mortality association with age during the continuity of the disease the health professional set up the most important critical issue in this aspect, as dealing with age related sequences of the affects the spectrum of illness severity, that affects the diagnosis, triage, management and decision making according to the prognosis, outcomes and expectations of the final end points whether positive or negative [12].

A prompt study was carried out by Zhang et al. who found that infants were more vulnerable to COVID-19, as the percentage of severe and critical cases was 10.7% among them, in other studies on the similar age group severe outcome in infants was not observed[13]. According to various studies, many mechanisms and risk factors are related to underlying diverse clinical defenses, they influence the morbidity and mortality, such as older age, chronic and communicable diseases as (CHT,DM,COPD,CVD,obesity and malignancy) as well as the male gender developed worse clinical course and higher mortality rate, this clear gender difference may be related to declining in T cell activation with age among male while it is sustained in female [14].

Till now limited data are available in concern to COVID-19 in children, but generally this age group showed milder symptoms than adults. In a largest scale report that studied the disease in pediatric age group, has showed that the most common symptoms were fever and cough, other features included fatigue, rhinorrhea, sore throat, dizziness, vomiting and diarrhea were asymptomatic [15]. In a study done in China showed that the temporal distribution of cases among 2143 pediatric patients was clear as there was a trend of rapid increase of the disease in the early stages of pandemic, while the spatial distribution showed rapid spread of the disease from Hubei to surrounding cities, where more children were infected in areas around Hubei province [6]. Reviewing various articles, it was suggested that most clinical manifestations among pediatric age group used to be less severe [16].

In a research published by PubMed done on (COVID-19) among pediatric age group showed the rate of asymptomatic children ranged between (4.4%-23%) of cases, representing an important underestimation meaning that most a symptomatic pediatric COVID-19 patients are not screened [17]. Regarding the outcome of the disease among pediatric age group, a study carried out in China showed that out of 123 patients (13.8%) were diagnosed as pneumonia, only 3 cases were admitted to ICU, and fortunately no death has been reported among studied sample [18]. A French study showed that the concomitant use of hydroxyl chloroquine and azithromycin showed benefit and children were cured. Regarding the management of respiratory distress, it needs hospitalization and ICU admission if the child got respiratory failure, shock or other organ dysfunction, and the main management lines are early tracheal intubation, using preoxygenation performed by nasal cannula; also noninvasive ventilation should be avoided because of risk of aerosol dispersion. The use of spray dosimetric inhaler is preferred in wheezy patients, antibiotic should be restricted to patients with secondary infection; steroids may suppress inflammation but should be used with caution except if there are specific indications [19].

Conclusion

It is concluded from the current study that children or pediatric age group had milder disease and those who presented as critical died.

Recommendation

It is recommended that early detection of the disease may have important role in protection from sever and critical stages of the disease.

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