# Correlation of clinical manifestations, length of hospital stay and disease severity to viral cycle threshold (CT- values) among pediatric patients ages 0-18 years old with COVID-19 infection admitted at a tertiary hospital in Bacolod City from December 2020 to December 2022; A retrospective study

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# BACKGROUND

COVID-19 is a viral disease caused by severe acute respiratory syndrome coronavirus-2. The virus has been identified as the cause of an outbreak of respiratory illness in Wuhan, Hubei Province, China, in December 2019 and rapidly spread across the globe.

Center for Disease Control and Prevention showed that recent evidence suggests that compared to adults, children likely have similar viral loads. They have the same co-infection rates, and they can spread the virus to others.

The primary method of diagnosis of COVID-19 is by real-time reverse transcriptase PCR (rRT-PCR) done by detection of two target genes, the open reading frame of 1ab (ORF1ab) and the nucleocapsid protein (N). Cycle threshold (CT) refers to the number of cycles needed to amplify the viral RNA to a detectable level which provides an estimate of viral load. It is inversely proportional to the amount of target nucleic acid.

# OBJECTIVE

To determine the correlation between the clinical manifestations, length of hospital stay, severity and the cycle threshold values of children with COVID-19 admitted at a tertiary hospital in Bacolod City.

# METHODOLOGY

A cross-sectional, retrospective study was done to determine the correlation between the clinical manifestations, disease severity and cycle threshold values of children with COVID-19 admitted at a tertiary hospital in Bacolod City. This included all pediatric patients who tested positive for COVID-19 last December 2020 to December 2022.

Patient's demographic profile, clinical manifestations, length of hospital stay and disease Severity were analyzed for any correlations to the CT values
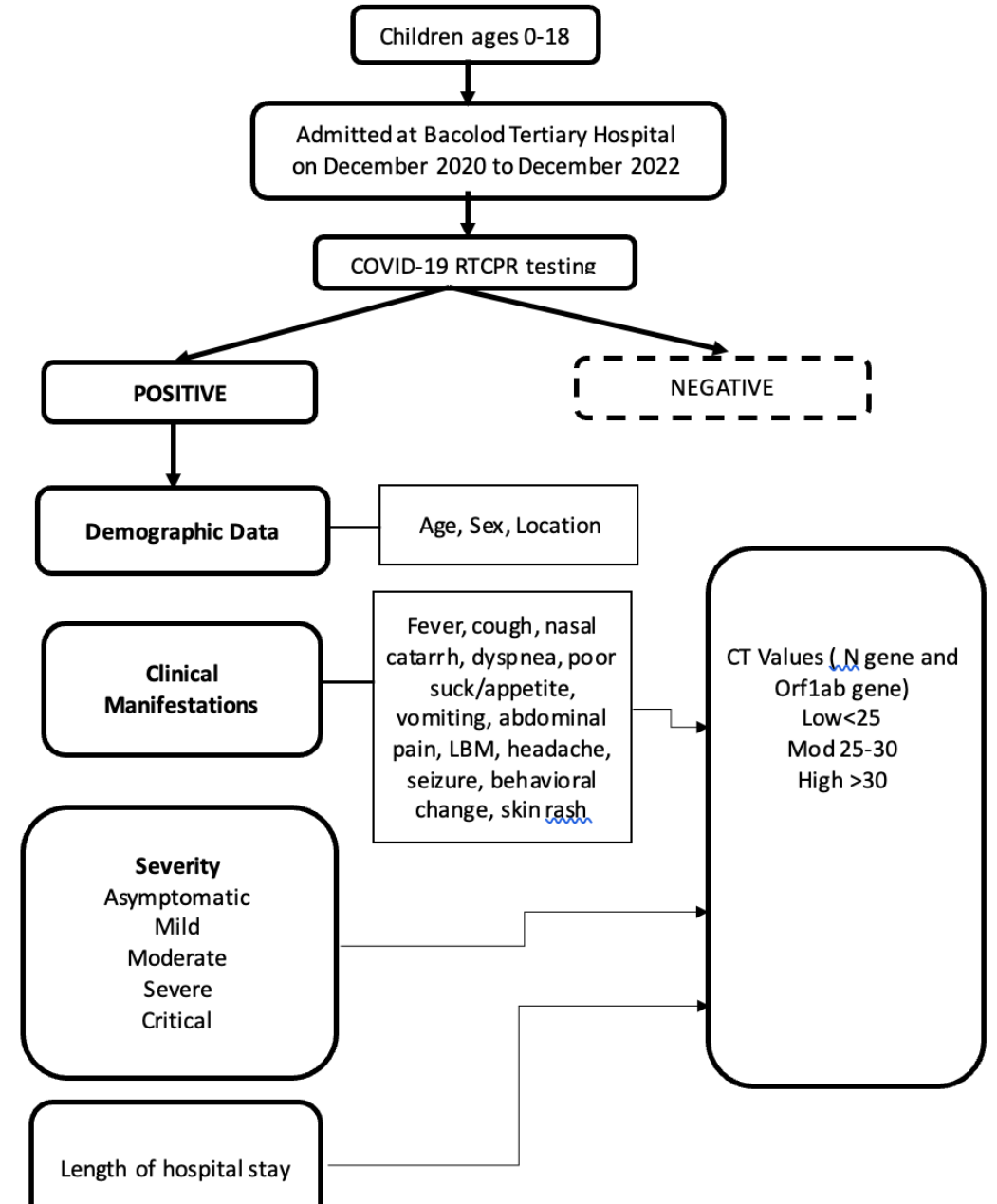
# RESULTS

## Demographic profile of patients with COVID-19

| AGE | Frequency | Percent |
|---|---|---|
| Infancy (<1 yo) | 31 | 19.1 |
| **Toddler (1-3 yo)** | **49** | **30.2** |
| Pre-school (4-6yo) | 26 | 16.0 |
| School age (7-12yo) | 26 | 16.0 |
| Adolescent (13-18yo) | 30 | 18.5 |
| TOTAL | 162 | 100.0 |
| **SEX** | | |
| **Male** | **100** | **61.7** |
| Female | 62 | 38.3 |
| TOTAL | 162 | 100.0 |
| **LOCATION** | | |
| **Bacolod City** | **89** | **54.9** |
| Northern Negros Occ. | 43 | 26.5 |
| Southern Negros Occ. | 17 | 10.4 |
| Outside Negros Occ. | 13 | 8.2 |
| TOTAL | 162 | 100.0 |

# RESULTS

A total of 162 pediatric patients ages 0-18 years old were included in the study. Age was categorized into different groups. Most of them were toddlers ages 1-3years old which comprised 30.2% of the total population. Males are more affected and majority are from Bacolod City, which is the capital of the province.

Children who were admitted presented with mild varied clinical manifestations in which, cough and fever are the dominant clinical presentations.

The clinical manifestations the patient had during their admission were tested to determine their correlation with the cycle threshold values. Results showed no single clinical characteristic could point who will develop severe or critical illness. There was no significant relationship between the clinical manifestations and CT values based on N gene and Orf1ab gene.

# RESULTS

The number of days ranges from 1 day, being the shortest to 25 days, being the longest.  Results showed that as the number of days increases, the cycle threshold values decrease. Therefore, there is a significant negative correlation between the length of hospital stay and the cycle threshold values.

Results also showed a significant correlation between the severity of the disease and the cycle threshold values using the N Gene and the ORF1ab. It showed that as the severity of COVID-19 increases, the cycle threshold values decrease.

# CONCLUSION and RECOMMENDATIONS

This study has significant positive results in correlation with the number of hospital days, severity of disease and N Gene and ORF1ab results. This conveyed that children who had lower CT values stayed longer in the hospital and had severe disease compared to those who have higher CT values. However, it also showed that CT values had no correlation to the signs and symptoms the patient had during admission and during their hospital stay.

Further studies in larger population and from other tertiary hospitals in the city. Also, more studies regarding CT values and possible complications and outcomes.