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[HOME](#)[PREFACE](#)[ARTICLES](#)[AUTHORS](#)[ORGANIZERS](#)[PUBLISHING INFORMATION](#)Series: *Advances in Health Sciences Research*

## Proceedings of the 1st Tarumanagara International Conference on Medicine and Health (TICMIH 2021)

The 1st Tarumanagara International Conference on Medicine and Health (TICMIH) 2021 was held by Consortium of Health Science of LLDIKTI Region III collaborated with Untar Institute of Research & Community Engagement (LPPM Untar). It was held online from August 5 to 6, 2021, using Zoom Platform.

The conference brought a topic about "Challenges and Opportunities for Overcoming Infectious Diseases in the 21st Century." The keynote speakers at this conference were Professor Tania Sorrell, MD, Ph.D, from the University of Sydney, Australia (subtopic: Global trends in emerging infectious diseases – How to manage them) and Dr. dr. Erni J. Nelwan, Sp.PD, Ph.D, from the University of Indonesia (subtopic: Emerging infectious diseases in Indonesia: Where are we now?).

This conference facilitated lecturers, students, and researchers to publish their articles in indexed international proceeding. The scope of the articles included but was not limited to the following: Medicine, Health, Public Health, Infectious Disease & Tropical Medicine, Community Medicine, Dentistry, Pharmacy, Nursing, Nutrition, Obstetrics, and Clinical Psychology.

Articles submitted to TICMIH 2021 was reviewed by expert reviewers before being presented. The results of those reviewed articles were later be further reviewed to be published according to the scientific publication standard criteria and requirements.

TICMIH 2021 Organizing Committee would like to thank Prof. Dr. Agus Setyo Budi, M.Sc, as the Head of Administration of LLDIKTI Region III at Ministry of Education and Culture of the Republic of Indonesia; Prof. Dr. Agustinus Purna Irawan as the Rector of Tarumanagara University; Ir. Jap Tji Beng, Ph.D. as the Head of LPPM Untar; Dr. dr. Saelan Tadjudin, Sp.KJ as the Dean of Untar Medical Faculty; Dr. dr. Meilani Kumala, MS., Sp.GK(K); Chairperson, members, and PIC of Consortium of Health Science of LLDIKTI Region III; TICMIH 2021 Organizing Committee; the Authors included in this proceeding; and all parties who contributed to this conference.

Jakarta, November, 2021

Organizing Committee

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### Bibliographic information:

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## Proceedings of the 1st Tarumanagara International Conference on Medicine and Health (TICMIH 2021)

---

[HOME](#)

---

[PREFACE](#)

---

[ARTICLES](#)

---

[AUTHORS](#)

---

[ORGANIZERS](#)

---

[PUBLISHING INFORMATION](#)

---

167 authors

- Abdiwijoyo, Mario** Phytochemical Screening and Total Antioxidant Capacity of Marigold Leaf Extract (*Tagetes Erecta* L.)
- Agustina, Yesyka** Absolute Eosinophil Count as a Marker for Sepsis Diagnosis
- Allida, Vencie B.** Problematic Smartphone Use and Problematic Internet Use: The Two Faces of Technological Addiction
- Amanda, Jennifer** The Relationships of Self-Compassion and Stress Among Emerging Adults Experiencing Early Adult Crisis
- Apriani, Irene** The Relationship Between Expressive Suppression and Problematic Smartphone Use
- Ardi, Imma Yedida** Mechanism Distress Tolerance Driven Smoking Addiction Behavior Among Indonesian Adults
- Balila, Jolly S.** The Role of Child Maltreatment and Tendency to Juvenile Delinquency in Late Adolescents
- Batobara-Yap, Mary Jane** The Role of Child Maltreatment and Tendency to Juvenile Delinquency in Late Adolescents
- Boentario, Frisca Priscilia** The Mediating Role of Depression between Childhood Trauma and Intimate Partner Violence
- Botabara-Yap, Mary Jane** Effect of a Lifestyle Medicine Program to Reduce the Risks of Cardiovascular Disease Among Young Male Adults in a Chosen Residential School in the Philippines
- Charissa, Olivia** Association of Nutritional Status with Diabetes Mellitus and Hypertension in the Elderly
- Chris, Arlends** Anxiety and Sleep Quality Among Medical Students in Indonesia During the COVID-19 Pandemic
- Chris, Arlends** Risk Factors Analysis with Anxiety Among Medical Students in Indonesia During COVID-19 Social Restrictions
- Chris, Arlends** Review and Prospect of Mindfulness-based Art Therapy in Reducing Symptoms of Depression in Cancer Patients
- Christanty, Cindy Arlinda** Grit and Socio-Demographic Characteristics Among Women with Polycystic Ovary Syndrome (PCOS)
- Christian, David** Association Between Physical Activity and Sleep Quality in Students of Tarumanagara Medical University
- Condinata, Frida** Psychological Distress among Emerging Adults: A Descriptive Study
- Dewanto, Naomi Esthernita Fauzia** Distance Learning on Paediatrics Clerkship:
- Dewi, Fransisca I. R.** The Role of Child Maltreatment and Tendency to Juvenile Delinquency in Late Adolescents
- Dewi, Fransisca I. Roemala** How Psychoeducational Intervention Effects on Burden in Caregivers of Schizophrenia: A Systematic Literature Review

Dewi, Fransisca I. Roesmala	Father Involvement in Parenting Talented Autistic Adolescents
Dewi, Fransisca I.R.	The Mediating Role of Depression between Childhood Trauma and Intimate Partner Violence
Dewi, Fransisca Iriani R	Grit and Socio-Demographic Characteristics Among Women with Polycystic Ovary Syndrome (PCOS)
Dewi, Fransisca Iriani R.	Adolescent Mental Health Disorders During the Covid-19 Pandemic
Dewi, Fransisca Iriani Roesmala	Self-Identity and Needs of Cosplayer in Role Playing
Dinatha, Vienchenzia Oeyta Dwitama	Self-Identity and Needs of Cosplayer in Role Playing
Eka, Ni Gusti Ayu	Effectiveness of Deep Breathing Relaxation and Music Therapy as a Pain-Reducing Intervention in Post-Caesarean Section Patients
Elizabeth	Phytochemical Screening and Total Antioxidant Capacity of Methanolic-Extract of Kembang Bokor Roots ( <i>Hydrangea Macrophylla</i> )
Emelda, Risti	Factors Influencing Adherence to Tuberculosis Treatment Among Patients in UPTD Puskesmas Muaradua and UPTD Puskesmas Buay Pemaca Ogan Komering Ulu Selatan
Eugenea, Priska	The Childhood of Workaholic Managers and Professional Workers
Fahditia, Amala	Applied Behavior Analysis Interventions on Children with Autism Spectrum Disorder in Indonesia: A Proposal for Systematic Review and Meta-Analysis
Farah, Fransiska	Distance Learning on Paediatrics Clerkship:
Ferdinal, F.	Phytochemicals Profiling and Total Antioxidant Capacity of Cinnamon Bark Extract ( <i>Cinnamomum burmanii</i> )
Ferdinal, F.	Phytochemical Screening and Total Antioxidant Capacity of Marigold Leaf Extract ( <i>Tagetes Erecta</i> L.)
Ferdinal, F.	Phytochemical Screening, Total Antioxidant Capacity, and Toxicity Test of Basil Leaf Extract ( <i>Ocimum x africanum</i> Lour).
Ferdinal, Frans	Methanolic Extracts of Rose Flowers ( <i>Rosa chinensis</i> Jacq.): Phytochemical Evaluation and Total Antioxidant Capacity
Ferdinal, Frans	Phytochemical Screening, Total Antioxidant Capacity and Toxicity Test of White Jasmine Flower Extract ( <i>Jasminum sambac</i> )
Ferdinal, Frans	Phytochemical Screening and Total Antioxidant Capacity of Methanolic-Extract of Kembang Bokor Roots ( <i>Hydrangea Macrophylla</i> )
Frisca	Association of Nutritional Status with Diabetes Mellitus and Hypertension in the Elderly
Gunawan, Shirly	The Relationship Between Knowledge and Medication Adherence in Hypertensive Patients: A Cross-Sectional Study in Gunung Putri Hospital Purwakarta
Gunawan, Shirly	Factors Influencing Adherence to Tuberculosis Treatment Among Patients in UPTD Puskesmas Muaradua and UPTD Puskesmas Buay Pemaca Ogan Komering Ulu Selatan
Gunawan, Shirly	The Relationship Between Knowledge and Medication Adherence in Diabetes Mellitus Patients in Toboali Hospital, South Bangka Selatan
Hadinata, Christine	The Role of Perceived Social Support Towards Stress in Early Adulthood During Pandemic Covid-19
Hapsara, Astri Anggraini	Father Involvement in Parenting Talented Autistic Adolescents
Haryanto, Suryanti	Absolute Eosinophil Count as a Marker for Sepsis Diagnosis

Hendrawan, Siufui	Severe COVID-19 Treatment Using Hypoxic-Mesenchymal Stem Cell Secretome: A Case Report
Heng, Pamela Hendra	Stress Related Wound Care Management during the COVID-19 Pandemic: Improving Outcomes through Kaki Diabet Indonesia Telemedicine
Heng, Pamela Hendra	Does Friendship Matter for Children with Autism Spectrum Disorder? Peer-mediated Intervention to Promote Social Competence: Review and Recommendation
Heng, Pamela Hendra	Effect of a Lifestyle Medicine Program to Reduce the Risks of Cardiovascular Disease Among Young Male Adults in a Chosen Residential School in the Philippines
Hertanto, Melina	Absolute Eosinophil Count as a Marker for Sepsis Diagnosis
Hervika, Lia	Emotional Expressiveness Among Women Who Experienced Domestic Violence
Herwanto	Distance Learning on Paediatrics Clerkship:
Herwanto, Velma	Absolute Eosinophil Count as a Marker for Sepsis Diagnosis
Hidayat, Niko Azhari	Stress Related Wound Care Management during the COVID-19 Pandemic: Improving Outcomes through Kaki Diabet Indonesia Telemedicine
Hong, Vicky	Risk Factors Analysis with Anxiety Among Medical Students in Indonesia During COVID-19 Social Restrictions
Jayanto, Endriansah	The Role of Fathers' Parenting Stress and His Parenting Styles on Behavior Problems in Children During the Covid-19 Pandemic
Juma, Mahlon	Mechanism Distress Tolerance Driven Smoking Addiction Behavior Among Indonesian Adults
Kartika, Ronald Winardi	Stress Related Wound Care Management during the COVID-19 Pandemic: Improving Outcomes through Kaki Diabet Indonesia Telemedicine
Kartika, Ronald Winardi	Severe COVID-19 Treatment Using Hypoxic-Mesenchymal Stem Cell Secretome: A Case Report
Kawi, Jeffrey Saputra	Phytochemicals Profiling and Total Antioxidant Capacity of Cinnamon Bark Extract ( <i>Cinnamomum burmannii</i> )
Koesma, Rismiyati E.	The Role of Fathers' Parenting Stress and His Parenting Styles on Behavior Problems in Children During the Covid-19 Pandemic
Koesma, Rismiyati E.	Humanization of Humans Through Altruism:
Kristanto, Eko	Distance Learning on Paediatrics Clerkship:
Kumala, Meilani	Association of Nutritional Status with Diabetes Mellitus and Hypertension in the Elderly
Kurniawati, Vera	Severe COVID-19 Treatment Using Hypoxic-Mesenchymal Stem Cell Secretome: A Case Report
Limanan, David	Methanolic Extracts of Rose Flowers ( <i>Rosa chinensis</i> Jacq.): Phytochemical Evaluation and Total Antioxidant Capacity
Limanan, David	Phytochemicals Profiling and Total Antioxidant Capacity of Cinnamon Bark Extract ( <i>Cinnamomum burmannii</i> )
Limanan, David	Phytochemical Screening and Total Antioxidant Capacity of Marigold Leaf Extract ( <i>Tagetes Erecta</i> L.)
Limanan, David	Phytochemical Screening, Total Antioxidant Capacity and Toxicity Test of White Jasmine Flower Extract ( <i>Jasminum sambac</i> )
Limanan, David	Phytochemical Screening, Total Antioxidant Capacity, and Toxicity Test of Basil Leaf Extract ( <i>Ocimum x africanum</i> Lour).



<b>Limanan, David</b>	Phytochemical Screening and Total Antioxidant Capacity of Methanolic-Extract of Kembang Bokor Roots ( <i>Hydrangea Macrophylla</i> )
<b>Lontoh, Susy Olivia</b>	The Association Between Physical Activity with the Nutritional Status of Student in Faculty of Medicine Tarumanagara University in 2019-2020
<b>Lontoh, Susy Olivia</b>	Association Between Physical Activity and Sleep Quality in Students of Tarumanagara Medical University
<b>Lukas, David Victorious</b>	Stress Related Wound Care Mangagement during the COVID-19 Pandemic: Improving Outcomes through Kaki Diabet Indonesia Telemedicine
<b>Lukas, David Victorious</b>	Severe COVID-19 Treatment Using Hypoxic-Mesenchymal Stem Cell Secretome: A Case Report
<b>Mantu, Melani Rahmi</b>	Distance Learning on Paediatrics Clerkship:
<b>Mar'at, Samsunuwijati</b>	TEACCH for Parents and Child with Autism Spectrum Disorder: A Review of the Literature
<b>Mar'at, Samsunuwiyati</b>	Autistic Children Parenting Stress
<b>Mar'at, Samsunuwiyati</b>	Loneliness of Z Generation Adolescents in the Covid-19 Pandemic: Descriptive Study
<b>Melissa</b>	Review and Prospect of Mindfulness-based Art Therapy in Reducing Symptoms of Depression in Cancer Patients
<b>Mergal, Beryl Ben</b>	The Relationship Between Expressive Suppression and Problematic Smartphone Use
<b>Munawar, Yemima Graciela</b>	The Association Between Physical Activity with the Nutritional Status of Student in Faculty of Medicine Tarumanagara University in 2019-2020
<b>Nirbayaningtyas, Rizky Bina</b>	Easy and Inexpensive Intervention for Parents? Physical Activity Interventions in Children with Autism Spectrum Disorder in Indonesia: Literature Review Study
<b>Noni</b>	TEACCH for Parents and Child with Autism Spectrum Disorder: A Review of the Literature
<b>Oktaviani, Deitra Rifqah</b>	The Relationship Between Knowledge and Medication Adherence in Hypertensive Patients: A Cross-Sectional Study in Gunung Putri Hospital Purwakarta
<b>Oktaviani, Felita</b>	The Effectiveness of Improvisational Music Therapy in Improving Communication and Social Interaction Skills in Children and Adolescents with Autism Spectrum Disorder: Systematic Review
<b>Ongah, Yola</b>	The Role of Child Maltreatment and Tendency to Juvenile Delinquency in Late Adolescents
<b>Pambudi, Wiyarni</b>	Distance Learning on Paediatrics Clerkship:
<b>Pangalila, Frans JV</b>	Absolute Eosinophil Count as a Marker for Sepsis Diagnosis
<b>Permana, Valencia Giovanni</b>	Loneliness of Z Generation Adolescents in the Covid-19 Pandemic: Descriptive Study
<b>Pertiwi, Inke Ayu</b>	Autistic Children Parenting Stress
<b>Prijatna, Zaida M.</b>	The Use of Art Therapy in the Treatment of Eating Disorders: A Systematic Review
<b>Puspitaningdyah, Furry</b>	Effectiveness of Deep Breathing Relaxation and Music Therapy as a Pain-Reducing Intervention in Post-Caesarean Section Patients
<b>Putri, Syahni Soraya</b>	Prevalence of Dating Violence in Late Adolescence
<b>Qlintang, Sandy</b>	Severe COVID-19 Treatment Using Hypoxic-Mesenchymal Stem Cell Secretome: A Case Report

Riana	Absolute Eosinophil Count as a Marker for Sepsis Diagnosis
Rodriguez, Donna Mae	Effect of a Lifestyle Medicine Program to Reduce the Risks of Cardiovascular Disease Among Young Male Adults in a Chosen Residential School in the Philippines
Roswiyani	The Effectiveness of Improvisational Music Therapy in Improving Communication and Social Interaction Skills in Children and Adolescents with Autism Spectrum Disorder: Systematic Review
Roswiyani, Roswiyani	The Childhood of Workaholic Managers and Professional Workers
Roswiyani, Roswiyani	The Relationships of Self-Compassion and Stress Among Emerging Adults Experiencing Early Adult Crisis
Roswiyani, Roswiyani	Social Support and Quality of Life on Online-Learning University Students
Roswiyani, Roswiyani	The Impact Between Quality of Life and Self Compassion on the Emergence of Depression Symptoms in University Students
Roswiyani, Roswiyani	Depression Among Healthcare Workers During the Covid-19 Pandemic
Sahrani, Riana	Adolescent Mental Health Disorders During the Covid-19 Pandemic
Sahrani, Riana	Criminality and Antisocial Behavior in Young Adult
Sahrani, Riana	The Role of Perceived Social Support Towards Stress in Early Adulthood During Pandemic Covid-19
Sahrani, Riana	Grit and Socio-Demographic Characteristics Among Women with Polycystic Ovary Syndrome (PCOS)
Sahrani, Riana	Father Involvement in Parenting Talented Autistic Adolescents
Salamah, Nurul	Depression Among Healthcare Workers During the Covid-19 Pandemic
Sandra, Lidia	Adolescent Mental Health Disorders During the Covid-19 Pandemic
Saputera, Monica Djaja	Risk Factors Analysis with Anxiety Among Medical Students in Indonesia During COVID-19 Social Restrictions
Sari, Alice Dian Permata	The Impact Between Quality of Life and Self Compassion on the Emergence of Depression Symptoms in University Students
Satiadarma, Monty P.	The Use of Art Therapy in the Treatment of Eating Disorders: A Systematic Review
Satiadarma, Monty P.	Psychological Distress among Emerging Adults: A Descriptive Study
Satiadarma, Monty P.	The Effectiveness of Improvisational Music Therapy in Improving Communication and Social Interaction Skills in Children and Adolescents with Autism Spectrum Disorder: Systematic Review
Satiadarma, Monty P.	Emotional Expressiveness Among Women Who Experienced Domestic Violence
Satiadarma, Monty P.	Prevalence of Dating Violence in Late Adolescence
Satiadarma, Monty P.	Review and Prospect of Mindfulness-based Art Therapy in Reducing Symptoms of Depression in Cancer Patients
Satyadi, Heryanti	How Psychoeducational Intervention Effects on Burden in Caregivers of Schizophrenia: A Systematic Literature Review
Satyadi, Heryanti	The Relationships of Self-Compassion and Stress Among Emerging Adults Experiencing Early Adult Crisis

Satyadi, Heryanti	Applied Behavior Analysis Interventions on Children with Autism Spectrum Disorder in Indonesia: A Proposal for Systematic Review and Meta-Analysis
Satyadi, Heryanti	Easy and Inexpensive Intervention for Parents? Physical Activity Interventions in Children with Autism Spectrum Disorder in Indonesia: Literature Review Study
Sekali, Maruli Pardamean Karo	Effectiveness of Deep Breathing Relaxation and Music Therapy as a Pain-Reducing Intervention in Post-Caesarean Section Patients
Septyadina, Ucitha	The Relationship Between Knowledge and Medication Adherence in Diabetes Mellitus Patients in Toboali Hospital, South Bangka Selatan
Silaban, Dorna Yanti Lola	Association of Nutritional Status with Diabetes Mellitus and Hypertension in the Elderly
Silaen, Eirene Adeleine	How Psychoeducational Intervention Effects on Burden in Caregivers of Schizophrenia: A Systematic Literature Review
Simatupang, Natasya Theresia	Methanolic Extracts of Rose Flowers ( <i>Rosa chinensis</i> Jacq.): Phytochemical Evaluation and Total Antioxidant Capacity
Soetikno, Naomi	The Mediating Role of Depression between Childhood Trauma and Intimate Partner Violence
Soetikno, Naomi	The Role of Fathers' Parenting Stress and His Parenting Styles on Behavior Problems in Children During the Covid-19 Pandemic
Soetikno, Naomi	Autistic Children Parenting Stress
Soetikno, Naomi	Criminality and Antisocial Behavior in Young Adult
Soetikno, Naomi	Loneliness of Z Generation Adolescents in the Covid-19 Pandemic: Descriptive Study
Soetikno, Naomi	The Childhood of Workaholic Managers and Professional Workers
Soetikno, Naomi	TEACCH for Parents and Child with Autism Spectrum Disorder: A Review of the Literature
Soetikno, Naomi	Easy and Inexpensive Intervention for Parents? Physical Activity Interventions in Children with Autism Spectrum Disorder in Indonesia: Literature Review Study
Soetikno, Naomi	Humanization of Humans Through Altruism:
Soetikno, Naomi	Emotional Expressiveness Among Women Who Experienced Domestic Violence
Soetikno, Naomi	Does Friendship Matter for Children with Autism Spectrum Disorder? Peer-mediated Intervention to Promote Social Competence: Review and Recommendation
Soetikno, Naomi	Prevalence of Dating Violence in Late Adolescence
Soetikno, Naomi	Depression Among Healthcare Workers During the Covid-19 Pandemic
Soetikno, Naomi	The Role of Child Maltreatment and Tendency to Juvenile Delinquency in Late Adolescents
Suaputra, Vincent	Phytochemical Screening, Total Antioxidant Capacity and Toxicity Test of White Jasmine Flower Extract ( <i>Jasminum sambac</i> )
Sulistiyorini, Elizabeth	Social Support and Quality of Life on Online-Learning University Students
Sunjaya, Anthony Paulo	Anxiety and Sleep Quality Among Medical Students in Indonesia During the COVID-19 Pandemic
Suyasa, P. Tommy Y. S.	Applied Behavior Analysis Interventions on Children with Autism Spectrum Disorder in Indonesia: A Proposal for Systematic Review and Meta-Analysis
Suyasa, P. Tommy Y. S.	Psychological Distress among Emerging Adults: A Descriptive Study



Tang, Benjamin MP	Absolute Eosinophil Count as a Marker for Sepsis Diagnosis
Taufik, Jordain R.	Problematic Smartphone Use and Problematic Internet Use: The Two Faces of Technological Addiction
Tiatri, Sri	Problematic Smartphone Use and Problematic Internet Use: The Two Faces of Technological Addiction
Tiatri, Sri	Mechanism Distress Tolerance Driven Smoking Addiction Behavior Among Indonesian Adults
Tiatri, Sri	The Relationship Between Expressive Suppression and Problematic Smartphone Use
Timotius	Phytochemical Screening, Total Antioxidant Capacity, and Toxicity Test of Basil Leaf Extract ( <i>Ocimum x africanum</i> Lour).
Tjoa, Enty	Absolute Eosinophil Count as a Marker for Sepsis Diagnosis
Uranus, Hanna Christina	Humanization of Humans Through Altruism:
Ursula, Ferrel	Anxiety and Sleep Quality Among Medical Students in Indonesia During the COVID-19 Pandemic
Wahyuni, Octavia Dwi	The Relationship Between Sitting Duration and Low Back Pain on Office Workers in DKI Jakarta 2021
Wati, Linda	The Use of Art Therapy in the Treatment of Eating Disorders: A Systematic Review
Wina, Tamara	Does Friendship Matter for Children with Autism Spectrum Disorder? Peer-mediated Intervention to Promote Social Competence: Review and Recommendation
Yanuari, Andiyani	Criminality and Antisocial Behavior in Young Adult
Yulianti, Eny	Methanolic Extracts of Rose Flowers ( <i>Rosa chinensis</i> Jacq.): Phytochemical Evaluation and Total Antioxidant Capacity
Yulianti, Eny	Phytochemicals Profiling and Total Antioxidant Capacity of Cinnamon Bark Extract ( <i>Cinnamomum burmanii</i> )
Yulianti, Eny	Phytochemical Screening and Total Antioxidant Capacity of Marigold Leaf Extract ( <i>Tagetes Erecta</i> L.)
Yulianti, Eny	Phytochemical Screening, Total Antioxidant Capacity and Toxicity Test of White Jasmine Flower Extract ( <i>Jasminum sambac</i> )
Yulianti, Eny	Phytochemical Screening, Total Antioxidant Capacity, and Toxicity Test of Basil Leaf Extract ( <i>Ocimum x africanum</i> Lour).
Yulianti, Eny	Phytochemical Screening and Total Antioxidant Capacity of Methanolic-Extract of Kembang Bokor Roots ( <i>Hydrangea Macrophylla</i> )
Yuwono, Andy	The Relationship Between Sitting Duration and Low Back Pain on Office Workers in DKI Jakarta 2021
Zega, Windy Septa Handayani	Effectiveness of Deep Breathing Relaxation and Music Therapy as a Pain-Reducing Intervention in Post-Caesarean Section Patients

# The Relationship Between Sitting Duration and Low Back Pain on Office Workers in DKI Jakarta 2021

Andy Yuwono<sup>1</sup>, Octavia Dwi Wahyuni<sup>2\*</sup>

<sup>1</sup>Faculty of Medicine, Tarumanagara University, Jakarta, Indonesia

<sup>2</sup>Department of Anatomy, Faculty of Medicine, Tarumanagara University, Jakarta, Indonesia

\*Corresponding Author. Email: [octaviaw@fk.untar.stu.ac.id](mailto:octaviaw@fk.untar.stu.ac.id)

## ABSTRACT

Low back pain is the main cause of activity limitation and can cause socio-economic losses to a person, society, and country. Low back pain is pain that is localized between the 12th rib and the lower part of the gluteal folds with or without pain radiating to the legs. The risk factors for low back pain at the age of 18-56 years vary, namely psychosocial factors, individual factors, and occupational factors. One of the risk factors that are included in the occupational factor is that workers who sit for half or more than half of their work shift period have a greater risk of experiencing complaints of non-specific low back pain. This is thought to be due to the theory of muscle fatigue when maintaining a sitting position and the theory of intervertebral discs. The purpose of this study was to find a relationship between sitting duration and low back pain in office workers in DKI Jakarta. The results obtained were from 61 respondents who took part in the study, as many as 4 (6.56%) respondents who had a sitting duration of less than half the time working every day without low back pain, 1 (1.64%) respondents who had a sitting duration of less than out of half the length of time working every day with low back pain, 17 (27.87%) respondents who have a sitting duration equal to or more than the length of time working every day without low back pain, and 39 (63.93%) respondents who have duration of sitting equal to or more than the length of time worked each day with low back pain. Based on the Fisher exact test calculation,  $p < 0.05$  ( $p = 0.044$ ) which states that there is a relationship between sitting duration and low back pain with Prevalence Ratio = 3,5.

**Keywords:** low back pain, office worker, sitting duration

## 1. INTRODUCTION

Low back pain is a major cause of activity limitation and can cause socio-economic losses to individuals, communities and countries.<sup>1</sup> Low back pain is pain that is localized between the 12<sup>th</sup> rib and the lower part of the gluteal folds with or without pain radiating to the legs. Low back pain based on its cause can be divided into two, specific low back pain (due to degenerative conditions, inflammatory, infectious and neoplastic causes) and non-specific low back pain is low back pain with no known underlying cause.<sup>1,2</sup> Low back pain is suspected influenced by several risk factors such as individual factors, psychosocial factors and occupational factors.<sup>3,4,5</sup> The global prevalence of adults with low back pain in women reaches 35.3% and in men it reaches 29.4%.<sup>6</sup>

With the rapid development of technology in developing countries, sitting is the most common position in the office.<sup>7,8</sup> Sitting is described as an upright posture in which the head and body are in a vertical line, the lower legs are bent about 90° at the hips and knees, and the feet are placed on the floor.<sup>9</sup> In one study it was found that workers who sit for half or more of their work shift, have a greater risk of low back pain.<sup>10</sup> Low back pain in office workers

is caused by uncompensated muscle fatigue when sitting uninterrupted for long periods of time.<sup>10,11</sup> Another cause of low back pain beside muscle fatigue is intervertebral discs that get excessive pressure due to sitting for long periods of time and inhibition of the diffusion of cerebrospinal fluid into the intervertebral discs that causes lack of oxygenation and nutrition to the intervertebral disc.<sup>10,11</sup> In America, the prevalence of low back pain in office workers reaches 25.7 %, with 24.5% in males, and 27.1% in females.<sup>12</sup> For prevalence of low back pain in office worker in Indonesia and the Special Capital Region of Jakarta (DKI) Jakarta is unknown. According to the Central Statistics Agency of DKI Jakarta Province, the number of office worker working in the DKI Jakarta area on 2019 reached 4,836,977 people with average working shift of 8 hours per day or more than 40 hours per week.<sup>13</sup> Based on the description above, it is necessary to know whether there is a relationship between duration sitting and low back pain in office workers. It is hoped that with this study, low back pain in office worker can be prevented, detected, and treated as soon as possible to avoid further complications.

**Table 1.** Characteristic of The Respondents (N=61)

Variable	Frequency (%)	Mean ± SD	Median (Min;Max)
<b>Sex</b>			
• Male	27 (44.26%)		
• Female	34 (55.74%)		
<b>Age (years)</b>		29.38 ± 6.19	29 (19;47)
<b>Low back pain</b>			
• yes	40 (65.58%)		
• no	21 (34.42%)		
<b>Work shift each day (hours)</b>		8.26 ± 1.0	8 (7;13)
<b>Sitting duration when working (hours)</b>		6.31 ± 1.4	6 (3;10)
• sitting duration < ½ work shift	5 (8.2%)		
• sitting duration ≥ ½ work shift	56 (91.8%)		

**2. METHODS**

This study is a cross-sectional analytical study. This study was conducted in DKI Jakarta from January 2021 to March 2021. The subjects of this study were 61 respondents who were office worker in DKI Jakarta and were taken using a purposive sampling technique. The inclusion criteria of this study were office worker in the DKI Jakarta area who did not have disorders of the musculoskeletal system, had a normal body mass index (BMI=18-25 kg/m<sup>2</sup>), worked in a sitting position most of the time while working and were willing to take part in this study. Data retrieval in this study used a questionnaire to obtain personal data, the history of complaints on the respondent and the duration of the respondent's sitting at workplace every day. The Oswestry Disability Questionnaire was used to assess complaints of low back pain in respondents based on how low back pain affecting respondent daily activity.<sup>4,5</sup> The collected data were analyzed to determine the association between sitting duration and low back pain using the Fisher Exact Test with a significance limit of  $p < 0.05$ .

**3. RESULTS**

From 61 respondents who joined this study, 34 respondents (55.74%) were female and 27 respondents (44.26%) were male. The average age of the respondents was 29.38 years old (SD=6.19, median=19;47). The majority of respondents suffer from low back pain, as many as 40 respondents (65.58%). The average respondent's working hour is 8.26 hours per day. Based on the sitting duration at work compared to the work shift each day, 5

people (8.2%) had a sitting duration of less than half of work shift each day and 56 people (91.2%) had a sitting duration equal or more than half the work shift each day. (Table 1)

In this study, it was found that 5 respondents had a sitting duration of less than half the work shift every day, 4 respondents (6.56%) not experiencing low back pain and 1 respondent (1.64%) experiencing low back pain. From 56 respondents who had a sitting duration equal to or more than half of work shift each day, 17 respondents (27.87%) did not experience low back pain and 39 respondents (63.93%) experienced low back pain. The results of this study showed a significant relationship between the duration of sitting at work and low back pain with a value of  $p = 0.044$ . Based on the epidemiological association, the prevalence ratio (PR) was 3.5. This means that the incidence of low back pain is 3.5 times greater in office worker who have a sitting duration of more than half the time of work each day compared to office worker who have the duration of sitting is less than half the length of time working each day. (Table 2)

**4. DISCUSSION**

In this study, it was found that the average age of respondents who experienced low back pain was 29 years, this result is in line with a study conducted by Hoy D et al which stated that the prevalence of low back pain increased when individuals reaching age of 20-29 years. When Individuals getting older, the function of the muscles to hold the body position decreases, and the body's compensation for muscle

fatigue also decreases and can cause pain in the lower back area.<sup>6</sup>

**Table 2.** The Relationship between Sitting Duration and Low Back Pain *Cross Tabulation* (N=61)

	Low Back Pain		PR	p-value
	Yes	No		
<b>Sitting duration at work</b>				
Sitting duration ≥ ½ work shift	39 (63.93%)	17 (27.87%)	3,5	0.044*
Sitting duration < ½ work shift	1 (1.64%)	4 (6.56%)		

\*P value significant, p<0.05

In this study, it was found that the average sitting duration of respondents who experienced low back pain was 6.31 hours per day, this is in line with a study conducted by Gupta et al., which found that office workers sat for 4-6 hours every day tend to experience lower back pain. The theories that can explain the relationship between sitting duration and low back pain such as increased intradiscal pressure, reduced lower back muscle strength, and stiffness in the spine.<sup>14</sup>

This study also incline with the study conducted by Goncharenko et al. In the study was said that worker who sat for more than 3 hours every day had a greater risk of experiencing low back pain. This is thought to be influenced by risk factors such as individual risk factors such as age and muscle, bone, and joint injuries, as well as occupational risk factors such as prolonged sitting, workload, and psychosocial stress at work.<sup>15</sup>

Table 2 shows that office worker who have a sitting duration equal to or more than half their work shift are 3.5 times more prone to low back pain compared to office worker who have a sitting duration of less than half their work shift (prevalence ratio = 3.5), these results are in line with the results of the study of Lis et al. which shows the prevalence of low back pain increases up to 50% in the population of worker who have a sitting duration equal to or more than half the work shift. This occurs due to several factors such as habits at work such as uninterrupted sitting for a long time, in an upright position, and psychosocial factors like stress, assignment at office and duration of work each day.<sup>10</sup>

**5. CONCLUSION**

In this study, it was found that the number of office worker in DKI Jakarta who had a sitting duration of more than half of the work shift period was 91% and the number of office worker in DKI Jakarta who had a sitting duration of less than half of the work shift

period was 9%. Complaints of low back pain experienced as much as 65.57% and no lower back pain as much as 34.43%. Based on this study, it can be concluded that there is a significant effect of sitting duration on low back pain in DKI Jakarta office worker.

**6. SUGGESTION**

In future studies, it is expected to consider other risk factors such as age, gender, and psychological stress. Companies and office worker are expected to be more conscious of the risk of low back pain and do take preventive measures and build a healthy supportive working space.

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