

RESEARCH PAPER

**PROFILE OF GASTROINTESTINAL MANIFESTATION ON PEDIATRIC
PATIENTS WITH COVID-19 IN RSUD DR. SOETOMO**



Author

Alya Kusumaningrum

011911133102

INTERNATIONAL CLASS MEDICAL PROGRAM

FACULTY OF MEDICINE

UNIVERSITAS AIRLANGGA

SURABAYA

2022

RESEARCH PAPER

**PROFILE OF GASTROINTESTINAL MANIFESTATION ON
PEDIATRIC PATIENTS WITH COVID-19 IN RSUD DR. SOETOMO**



Author

Alya Kusumaningrum

011911133102

INTERNATIONAL CLASS MEDICAL PROGRAM

FACULTY OF MEDICINE

UNIVERSITAS AIRLANGGA

SURABAYA

2022

PREREQUISITE SHEET

**PROFILE OF GASTROINTESTINAL MANIFESTATION ON
PEDIATRIC PATIENTS WITH COVID-19 IN RSUD DR. SOETOMO**

RESEARCH PAPER

This statement is to fulfill the requirement of the research module Medical Faculty
of Universitas Airlangga

Author

ALYA KUSUMANINGRUM

011911133102

INTERNATIONAL CLASS MEDICAL PROGRAM

FACULTY OF MEDICINE

UNIVERSITAS AIRLANGGA

SURABAYA

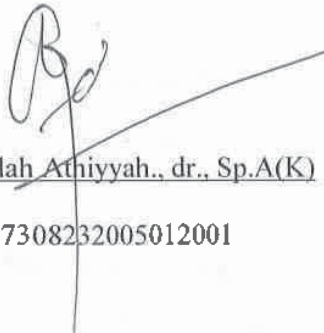
2022

APPROVAL SHEET

This research paper has been approved at

Date: 28 December 2022

First Supervisor



Dr. Alpha Fardah Athiyyah., dr., Sp.A(K)

NIP. 197308232005012001

Second Supervisor



Ulfa Kholili, dr., Sp.PD, K-GEH, FINASIM

NIP. 197504042008012017

Acknowledged By,

Head of Medical Program



Dr. Purwo Sri Rejeki, dr., M. Kes

NIP. 197506122005012003

EXAMINER DECISION FORM

**PROFILE OF GASTROINTESTINAL MANIFESTATION ON
PEDIATRIC PATIENTS WITH COVID-19 IN RSUD DR. SOETOMO
THESIS**

Author:

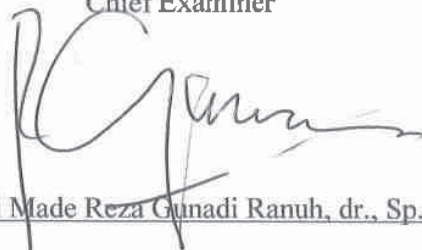
Alya Kusumaningrum

NIM. 011911133102

Approved and accepted after being assessed by the Examiner Team of the
Medical Program, Faculty of Medicine, Universitas Airlangga
Surabaya, 16 Desember 2022

Approved by,

Chief Examiner



Dr. I Gusti Made Reza Gunadi Ranuh, dr., Sp.A(K)

NIP. 196011051988021002

First Supervisor



Dr. Alpha Fardah Athiyah., dr., Sp.A(K)

NIP. 197308232005012001

Second Supervisor



Ulfa Kholili, dr., Sp.PD, K-GEH, FINASIM

NIP. 197504042008012017

STATEMENT OF ORIGINALITY

The undersigned, I,

Name : Alya Kusumaningrum

NIM : 011911133102

Study Program : Medical Program

Faculty : Medicine

Stage : Bachelor

Stating that I have not committed plagiarism in the writing of my thesis with a title of,

**PROFILE OF GASTROINTESTINAL MANIFESTATION ON
PEDIATRIC PATIENTS WITH COVID-19 IN RSUD DR. SOETOMO**

If one day it is proven to have committed plagiarism, then I will receive the sanctions that have been set.

Thus this statement letter I made in real terms.

Surabaya, 16 December 2022



Alya Kusumaningrum

NIM 011911133102

ACKNOWLEDGEMENT

In the name of Allah SWT, The Most Gracious and The Most Merciful. Praise and gratitude I pray for Allah SWT for guiding, blessing, and allowing the author to complete the preparation of this research paper with the title of “Profile of Gastrointestinal Manifestation in Pediatric Patients with COVID-19 in RSUD Dr. Soetomo”. This research paper was submitted to meet the graduation requirements for the research course at the Faculty of Medicine of Universitas Airlangga. The author realized this research paper would not be complete without a great number of contributions, help, support, and motivation from numerous parties. Consequently, the author wishes to massively thank the following people:

1. Prof. Dr. Muhammad Nasih S. E., M. T., Ak., CMA, as the Chancellor of Universitas Airlangga, who gave the author permission to attend studies at Universitas Airlangga.
2. Prof. Dr. Budi Santoso, dr., Sp. OG (K) as the Dean of the Faculty of Medicine, Universitas Airlangga who provided the author permission to finish their research paper and to continue their education.
3. Dr. Purwo Sri Rejeki, dr., M. Kes. as the Program Coordinator of the Faculty of Medicine, Universitas Airlangga who continuously facilitated the process of completing this research paper.
4. Dr. Pudji Lestari, dr., M. Kes. as the Head Coordinator of the Research Module who continuously provided courses, advices, facility, and permission for the author to complete this research paper.
5. Dr. Alpha Fardah Atiyyah, dr., Sp.A(K) as the first supervisor who consistently spared her precious time to guide, mentor, and share important advices in the process of completing this research paper.
6. Ulfa Kholili, dr., Sp.PD, K-GEH, FINASIM as the second supervisor who continuously spared her valuable time to guide, mentor, and give important advices in the process of completing this research paper.
7. All the Faculty of Medicine of Universitas Airlangga doctors and teachers who have educated and provided knowledge during lectures, as well as all the RSUD Dr. Soetomo staffs who are always patient in serving all administration during this research process.
8. The author’s family: Prof. Dr. Syamsul Maarif, M.Si as the author’s father, Nanik Kadariyani as the author’s mother, Erwin Yudho Prasetyo as the author’s older brother, and Kartika Wulan Ningrum as the author’s older sister for their patience, understanding, support, and encouragement while completing this research.
9. Raka Ibrahim Faiz Syafrisal as the author’s special person for their patience, moral support, and assistance while completing this research.

10. The author's colleagues: Ahmad Akmaluddin, Alkautsar Kitto Avenzora, Alya Dwi Oktaliani, Hafiza Amadhin Rusti, Gabriel Rio Widi priyatama, Muhammad Harits, Muhammad Irfan Indianto, Muhammad Muhibuddin Hilmy Asari, Okta Margarita Susiana, and Raynanda Sabta Charis Binti for their friendship and encouragement throughout completing this research.
11. The author's colleagues: Anisa Putri Khairul, Bunga Priscilla Rotua Manurung, Dania Raisya Safira, Fidela Azarine Feby Nurhadi, Ni Made Indira Kusuma Putri, Poppy Azura Putri, Vindy Vanessa Wennas, as well as Ailsa Reina Faradiba, Insyira Rayhana Irsan, and Lana Kautsar in Izzatazkia for their friendship, comfort, and reinforcement throughout completing this research.
12. All colleagues from COSTAE class of 2019 who always provided support and motivation in the making of this research.
13. All parties who have helped the author during the process of completing this research paper that cannot be mentioned one by one.

The author realized that this research paper still has a lot of rooms for improvement. For this reason, the author welcomes all positive suggestions, criticism, as well as guidance from the readers. With this research paper, the author hopes that it can be advantageous for all the parties in need.

Surabaya, 16 December 2022

(Alya Kusumaningrum)

SUMMARY**PROFILE OF GASTROINTESTINAL MANIFESTATION ON
PEDIATRIC PATIENTS WITH COVID-19 IN RSUD DR. SOETOMO**

Alya Kusumaningrum

Coronavirus Disease 2019 (COVID-19) is predominantly a respiratory disease caused by Severe Acute Respiratory Syndrome Coronavirus 2 (SARS-CoV-2), which were first reported in China on December 2019 and has been declared as a global pandemic by the World Health Organization (WHO) since March 2020 (Lee et al., 2020; Puoti et al., 2021). As of June 16, 2021, there have been over 176 million confirmed COVID-19 cases and 3.8 million deaths worldwide, with approximately 8.5% of the reported cases were pediatric patients under the age of 18 years (WHO, 2021). The majority of children infected with SARS-CoV-2 show mild symptoms, although 15 to 35% may be asymptomatic (Chen et al., 2020). Based on a study by Kariyawasam et al. (2021), COVID-19 patients experience gastrointestinal symptoms in 11.4 to 61.1% of cases. Anorexia, diarrhea, nausea, vomiting, and abdominal pain are among the most common COVID-19-related GI symptoms.

The general objective of this study is to identify and analyze the gastrointestinal manifestations on pediatric patients with COVID-19 in RSUD Dr. Soetomo. This study uses a descriptive and retrospective study design to examine the profile of gastrointestinal manifestation on pediatric patients with COVID-19 in RSUD Dr. Soetomo by using secondary data through medical records. The population in this study were pediatric patients with COVID-19 in the Pediatric Ward of RSUD Dr. Soetomo during the period of 1 July 2020 to 30 June 2021.

Based on the data obtained, there were 113 eligible pediatric COVID-19 patients in RSUD Dr. Soetomo during the period of 1 July 2020 to 30 June 2021. The predominant demographic characteristics of pediatric patients with COVID-19 in RSUD Dr. Soetomo were those with the age group of 6 to less than 18 years with an average of 8 years old, male, confirmed COVID-19 positive before hospitalization, not yet recovered after being discharged, and had a mean hospital length of stay of 16 days. There was 76.1% of patients that had an underlying medical condition. The severity of illness of COVID-19 of the patients was dominated by asymptomatic infection (37.2%). The gastrointestinal manifestations of COVID-19 found in 44.2% of the total patients include nausea or vomiting (25.7%), diarrhea (15.9%), anorexia (13.3%), abdominal pain (8.8%), hepatomegaly (1.8%), splenomegaly (1.8%), and GI bleeding (1.8%).

The mean laboratory examination results of pediatric COVID-19 patients were as follows: hemoglobin level of 10.69 g/dL, RBC count of 4.45×10^6 cells/mm³, hematocrit level of 34.24%, WBC count of 24.17×10^3 cells/mm³, platelet count of 260.77×10^3 cells/ μ L, sodium level of 136.9 mEq/L, potassium level of 4 mEq/L, chloride level of 102.7 mEq/L, BUN level of 21.59 Mg/dL (31.0%), serum creatinine level of 1.40 Mg/dL, albumin level of 3.29 g%, SGPT level of 84.73 U/L, and SGOT level of 53.67 U/L. The most prevalent macroscopic characteristics of the stool analysis of pediatric COVID-19 patients with diarrhea were transparent in color (72.2%), liquid in consistency (77.8%), and without the presence of blood and mucus (88.9%).

ABSTRACT

**PROFILE OF GASTROINTESTINAL MANIFESTATION ON
PEDIATRIC PATIENTS WITH COVID-19 IN RSUD DR. SOETOMO**

Alya Kusumaningrum

Introduction: Coronavirus disease (COVID-19) is an infectious disease caused by the SARS-CoV-2 virus. Although primarily known as a respiratory disease, COVID-19 could have gastrointestinal manifestations, such as diarrhea, nausea or vomiting, and abdominal pain since angiotensin-converting enzyme 2 (ACE2) receptors are also expressed in small intestinal epithelial cells.

Objective: To identify and analyze the gastrointestinal manifestations on pediatric patients with COVID-19 in RSUD Dr. Soetomo.

Method: This is a descriptive retrospective research that use secondary data from the medical records of pediatric patients of COVID-19 in RSUD Dr. Soetomo during the period of 1 July 2020 to 30 June 2021. The inclusion criteria of this research are patients in the age of 0-18 years who were confirmed COVID-19 through PCR test. The collected data include the demographic, underlying medical condition, severity of illness, gastrointestinal manifestation, and supporting examinations.

Results: Of all 113 pediatric patients with COVID-19, the average age was 8 years old, male, confirmed COVID-19 positive before hospitalization, not yet recovered after being discharged, and had a mean hospital length of stay of 16 days. 76.1% of patients had an underlying medical condition. 37.2% of patients was asymptomatic. The gastrointestinal manifestations of COVID-19 found in 44.2% of the total patients include nausea or vomiting (25.7%), diarrhea (15.9%), anorexia (13.3%), abdominal pain (8.8%), hepatomegaly (1.8%), splenomegaly (1.8%) and GI bleeding (1.8%).

Conclusion: 44.2% of the total patients in this study had at least one gastrointestinal symptom of COVID-19. The highest prevalence of GI manifestation of COVID-19 was nausea or vomiting, accounting for 25.7% of all patients.

Kata Kunci: COVID-19, gastrointestinal, pediatric

TABLE OF CONTENT

RESEARCH PAPER	1
PREREQUISITE SHEET	2
APPROVAL SHEET	3
EXAMINER DECISION FORM.....	4
STATEMENT OF ORIGINALITY	5
ACKNOWLEDGEMENT	6
SUMMARY	8
ABSTRACT	10
TABLE OF CONTENT	11
LIST OF FIGURES.....	14
LIST OF TABLES	15
LIST OF ATTACHMENTS	16
LIST OF ABBREVIATIONS.....	17
CHAPTER I	18
1.1 Background	18
1.2 Formulation of Problem	20
1.3 Objective of Research	20
1.3.1 General Objective.....	20
1.3.2 Specific Objective	20
1.4 Benefit of Research	21
1.4.1 Academic Benefit.....	21
1.4.2 Practical Benefit	21
CHAPTER II.....	22
2.1 COVID-19	22
2.1.1 Definition and Etiology.....	22
2.1.2 Epidemiology	24
2.1.3 Pathophysiology and Risk Factors of COVID-19 in Pediatric Patients	26
2.1.4 Manifestation of COVID-19 in Pediatric Patients	28
2.1.5 Classification of COVID-19 based on the Severity of Illness	29
2.1.6 Diagnosis of COVID-19 in Pediatric Patients	31
2.1.7 Management and Therapy of COVID-19 in Pediatric Patients	33
2.2 Gastrointestinal Manifestation of COVID-19 in Pediatric Patients.....	34

2.2.1 Definition, Etiology, and Epidemiology	34
2.2.2 Pathophysiology and Risk Factors	35
2.2.3 Gastrointestinal Manifestation	36
2.2.4 Correlation Between Gastrointestinal Manifestation with the Severity and Outcome of COVID-19 in Pediatric Patients	38
2.2.5 Management and Therapy	40
CHAPTER III.....	42
3.1 Conceptual Framework	42
3.2 Description of Conceptual Framework	43
CHAPTER IV	45
4.1 Research Type and Design.....	45
4.2 Population, Sample, and Sampling Technique	45
4.2.1 Population	45
4.2.2 Research Sample	45
4.2.3 Sampling Technique.....	46
4.3 Research Variables.....	46
4.3.1 Variable Classification	46
4.3.2 Operational Variable Definition.....	47
4.4 Research Materials	51
4.5 Research Instruments	52
4.6 Research Location and Time.....	52
4.6.1 Research Location.....	52
4.6.2 Research Time.....	52
4.7 Procedure of Data Collection	52
4.7.1 Data Collection.....	52
4.7.2 Operational Framework	53
4.8 Data Processing Technique and Analysis	53
4.8.1 Data Processing Technique	53
4.8.2 Data Analysis	54
4.9 Ethical Aspect of Research	54
CHAPTER V.....	55
5.1 Demographic Characteristics	55
5.2 Underlying Medical Condition	57
5.3 Severity of Illness of COVID-19	58
5.4 Gastrointestinal Manifestation	59

5.5 Supporting Examination.....	60
5.5.1 Laboratory Examination.....	60
5.5.2 Stool Analysis	66
CHAPTER VI	68
6.1 Demographic Characteristics	68
6.2 Underlying Medical Condition	71
6.3 Severity of Illness of COVID-19	72
6.4 Gastrointestinal Manifestation	73
6.5 Supporting Examination.....	75
6.5.1 Laboratory Examination.....	75
6.5.2 Stool Analysis	77
CHAPTER VII.....	79
7.1 Conclusion.....	79
7.2 Suggestion	80
REFERENCES.....	81
ATTACHMENT	85

LIST OF FIGURES

Figure 1 Transmission Cycle of SARS-CoV-2 Virus (Galanopoulous et al., 2020)	23
.....	
Figure 2 COVID-19 cases per 100,000 population reported by countries, territories, and areas, 14 – 20 June 2021 (WHO, 2021)	25
Figure 3 COVID-19 deaths per 100,000 population reported by countries, territories, and areas, 14 – 20 June 2021 (WHO, 2021).....	25
Figure 4 Schematic representation of SARS-CoV-2 virus showing target proteins and its host entry mechanism (Naqvi et al., 2020).....	27

LIST OF TABLES

Table 1 Operational Variable Definition.....	47
Table 2 Demographic Characteristics: Age, Sex, Confirmed COVID-19 Positive, Outcome	55
Table 3 Demographic Characteristic: Hospital Length of Stay	56
Table 4 Underlying Medical Condition	57
Table 5 Underlying Medical Condition Categories	57
Table 6 Severity of Illness of COVID-19 Classification	58
Table 7 Gastrointestinal Manifestation of Pediatric COVID-19 Patients.....	59
Table 8 Gastrointestinal Manifestation Categories	59
Table 9 Hematologic Examination of Pediatric COVID-19 Patients	60
Table 10 Value of Hematologic Examination of Pediatric COVID-19 Patients ..	61
Table 11 Electrolyte Examination of Pediatric COVID-19 Patients	62
Table 12 Value of Electrolyte Examination of Pediatric COVID-19 Patients.....	63
Table 13 Kidney Function Examination of Pediatric COVID-19 Patients.....	64
Table 14 Value of Kidney Function Examination of Pediatric COVID-19 Patients	64
Table 15 liver Function Examination of Pediatric COVID-19 Patients	65
Table 16 Value of Liver Function Examination of Pediatric COVID-19 Patients	66
Table 17 Stool Analysis of Pediatric COVID-19 Patients Presented with Diarrhea	66

LIST OF ATTACHMENTS

Attachment 1: Ethical Clearance.....	85
Attachment 2: Good Clinical Practice.....	86
Attachment 3: Research Timeline.....	87

LIST OF ABBREVIATIONS

ACE-2	: Angiotensin Converting Enzyme 2
Ag-RDT	: Antigen Rapid Diagnostic Test
AlphaCoV	: Alphacoronavirus
BetaCoV	: Betacoronavirus
COVID-19	: Coronavirus Disease 2019
DeltaCoV	: Deltacoronavirus
GammaCoV	: Gammacoronavirus
GI	: Gastrointestinal
ICU	: Intensive Care Unit
IDAI	: Ikatan Dokter Anak Indonesia
Kemenkes RI	: Kementrian Kesehatan Republik Indonesia
MERS	: Middle East Respiratory Syndrome
NAAT	: Nucleic Acid Amplification Test
NIH	: National Institute of Health
RNA	: Ribonucleic Acid
rRT-PCR	: Real-Time Reverse-Transcriptase Polymerase-Chain-Reaction
SARS	: Severe Acute Respiratory Syndrome
SARS-CoV-2	: Severe Acute Respiratory Syndrome Coronavirus 2
WHO	: World Health Organization