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# Quality of Life Measures for Iraqi Children's Patients with Covid-19

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***Abstract: Background: The COVID-19 pandemic has had a major impact on public health in particular and on the survival rate in general.***
***Objective: This study aimed to assess children's quality of life during COVID-19.***
***Patients and methods: A prospective study was conducted on paediatric patients infected with Covid-19, aged between 2 and 15 years, in different hospitals in Iraq, from July 17, 2022, to March 15, 2023. The study assessed the patients' general health by comparing their quality of life before and during COVID-19 using the ED-EQ scale. It also evaluated the survival rate of paediatric patients during Covid-19, using the Kaplan-Meier survival scale. Results: The results showed data for pediatric patients infected with COVID-19, indicating that patients in the age group (12-15) years recorded the highest infection rate, with 50 cases, with the percentage of males reaching 64 cases and females 38 cases. The most common symptoms were accompanied by fever in 21 patients and diarrhea in 19 patients. The clinical outcomes recorded that the dependent parameters in patients' health decreased during COVID-19 compared to before COVID-19, and they were general health factor (65.35 ± 7.8), physical factor (67.82 ± 9.2), and school interaction (54.20 ± 8.9). This is the most common of these findings. Moreover, these results recorded the 70-day survival rate of pediatric patients during and after COVID-19, as the survival rates were significantly lower during the period between days ten and day 60 compared to post-COVID-19.***
***Conclusion: Although COVID-19 appears to be less frequent in children than in adults, it has a detrimental impact on children's quality of life, posing considerable physical, psychological, as well as mental health on children.***

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***Keywords: COVID-19, Quality of Life Measure, Physical Activity, Psychological Effect.***

## 1. INTRODUCTION

The pandemic due to the SARS-CoV-2 virus is having a great impact on the whole planet and, especially in our country. It is a challenge for our health system, with an important health, social, and economic impact due to the consequences for our way of life, which has the fight against disease and its morbidity and mortality. [1]

The pandemic generated by COVID-19 has become one of the greatest challenges that the world's population has had to face during the present century. The pandemic due to the SARS-CoV-2 virus has caused drastic changes in our daily life, in addition to important health and socio-economic consequences [2-4]. As for the transmission mechanisms, it seems that there are viral factors that can favor infection (due to increased transmissibility, evasion of previous immunity, lower detection by diagnostic tests, and clinical severity), as demonstrated by the various SARS-CoV2 mutations suffered so far. [5,6] This fact is evident with the new Omicron variant that, due to the change in capsular proteins, improves adherence to ACE2 receptors and, along with other possible factors, increases transmissibility. [7]

The pandemic generated by COVID-19 has become one of the greatest challenges that the world's population has had to face during the present century [8]. The pandemic due to the SARS-CoV-2 virus has caused drastic changes in our daily life, in addition to important health and socio-economic consequences [9]. This fact is evident with the new Omicron variant that, due to the change in capsular proteins, improves adherence to ACE2 receptors and, along with other possible factors, increases transmissibility [10]. The new coronavirus, called SARS-CoV-2, causes the COVID-19 disease. Its severity is characterized by a massive inflammatory response resulting in multi-organ dysfunction [11]. Acute respiratory distress syndrome is a complication that needs to be treated in the intensive care unit and requires a multidisciplinary team [12]. There is currently no specific nutritional treatment for pediatric patients infected with this virus; however, nutritional therapy is aimed at the symptoms that appear. Patients who are not intubated or not hospitalized may have fever and diarrhea. [13]
It is important that pediatric patients with COVID-19 maintain an adequate nutritional status that prevents them from becoming malnourished, overweight, or obese [14]. It is necessary to promote proper nutrition and avoid deficiencies of vitamins and inorganic nutrients [15]. In hospitalized patients, the previous nutritional status and the one they should have during their stay in intensive care will have an impact on the prognosis and requirement of ventilatory support and, therefore, on long-term morbidity and mortality. [16]

There is a huge amount of research on COVID-19, initially carried out urgently and under exceptional conditions, which led to the publication of studies with important limitations. The information has acquired surprising dimensions for its volume, immediacy, and, progressively, for its quality and collaborative character. [17, 18]

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The pediatric population has been affected as much as other age groups. Most infections have been mild or moderate or severe symptoms with a small number of patients with potentially severe clinical forms [19]. In these circumstances, the Association of Primary Care Pediatrics considered it necessary to prepare a document on the available evidence of COVID-19 in the pediatric population (0-18 years), addressing all aspects of the disease: epidemiology, clinical, diagnosis, treatment, prevention, and vaccines. [20]

## 2. PATIENTS AND METHODS

We conducted a prospective study of pediatric patients infected with COVID-19 in different hospitals in Iraq to evaluate the health quality of life and survival rate during follow-up from July 17$^{th}$, 2022, to March 15$^{th}$, 2023. Comprehensive and relevant reports were collected for 102 patients infected with COVID-19 by conducting a questionnaire linked to the results of clinical examinations and COVID-19 PCR tests, which included all patients in the hospital. This study determined the clinical data parameters of Covid-19 patients who ranged between (2 - 15) years in terms of age, gender, symptoms, educational level, income level, and parent's marital status. Also, we conducted a comprehensive analysis of pediatric patients, which included examinations in terms of respiratory rate, systolic and diastolic blood pressure, oxygen saturation, and intubation. The hospitals also recorded data on admission to the pediatric intensive care unit and length of stay in the hospital. This study showed the outcomes of COVID-19 for pediatric patients, including infection, severity, and duration of COVID-19 disease in children. We included the laboratory results of the patients through taking a blood sample and determining them as WBC, lymphocytopenia, CRP, CPK, UARBC, and UAWBC, where all criteria and laboratory tests were classified on the basis of classification determined by the patient's data. Moreover, we evaluated the daily routine of pediatric patients to show the differences and variances in general health before and during COVID-19. This study was also enhanced by assessing the quality of life of patients based on the criteria of general health, emotional aspect, physical factor, social aspect, and social and school activities. Also, this study contributed to conducting a prospective evaluation of the use of the ED-EQ scale, as it was adopted to predict and determine the estimated long-term adverse health conditions among sick children infected with COVID-19. Also, this study identified risk factors affecting pediatric patients infected with Covid-19. This study was also conducted by determining the probability of pediatric patients surviving after and during COVID-19 through the Kaplan-Meier survival scale.

## 3. RESULTS

Table 1: Demographic characteristics of children with Covid-19 in this study.

| Characteristics | Number of patients [102] | Percentage [%] |
|---|---|---|
| Age [years] | | |
| 2- 6 | 20 | 19.61% |
| 7-11 | 32 | 31.37% |

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| | | |
|---|---|---|
| 12-15 | 50 | 49.02% |
| Gender | | |
| Males | 64 | 62.75% |
| Females | 38 | 37.25% |
| Symptoms | | |
| Fever | 21 | 20.59% |
| Cough | 17 | 16.67% |
| Diarrhea | 19 | 18.63% |
| Breathing difficulties | 13 | 12.75% |
| Headache | 10 | 9.80% |
| Abdominal pain | 16 | 15.69% |
| Stuffy or runny nose | 6 | 5.88% |
| Nausea | 21 | 20.59% |
| Parents education | | |
| High school | 30 | 29.41% |
| Undergraduate | 24 | 23.53% |
| Postgraduate | 48 | 47.06% |
| Income, $ | | |
| 300-500 | 33 | 32.35% |
| 501-700 | 17 | 16.67% |
| > 700 | 52 | 50.98% |
| Marital status | | |
| Married | 66 | 64.71% |
| Divorced | 23 | 22.55% |
| Widowed | 13 | 12.75% |
| Respiratory rate | | |
| < 25 | 20 | 19.61% |

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| | | |
|---|---|---|
| ≥ 25 | 82 | 80.39% |
| Systolic/diastolic blood pressure | | |
| ≤ 128/88 | 14 | 13.73% |
| > 128/88 | 88 | 86.27% |
| PICU admission | | |
| Yes | 30 | 29.41% |
| No | 72 | 70.59% |
| O2 saturation | | |
| ≥ 95% | 67 | 65.69% |
| < 95% | 35 | 34.31% |
| Intubation | | |
| Yes | 6 | 5.88% |
| No | 96 | 94.12% |
| Length of hospital stay (day) | | |
| < 6 | 76 | 74.51% |
| 7 – 13 | 22 | 21.57% |
| > 14 | 4 | 3.92% |

Table 2: Determine COVID-19 data associated with children.

| **Parameters** | **Number of patients [102]** | **Percentage [%]** |
|---|---|---|
| Covid-19 infection | | |
| A family member was infected | 89 | 87.25% |
| A relative died of COVID-19 | 13 | 12.75% |
| Severity of covid-19 | | |
| Mild | 15 | 14.71% |
| Moderate | 50 | 49.02% |
| Sever | 37 | 36.27% |

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| | | |
|---|---|---|
| Duration of covid-19, Days | | |
| 5 - 6 Days | 27 | 26.47% |
| 7- 12 Days | 51 | 50.00% |
| 13 – 17 Days | 24 | 23.53% |

Table 3: Laboratory outcomes.

| **Variables** | **Number of patients [102]** | **Percentage [%]** |
|---|---|---|
| WBC (× $10^3$ /µL) | | |
| < 5000 | 65 | 63.73% |
| 5000 – 15000 | 21 | 20.59% |
| > 15000 | 16 | 15.69% |
| Lymphopenia | | |
| Yes | 28 | 27.45% |
| No | 76 | 74.51% |
| CRP | | |
| 0 | 37 | 36.27% |
| +1 | 30 | 29.41% |
| +2 | 22 | 21.57% |
| +3 | 13 | 12.75% |
| CPK (U/L) | | |
| ≤ 200 | 88 | 86.27% |
| > 200 | 14 | 13.73% |
| UARBC | | |
| ≤4 | 92 | 90.20% |
| > 4 | 10 | 9.80% |
| UAWBC | | |
| Normal | 86 | 84.31% |

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| | | |
|---|---|---|
| Abnormal | 16 | 15.69% |

Table 4: Daily active routine of children before and during the pandemic covid-19.

| **Variables** | **Before covid-19** | **During covid-19** |
|---|---|---|
| **Screen time [hours]** | | |
| < 3 hr | 60 [58.82%] | 37 [36.27%] |
| > 3hr | 42 [41.18%] | 65 [63.73%] |
| **Physical activity** | | |
| No | 21 [20.59%] | 77 [75.49%] |
| Yes | 81 [79.41%] | 24 [24.51%] |
| **Seep** | | |
| Poor | 17 [16.67%] | 35 [34.51%] |
| Good | 85 [83.33%] | 67 [65.69%] |
| **Eating habits** | | |
| Worse | 17 [16.67%] | 30 [29.41%] |
| Good | 40 [39.22%] | 32 [31.37%] |
| Excellent | 45 [44.12% | 40 [39.22%] |

Table 5: Assessment of quality-life associated with health outcomes of paediatric patients before and during covid-19.

| **Items** | **Before covid-19** | **During covid-19** |
|---|---|---|
| General Health | 88 ± 6.5 | 65.35 ± 7.8 |
| Physical factor | 92.55 ± 3.7 | 67.82 ± 9.2 |
| Emotional factor | 86.46 ± 6.8 | 67.48 ± 8.52 |
| School Activity | 90.60 ± 5.7 | 54.20 ± 8.9 |
| Social factor | 91.13 ± 2.4 | 70.69 ± 7.2 |

Table 6: Assessment of estimated long-term adverse health outcomes in paediatric patients with Covid-19.

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| Parameters | Quality-life scores |
|---|---|
| **Multisystem Inflammatory Syndrome (MIS), (mean ± SD)** | |
| Pneumonia | 55 ± 12.45 |
| Shortness of breath | 67.36 ± 12.54 |
| Cough | 57.86 ± 14.68 |
| **Long-lasting symptoms (mean ± SD)** | |
| Fatigue | 60.65 ± 9.5 |
| Cognitive difficulties | 70.74 ± 4.4 |
| Headache | 58.92 ± 10.4 |
| **Psychological effect (mean ± SD)** | |
| Anxiety | 77.5 ± 11.47 |
| Post-traumatic stress | |
| Changes in behavior | 76.54 ± 12.4 |

Table 7: Multivariate logistic regression for paediatric patients with covid-19.

| Risk factors | OR | (CI 95%) |
|---|---|---|
| Fever | 2.01 | 0.8 - 4.16 |
| Nausea | 1.6 | 0.6 - 3.7 |
| A family member was infected | 3.55 | 1.41 - 6.85 |
| Severity of covid-19 | 2.6 | 0.6 - 3.06 |
| Multisystem Inflammatory Syndrome | 4.6 | 1.44 - 7.89 |

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| | | |
|---|---|---|
| Long-lasting symptoms | 2.86 | 1.22 - 5.7 |
| Post-traumatic stress | 2.8 | 1.48 - 8.96 |

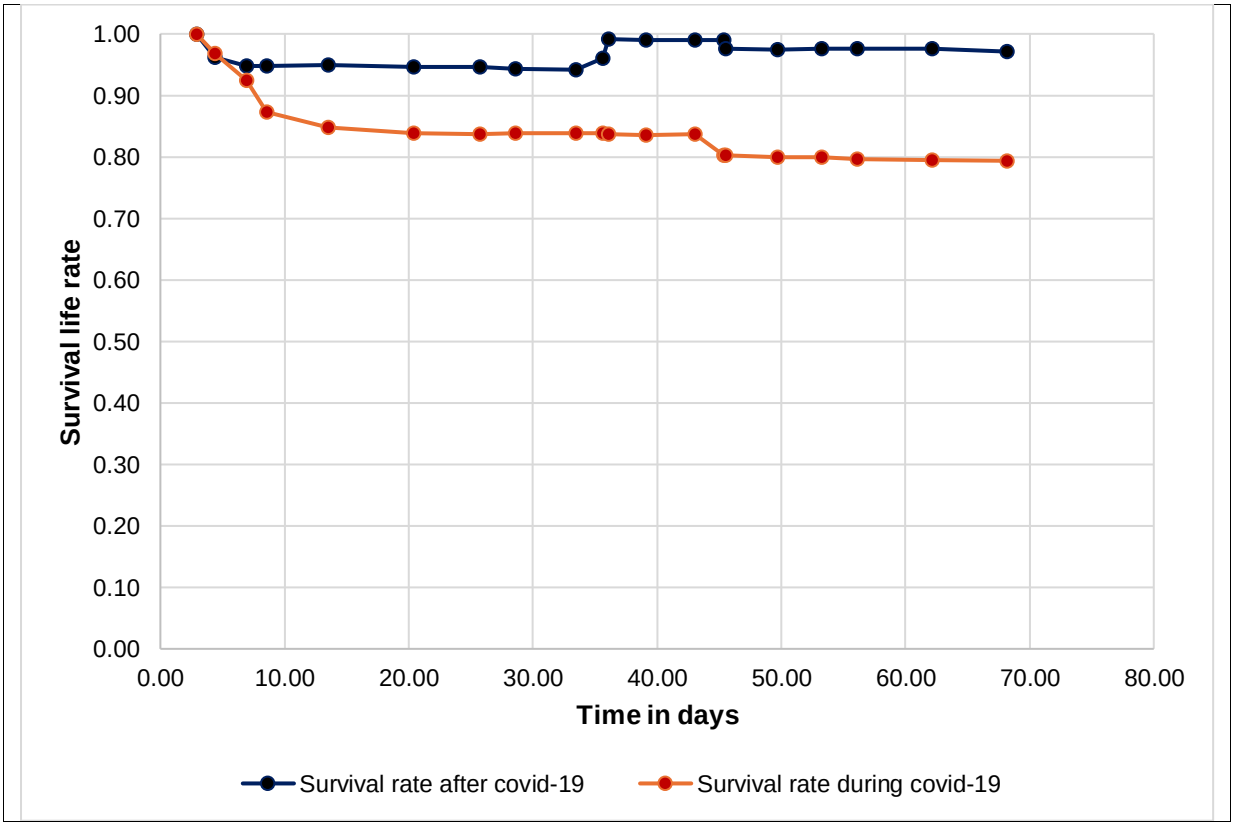


Figure 1: Survival-life rate of pediatric patients after and during covid-19.

## 4. DISCUSSION

The results recorded data on paediatric patients infected with Covid 19, showing that patients in the age group (12-15) years had the highest infection rate with 50 cases, with the percentage of males 64 cases and females 38 cases, as the most common symptoms were accompanied by fever in 21 patients and diarrhoea in 19 patients. For the primary diagnoses, the initial examinations showed respiratory rate ≥ 25 in 82 patients, systolic/diastolic blood pressure > 128/88 in 88 patients, 30 children were admitted to the paediatric intensive care unit, and oxygen saturation ≥ 95% in 67 patients and < 95% in 35 patients. The length of hospital stay was less than six days for 76 patients. Based on the PCR test for Covid-19 patients, one family member was infected with Covid-19. There were 89 patients, as the level of COVID-19 was found to be mild in 15 cases, moderate in 50 cases, and severe in 37 cases. Laboratory tests showed WBC <5000 in 65 patients, lymphocytopenia in 28 patients, UARBC ≤4 in 92 patients, normal UAWBC in 86 patients, and above normal in 16 patients. Regarding the quality of life of the patients before and during COVID-19, the clinical results

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recorded that the standards adopted in the patients' health decreased during Covid compared to before COVID-19, and they were the public health factor (65.35 ± 7.8), the physical factor (67.82 ± 9.2) and the interaction in school (54.20 ± 8.9) were the most common of these results. In addition, future results of paediatric patients showed that these factors are the most common aetiological factors affecting children after injury, such as pneumonia (55 ± 12.45), cough (57.86 ± 14.68), fatigue (60.65 ± 9.5), and post-traumatic stress (62 ± 4.80). In addition, these results recorded the survival rate of paediatric patients during and after Covid-19 within 70 days, as survival rates were extremely low between the tenth and the sixtieth day compared to after Covid-19. Previous studies have shown that Covid-19 poses a major risk to the quality of children's public and mental health. These studies confirmed that COVID-19 causes a sharp decline in the level of physical activity, which impairs the respiratory rate of children [21]. Another study indicated that COVID-19 negatively affects psychological factors, as children suffer from severe anxiety and stress, which results in a disruption in their daily routine, which poses a great threat to mental health [22]. Moreover, an American study confirmed the poor health services systems and the lack of availability of health care may make it difficult to maintain the survival rate. [23]

## 5. CONCLUSION

Although COVID-19 appears less common than in adults, COVID-19 negatively affects children's quality of life, which poses a significant physical, psychological, and mental health burden on children. This study indicated that poor health care, diet, and low family income exacerbate the risk to children's general health, which does not allow them to cope better. The study results suggest that a decrease in oxygen levels and the presence of lymphopenia are associated with reduced survival rates. Additionally, logistic regression analysis revealed an increased hospital stay rate is a risk factor for Covid-19 complications. Poor efficiency in healthcare systems causes a decrease in patients' quality of life, which is attributed to a decrease in the survival rate during the COVID-19 pandemic. The predictive results in this study showed that Covid-19 is a risk factor for patients' long-term health in terms of physical and psychological aspects and long-term symptoms.

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