



# PROCEEDINGS

## The 4<sup>th</sup> International Conference on Sustainable Innovation (ICoSI) 2020

Cutting Edge Innovations for Sustainable Development Goals

Universitas Muhammadiyah Yogyakarta (Indonesia)

October 13 - 14 2020

<https://icosi.umy.ac.id/>

## Focal Conferences



- ✔ (ICPU) The 2nd International Conference on Pharmaceutical Updates
- ✔ (ICOMS) The 6th International Conference on Management Sciences
- ✔ (ICLAS) The 9th International Conference on Law and Society
- ✔ (ICMHS) The 4th International Conference Medical and Health Sciences
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- ✔ (ICONPO) The 10th International Conference on Public Organization
- ✔ (DREAM) The 5th Dental Research and Exhibition Meeting
- ✔ (ICHA) The 5th International Conference on Hospital Administration
- ✔ (ICOSA) The 3rd International Conference on Sustainable Agriculture





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## Preface by the Chairperson of the 4<sup>th</sup> ICoSI 2020



**Dr. Yeni Rosilawati, S.IP. S.E., MM.**

Assalamu'alaikum Wr. Wb.

All praise is due to Allah, the Almighty, on whom we depend for sustenance and guidance. Prayers and peace be upon our Prophet, Muhammad SAW, his family and all of his companions.

On behalf of the organizing committee, it is my pleasure and privilege to welcome the honourable guests, distinguished keynote & invited speakers, and all the participants.

With the main theme of “Cutting-Edge Innovations on Sustainable Development Goals (SDGs)”, the 4<sup>th</sup> International Conference on Sustainable Innovation (ICoSI) 2020 serves as a forum to facilitate scholars, policy makers, practitioners, and other interested parties at all levels from Indonesia and abroad to present their novel ideas, promote cutting-edge research, and to expand collaboration network. The conference has about 1373 participants participating from more than 8 countries 4 continents all over the world, making this conference a truly international conference in spirit.

This multidisciplinary conference was first held in 2012 and has undertaken various changes and adopted to the current technological trends of our education system. From having this conference with just 175 participants back in 2012 we have come a long way in making the conference a huge success with more than 1373 participants participating in this two-day conference.

Formerly, this conference consisted of only 9 (nine) focal conferences. This year, there are 14 focal conferences from various disciplines, namely: 1) The 2<sup>nd</sup> International Conference on Pharmaceutical Updates (ICPU), 2) The 6<sup>th</sup> International Conference on Management Sciences

(ICoMS), 3) The 9<sup>th</sup> International Conference on Law and Society (ICLAS), 4) The 4<sup>th</sup> International Conference Medical and Health Sciences (ICMHS), 5) The 6<sup>th</sup> International Conference for Accounting and Finance (ICAF), 6) The 2<sup>nd</sup> International Language and Education Conference (ILEC), 7) The 2<sup>nd</sup> International Conference on Nursing (ICONURS), 8) The International Conference on Information Technology, Advanced Mechanical and Electrical Engineering (ICITAMEE), 9) The 2<sup>nd</sup> International Conference of Agribusiness and Rural Development (IConARD), 10) The 10<sup>th</sup> International Conference on Public Organization (ICONPO), 11) The 2<sup>nd</sup> International Symposium on Social Humanities Education and Religious Sciences (ISHERSS), 12) The 5<sup>th</sup> Dental Research and Exhibition Meeting (DREAM), 13) The International Conference on Hospital Administration (ICHA), and 14) The 3<sup>rd</sup> International Conference on Sustainable Agriculture (ICoSA).

Accordingly, We are proud to announce that this year, the 4<sup>th</sup> ICoSI 2020 breaks the Museum Rekor-Dunia Indonesia (MURI) record as the Virtual Multidisciplinary Conference with the Largest Number of Area of Fields in Indonesia

In addition, this year, this conference holds special value since this is the first conference in the history of our university where the entire conference is taking place remotely on a digital platform through the use of advance technologies due to the Covid-19 Pandemic.

I would take this opportunity to express my highest respect to the Rector of Universitas Muhammadiyah Yogyakarta, Dr. Gunawan Budiyanto who gave approval and ensured the maximal support from all the faculty members of Universitas Muhammadiyah Yogyakarta (UMY) that made this event a big success. In addition, my appreciation goes to all the support teams who have provided their valuable support and advice from planning, designing and executing the program.

Let me conclude my speech by encouraging the delegates to participate with an increasing number in all the activities and discussions through the digital platforms for the next two days. I wish everyone a successful, safe, and fruitful conference.

Thank you!

Wassalamu'alaikum Wr. Wb.

Yogyakarta, Indonesia, 14 October 2020





## Welcoming Remarks by the Rector of Universitas Muhammadiyah Yogyakarta



**Assoc. Prof. Dr. Gunawan Budiyanto**

Innovation is the beginning of the development of technology, and technology is a development machine that is expected to provide benefits to humans and provide the smallest possible impact on environmental quality. In the concept of sustainable development, development must improve the quality of human life without causing ecological damage and maintain the carrying capacity of natural resources.

International Conference on Sustainable Innovation (ICoSI) is an international conference which is an annual conference held by the University of Muhammadiyah Yogyakarta (UMY), Indonesia. In 2020 this raises the issue of "Cutting-Edge Innovations on Sustainable Development Goals." Therefore, on behalf of all UMY academics, I would like to congratulate you on joining the conference, hoping that during the Covid-19 Pandemic, we can still provide suggestions and frameworks for achieving sustainable development goals.

# About The 4<sup>th</sup> International Conference on Sustainable Innovation (ICoSI) 2020

## *Cutting Edge Innovations for Sustainable Development Goals*

The 2030 Agenda for Sustainable Development is enacted by the United Nations as a shared blueprint for peace and prosperity for people and the planet, now and into the future. It consists of strategies to improve health and education, reduce inequality, and spur economic growth while also conserving natures by 2030.

This year, however, at the first one-third of its timeline, the SDG Reports shows that the outbreak of COVID-19 did hinder the achievement, or at least decelerate the progress of achieving the 17 goals. In fact, according to the report, “some number of people suffering from food insecurity was on the rise and dramatic levels of inequality persisted in all regions. Change was still not happening at the speed or scale required”, accordingly.

Therefore, in this event of pandemic, the quantity and quality of research, innovation, and more importantly multi-disciplinary collaboration are indispensable. Furthermore, there needs to be clear ends of those works. That is how those research are applicable and benefits directly to the society. That is how those research is incorporated as the drivers of policy making, and used practically in the society. Hence, the stakeholders especially the triple helix of higher education institution, government, and industry must be re-comprehended and supported to reach the common goal of the SGD.

International Conference on Sustainable Innovation (ICoSI) has been essentially attempting to strengthen this regard since its first establishment. One of the goals of ICoSI is to provide primarily a platform where scholars, practitioners, and government could grasp the development and trends of research. Hopefully, meeting these actors altogether would result in stronger collaboration, sophisticated and advantageous research, and brighter ideas for further research. Based on these reasoning, this year, the 4th ICoSI 2020 UMY is themed ‘Cutting-edge Innovations for Sustainable Development Goals’.

Improving from last year conference which brought nine focal conference, this year ICoSI 2020 UMY brings 14 disciplines, from social sciences, natural sciences, and humanities. ICoSI 2020 received as much as 1005 papers. The paper works submitted in ICoSI 2020 UMY will be published in Atlantis Proceedings, IOP Proceedings, National/International Journals, and ICoSI ISBN-indexed Proceedings.

Nevertheless, ICoSI believes that publication is only the beginning of research dissemination. The publications will enhance the chance of the research known by wider audience, and then used, applied, and incorporated at either system, institutional, or personal level of human lives.



# CONTENTS



The 4 <sup>th</sup> ICoSI 2020 Committees .....	2
Reviewers of 4 <sup>th</sup> ICoSI 2020 .....	5
Preface by the Chairperson of the 4 <sup>th</sup> ICoSI 2020 .....	7
Welcoming Remarks by the Rector of Universitas Muhammadiyah Yogyakarta.....	9
About The 4 <sup>th</sup> International Conference on Sustainable Innovation (ICoSI) 2020 .....	10
CONTENTS .....	11
TRACK ECONOMICS, LAW, EDUCATION, SOCIAL, AND HUMANITIES .....	15
A Policy Analysis for Building Regulation in Disaster Situations on Sleman Regency .....	16
Wisnu Dimas Punto Aji <sup>1,*</sup> Dewi Sekar Kencono <sup>2</sup> .....	16
Valuation of a Declining Oilfield under Stochastic Oil Prices and Non-Constant Interest Rates .....	20
Fransiscus Pratikto <sup>1,*</sup> , Sapto Indratno <sup>2</sup> , Kadarsah Suryadi <sup>3</sup> , Djoko Santoso <sup>4</sup> .....	20
The Dispute Board as an Alternative to the Construction Service Disputes Settlement.....	26
Fadia Fitriyanti <sup>1,*</sup> Emil Adli <sup>2</sup> .....	26
The Promotion and Protection of Human Rights in Islam for Creating the Culture of Peace .....	33
Martinus Sardi <sup>1,*</sup> .....	33
Trusts Concept Settings in Management Limited Company.....	39
Reni Anggriani <sup>1,*</sup> King Faisal <sup>2</sup> .....	39
Legal Protection of Nurses in Health Care Efforts During the co-pandemic Period 19 .....	43
Reny Suryanti <sup>1,*</sup> Nyoman Putra Putra <sup>2</sup> .....	43
Effect of Parenting against Smartphone Addiction .....	47
Mawaddah Nasution <sup>1,*</sup> , Siswanto Masruri <sup>2</sup> , Khoiruddin Bashori <sup>3</sup> .....	47
Model of Organizing Film Productio Amid the Covid-19 Outbreak in Indonesia.....	51
Citra Dewi Utami <sup>1,*</sup> .....	51
Accountability of Village Fund Allocation Management (ADD) in Village Government.....	56
Mohamad Sukarno <sup>1,*</sup> .....	56
Effect of Parenting against Moral Development of Children Aged 4-10 Years .....	62
Widya Masitah <sup>1,*</sup> Asmadi Alsa <sup>2</sup> Abd.Madjid <sup>3</sup> .....	62
The Influence of Family Communication on Children’s Social Competence at SD Ar-Rahman Full Day School Medan.....	67
Juli Maini Sitepu <sup>1,*</sup> Asmadi Alsa <sup>2</sup> Abd.Madjid <sup>3</sup> .....	67
The Integration of Law and Religion for New Civilization in Indonesia .....	72
Dewi Nurul Musjtari <sup>1,*</sup> Nurmawati <sup>2</sup> Zola Fi Dinillah Halim <sup>3</sup> .....	72
Head of East Java Aisyiah Board Women’s Empowerment Methods in Realizing Sustainable Development Goals Di Indonesia.....	78
Nur Azizah Hidayat <sup>1,*</sup> Iman Zukhrufi Nur Azzam <sup>2</sup> .....	78
Optimization of Child-Friendly City Development Policy in Yogyakarta City .....	89
Septi Nur Wijayanti <sup>1,*</sup> Hanum Salsabila <sup>2</sup> .....	89
The Obligation of Indonesian Government to Ratify the Rome Statute for the Global Justice .....	98
Muhammad Nur Islami <sup>1</sup> , Martinus Sardi <sup>2</sup> .....	98
Legal Politics of Restoration of Indonesia’s State Policy Post Amendment of the 1945 Constitution .....	103
King Faisal Sulaiman <sup>1,*</sup> .....	103
Competition Price Regulations in an Islamic Perspective: Determination of the Aircrat Ticket Tariff .....	109
M. Tri Saputra <sup>1,*</sup> Mukti Fajar ND <sup>2</sup> .....	109
Romanticism Dyanamics of Legal Politics Protection and Management of Environmental Protection to Indonesia’s Ecocracy .....	116
Al Qodar Purwo S <sup>1</sup> , Nur Azizah Hidayat <sup>2</sup> , Iman Zukhrufi Nur Azzam <sup>3</sup> .....	116
Ambiguity of Environmental Economic Instruments between Ecological or Economic Interests, in Controlling Environmental Damage in Special Region of Yogyakarta.....	123
Sunarno <sup>1</sup> Arvin Setiyana Dewangga <sup>2</sup> .....	123
The Law Enforcement against a Non-Sharia Compliance Banking Transaction by the Financial Services Authority in Indonesia .....	130
Dewi Nurul Musjtari <sup>1,*</sup> Nasrullah <sup>2</sup> Aunurochim Mas’ad <sup>3</sup> Nurmawati <sup>4</sup> .....	130



Shariah Audit Expectation-Performance Gap in Malaysian Islamic Banks.....	137
Supiah Salleh <sup>1</sup> , Mustafa Mohd Hanefah <sup>2</sup> , Zurina Shafii <sup>3</sup> .....	137
Students' Attitudes towards Blended Learning Implementation in a private university of Yogyakarta .....	144
Avita Elok Faiqoh <sup>1</sup> , Eko Purwanti <sup>2</sup> .....	144
How Millenial Think About Privacy Concern? .....	152
Anissa Hakim Purwantini <sup>1</sup> , Betari Maharani <sup>1</sup> .....	152
Impact Of Changes in Psak on the Competence of Lecturers and Students Understanding Levels.....	157
Duwi Rahayu <sup>1*</sup> , Imelda Dian Rahmawati <sup>1*</sup> , Bayu Hari Prasajo <sup>1</sup> .....	157
The Influence of Internal Locus of Control, Idealism, Ethical Knowledge, and Gender on Accounting Students' Ethical Perception.....	167
Aji Baskoro <sup>1*</sup> , Dyah Ekari Sekar Jatiningsih <sup>1</sup> .....	167
Effect of Net Income, Rupiah Exchange Rate, Interest Rate dan Inflation on Stock Price .....	174
Edon Ramdani <sup>1*</sup> , Zehan Nur Apsah <sup>2</sup> .....	174
A Comparative Analysis on the Recognition of Zakat in the Taxation Systems of Malaysia and Indonesia .....	187
Suhaila Abdul Hamid <sup>1*</sup> , Ickuk Rangga Bawono <sup>2*</sup> , Ayu Ratu Wulandari <sup>2</sup> .....	187
Developing an Environmental Tax Framework for Malaysia: .....	192
Izlawanie Muhammad <sup>1*</sup> , Norfakhirah Nazihah Mohd Hasnu <sup>2</sup> .....	192
Determining Factors for Success Use of E-Learning in Learning Process in College.....	196
Mohammad Alfian <sup>1*</sup> , Hikmatul Maulidah <sup>2</sup> .....	196
Effect Of Money Ethics And The Use Of Siskeudes On The Level Of Fraud In Village Fund Management With Religiosity As A Moderation Variable.....	202
Elisa Purwitasari <sup>1*</sup> , Mohammad Alfian <sup>1*</sup> , M. Sofyan Firman Syah <sup>1*</sup> .....	202
The Relationship between Performance Based Budgeting Implementation, Budget Absorption, Accountability and Local Government Performance.....	208
Parwoto <sup>1*</sup> .....	208
The Influence of Information Technology (IT) on Accrual Accounting Adoption of the Jordanian Public Sector .	217
Moawiah Awad Alghizzawi <sup>1*</sup> , Rosnia Masruki <sup>1</sup> .....	217
The Effect of Professional Skeptisism, Auditor Expertise, and Integrity of Audit Quality.....	224
Ruci Arizanda Rahayu <sup>1*</sup> , Sarwenda Biduri <sup>1*</sup> , Mahardika D. Kusuma Wardana <sup>1*</sup> .....	224
E-Procurement and Effectiveness of Internal Controls on Fraud Prevention .....	231
Sarwenda Biduri <sup>1*</sup> , Wiwit Hariyanto <sup>1*</sup> , Ilmi Usrotin <sup>1</sup> .....	231
Usefulness of Accounting Information in Predicting Hedging Decision .....	234
Sustari Alamsyah <sup>1*</sup> , Triana Zuhrotun Aulia <sup>1</sup> .....	234
Religious Belief & <i>Halal</i> Cosmetic Products Consumption .....	241
Tanti Handriana <sup>1</sup> , Praptini Yulianti <sup>2</sup> , Ryan Bayu Permana <sup>3</sup> .....	241
Does Corporate Social Responsibility Disclosure Affect Profit Sharing Ratio? .....	246
Veni Soraya Dewi <sup>1*</sup> , Fritztina Anisa <sup>1*</sup> , Faqiatul Mariya Waharini <sup>1</sup> .....	246
Determination Analysis Affecting Intellectual Capital Disclosure and Its Effect on Market Performance and Cost of Equity Capital.....	252
Wawan Sadtyo Nugroho <sup>1*</sup> , Nia Kurniati Bachtiar <sup>1</sup> .....	252
TRACK HEALTH AND NURSING SCIENCE .....	261
The Effect of Assertive Behaviour Therapy towards Bullying Behavior in Adolescents .....	262
Chindy Maria Orizani <sup>1*</sup> , Dwi Yuniar Ramadhani <sup>2</sup> .....	262
Characteristics and Level of Knowledge of Newborn Baby Care in Pandemic Covid 19 .....	265
Devita Elsanti <sup>1*</sup> , Diyah Yulistika Handayani <sup>2</sup> .....	265
Risk factors for disease severity in paediatric patients with Covid-19: A literature review .....	269
Eka Oktavianto <sup>1</sup> , Gani Apriningtyas Budiyati <sup>2</sup> , I Made Moh. Yanuar Saifudin <sup>3*</sup> , Endar Timiyatun <sup>4</sup> , Aris Setyawan <sup>5</sup> .....	269
The Role of Self-Efficacy and Family Support in Improving the Quality Of Life of Patients with Hypertension ...	276
Erni Tri Indarti <sup>1*</sup> , Oktaffrasya Widhamurti <sup>2</sup> , Remita Yuli Kusumaningrum <sup>3</sup> .....	276
The Influence of Head Nurses Supervision on Discharge Planning Completeness .....	280
Etik Kustiati <sup>1*</sup> , Vivi Yosafianti Pohan <sup>2</sup> .....	280
Lemon and Rose Aromatherapy Reduce Blood Pressure in Preeclampsia during Pregnancy .....	284
Etika Purnama Sari <sup>1*</sup> , Dewi Andriani <sup>2</sup> .....	284



Phenomenology of Acceptance Process and Self Concept Changes of the Hernia Post-Surgery Clients in Kebumen Regency, Central Java Indonesia .....	288
Ike Mardiaty Agustin <sup>1</sup> , Doni Kurniawan <sup>2</sup> , Sawiji <sup>3</sup> .....	288
The Role of Family Support to Medication, Diet and Activity of Diabetic Patients .....	292
Indah Wulandari <sup>1,*</sup> , Kusnanto <sup>2</sup> , Sony Wibisono <sup>3</sup> , Dwi Abdul Aziz <sup>4</sup> .....	292
The Effectiveness of Giving Fe Tablet in Increasing Hemoglobin Levels in Adolescent at Vocational School of Swadaya Temanggung .....	297
Halimah Sarjiyati <sup>1</sup> , Luluk Rosida <sup>2,*</sup> .....	297
The Effect of Passive Physiotherapy on Hemodynamic Status of Patients with Head Injury: A Literature Review .....	300
Ni Luh Seri Astuti <sup>1</sup> , I Made Moh. Yanuar Saifudin <sup>2,7,*</sup> , Novida Prima Wijayanti <sup>3</sup> , Marsha Yoke Nancy <sup>4</sup> , Ahmad Firdaus <sup>5</sup> , Sri Setiyorini <sup>6</sup> .....	300
The Effectiveness of Cognitive Behaviour Therapy towards Hallucination Intensity in Skizofrenia Patients .....	312
Noviana Ayu Ardika <sup>1,*</sup> , Mohammad Fatkhul Mubin <sup>2</sup> .....	312
The Effect of Tuberculosis Event on the Self-Concept of Positive Pulmonary Tuberculosis and Negative Pulmonary Tuberculosis .....	316
Nurbaiti <sup>1</sup> , Meynur Rohmah <sup>2,*</sup> .....	316
An Overview of the Implementation of IMCI in Primary Health Community of Bantul and Yogyakarta City .....	320
Rahmah <sup>1,*</sup> .....	320
The Influence of Cervical Cancer Education on Cervical Cancer Prevention Behaviour in Women of Childbearing Age: a Literature Review .....	325
Riska Putri Miharja <sup>1</sup> , Enny Fitriahadi <sup>2,*</sup> .....	325
Family Support for Type 2 DM Patients in Controlling Blood Sugar levels in Kebonsari Surabaya .....	330
Rusdianingseh <sup>1,*</sup> , Difran Nobel Bistara <sup>2</sup> .....	330
Relationship Family Support with Menstrual Hygiene Behavior in Early Adolescents .....	333
Julita Kartrikasari Eka Pratiwi <sup>1</sup> , Sarwinanti <sup>2,*</sup> .....	333
Risk Factors of Stunting: A Literature Review .....	339
Sholihah Gustavia Yolanda <sup>1,*</sup> , Ellyda Rizki Wijhati <sup>2</sup> .....	339
Analysis of Education and Family Income Factors on Caregiver Burden in Elderly Care at Community Health Center of Perak Timur .....	345
Siti Aisyah <sup>1,*</sup> , Gita Marini <sup>2</sup> .....	345
Analysis of Diet Compliance in Patients with Diabetes Mellitus on the occurrence of complications in the Polyclinic in Nganjuk Regional Hospital .....	350
Sony Wahyu Tri Cahyono <sup>1,*</sup> , Laili Indana Lazulva <sup>2</sup> , Indah Permatasari <sup>3</sup> .....	350
Anti-Cancer Activity of Ants Nest Plant ( <i>Myrmecodia Pendans Merr. &amp; Perry</i> ) on Protein Transduction Signal Resistance Complex CDK-2-Cyclin-E and NF-Kb: Silico Molecular Docking Study .....	354
Ana Medawati <sup>1,*</sup> , Supriatno <sup>2</sup> , Sofia Mubarika <sup>3</sup> , Sitarina Widyarini <sup>4</sup> .....	354
Black Triangle Treatment with Non Surgeryaesthetic Restoration (Case Report) .....	358
Any Setyawati <sup>1,*</sup> .....	358
The Effect of Rosella Flower Tea Solution Onto Discoloration of Plate Heat Cured Acrylic Resin Base .....	361
Fransiska Nuning Kusmawati <sup>1,*</sup> , Tabitha Nurul Arifa <sup>2</sup> .....	361
Management of Dental Mobility with Combinations of Splinting And Jacket Crown .....	367
Hartanti <sup>1,*</sup> .....	367
Dental Service Time in the Implementation of Indonesia National Health Insurance Based on the Highest Dental Treatments At Primary Care .....	370
Iwan Dewanto <sup>1,*</sup> , Sharon Sesita Frinces <sup>2</sup> .....	370
The Oral Hygiene Level Of Dentistry School Female Students Using Fixed Orthodontics .....	374
Muhammad Shulchan Ardiansyah <sup>1,*</sup> , Rizki Adzhani Nur Shabrina <sup>2</sup> .....	374
Radix Anchor Post as Intracanal Retention in Porcelain Fused Metal Crown Restoration .....	378
Nia Wijayanti <sup>1,*</sup> .....	378
Correlation between Dental Behavior and Dental Caries Status (DMF-T) of Pendul Community Sedayu District Bantul Yogyakarta .....	381
Novitasari Ratna Astuti <sup>1,*</sup> .....	381
An Evaluation of the Training of Structured Feedback with 4c/Id Method in Clinic Advisors .....	385





Nyka Dwi Febria <sup>1,*</sup> , Mora Claramitha <sup>2</sup> , Widyandana <sup>3</sup> .....	385
Halal and Tayyib is The New Life Style of Food Consumption in Achieving Sustainable Development Goals ...	389
Arif Pujjiono <sup>1,*</sup> .....	389
Entrance and Exit Wound in Gunshot Death Cases at Forensic and Medicolegal Installation of Dr. Soetomo Hospital in 2019: Case Study .....	392
Desy Martha Panjaitan <sup>1,*</sup> , Ahmad Yudianto <sup>2</sup> , Ariyanto Wibowo <sup>3</sup> .....	392
Measuring Urban Self-Payers' WTP for the JKN-KIS Health Insurance: A Choice-Based Conjoint Approach ...	395
Fransiscus Rian Pratikto <sup>1,*</sup> Rika Teddy <sup>2</sup> .....	395
Level of Lipoprotein (a) as A Predictive Factor for Coronary Thrombus.....	400
Iin Novita Nurhidayati Mahmuda <sup>1,*</sup> .....	400
The Influence of Health Education (Health Promotion) Breast Self Examination (BSE) Against Behavior of BSE (Knowledge, Attitudes, and Action) Student of Madrasah Aliyah Ar-Raudlatul Ilimiyah Islamic Boarding School Kertosono in Early Detection of Breast Cancer .....	403
Lina Nur Hidayah <sup>1</sup> , Nurma Yuliyanasari <sup>2</sup> , Musa Ghufro <sup>3</sup> , Muhammad Anas <sup>4,*</sup> .....	403
Case Report: Misdiagnosis Case Of Nasopharyngeal Carcinoma in Patient with Chronic Rhinosinusitis: Family Doctors Awareness is Essential .....	408
Oke Kadarullah <sup>1,*</sup> .....	408
The Effectiveness of Iler Leaf ( <i>Plectranthus Scutellarioides</i> [L.] R.Br. <i>Folium</i> ) on the Healing Process (Diameter) Of Burn Injury Grade II A on White Mouse ( <i>Rattus Norvegicus</i> ) Wistar Strain.....	411
Wulandini Ayuning Dinda <sup>1,*</sup> , Kusumawinakhyu Titik <sup>2</sup> , Bahar Yenni <sup>3</sup> , Romdhoni Fadhol Muhammad <sup>4</sup> .....	411
Influence of Body Height on Central Motor Conduction Time Using Transcranial Magnetic Stimulation .....	415
Yetty Hambarsari <sup>1,*</sup> , Priyanka Ganesa Utami <sup>2</sup> , Rivan Danuaji <sup>3</sup> , Baarid Luqman Hamidi <sup>4</sup> , Subandi <sup>5</sup> , Sulistyani <sup>6</sup> .....	415
The Effect of <i>Phoenix Dactylifera Pollen</i> on Histology Liver of <i>Rattus norvegicus</i> Exposed with Air Fresheners.....	419
Yuningtyaswari <sup>1,*</sup> , Mega Silviana Dewi <sup>2</sup> .....	419
Comparison of Dominant and Non-Dominant Hemisphere Cortical Excitability Using Transcranial Magnetic Stimulation .....	425
Yetty Hambarsari <sup>1,*</sup> , Baarid Luqman Hamidi <sup>2</sup> , Rivan Danuaji <sup>3</sup> , Priyanka Ganesa Utami <sup>4</sup> , Sulistyani <sup>5</sup> .....	425



# TRACK ECONOMICS, LAW, EDUCATION, SOCIAL, AND HUMANITIES



# Characteristics and Level of Knowledge of Newborn Baby Care in Pandemic Covid 19

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## ABSTRACT

The mortality of newborn in Indonesia is still high. Therefore it needs interventions to decrease this prevalence . The Covid-19 pandemic caused some of people stay at home and it can caused primipara hard enough to get information and to get knowledge about newborn care. Primipara with low knowledge has higher risk of causing infants health problems, compared to those with high knowledge. To figure out the correlation between characteristics of primipara and knowledge level of newborn care in pandemic Covid-19. It was a quantitative research with cross sectional study design. It used total sampling technique with 33 respondents of primipara. The data of this study were obtained by using closed questionnaire based on inclusion criteria taken primiparous women having 40-day-old babies. Results of this study were analyzed using bivariate analysis with *Correlation of Product Pearson*. Primiparaos mother was characterized based on age, education, and occupation. Pearson Product Correlation analysis based on age characteristic obtained  $p\ value = 0.005 < 0.05$ , correlation between education of primipara and newborn care knowledge obtained  $p\ value = 0.000 < 0.05$ , correlation between job of primipara and newborn care knowledge obtained  $p\ value = 0.004 < 0.05$ . It can be stated that there was a correlation between characteristics of primipara and knowledge level of newborn care. There was a correlation between primipara characteristics and newborn care knowledge level. Nurses should be involved to share knowledge using media social such as whats-app counseling.

**Keywords:** Primipara, Newborn baby care, Pandemic Covid-19

## 1. INTRODUCTION

The world, including Indonesia, faces an unprecedented global health crisis triggered by the COVID-19 pandemic. This pandemic affects on several health activities, such as postpartum examinations which are usually carried out at Puskesmas (Public Health Center). After giving birth, mothers experience a period of crisis, for example the sustainability of the newborn welfare .

According to the results of the IDHS (Indonesian Health Demographic Survey) in 2012, the infant mortality rate in Indonesia was 32 per 1,000 live births, while Indonesia's target was 23 per 1,000 live births. The mortality rate in infants under 28 days of age is still quite high, reaching 50 percent of the total number of infant mortality cases. Those incidents are generally caused by breathing difficulties at birth (asphyxia), infections and complications of early birth and low birth weight.

United Nations Children's fund (UNICEF) in 2012 mentioned that most child deaths in Indonesia currently occur in the newborn period (neonatal), not the first month after birth. The neonatal mortality rate in 2012 worldwide is 21 neonatal deaths per 1,000 live births, while the neonatal mortality rate in Indonesia is 19 neonatal deaths per 1,000 live births <sup>1</sup>. Neonatal death which is triggered by the infants' disease usually can be overcome <sup>2</sup>.

Shivaleela P. U <sup>3</sup> from World Health Organization (WHO), reported that 6.9 million children under the age of five died in 2011. It is also conveyed that the highest risk

of death in children is during the neonatal period, namely the first 28 days of life. Safe delivery and effective neonatal care are essential to prevent these deaths. 43% of child deaths under five years of age occur in the neonatal period. More than 3 million babies die each year in their first month of life and an equal number are still born. Within the first month, a quarter to one half of all deaths occur within the first 24 hours of life, and 75% occur in the first week. 48 hours after birth is the most important period for the survival of the newborn. This is when mother and baby should receive further care to prevent and treat disease.

The aforementioned conditions can be overcome by complications which are the most common causes of death, namely asphyxia, low birth weight babies, and infections. Babies are very susceptible to disease because they do not have perfect immune power, therefore parents must pay attention to how to properly and comprehensively care for newborns <sup>4</sup>. Diseases suffered by babies are most commonly caused by bacteria and viruses that can come from inappropriate baby care <sup>4</sup>. Increasing efforts towards quality need to be emphasized to develop prenatal health, including care for newborns<sup>5</sup>.

The roles, duties, and responsibilities of parents started from pregnancy to when the baby is born. The parents should care their babies during these times, particularly when the baby is born. In the early period, parents must prioritize the relationship between the mother and the baby, that they should realize that the baby is helpless and dependent, so that she/he needs protection,



care and socialization which is marked by an intensive learning period and demands to care for him/her<sup>5</sup>.

However, it cannot be denied that the Covid 19 pandemic in Indonesia and all over the world has made pregnant women unwilling to check their health. They prefer stay at home. This study tried to find out the knowledge of mothers who care for newborns during the Covid 19 pandemic.

## 2. METHODS

This is a quantitative descriptive study using a quantitative approach. Data recording and processing of research results obtained were collected using Google form. The number of samples in this study was 33 respondents consisting of primiparous mothers who had babies aged 0 to 40 days.

## 3. RESULTS

The following are the results of the research which can be explained as follows:

### 3.1. Characteristics of Respondents

Table 3.1 Characteristics of Respondents

Characteristics of Respondents	Total (f)	Percentage (%)
<b>Age</b>		
< 20 Years old	4	12,1
20 – 35 Years old	27	81,8
> 35 Years old	2	6,1
<b>Education</b>		
SD (Primary School)	4	12,1
SMP (Junior High School)	12	36,4
SMA (Senior High School)	13	39,4
University	4	12,1
<b>Occupation</b>		
Not Working	25	75,8
Working	8	24,2
<b>Knowledge of Newborn Baby Care</b>		
Poor	8	24,2
Moderate	17	51,5
Good	8	24,2
<b>Total</b>	<b>33</b>	<b>100,0</b>

Based on table 4.1 it can be seen that there are 4 respondents (12.1%) whose age is less than 20 years old, 27 (81.1%) respondents whose age is between 20 - 35 years old. There are 13 people (39.4%) who were graduated from Junior High School. There are 25 people (75.8%) respondents who do not work.

### 3.2 The correlation between the Age of Primiparous Mothers and Knowledge of Newborn Care.

Table. 3.2. The Corellation between the Age of Primiparous Mother and Knowledge

Age	Knowledge of Newborn Care						Total		P Value
	Poor		Moderate		Good		F	%	
	f	%	F	%	F	%			
< 20 Years old	4	100,0	0	0,0	0	0,0	4	100,0	0,005
20 – 35 Years old	4	14,8	16	59,3	7	25,9	27	100,0	
> 35 Years old	0	0,0	1	50,0	1	50,0	2	100,0	

Based on table 3.2, it can be seen that there are 4 respondents (14.8%) between 20 - 35 years with poor knowledge of newborn care, 16 respondents (59.3%) with moderate knowledge of newborn care, and 7 respondents (25.9%) with poor knowledge of newborn care. From the results of the analysis of Spearman's Rank correlation data, it obtained p value = 0.005 ( $\alpha = 0.05$ ).

### 3.3. The Correlation between the Education of Primiparous Mother and Knowledge of Newborn Care

Table 3.3. The Correlation between the Education of Primiparous Mother and Knowledge of Newborn Care

Occupation	Knowledge of Newborn Care						Total		p value
	Poor		Moderate		Good		f	%	
	F	%	f	%	f	%			
Not working	8	32,0	1	56,4	3	12,0	2	100,0	0,00
Working	0	0,0	3	37,5	5	62,5	8	100,0	

Based on table 3.3. , it can be seen that respondents with high school education do not have poor knowledge of newborn care. Meanwhile, there are 11 respondents (84.6%) with moderate knowledge of newborn care, and 2 people (15.4%) with knowledge of good newborn. Based on the results of the Spearman's Rank correlation data analysis test, it obtained p value = 0.005 ( $\alpha = 0.000 < 0.05$ ).

### 3.4. The correlation between the Occupation of Primipara and Knowledge of Newborn Care

Table 3.4. The correlation between the Occupation of Primipara and Knowledge of Newborn Care

Based on table 3.4. it can be explained that 8 respondents (32.0%) who do not work have poor knowledge of newborn care, 14 respondents (56.0%) had moderate knowledge of newborn care, and 3 respondents (12.0%) had good knowledge of newborn care. The results of the analysis of Spearman's Rank correlation data obtained p value = 0,005 ( $\alpha = 0,004$ ).

## 4. DISCUSSIONS

### 4.1. The correlation between Age of the Mother with Primipara and Knowledge of Newborn Care

From the results of the study, it is found that the age of the respondents is between 20 - 35 years old, which means that most of the respondents are in the productive age. It means that this range of age is the safe age for pregnancy, childbirth, breastfeeding and baby care, so the level of maturity and strength of a person will be more mature in thinking and working<sup>7</sup>.

The age of young mothers in postpartum care will be different from those of older mothers. Surely, mothers who are over 35 years of age feel that caring for a newborn is physically tiring, while mothers younger than 20 years have limited experience with newborn care because they have not had the experience of their previous children. Therefore, the mother will be more worried about the condition of the baby. Then, the mother should be more active in seeking information about baby care, either from family or peers who already have experience caring for babies.

The study<sup>[3]</sup> found that there is a significant correlation between age and the characteristics of primiparous mothers in practicing newborn care used quantitative methods with a total sample of 100 primiparous mothers. The variables in this study were age, education, occupation, religion and income. The results of

Education	Knowledge of Newborn Care						Total		p value
	Poor		Moderate		Good		f	%	
	f	%	f	%	f	%			
SD	4	100,0	0	0,0	0	0,0	4	100,0	0,000
SMP	4	33,3	6	50,0	2	16,7	12	100,0	
SMA	0	0,0	11	84,6	2	15,4	13	100,0	
University	0	0,0	0	0,0	4	100,0	4	100,0	

the study stated that the age ranging from 18-30 years included in middle adulthood or the matured age to have babies. It is also found that mothers who are in the age range of 20-35 years have higher knowledge than those who are younger. Age also determines whether a person is easy to absorb information or not as stated in the theory<sup>[8]</sup>

The mother's age also determines her health because it relates to the conditions of pregnancy, postpartum and childbirth, as well as the ways to care for and breastfeed the baby. Mothers who are less than 20 years old are still immature and are not ready physically and socially to face pregnancy, postpartum, and to care for their newborn babies. While mothers aged 20-35 years are referred to as "adulthood" and are also called the reproductive period. When woman is in this range of age, it is hoped that they will be able to solve problems sedately

and unemotionally, especially in dealing with pregnancy, postpartum, and caring for the baby later<sup>[7]</sup>. Wiknjastro<sup>[9]</sup> states that when the woman is getting older, she will have more mature in her ways of thinking and working. Viewed from common belief, the more mature woman will have good knowledge. more than an immature woman. This is a result of her knowledge and maturity of her soul. As a person gets older, the knowledge and maturity will also increase. Similar to postpartum mothers, the older the mother is, the more knowledge the mother has about how to care the newborn.

### 4.2. Correlation between the Mother Education and the Knowledge of Newborn Care.

Based on the results of the study, it was found that most of the respondents, 13 people (39.4%), who were graduated from high school had moderate knowledge of newborn care.

Education means guidance given by someone to another in order to understand something. It cannot be denied that if persons have higher education, they will receive information easier, and in the end they will obtain and get the knowledge. Conversely, if a person has a low level of education, he/she will not take the newly introduced information and values easily<sup>[9]</sup>.

According to Nindya<sup>[10]</sup> someone with a high school graduate (SMA) has more knowledge than those who only graduated from primary school (SD or SMP). It happens because they gain more knowledge and learning experience. Then, mothers with high school graduates have moderate knowledge.

Hanifah<sup>[11]</sup> states that information obtained from both formal and non-formal education can have an immediate impact so that it can make changes or increase knowledge. A person's education level will have an effect in responding to something from outside. .

### 4.3. The correlation between the mother's occupation and the knowledge of newborn care

Based on the results of the study, it was found that most of the respondents, 25 people (75.8%), who do not work have moderate knowledge of newborn care. It was also found that the respondents who do not work are only housewives. However, it is possible that they can still get information although the information obtained does not necessarily mean that mothers understand it immediately. Eventually, the respondents on average only have moderate ability to care for their babies. .

According to Shivaleela. P. U<sup>[3]</sup>, the practice of primiparous newborns is believed that mothers are the first nurses to care for and fulfill the main needs of newborns as long as the babies are born. The sample in this study were 100 primiparous mothers.

According to Enok<sup>[13]</sup> on the results of research conducted at Dr. Soekarjo Tasikmalaya, it is mentioned that 64 primiparous mothers had a low level of knowledge. Primiparous mothers with lack knowledge must be influenced by several factors, namely internal factors and

external factors. There are also some factors affecting the mothers' knowledge such as age, education and occupation. In details, it is seen that the majority of mother, 109 people (86.51%) do not work, 85 people (67.46%) are 20-35 years old, and 56 people (44.44%) are primary school graduates..

Likewise with age and occupation, it is believed that when someone is older, he/she will have higher level of maturity and strength especially in their way of thinking and working. Viewed from the public belief, it is believed that more mature persons are trusted than the immature ones. Meanwhile, occupation itself is not the source of pleasure but it is boring, repetitive activities with many challenges. Working is an activity that takes up time so that working for mothers will affect the family life.

## AUTHOR'S CONTRIBUTION

This research conducted and give information to got knowledge during pandemic COVID19 especially prniparouse women

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# Risk factors for disease severity in paediatric patients with Covid-19: A literature review

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## ABSTRACT

Cases of COVID-19 reported in children are quite small compared to the total number of cases in the population. Clinical features in children are unclear and asymptomatic. The World Health Organization (WHO) has emphasized that one of the most important questions to address regarding the COVID-19 pandemic is to understand risk factors for disease severity. There has been some literature published, but studies that specifically review risk factors for disease severity of COVID-19 infection in children are still lacking. The present work aimed to identify risk factors that increase the severity in paediatric patients with COVID-19. We conducted a literature review of available evidence through 3 journal databases, including PubMed, EBSCO and ScienceDirect. Searching process was performed by main search terms, including “(Children OR Infant) AND (Risk factor OR Predisposing Factor) AND (COVID-19 OR SAR-CoV-2)”. Quality of each study was assessed by Crowe Critical Appraisal Tool (CCAT). We identified a total of 6 studies, with retrospective cohort study, case series study, case control study and RNA sequencing design. The sample size was ranged from 8 to 582 people. There were 4 risk factors that affect the disease severity including age, history of respiratory disease, obesity, cigarette exposure. Against mixed results, more research should be done on identifying comorbidities associated with disease severity in paediatric patients.

**Keywords:** children, paediatric, Covid-19, severity, risk factors

## 1. INTRODUCTION

In December 2019, the 2019 coronavirus disease outbreak (COVID-19) caused by severe acute respiratory syndrome related to coronavirus-2 (SARS-CoV-2) occurred in Wuhan, Hubei Province, China. According to COVID-19 Dashboard by the Center for Systems Science and Engineering (CSSE) at Johns Hopkins University (JHU), this plague then transformed into a pandemic, and is a global health and economic disaster on a massive scale. To date, more than 16 million people worldwide have been infected with COVID-19, resulting in more than 830,000 deaths, with regional mortality rates ranging from less than 1% to 12% (JHU, 2020; Li et al. 2020).

Two preliminary observational studies from the province of Wuhan, China, reported that infants and children experience less severe COVID-19 than adults. A data report from the Chinese center for disease control and prevention noted that only 1.3% of the 72314 patients diagnosed with COVID-19 were younger than 20 years. Another study reported, of the 171 children under 16 who were treated in Wuhan province, only 3 were admitted to the intensive care unit (ICU), and 1 (one) of those children died. The overall disease severity in children is reported to be significantly less than in adults (Lu et al. 2020; Wu and McGoogan 2020).

Usually, COVID-19 in children is asymptomatic or accompanied by minimal sub-clinical symptoms. Of the 10

sick children, symptoms include fever at 6 years of age, sore throat at 4 years of age, rhinorrhea (runny nose, nasal congestion), defecation disorders and vomiting. Fever and other symptoms pass fairly quickly. Often times, children have a fever for 2-4 days, although in some cases it may be a week or longer (Pan et al. 2020; Stockman et al. 2007; Wang et al. 2020).

The number of COVID-19 cases reported in children is quite small compared to the total number of cases in the general population. As of February 20, 2020, 2.4% of the 75,465 confirmed and suspected cases in China occurred among people under 19 years of age. An analysis carried out in a major city in southern China suggests that among all cases of the disease, the proportion of children under the age of 15 may increase from 2% to 13% from the start to the end of the epidemic outbreak. Of the cases reported to date in China, the majority of children have had contact with family members with confirmed COVID-19 (Shen et al. 2020).

Disease severity is a very important parameter for understanding this new disease. However, it has been reported that it is quite difficult to estimate the risk of increasing case severity accurately, because the severity of pediatric cases is so low that diagnosis and mortality rates are very low (Zhou et al. 2020).

Although widespread throughout the world, little is known about risk factors for increased severity or death in children. In this study, we aimed to explore the risk factors that lead to increased severity in pediatric patients. There has

been some literature published in the world, but as far as the researcher has insight into, studies that specifically review what risk factors lead to increased severity due to COVID-19 infection in children are still not available. The results of this literature study can increase the capacity and efficiency of the health team in minimizing the increase in the severity of COVID-19 infection in children.

## 2. METHODS

This research is a literature review which is a review of various original research. The strategy to search for articles is to determine the search term based on the PEO (Population, Exposure and Outcome) method. The PEO structure used is Population: children OR infant, exposure: risk factor OR predisposing factor, and outcome: COVID-19 OR SARS-CoV-2. Based on the PEO, the search terms are “(children OR infant) AND (risk factor OR predisposing factor) AND (COVID-19 OR SARS-CoV-2)”.

The search was carried out on 3 journal databases, namely PubMed, Proquest and ScienceDirect. The articles taken were only those published in English, peer-reviewed, and within the last 1 year. From the articles obtained, then screening was carried out by reading titles, keywords and abstracts and articles that had inclusion criteria, namely: a) the aim is to assess the risk factors for an increase in the severity of COVID-19 in children, b) the study design was observational. While the exclusion criteria were research with a qualitative design, literature review, not original research.

The selection of articles was carried out independently by 5 researchers by first conducting a critical review of the article using the Crowe Critical Appraisal Tool (CCAT) to determine the feasibility of the article content. At first, the critical review process of the article was carried out by 3 independent researchers, and the same score was obtained. Then these results were discussed in a panel with 2 other researchers and it was agreed that the final score.

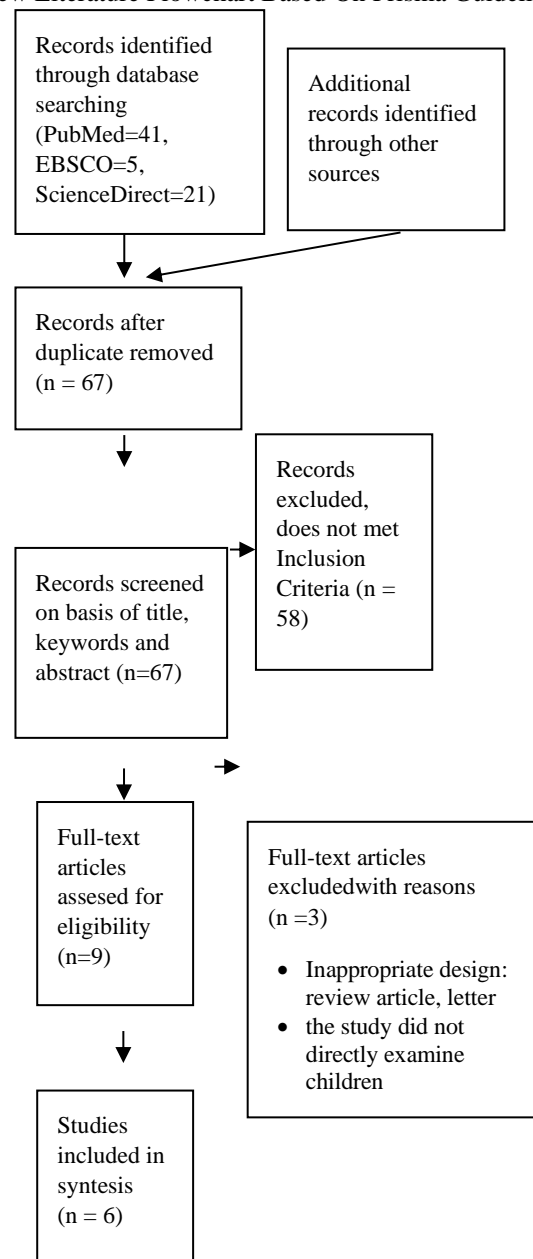
Data extraction was also independently carried out by 5 researchers. The results of the independent extraction were first collected which was then followed by a panel discussion on the important findings in each article, including the characteristics of the sample, measurement of sample severity and results in the form of risk factors/comorbidities. At the end of the panel discussion, the researcher combined all the results of data extraction into one into a synthesis table that helps researchers systematically determined conclusions. The extraction results are shown in table 2.

## 3. RESULTS

Literature searched from the PubMed, Proquest and ScienceDirect databases with the limitation of articles published in peer-reviewed English and in the last 1 year, obtained 67 articles, then screened based on titles, keywords and abstracts to get 9 articles. From a total of 9 articles, the researcher made a selection based on full text and resulted in 3 articles that were excluded due to inappropriate designs, namely in the form of reviews and letters and the study did not directly examine child respondents. Based on this process, 6 articles were included and were used as the main source.

The flow of the search process that we have carried out has been outlined in a flow diagram based on the Preferred reporting items for systematic review and meta-analyze (PRISMA) 2009 Flow Diagram (Liberati et al. 2009).

Review Literature Flowchart Based On Prisma Guidelines



### 3.1. Study Characteristics

Based on the data extraction, the characteristics of the study area were obtained, including the America, Asia, Australia and Europe. All articles are published in 2020, with a research design consisting of retrospective cohort studies, case series studies, case control studies and analysis of RNA sequences. Sample sizes ranged from 8 to 582 people.

In addition, several risk factors were obtained related to the worsening of COVID-19 in children, which are shown in table I below.

Table I. Risk Factor for Disease Severity



No	Risk Factors	Sources
1	Age (<6 months)	(Göttinger et al. 2020; Radzikowska et al. 2020; Parri et al. 2020)
2	History of Respiratory Disease	(Ibrahim et al. 2020; Y. Wang et al. 2020)
3	Obesity	(Radzikowska et al. 2020; Chao et al. 2020)
4	Cigarette Exposure	(Radzikowska et al. 2020)

## Articles Data Extraction

No.	Title/Authors	Country	Design	Participants	Result
1.	COVID-19 in children and adolescents in Europe: a multinational, multicentre cohort study  (Göttinger et al. 2020)	25 European countries, including Austria, Belgium, Bulgaria, Croatia, Denmark, Estonia, Germany, Greece, Hungary, Ireland, Italy, Lithuania, Norway, Portugal, Slovakia, Slovenia, Spain, Sweden, Switzerland, Turkey, the UK, Netherlands, Moldova, Ukraine, and Russia.	Multicentre cohort study	582 individuals younger than or equal to 18 years of age were infected with SARS-CoV-2 (confirmed PCR).	In the multivariate analysis, the factors associated with worsening disease and admission to the ICU were children less than 1 month old and a history of previous respiratory disease.
2.	SARS-CoV-2 testing and outcomes in the first 30 days after the first case of COVID-19 at an Australian children's hospital  (Ibrahim et al. 2020)	Melbourne, Australia	Retrospective cohort study	Patients aged 0–18 years who were recorded attended the ER and Respiratory Infection Clinic (RIC) and had tested for SARS-CoV-2.  Of the 433 children tested, 4 children tested positive for SARS-CoV-2.	The results showed that the comorbidity in children who were positive for SARS-CoV-2 was asthma, while the risk factors were direct contact with previous sufferers and trips abroad.
3.	Children hospitalized with severe COVID-19 in Wuhan  (Y. Wang et al. 2020)	Wuhan, China	A retrospective case-control study	8 out of 260 children were diagnosed with SARS-CoV-2.	More than 3 lung segments that develop pneumonia are associated with a greater risk for developing severe COVID-19 in children. In addition, elevated IL-6, total bilirubin and D-dimer by univariable analysis could identify the patient to be severe earlier.
4.	Distribution of ACE2, CD147, CD26 and other SARS-CoV-2 associated molecules in tissues and immune cells in health and in asthma, COPD, obesity, hypertension, and COVID-19 risk factors  (Radzikowska et al. 2020)	Multi country	RNA sequencing and explored available RNA-Seq databases to study gene expression and co-expression of ACE2, CD147	53 DNA sequences of pediatric COVID-19 positive patients.	age, sex, obesity and smoking, as well as with disease status can all contribute to patterns of morbidity and severity of COVID-19.

			(BSG), CD26 (DPP4).		
5.	Characteristic of COVID-19 infection in pediatric patients: early findings from two Italian Pediatric Research Networks  (Parri et al. 2020)	Italy	Descriptive case series study	130 children with confirmed COVID-19	Infants under 6 months have a significant risk of worsening the disease.
6.	Clinical Characteristics and Outcomes of Hospitalized and Critically Ill Children and Adolescents with Coronavirus Disease 2019 at a Tertiary Care Medical Center in New York City  (Chao et al. 2020)	New York, USA	Retrospective study	67 children with confirmed COVID-19	The results showed that the risk factors for disease worsening occurred in obese children.

The 6 selected articles were assessed for quality using the Crowe Critical Appraisal Tool (CCAT). CCAT assessment was carried out by looking at the points for each category and calculating the total score obtained from the eight categories. The total score generated was converted by referring to the manual provided. Based on the CCAT results in the 6 articles, the total score of 29 (73%), 29 (73%), 28 (70%), 28 (70%), 28 (70%), 28 (70%) and 28 (70%). The provisions in each assessment category were closer to the maximum score (score 5) where the closer to the maximum score for each point being assessed, the better the results will be. Therefore, it can be concluded that the six articles obtained were good articles.

#### 4. DISCUSSION

##### 4.1. Obesity

Several published research results indicate that patients infected with COVID-19 who are obese or a body mass index of more than 30 will tend to worsen. From several main literatures that have been collected using predetermined keywords, there are 2 literatures mentioned that obese children will tend to experience worsening compared to children who have a normal body mass index if infected with COVID-19.

This was explained by Hussain et al. (2020), that there are findings that show COVID-19 patients who are obese regardless of age, sex, and other comorbidities, will tend to require intensive care, requiring treatment in the ICU.

The problem that often arises that requires them to be treated in intensive care is the high risk of respiratory failure. In addition, individuals who are overweight have a lower lung function capacity than individuals with normal weight. Hypoventilation conditions that occur will worsen the condition of the COVID-19 patient. When an infection occurs that affects the lungs and respiratory system, it will be worse for obese patients than in individuals with normal lung function capacity. The ability of the immune system in obese individuals is lower than individuals with normal nutritional status (Huang et al. 2020).

Explanation from Andersen, Murphy, and Fernandez (2016), that being overweight will change the cytokine response which ultimately decreases the response of cytotoxic cells when a virus or allergen is present. In addition, obese individuals are often associated with hormonal imbalances and impaired metabolic function and immunity. This increases the individual's risk for metabolic disease and infection. More metabolic diseases will be experienced by obese individuals, such as: Diabetes mellitus, Hypertension, and cardiovascular disease.

Hussain et al. (2020), said that death in COVID-19 patients who are obese is closely related to other comorbid diseases such as diabetes, hypertension, heart disease and other diseases that arise due to obesity.

In obese individuals, more adipose tissue mass is formed than non-obese individuals. This adipose tissue is the site for the expression of ACE 2 receptors. The connection with COVID-19 infection is that ACE 2 is a co-receptor of the corona virus. Therefore, obese patients will be at risk of experiencing a more severe Covid infection than Covid patients whose nutritional status is normal (Li et al. 2020).

Hussain et al. (2020), adding his explanation as a conclusion from his research, namely that the comorbidity and mortality in COVID-19 patients who are obese are related to the immune system, metabolic disorders, hormonal imbalances, respiratory and cardiovascular functions that are not optimal.

##### 4.2. History of Respiratory Disease

A history of illness or problems with the function of the respiratory system contributes to the worsening of COVID-19 patients. The results of searching the literature using predefined keywords found 2 main articles discussing this subject.. The results of this study convey that a history of diseases in the child's respiratory system will worsen their condition when infected with COVID-19. This matter is also supported by other supporting literature which also discusses the relationship between the two.

Inhaled corticosteroid drugs, which are commonly used by people with respiratory problems such as asthma, allergic

rhinitis, and other COPD diseases, also have an effect on the incidence of severity of COVID-19 infection. Panettieri et al. (2020) stated that inhaled corticosteroids cause a decrease in the expression of Angiotensin-converting enzyme (ACE) 2 as a co-receptor for SAR-CoV-2. ACE 2 is found on the surface of human body cells, especially in the lungs, respiratory tract, heart and intestines. The SARS-Cov virus can enter and invade host cells by binding to ACE 2 as its receptor.

Camiolo et al. (2020), stated that in severe acute respiratory syndrome caused by viral infection, there is a decrease in blood eosinophil and an increase in the expression of ACE2 receptors in the bronchial epithelium. In addition, Peters et al. (2020) found that there was an increase in ACE2 in patients with COVID-19 and this was related to the worsening of the disease. By using inhaled corticosteroids, covid patients who experience asthma will have less severity.

However, on the other hand, there are other effects of inhaled corticosteroids, namely reducing the ability of the immune system to function. In addition, the side effects of corticosteroids can also inhibit the rate of clearing the SARS virus from the human respiratory tract, hence it can worsen the condition of patients infected with COVID-19. These two things will increase the susceptibility to infection and worsen when a COVID-19 infection occurs (Panettieri et al. 2020).

Several studies have conveyed the unclear link between Asthma and the worsening condition of COVID-19 infection. COVID-19 patients who have a history of asthma, even though they have reduced lung function, have less effect on worsening of the condition compared to COVID-19 patients who do not have asthma. Asthma tends to be associated with a much less severe degree than chronic obstructive pulmonary disease or cardiovascular disease (Panettieri et al. 2020).

The results of a meta-analysis conducted by Lippi and Henry (2020), show that there is a significant increase in the risk of worsening, which is 5 times in people with Covid-19 who have a history of COPD. The same thing was conveyed from the results of research conducted by Alqahtani et al. (2020), that although reports regarding the prevalence of COPD in Covid patients are still few, it is closely related to the severity and mortality of sufferers. He also added that active smoking has a risk of developing more severe complications and a higher mortality rate.

### 4.3. Cigarette Exposure

Cigarette smoke is one of the risk factors for diseases associated with infections of the respiratory tract and can increase the prevalence of Tuberculosis (TB), SARS-CoV and SARS-CoV-2. COVID-19 which can cause pneumonia and respiratory disorders and even death. The results of the systematic review show that smoking is one of the factors that can accelerate the severity of COVID-19 (Nugraha et al. 2020; Jiang, Chen, and Xie 2020).

Research shows that, compared to nonsmokers, having a smoking history can substantially increase the likelihood of adverse health outcomes for COVID-19 patients, including being admitted to intensive care, requiring mechanical ventilation, and suffering severe health consequences (Vardavas and Nikitara 2020).

The home environment is often the place where children

and adults are most exposed to second-hand smoke. Children are especially vulnerable to exposure to secondhand smoke, which has been shown to increase the risk of lower respiratory tract infections, asthma, middle ear disease and other debilitating health conditions. Children who are exposed to secondhand smoke also tend to suffer from more severe symptoms of respiratory tract infections (such as COVID-19, a respiratory infection is a form of viral pneumonia) (DiFranza et al. 2012).

In addition, exposure to third-hand smoke in the home may increase. Third-hand cigarette smoke is a persistent residue that results from tobacco smoke that accumulates in dust, objects, and household surfaces where tobacco has been used and re-emitted into the air. Children are exposed to toxic third-hand smoke through inhalation, ingestion, and skin transfer (Matt et al. 2011; Jacob et al. 2017; Mahabee-Gittens, Merianos, and Matt 2018).

### 4.4. Age

There is no data that can explain with certainty the impact of Covid 19 on the health conditions of children/babies. Based on data that occurred in Wuhan, it was found that no severe cases were found in children aged less than 15 years. The majority of symptoms that occur in children are mild to moderate symptoms. However, even so, health workers in the pediatric field still have to be vigilant and pay more attention to handling children because the immune system is still developing (De Rose et al. 2020).

Although several studies have found that children (infant) who contracted COVID-19 do not show severe symptoms, further studies are needed. From this study, it was reported that in infant children, COVID-19 can be detected positive by looking at some of the symptoms shown, including fever and cough. On average, the infant is exposed to direct contact with caregivers or parents who are also exposed to COVID-19. Infant patients whose samples were studied in this study showed high viral loads, even though they showed mild symptoms (Mithal et al. 2020).

Symptoms in neonatal infections generally show milder symptoms than those in adults which cause a high mortality rate. However, these mild symptoms or even no symptoms also cause difficulties for early detection and prevention of transmission (Zhang et al. 2020).

## 5. CONCLUSION

The results shown by this study can provide an overview for practitioners, policy makers, and the general public in carrying out the best care for children during a pandemic like today. This study highlights what factors can increase the risk of worsening the disease in children infected with COVID-19. Therefore, health workers and parents need to be more vigilant if their children have a situation like the one discussed in the discussion section.

This study has several limitations, including the number of respondents who are quite few in each article discussed. As the number of infected children is quite rare, the samples required are sometimes difficult to obtain. In addition, studies that specifically assess the risk factors for disease worsening



in children with SARS-CoV-2 are still lacking, therefore the researcher suggest conducting further studies, so as to provide greater evidence-based insights.

The risk factor for the disease severity in children infected with COVID-19 is necessary evidence because children are a vulnerable group in a population. This review found 4 risk factors that need attention, including age (<6 months), history of respiratory disease, obesity and cigarette exposure.

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