

WORLD WIDE JOURNAL OF MULTIDISCIPLINARY RESEARCH AND DEVELOPMENT

VOLUME 9 ISSUE 7

July 2023

Open



WORLD WIDE JOURNAL
OF MULTIDISCIPLINARY RESEARCH
AND DEVELOPMENT

Editor-in-Chief

Prof.(Dr.) P. K. Upadhyay

✉ drpku.2010@yahoo.com, dr.prempku@gmail.com, dean.agri@madhavuniversity.edu.in
M.Sc., Ph.D, FISGPB, FIBS, FSRDA, FSSR, FISGBRD & FSBSRD, Former Head Genetics and Plant
Breeding RBS College (DrBRA University Agra) Presently working as Professor & Dean College of
Agriculture, Madhav University, Rajasthan, India



Associate Editors



Rahul Mishra

✉ rahul.mishra@alliance.edu.in
Assistant Professor of Law,
M.A(English Literature.),LL.B,
(General Laws from HPU), LL.M (Corporate
Laws with International Business from NALSAR),
Course Co-ordinator, SWAYAM, Alliance
University, Central Campus,
Chandapura-Anekal Road,



Dr. Ogori Akama Friday

✉ ogorifaraday@gmail.com
Faculty of Agriculture Department of
Home science Federal University
Gashua PMB1005, Gashua, Nigeria



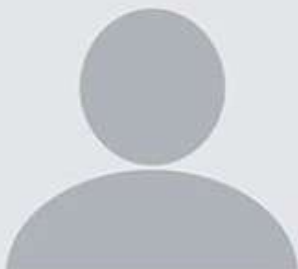
Dr. Lakshmi Narayan Mishra

✉ lakshminarayan.mishra@vit.ac.in,
lakshminarayanmishra04@gmail.com
Dept of Mathematics, VIT University,
Vellore, TN, India



Prof. Mohamed Ahmed Abdel fattah El-Esawi

✉ elesawi2005@yahoo.com
Lecturer and researcher of Plant
Genetics, Genomics and Molecular
Biology at Botany Department,
Faculty of Science, Tanta University,
Tanta, Egypt.



Prof. Bensafi Abd-El-Hamid

✉ aeh.bensafi@gmail.com
Department of Chemistry and
Physics, Abou Bekr Belkaid
University of Tlemcen, Tlemcen,
Algeria



Professor Smruti Sohani

✉ smrutisohani@gmail.com
Associate Professor of Agriculture
Sciences (Botany), * DAC at Institute
of Agriculture Sciences, SAGE
University, Indore (M.P), India.



Dr. V. Raghu Raman

✉ drraghuraman@yahoo.com
M.Com. PGDBM MBA. Ph.D,
Sr.Faculty ,Business Studies
Department, Ibra College of
Technology, Ibra, Al Sharqiyah North
Governorate, Sultanate of Oman



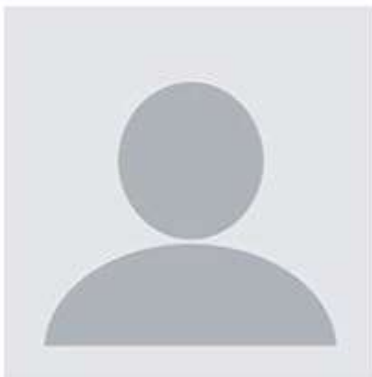
Dr. K. Leelavathy

✉ priyaleelavathy@gmail.com
Assistant professor PG and Research
Department of Commerce, Bon
Secours College for women,
Thanjavur, India



Jiban Shrestha

✉ jibanshrestha@narc.gov.np
Scientist, Nepal Agricultural
Research Council, National Maize
Research Programme, Rampur,
Chitwan, Nepal



**Prof. Lakshmi Narayan
Mishra**

✉
lakshminarayanmishra04@gmail.com
Department of Mathematics,
National Institute of Technology,
Silchar, India



Prof. Vandana

✉ vandana.rsu03@gmail.com
School of Studies in Mathematics, Pt.
Ravishankar Shukla University,
Raipur, India



Dr. Mahdi Zowghi

✉ mahdizoughi@gmail.com
Industrial and System Engineering,
Management and Soft Computing,
Manchester Universial Academy,
London, UK



Dr. Serkan Araci

✉ mtsrkn@hotmail.com
Mathematics, Faculty of Economics,
Administrative and Social Sciences,
Hasan Kalyoncu University,
Gaziantep, Turkey



Dr. Sunil Kumar

✉ gkv.sunil@gmail.com
Assistant Prof. & Head Dept. of
Mathematics & Computer Science,
International College of Engineering,
Ghaziabad, India



Dr. Wasin Chareerntantanakul

✉ wasin@mju.ac.th
Associate Professor Program of
Biotechnology, Faculty of Science,
Maejo University, Thailand 63 M.4
Sansai Chiang Mai, Thailand



Cezarina Adina Tofan

✉ cezarina_adina@yahoo.com
Faculty of Accounting and Finance,
Spiru Haret University, Bucharest,
Romania



Dr. C. Babou Scientist

✉ kcbabou@gmail.com
Central Coffee Research Institute,
Govt. of India, Karnataka, India



Dr. Amrendra Kumar Sharma

✉ a_sharma@du.edu.om
Assistant Professor of Linguistics,
Department of Languages &
Translation, Dhofar University,
Salalah, Oman



Dr. B. Suresh Lal

✉ lalbsuresh@gmail.com
Associate Professor Department of
Economics, Kakatiya University,
Warangal, Andhra Pradesh, India



Dr. Oscar Sunny Onuke

✉ petroequipengineeringltd@gmail.com
Post-Doctorate Scholar, Walden
University, Baltimore, United States



Prof. Dr. Shiv Datt Sharma

✉ shivdutt1957@gmail.com
Associate Professor, Head of Deptt
of Hindi Govt. College Dhaliara
Kangra, India



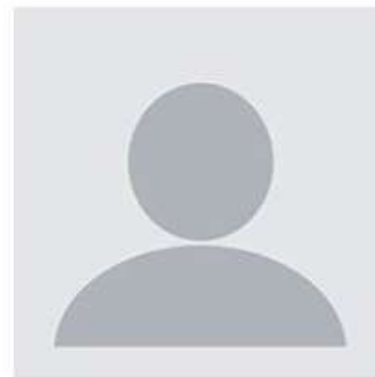
**Asst. Prof. Dr. Vishnu
Narayan Mishra**

✉ vnm@igntu.ac.in
B.Sc.(Gold Medalist),M.Sc. (Double
Gold Medalist), Ph.D. (I.I.T. Roorkee),
YSA, Associate Professor of
Mathematics, Department of
Mathematics, Indira Gandhi National
Tribal University, Lalpur,
Amarkantak, Anuppur, Madhya
Pradesh 484 887, India



Prof. Dr. H. M. Srivastava

✉ harimsri@math.uvic.ca
Professor Emeritus, Department of
Mathematics and Statistics,
University of Victoria, Victoria,
British Columbia V8W 3R4,, Canada



Dr. Deepmala

✉ deepmaladm23@gmail.com
Visiting Scientist, SQC & OR Unit,
Indian Statistical Institute,
Barrackpore, Kolkata, India



**Asst. Prof. Ekachai
Chukeatirote**

✉ ekachai@mfu.ac.th
Microbiology, school of Science, Mae
Fah Luang University, Chiang Rai,
Thailand



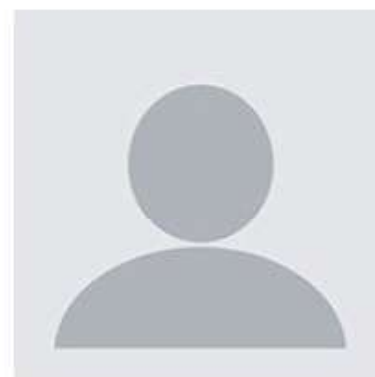
Prof. Ubaldo Comite

✉ ubaldo.comite@libero.it
Professor of Budget and Business
Organization at the Faculty of
Economy, Department of Business
Sciences, University of Calabria,
Cosenza, Italy



Dr Pankaj Thakur

✉ dr_pankajthakur@yahoo.com
Head Department of Mathematics,
Associate Professor, Mathematics,
IEC University Badii, Distt Solan,
India



Dr. Pardeep Kr. Rana

✉ pardeepkrana@yahoo.com
Assistant Professor, Department of
Mathematics Moradabad Institute of
Technology, Moradabad, Uttar
Pradesh, India



Dr. Amit Sharma

✉ draksharma5477@gmail.com
Assistant Professor, Department of
Physics, Bharatividyaapeeth's college
of Engineering, New Delhi, India



Dr. Pramod Kumar Singh

✉ drpksingh101@gmail.com
Professor & Head, P.G. Deptt. of
English, S.P. Jain College, Sasaram
Rohtas, Bihar, India



Dinesh Kumar

✉ dineshkumarmat@gmail.com
Assistant Professor, Department of
Mathematics, Dhanalakshmi
Srinivasan Engineering College,
Tamilnadu, India



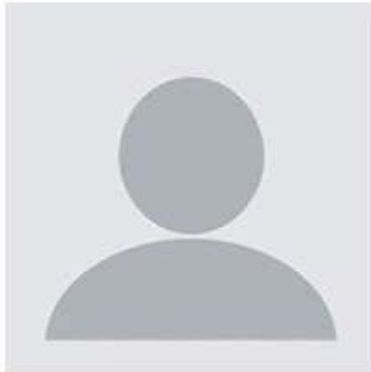
Dr. Rabindra Kayastha

✉ rkayastha8@hotmail.com
Associate Professor Department of
Natural Sciences School of Science
Kathmandu University Dhulikhel,
Nepal



David Ackah

✉ drdavidackah@gmail.com
(Ph.D. Candidate) (MSc/BSc/Dip -
Economist) Lecturer - School of
Business Golden Sunbeam
University of Science & Technology,
Ghana, West Africa



Gaurav Kumar Roy

✉ gauravkoj62@gmail.com
Cyber Security, Computer Science,
Research Scholar in Lovely
Professional University, Phagwara,
Punjab



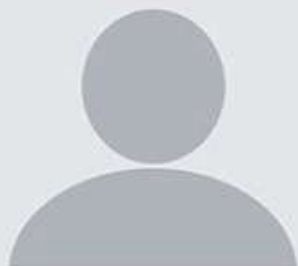
Dr. A.C. Lal Kumar

✉ lalkumareducation@gmail.com
M.Sc., M.A., M.A., M.Ed., M.Phil.,
Ph.D., D.Litt., Assistant Professor for
M.Ed., G.E.T. B.Ed M.Ed College of
Education, VS Puram Village,
Paradarami Post, Gudiyattam Taluk,



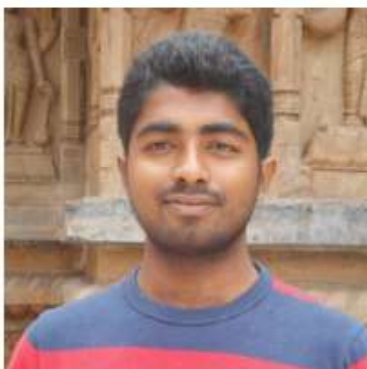
T. F. McLaughlin

✉ tim.mclaughlin6@comcast.net
Professor, Department of Special
Education, School of Education,
Gonzaga University, Spokane, WA,
USA



Dr. Gayathri Rajaraman

✉ Gayathri_Rajaraman@yahoo.co.in
M.E., M.B.A., PhD (Electrical Engg.),
Assistant Professor of ECE, Dept of
Electrical Engineering, Annamalai
University, Chidambaram



Dr. Harinath Palem

✉ haributterfly.yvu@gmail.com
Senior Research Fellow Dept. of
Zoology School of Life sciences Yogi
Vemana University Kadapa - Andhra
Pradesh, India



Dr. Fidèle Suanon

✉ officielsuanon@yahoo.com
Faculty of Sciences and Techniques,
Laboratory of Physical Chemistry,
University of Abomey-Calavi,
Republic of Benin



Dariusz Jacek Jakobczak

✉ Dariusz.jakobczak@tu.koszalin.pl
Assist. Prof., Ph.D. Department of
Electronics and Computer Science,
Koszalin University of Technology,
Sniadeckich 2, 75-453 Koszalin,
Poland



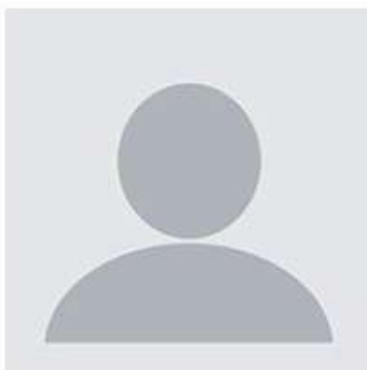
Rudrarup G

✉ rudrarupgupta21@gmail.com
Commercial Manager of Multifarious
Projects Group India and Overseas
Editor/ Reviewer of American
Institute of Science, USA



Dr. Manoranjan Tripathy

✉ manoranjan.tripathy@dsv.ac.in
(Assistant Professor) Department of
Psychology Dev Sanskriti
Vishwavidyalaya Haripur Kalan,
Motichur Range Haridwar,
Uttarakhand, India



Narendra Kumar Ahirwar

✉ narendra87.ahirwar@gmail.com
(PhD, MSc, NET) Senior Researcher
(Microbiology) Department of
Biological Sciences Faculty of
Science and Environment Mahatma
Gandhi Chitrakoot Gramodaya
Vishwavidhyalaya Chitrakoot, Satna,
MP, India



Dr. Ho Soon Min

✉ soonmin.ho@newinti.edu.my
(Ph. D, LMIC, MWRA, STRA) Professor
at Centre for Green Chemistry and
Applied Chemistry, INTI
International University, Putra Nilai,
Negeri Sembilan, Malaysia



Mahmoud Magdy Abbas

✉ drmahmoudmagdy2013@yahoo.com
Plant Nutrition Dept., National
Research Centre, 31 El Behoos
Street, 12622 Dokki, Giza, Egypt



**Dr. Osama Mohamed Anwar
Nofal**

✉ nofalosama@hotmail.com
Professor in Plant Nutrition Dept.,
National Research Center, El-Tahrir
St. Dokki, Giza, Egypt



Mr. K.Kumaravel

✉ kumaravk@srmist.edu.in
Head, Department of French Faculty
of Science and Humanities SRM
Institute of Science and Technology
Kattankulathur, Tamil Nadu, India



Dr. Shashank Tiwari

✉ shashank6889@gmail.com
Director, JP College of Pharmacy &
Nursing, Lucknow, Uttar Pradesh



Dr. Nalla Bala Kalyan

✉ kalyankumar.n@svcolleges.edu.in,
drnallabala@gmail.com
Associate Professor Department of
Management Studies Sri
Venkateswara College of
Engineering Tirupati, Andhra
Pradesh, India



Dr. Mothukuri Anjaiah

✉ m.anjaiah@dravidianuniversity.ac.in,
anjaiahlib@gmail.com
Assistant Professor, Political Science
& Public administration, Library &
Information Science Programmes,
Methodology in Social Sciences,
Conducted, University Central
Library Dravidian University,
Kuppam, Andhra Pradesh, India



Dr.S.Mohan

✉ smohan@klu.ac.in,
smoha001@gmail.com
Associate Professor of English,
Kalasalingam Academy of Research
and Education, (Deemed to
beUniversity), Krishnankoil,
Srivilliputhur, Virudhunagar (Dt), Pin-
626 126. Tamilnadu, India.



Dr. J. Gajendra Nidu

✉ profnaidugn@gmail.com
Head of the Department Faculty of
Commerce & Business
Administration, Gaborone
University, Gaborone. Botswana,
Gaborone, Botswana



Dr. M M Bagali

✉ dr.mmbagali@gmail.com
Professor of Management and Human Resources Head, Department of Management, MBA program Acharya Institute Karnataka, India



Dr Selvakumar Kandaswamy

✉ bennysgod@gmail.com
M.Sc., M.Phil., Ph.D., MBA (HM), Clinical Biochemist, Research Scholar, Department of Endocrinology, University of Madras, Chennai, Tamil Nadu, India



Asmaa Shaker Ashoor Alzubaydi

✉ asmaa@uobabylon.edu.iq
Computer Science, Security of Operating Systems, Iraqi Commission for Computers and Informatics, Networks Security, information technology, University of Babylon Iraq



Nargiza Ismatullayeva

✉ ismatullayeva.nargiza@gmail.com
ismatullayeva.nargiza@yandex.ru
Department of Translation Studies and International Journalists, "Lacuna's Occurrence in Chinese and Uzbek Languages" Tashkent State University of Oriental Studies, Tashkent, Uzbekistan



Dr Meetkamal

✉ meetk_dwi@yahoo.co.in
Associate professor Department of Chemistry Christ Church College, Kanpur(UP), India



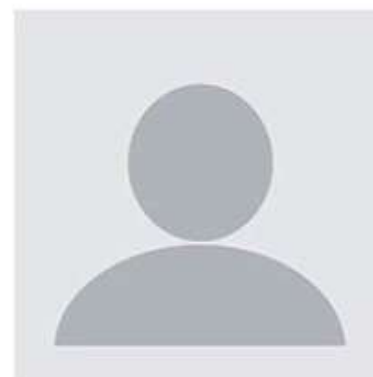
Dr. PATITA PABAN MOHANTY

✉ patitamohanty@soa.ac.in
Assistant Professor School of Hotel Management Faculty of Hospitality and Tourism Management S O A (Deemed to be University) Odisha, India.



HERBERT D. VERTUCIO

✉ tucio@yahoo.com
Philosophy in Educational Management Professor Lecturer 1 Arellano University, Philippines
Research Coordinator 2015-2017 Arellano University, Philippines



KOMAL TAHILIANI

✉ komaltahiliani@yahoo.com,
komaltahiliani1982@gmail.com
Associate Professor in Computer science Department Sagar Institute of Research and Technology, Bhopal, MP, India



**Ignatius Nnaemeka
Onwuatuwegwu PhD**

✉ frig2014@gmail.com
Philosophy Department, Faculty of
Arts, Nnamdi Azikiwe University
Awka, Anambra state, Nigeria



Dr. Kandi Kamala

✉ kamala.ranu@gmail.com
Asst. Professor Dept. of Political
Science, M.A., Bed. NET, SET., Ph.D.
Government Degree College for
Women Autonomous Begumpet,
(Affiliation) of Osmania University,
Hyderabad, Telangana State, India



Dr. Kishore Mukhopadhyay

✉ Kishore.km2007@gmail.com,
principaluctc@rediffmail.com
Associate Professor in Physical
Education, Union Christian Training
College, Berhampore, Murshidabad,
West Bengal, India



Dr. Gedam Kamalakar

✉ kamalakarou@gmail.com
M.A, B.Ed., LLM, SET, PhD Dept. of
Political Science, Osmania
University, Hyderabad, Telangana,
India.



Norfariza Ab Wahab

✉ norfariza@utem.edu.my
PhD Senior Lecturer, Department of
Manufacturing Engineering
Technology, Faculty of Mechanical &
Manufacturing Engineering
Technology, Universiti Teknikal
Malaysia.



Kaveh Ostad Ali Askari

✉ ostadaliaskari.k@of.iut.ac.ir,
kaveh.oaa2000@gmail.com
Ph.D, Civil Engineering, Research
Assistant, Department of Water
Engineering, College of Agriculture,
Isfahan University of Technology
(IUT), Isfahan, Iran.



Dr. Ambreen Safdar Kharbe

✉ ambreenkharbe72@gmail.com,
askharbe@nu.edu.sa
Ph.D. (English), M.A (English
Literature), M.A (Applied Linguistics),
MBA (HR & Marketing) Assistant
Professor, College of Language and
Translation, Najran University, Saudi
Arabia (Indian, have recently joined -
18th February 2020 Najran
University)

[Home \(https://wwjmr.com/\)](https://wwjmr.com/)[Editorial Board \(https://wwjmr.com/editorial-board\)](https://wwjmr.com/editorial-board)[Instructions \(https://wwjmr.com/instructions\)](https://wwjmr.com/instructions)[Archives \(https://wwjmr.com/archives\)](https://wwjmr.com/archives)[Indexing \(https://wwjmr.com/indexing\)](https://wwjmr.com/indexing)[Contact Us \(https://wwjmr.com/contact\)](https://wwjmr.com/contact)[Questions \(https://wwjmr.com/question\)](https://wwjmr.com/question)[Login/Sign Up \(https://wwjmr.com/manage\)](https://wwjmr.com/manage)[+919999669429 \(tel:+919999669429\)](tel:+919999669429) [wwjmr@gmail.com \(mailto:wwjmr@gmail.com\)](mailto:wwjmr@gmail.com)**Title and Authors Name****1****Suspected Waterborne Disease Outbreak Investigation in JNU in response to a Media Scanning Alert****Ray Laskar A****Country : India****Subject : Community Medicine**[View Details \(https://wwjmr.com/archive/2023/7/2087/suspected-waterborne-disease-outbreak-investigation-in-jnu-in-response-to-a-media-scanning-alert\)](https://wwjmr.com/archive/2023/7/2087/suspected-waterborne-disease-outbreak-investigation-in-jnu-in-response-to-a-media-scanning-alert)**2****A Marca Pessoal Como Vantagem Competitiva No Mercado De Trabalho: Um Estudo Sobre a Realidade das Instituições De Ensino Superior Em Luanda****Guiomar Hebo João Guilherme Zebedeu****Country : Angola****Subject : Marketing and Advertising**[View Details \(https://wwjmr.com/archive/2023/7/2088/a-marca-pessoal-como-vantagem-competitiva-no-mercado-de-trabalho-um-estudo-sobre-a-realidade-das-institui-es-de-ensino-superior-em-lu\)](https://wwjmr.com/archive/2023/7/2088/a-marca-pessoal-como-vantagem-competitiva-no-mercado-de-trabalho-um-estudo-sobre-a-realidade-das-institui-es-de-ensino-superior-em-lu)**3****The Treatment Period for Pediatric COVID-19 Patients is Reviewed from the Use of Antibiotics****Irma Yanti Rangkuti****Country : Indonesia****Subject : Pharmacology**[View Details \(https://wwjmr.com/archive/2023/7/2089/the-treatment-period-for-pediatric-covid-19-patients-is-reviewed-from-the-use-of-antibiotics\)](https://wwjmr.com/archive/2023/7/2089/the-treatment-period-for-pediatric-covid-19-patients-is-reviewed-from-the-use-of-antibiotics)

[Home \(https://wwjmr.com/\)](https://wwjmr.com/)

[Editorial Board \(https://wwjmr.com/editorial-board\)](https://wwjmr.com/editorial-board)

[Instructions \(https://wwjmr.com/instructions\)](https://wwjmr.com/instructions)

[Archives \(https://wwjmr.com/archives\)](https://wwjmr.com/archives)

[Indexing \(https://wwjmr.com/indexing\)](https://wwjmr.com/indexing)

[Contact Us \(https://wwjmr.com/contact\)](https://wwjmr.com/contact)

[Questions \(https://wwjmr.com/question\)](https://wwjmr.com/question)

[Login/Sign Up \(https://wwjmr.com/manage\)](https://wwjmr.com/manage)

+919999669429 (tel:+919999669429) [wwjmr@gmail.com \(mailto:wwjmr@gmail.com\)](mailto:wwjmr@gmail.com)

[View Details \(https://wwjmr.com/archive/2023/7/2094/issues-and-challenges-facing-islamic-universities-a-case-study-of-nigeria\)](https://wwjmr.com/archive/2023/7/2094/issues-and-challenges-facing-islamic-universities-a-case-study-of-nigeria)

6

Issues and Challenges facing Islamic Universities: A Case Study of Nigeria

Yusuf Sani Abubakar

Country : Brunei

Subject : Shariah and Law

[View Details \(https://wwjmr.com/archive/2023/7/2094/issues-and-challenges-facing-islamic-universities-a-case-study-of-nigeria\)](https://wwjmr.com/archive/2023/7/2094/issues-and-challenges-facing-islamic-universities-a-case-study-of-nigeria)

7

Determinant Sustainability Business Perspective of The Tri Hita Karana (THK) Concept for MSMEs in Bali

Ni Wayan Sitiari

Country : Indonesia

Subject : Economics and Business

[View Details \(https://wwjmr.com/archive/2023/7/2095/determinant-sustainability-business-perspective-of-the-tri-hita-karana-thk-concept-for-msmes-in-bali\)](https://wwjmr.com/archive/2023/7/2095/determinant-sustainability-business-perspective-of-the-tri-hita-karana-thk-concept-for-msmes-in-bali)

8

Overcoming Academic Anxiety and Depression Using Yoga Prana Vidya Healing Protocols: A detailed case study

Leelavathi Nayak

Country : India

Subject :

[View Details \(https://wwjmr.com/archive/2023/7/2096/overcoming-academic-anxiety-and-depression-using-yoga-prana-vidya-healing-protocols-a-detailed-case-study\)](https://wwjmr.com/archive/2023/7/2096/overcoming-academic-anxiety-and-depression-using-yoga-prana-vidya-healing-protocols-a-detailed-case-study)

9

Medical countermeasures for the COVID-19 pandemic management in India

Balaji More


[Home \(https://wwjmr.com/\)](https://wwjmr.com/)
[Editorial Board \(https://wwjmr.com/editorial-board\)](https://wwjmr.com/editorial-board)
[Instructions \(https://wwjmr.com/instructions\)](https://wwjmr.com/instructions)
[Archives \(https://wwjmr.com/archives\)](https://wwjmr.com/archives)
[Indexing \(https://wwjmr.com/indexing\)](https://wwjmr.com/indexing)
[Contact Us \(https://wwjmr.com/contact\)](https://wwjmr.com/contact)
[Questions \(https://wwjmr.com/question\)](https://wwjmr.com/question)
[Login/Sign Up \(https://wwjmr.com/manage\)](https://wwjmr.com/manage)
[+919999669429 \(tel:+919999669429\)](tel:+919999669429)
[wwjmr@gmail.com \(mailto:wwjmr@gmail.com\)](mailto:wwjmr@gmail.com)

Marcelina Gomes da Silva Coimbra

Country : Angola

Subject :

[View Details \(https://wwjmr.com/archive/2023/7/2099/a-influ-ncia-da-marca-na-decis-o-de-compra-um-estudo-sobre-a-realidade-do-mercado-do-30-e-a-rede-de-lojas-da-bricomat\)](https://wwjmr.com/archive/2023/7/2099/a-influ-ncia-da-marca-na-decis-o-de-compra-um-estudo-sobre-a-realidade-do-mercado-do-30-e-a-rede-de-lojas-da-bricomat)

12

Marianne Wanjiru Mureithi, Kefa Okongo Bosire, Gracelyn Portia Anthony Doss, Antony Otinga Oteng'o

Kemboi Willy

Country : Kenya

Subject : Medical Microbiology

[View Details \(https://wwjmr.com/archive/2023/7/2100/marianne-wanjiru-mureithi-kefa-okongo-bosire-gracelyn-portia-anthony-doss-antony-otinga-oteng-o\)](https://wwjmr.com/archive/2023/7/2100/marianne-wanjiru-mureithi-kefa-okongo-bosire-gracelyn-portia-anthony-doss-antony-otinga-oteng-o)

13

The Online Undergraduate Thesis Guidance during the Covid-19 Pandemic, Indonesia

Ahmad Helman Hamdani

Country : Indonesia

Subject : Geology

[View Details \(https://wwjmr.com/archive/2023/7/2101/the-online-undergraduate-thesis-guidance-during-the-covid-19-pandemic-indonesia\)](https://wwjmr.com/archive/2023/7/2101/the-online-undergraduate-thesis-guidance-during-the-covid-19-pandemic-indonesia)

14

Dry eye disease and its risk factors in rural and urban areas in Indonesia

Noviani Prasetyaningsih

Country : Indonesia

Subject : Medicine

[View Details \(https://wwjmr.com/archive/2023/7/2102/dry-eye-disease-and-its-risk-factors-in-rural-and-urban-areas-in-indonesia\)](https://wwjmr.com/archive/2023/7/2102/dry-eye-disease-and-its-risk-factors-in-rural-and-urban-areas-in-indonesia)

[Home \(https://wwjmr.com/\)](https://wwjmr.com/)

[Editorial Board \(https://wwjmr.com/editorial-board\)](https://wwjmr.com/editorial-board)

[Instructions \(https://wwjmr.com/instructions\)](https://wwjmr.com/instructions)

[Archives \(https://wwjmr.com/archives\)](https://wwjmr.com/archives)

[Indexing \(https://wwjmr.com/indexing\)](https://wwjmr.com/indexing)

[Contact Us \(https://wwjmr.com/contact\)](https://wwjmr.com/contact)

[Questions \(https://wwjmr.com/question\)](https://wwjmr.com/question)

[Login/Sign Up \(https://wwjmr.com/manage\)](https://wwjmr.com/manage)

[+919999669429 \(tel:+919999669429\)](tel:+919999669429) [wwjmr@gmail.com \(mailto:wwjmr@gmail.com\)](mailto:wwjmr@gmail.com)

ISSN: 2474-3654

[View Details \(https://wwjmr.com/archive/2023/7\)](https://wwjmr.com/archive/2023/7) [2023/7](#) [Index of Foreign Direct Investment in Nepal](#)



[Home \(https://wwjmr.com/\)](https://wwjmr.com/)

[Editorial Board \(https://wwjmr.com/editorial-board\)](https://wwjmr.com/editorial-board)

[Instructions \(https://wwjmr.com/instructions\)](https://wwjmr.com/instructions)

[Archives \(https://wwjmr.com/archives\)](https://wwjmr.com/archives)

[Indexing \(https://wwjmr.com/indexing\)](https://wwjmr.com/indexing)

[Contact Us \(https://wwjmr.com/contact\)](https://wwjmr.com/contact)

[Questions \(https://wwjmr.com/question\)](https://wwjmr.com/question)

[Login/Sign Up \(https://wwjmr.com/manage\)](https://wwjmr.com/manage)

+919999669429 (tel:+919999669429) [wwjmr@gmail.com \(mailto:wwjmr@gmail.com\)](mailto:wwjmr@gmail.com)

ISSN: 2474-6615



World Wide Journal of Multidisciplinary Research and Development is peer-reviewed, indexed and refereed journal and is designed to publish research articles.

» [Read more \(https://wwjmr.com/archives\)](https://wwjmr.com/archives)

Useful Links

[Home \(https://wwjmr.com/\)](https://wwjmr.com/)

[Terms and condition \(https://wwjmr.com/terms-and-condition\)](https://wwjmr.com/terms-and-condition)

[Privacy policy \(https://wwjmr.com/privacy-policy\)](https://wwjmr.com/privacy-policy)

[Refund and cancellation \(https://wwjmr.com/refund-and-cancellation\)](https://wwjmr.com/refund-and-cancellation)

[Online service details with pricing structure \(https://wwjmr.com/online-service-details-with-pricing-structure\)](https://wwjmr.com/online-service-details-with-pricing-structure)

[About Us \(https://wwjmr.com/about\)](https://wwjmr.com/about)

<https://wwjmr.com/paypal>

[Instructions \(https://wwjmr.com/instructions\)](https://wwjmr.com/instructions)

[Archives \(https://wwjmr.com/archives\)](https://wwjmr.com/archives)

Quick Contact



[Home \(https://wwjmr.com/\)](https://wwjmr.com/)

[Editorial Board \(https://wwjmr.com/editorial-board\)](https://wwjmr.com/editorial-board)

[Instructions \(https://wwjmr.com/instructions\)](https://wwjmr.com/instructions)

[Archives \(https://wwjmr.com/archives\)](https://wwjmr.com/archives)

[Indexing \(https://wwjmr.com/indexing\)](https://wwjmr.com/indexing)

[Contact Us \(https://wwjmr.com/contact\)](https://wwjmr.com/contact)

[Questions \(https://wwjmr.com/question\)](https://wwjmr.com/question)

[Login/Sign Up \(https://wwjmr.com/manage\)](https://wwjmr.com/manage)

☎ [+919999669429 \(tel:+919999669429\)](tel:+919999669429) ✉ [wwjmr@gmail.com \(mailto:wwjmr@gmail.com\)](mailto:wwjmr@gmail.com)



WWJMRD2023; 9(07):108-110
www.wwjmr.com
International Journal
Peer Reviewed Journal
Refereed Journal
Indexed Journal
Impact Factor SJIF 2017:
5.182 2018: 5.51, (ISI) 2020-
2021: 1.361
E-ISSN: 2454-6615

Noviani Prasetyaningsih
Faculty of Medicine,
Universitas Trisakti, Jakarta,
Indonesia.

Anggraeni Adiwardhani
Faculty of Medicine,
Universitas Trisakti, Jakarta,
Indonesia.

Riani Witjaksana
Faculty of Medicine,
Universitas Trisakti, Jakarta,
Indonesia.

Isa Bella
Faculty of Medicine,
Universitas Trisakti, Jakarta,
Indonesia.

Jihan Samira
Faculty of Medicine,
Universitas Trisakti, Jakarta,
Indonesia.

Ida Effendi
Faculty of Medicine,
Universitas Trisakti, Jakarta,
Indonesia.

Monica Dwi Hartanti
Faculty of Medicine,
Universitas Trisakti, Jakarta,
Indonesia
Center for Biomedical
Research, National Research
and Innovation Agency, West
Java, Indonesia.

Freily Akay
Universitas Sam Ratulangi,
Manado, Indonesia.

Correspondence:
Monica Dwi Hartanti
Faculty of Medicine,
Universitas Trisakti, Jakarta,
Indonesia.

Dry eye disease and its risk factors in rural and urban areas in Indonesia

Noviani Prasetyaningsih, Anggraeni Adiwardhani, Riani Witjaksana, Isa Bella, Jihan Samira, Ida Effendi, Monica Dwi Hartanti, Freily Akay

Abstract

This cross-sectional study was conducted in two regions in Indonesia, Karawaci Banten and Depok City to determine the risk factors of Dry Eye Disease (DED) in rural and urban areas. To assess DED, the Schirmer test was performed on one eye (right eye). The risk factors being studied were age, gender, smoking habits, and the use of electronic devices. A total of 145 respondents was recruited, with 60 respondents (41.4%) from rural areas and 85 respondents (58.6%) from urban areas. The prevalence of DED was higher in urban areas, with 54.1% (46/85) compared to 48.3% (29/60) in rural areas. There was no significant association between age and gender with the incidence of DED in both rural and urban areas ($p>0.05$). Smoking was significantly associated with DED incidence in rural areas ($p=0.0004$), but not in urban areas. The use of electronic devices was significantly associated with DED incidence only in urban areas ($p=0.043$). Smoking is a risk factor for DED in rural areas, while the use of electronic devices is the main risk factor in urban areas.

Keywords: Dry Eye Disease, Rural, Urban, Schirmer.

1. Introduction

Dry eye disease is defined by the Report of the Definition and Classification Subcommittee of the International Dry Eye WorkShop as a multifactorial disease of the tears and ocular surface, which results in symptoms of discomfort, visual disturbance, and tear film instability, with potential damage to the ocular surface.^[1] The prevalence of dry eye disease ranges from 5-35% of the population worldwide, with Nigeria having a prevalence of 19.2%,^[2] China 17%,^[3] and Dubai 62.6%.^[4] In Indonesia, the prevalence of dry eye disease is 27.5% in a study conducted in the Riau Islands.^[5] The purpose of this study is to compare the incidence of dry eye disease in rural and urban areas based on risk factors such as age, gender, smoking habits and the use of electronic devices.

2. Methods

This cross-sectional study was conducted in two regions in Indonesia, Karawaci Banten as a rural area and Depok City as an urban area. The exclusion criteria were the presence of signs of eye infection, the use of contact lenses, and the use of routine eye drops for the last 6 months. After signing the informed consent and filling out the identity sheet, there were several additional questions regarding smoking habits, and the use of electronic devices. The eye examination performed was a Schirmer's test just to the right eye to assess the quantity of tears. The Schirmer test was performed by an ophthalmologist without anesthetic using Whatman No. 41 filter paper, which is 5 mm wide and 30 mm long. The tip of the Schirmer paper was folded about 5 mm and inserted into the inferior fornix conjunctiva. The eye was closed and left for 5 minutes. After 5 minutes, the length of the wetted Schirmer paper was measured. DED was indicated if the wetted Schirmer paper was less than 10 mm.^[6]

All data were analyzed using the GraphPad version 9 program. The data collected was presented in the form of frequency and percentage distributions. Bivariate analysis of two groups was performed using the Chi-square test, if certain conditions were met with a significance level of $p<0.05$. If not, the Fisher's exact test was used.

2. Result

A total of 145 respondents participated in the research, with 60 respondents (41.4%) from rural areas and 85 respondents (58.6%) from urban areas. The respondents were divided into two age groups, the age group of 30-50 years old consisted of 79 respondents (54,5%), while the age group of over 50 years old consisted of 66 respondents (45,5%). The prevalence of DED was 48.3% in the rural group (n=60) and 54.1% in the urban group (n=85). The demographic profile of the study subjects in rural and urban areas is presented in Table 1.

Table 2 shows various risk factors for Dry Eye Disease in both rural and urban areas. According to our research, age and gender did not have a significant relationship with the incidence of Dry Eye Disease ($p > 0.05$). However, smoking habits were significantly associated with the incidence of Dry Eye Disease in rural areas ($p = 0.0004$), but not in urban areas. On the other hand, excessive use of electronic devices was the main risk factor for Dry Eye Disease in urban areas ($p = 0.043$).

Table 1: Characteristics of respondents in Rural and Urban areas.

Characteristics	Rural		Urban	
	n = 60	%	n = 85	%
Gender				
Male	26	43,3	33	38,8
Female	34	56,7	52	61,2
Ages				
30 - 50	44	73,3	35	41,2
More than 50	16	26,7	50	58,8
Smoking habits				
Yes	13	21,7	23	27,1
No	47	78,3	62	72,9
Use of electronic devices				
Yes	43	71,7	33	38,8
No	17	28,3	52	61,2
Dry Eye (Schirmer)				
Yes	29	48,3	46	54,1
No	31	51,7	39	45,9

Table 2: Distribution of Dry Eye Disease based on Risk Factors in Rural and Urban Areas.

Risk Factors	Rural (n = 60)				p	Urban (n = 85)				p
	Dry Eye (Schirmer)					Dry Eye (Schirmer)				
	Yes		No			Yes		No		
	n	%	n	%		n	%	n	%	
Gender										
Male	15	25,0	11	18,3	0,205	14	16,5	19	22,4	0,085
Female	14	23,3	20	33,3		32	37,6	20	23,5	
Ages										
30 - 50	19	31,7	25	41,7	0,185	19	22,4	16	18,8	0,979
More than 50	10	16,7	6	10,0		27	31,8	23	27,0	
Smoking habits										
Yes	12	20,0	1	1,7	0,0004*	9	10,6	15	17,6	0,054
No	17	28,3	30	50,0		37	43,5	24	28,2	
Use of electronic devices										
Yes	21	35,0	22	36,7	0,901	17	20,0	23	27,1	0,043
No	8	13,3	9	15,0		29	34,1	16	18,8	

* Fisher test

4. Discussion

The prevalence of DED based on Schirmer examination in this study was 48.3% in rural areas and 54.1% in urban areas. This number has increased compared to the results of a study conducted in Indonesia in 2002, which had a prevalence of 27.5%.^[5] A relatively high prevalence was also found in Hotan, China, where the prevalence reached 40.6%,^[7] while the prevalence in a study in rural areas of India was 45.39%.^[8] A study in Ghana, Africa compared the prevalence of DED in rural and urban areas, and the results showed that respondents in rural areas suffered more from DED and had more severe symptoms than respondents in urban areas.^[9] DED usually affects older individuals, with its prevalence increasing as age increases. Women are at a higher risk of developing DED compared

to men.^[10-15] This is supported by clinical examinations that have found a decrease in tear production in individuals in their sixth decade of life.^[10]

In his research on the effects of smoking on tear proteins, Grus found that there were changes in the tear film of a smoker, where there was an increase in protein spots due to toxins from cigarettes that caused oxidative damage to the proteins.^[16] This explains why smoking is a risk factor for Dry Eye Disease. The research conducted in Saudi Arabia regarding electronic cigarettes, which are claimed to be an alternative to conventional cigarettes that are safe and non-addictive, has found that they are actually unsafe and can cause health issues such as nausea, vomiting, headaches, dryness around the mouth, eyes, and mucous membranes.^[17] In our research, there is a positive

correlation between smoking habits and the incidence of Dry Eye Disease in rural areas ($p=0,0004$).

Several literature states that excessive use of electronic devices can cause dry eyes. A study in Serbia with a population of 18–34-year-old students found a prevalence of Dry Eye Disease (DED) of 60.5%. Electronic devices have a significant relationship with the occurrence of DED, and the longer the duration of electronic device use, the higher the prevalence of DED. [18] To assess the effect of smartphones on the onset of DED symptoms, tear film and oxidative stress in the eyes, Choi conducted a case-control study, and the results showed that using electronic devices for more than 4 hours would worsen DED symptoms and lead to oxidative stress in the eyes.

5. Conclusion

The habit of smoking and excessive use of electronic devices can cause damage to the tear film layer, resulting in DED symptoms. It is necessary to explain this to the public, both in rural and urban areas.

References

1. International Dry Eye WorkShop. The definition and classification of dry eye disease: report of the Definition and Classification Subcommittee of the International Dry Eye WorkShop. *Ocul Surf.* 2007;5:75-92.
2. Echieh CI, Etim BA, Echieh CP, Oyeniyi T, Ajewole J. A comparative assessment of Dry Eye Disease Among Outdoor Street Sweepers and Indoor Office Cleaners. *BMC Ophthalmology* 2021;21:265. doi.org/10.1186/s12886-021-02025-y
3. Liu N, Liu L, Li J, Sun Y. Prevalence of and Risk Factors for Dry Eye Symptom in Mainland China: A Systematic Review and Meta-Analysis. *J. Ophthalmol* 2014;1-8. http://dx.doi.org/10.1155/2014/748654
4. Alkabbani S, Jeyaseelan L, Rao AP, Thakur SP, Warhekar PT. The Prevalence, Secerity, and Risk Factors for Dry Eye Disease in Dubai – a cross sectional study. *BMC Ophthalmology* 2021;21:219. https://doi.org/10.1186/s12886-021-01978-4
5. Lee AJ, Lee J, Saw S-M, Gazzard G, Koh D, Widjaja D, Tan DTH. Prevalence and Risk Factors Associated with Dry Eye Symptoms: a population-based study in Indonesia. *Br J Ophthalmol* 2002;86:1347–1351
6. Stevens S. Schirmer's test. *Community Eye Health.* 2011 Dec;24(76):45
7. Li X, Wang Z, Mu J, Puerkaiti H, Nulahou A et al. Prevalence and Associated Risk Factors of Dry Eye Disease in Hotan, Xinjiang: A Cross Sectional Study. *BMC Ophthalmology* (2023); 23:214. https://doi.org/10.1186/s12886-023-02955-9
8. Ranjan R, Shukla SK, Singh CV, Mishra BN, Sinha S et al. Prevalence of Dry Eye and Its Association with Various Risk Factors in Rural Setup of Western Uttar Pradesh in a Tertiary Care Hospital. *Journal of Preventive Medicine,* 6, 57-63. http://dx.doi.org/10.4236/ojpm.2016.61005_
9. Osaie EA, Ablordeppey RK, Horstmann J, Kumah DB, Steven P. Clinical Dry Eye and Meibomian Gland Features Among Dry Eye Patients in Rural and Urban Ghana. *Clinical Ophthalmology* 2020;14:4055-63
10. de Paiva CS. Effects of Aging in Dry Eye. *Int Ophthalmol Clin.* 2017; 57(2): 47–64. doi:10.1097/HIO.000000000000170
11. Ozdemir M, Temizdemir H. Age and gender related tear function changes in normal population. 2010. *Eye* 24; 79-83
12. Sharma A, Hindman HB. Aging: A Predisposition to Dry Eyes. 2014. *Journal of Ophthalmology.* http://dx.doi.org/10.1155/2014/781683
13. Bikbov MM, Kazakbaeva GM, Rakhimova EM, Rusakova IA, Fakhretdinova AA et al. The prevalence of dry eye in a very old population. *Acta Ophthalmologica.* 2022; 100: 262-8. doi: 10.1111/aos.14937
14. AlMarshedi MM, Alshammari SA. The Prevalence of Dry Eye Disease and Related Factors Among Adult Patients Attending Primary Healthcare Centers in Riyadh, Saudi Arabia. *Cureus* 14(11): e31400. DOI 10.7759/cureus.31400
15. Panggat KMS, Covar RV SL. Prevalence of Dry Eye Disease in an Urban Community. *Philipp J Ophthalmol.* 2015;40:29-35
16. Grus FH, Sabuncuo P, Augustin A, Pfeiffer N. Effect of Smoking on Tear Protein. *Graefe's Arch Clin Exp Ophthalmol.* (2002) 240:889–892. DOI 10.1007/s00417-002-0539-y
17. Meo SA, Al Asiri SA. Effects of Electronic Cigarette Smoking on Human Health. *European Review for Medical and Pharmacological Sciences.* 2014; 18: 3315-3319
18. Aćimović L, Stanojlović S, Kalezić T, Krnjaja BD. Evaluation of Dry Eye Symptoms and Risk Factors among Medical Students in Serbia. *Plos One* 2022;17(10): e0275624. https://doi.org/10.1371/journal.pone.0275624
19. Wu H, Wang Y, Dong N, Yang F, Lin Z et al. Meibomian Gland Dysfunction Determines the Severity of the Dry Eye Conditions in Visual Display Terminal Workers. *Plos One* 2014;9(8): e105575. doi:10.1371/journal.pone.0105575
20. Choi JH, Li Y, Kim SH, Jin R, Kim YH et al. The influences of smartphone use on the status of the tear film and ocular surface. *Plos One.* 2018;13(10): e0206541. https://doi.org/10.1371/journal.pone.0206541

Ida Eff Dry eye Noviani

by Ida Effendi FK

Submission date: 20-Aug-2024 11:23PM (UTC+0700)

Submission ID: 2435083841

File name: isk-factors-in-rural-and-urban-areas-in-indonesia_1690536758.pdf (252.77K)

Word count: 2290

Character count: 11020



WWJMRD2023; 9(07):108-110
www.wwjmr.com
International Journal
Peer Reviewed Journal
Refereed Journal
Indexed Journal
Impact Factor SJIF 2017:
5.182 2018: 5.51, (ISI) 2020-
2021: 1.361
E-ISSN: 2454-6615

Noviani Prasetyaningsih
Faculty of Medicine,
Universitas Trisakti, Jakarta,
Indonesia.

Anggraeni Adiwardhani
Faculty of Medicine,
Universitas Trisakti, Jakarta,
Indonesia.

Riani Witjaksana
Faculty of Medicine,
Universitas Trisakti, Jakarta,
Indonesia.

Isa Bella
Faculty of Medicine,
Universitas Trisakti, Jakarta,
Indonesia.

Jihan Samira
Faculty of Medicine,
Universitas Trisakti, Jakarta,
Indonesia.

Ida Effendi
Faculty of Medicine,
Universitas Trisakti, Jakarta,
Indonesia.

Monica Dwi Hartanti
Faculty of Medicine,
Universitas Trisakti, Jakarta,
Indonesia
Center for Biomedical
Research, National Research
and Innovation Agency, West
Java, Indonesia.

Freily Akay
Universitas Sam Ratulangi,
Manado, Indonesia.

Correspondence:
Monica Dwi Hartanti
Faculty of Medicine,
Universitas Trisakti, Jakarta,
Indonesia.

Dry eye disease and its risk factors in rural and urban areas in Indonesia

Noviani Prasetyaningsih, Anggraeni Adiwardhani, Riani Witjaksana, Isa Bella, Jihan Samira, Ida Effendi, Monica Dwi Hartanti, Freily Akay

Abstract

This cross-sectional study was conducted in two regions in Indonesia, Karawaci Banten and Depok City to determine the risk factors of Dry Eye Disease (DED) in rural and urban areas. To assess DED, the Schirmer test was performed on one eye (right eye). The risk factors being studied were age, gender, smoking habits, and the use of electronic devices. A total of 145 respondents was recruited, with 60 respondents (41.4%) from rural areas and 85 respondents (58.6%) from urban areas. The prevalence of DED was higher in urban areas, with 54.1% (46/85) compared to 48.3% (29/60) in rural areas. There was no significant association between age and gender with the incidence of DED in both rural and urban areas ($p>0.05$). Smoking was significantly associated with DED incidence in rural areas ($p=0.0004$), but not in urban areas. The use of electronic devices was significantly associated with DED incidence only in urban areas ($p=0.043$). Smoking is a risk factor for DED in rural areas, while the use of electronic devices is the main risk factor in urban areas.

Keywords: Dry Eye Disease, Rural, Urban, Schirmer.

1. Introduction

Dry eye disease is defined by the Report of the Definition and Classification Subcommittee of the International Dry Eye Workshop as a multifactorial disease of the tears and ocular surface, which results in symptoms of discomfort, visual disturbance, and tear film instability, with potential damage to the ocular surface.^[1] The prevalence of dry eye disease ranges from 5-35% of the population worldwide, with Nigeria having a prevalence of 19.2%,^[2] China 17%,^[3] and Dubai 62.6%.^[4] In Indonesia, the prevalence of dry eye disease is 27.5% in a study conducted in the Riau Islands.^[5] The purpose of this study is to compare the incidence of dry eye disease in rural and urban areas based on risk factors such as age, gender, smoking habits and the use of electronic devices.

2. Methods

This cross-sectional study was conducted in two regions in Indonesia, Karawaci Banten as a rural area and Depok City as an urban area. The exclusion criteria were the presence of signs of eye infection, the use of contact lenses, and the use of routine eye drops for the last 6 months. After signing the informed consent and filling out the identity sheet, there were several additional questions regarding smoking habits, and the use of electronic devices. The eye examination performed was a Schirmer's test just to the right eye to assess the quantity of tears. The Schirmer test was performed by an ophthalmologist without anesthetic using Whatman No. 41 filter paper, which is 5 mm wide and 30 mm long. The tip of the Schirmer paper was folded about 5 mm and inserted into the inferior fornix conjunctiva. The eye was closed and left for 5 minutes. After 5 minutes, the length of the wetted Schirmer paper was measured. DED was indicated if the wetted Schirmer paper was less than 10 mm.^[6] All data were analyzed using the GraphPad version 9 program. The data collected was presented in the form of frequency and percentage distributions. Bivariate analysis of two groups was performed using the Chi-square test, if certain conditions were met with a significance level of $p<0.05$. If not, the Fisher's exact test was used.

2. Result

A total of 145 respondents participated in the research, with 60 respondents (41.4%) from rural areas and 85 respondents (58.6%) from urban areas. The respondents were divided into two age groups, the age group of 30-50 years old consisted of 79 respondents (54.5%), while the age group of over 50 years old consisted of 66 respondents (45.5%). The prevalence of DED was 48.3% in the rural group (n=60) and 54.1% in the urban group (n=85). The demographic profile of the study subjects in rural and urban areas is presented in Table 1.

Table 2 shows various risk factors for Dry Eye Disease in both rural and urban areas. According to our research, age and gender did not have a significant relationship with the incidence of Dry Eye Disease ($p > 0.05$). However, smoking habits were significantly associated with the incidence of Dry Eye Disease in rural areas ($p = 0.0004$), but not in urban areas. On the other hand, excessive use of electronic devices was the main risk factor for Dry Eye Disease in urban areas ($p = 0.043$).

Table 1: Characteristics of respondents in Rural and Urban areas.

Characteristics	Rural		Urban	
	n = 60	%	n = 85	%
Gender				
Male	26	43,3	33	38,8
Female	34	56,7	52	61,2
Ages				
30 - 50	44	73,3	35	41,2
More than 50	16	26,7	50	58,8
Smoking habits				
Yes	13	21,7	23	27,1
No	47	78,3	62	72,9
Use of electronic devices				
Yes	43	71,7	33	38,8
No	17	28,3	52	61,2
Dry Eye (Schirmer)				
Yes	29	48,3	46	54,1
No	31	51,7	39	45,9

Table 2: Distribution of Dry Eye Disease based on Risk Factors in Rural and Urban Areas.

Risk Factors	Rural (n = 60)				p	Urban (n = 85)				p
	Dry Eye (Schirmer)					Dry Eye (Schirmer)				
	Yes		No			Yes		No		
	n	%	n	%	n	%	n	%		
Gender					0,205					0,085
Male	15	25,0	11	18,3		14	16,5	19	22,4	
Female	14	23,3	20	33,3		32	37,6	20	23,5	
Ages					0,185					0,979
30 - 50	19	31,7	25	41,7		19	22,4	16	18,8	
More than 50	10	16,7	6	10,0		27	31,8	23	27,0	
Smoking habits					0,0004*					0,054
Yes	12	20,0	1	1,7		9	10,6	15	17,6	
No	17	28,3	30	50,0		37	43,5	24	28,2	
Use of electronic devices					0,901					0,043
Yes	21	35,0	22	36,7		17	20,0	23	27,1	
No	8	13,3	9	15,0		29	34,1	16	18,8	

* Fisher test

4. Discussion

The prevalence of DED based on Schirmer examination in this study was 48.3% in rural areas and 54.1% in urban areas. This number has increased compared to the results of a study conducted in Indonesia in 2002, which had a prevalence of 27.5%.^[5] A relatively high prevalence was also found in Hotan, China, where the prevalence reached 40.6%,^[7] while the prevalence in a study in rural areas of India was 45.39%.^[8] A study in Ghana, Africa compared the prevalence of DED in rural and urban areas, and the results showed that respondents in rural areas suffered more from DED and had more severe symptoms than respondents in urban areas.^[9] DED usually affects older individuals, with its prevalence increasing as age increases. Women are at a higher risk of developing DED compared

to men.^[10-15] This is supported by clinical examinations that have found a decrease in tear production in individuals in their sixth decade of life.^[10] In his research on the effects of smoking on tear proteins, Grus found that there were changes in the tear film of a smoker, where there was an increase in protein spots due to toxins from cigarettes that caused oxidative damage to the proteins.^[16] This explains why smoking is a risk factor for Dry Eye Disease. The research conducted in Saudi Arabia regarding electronic cigarettes, which are claimed to be an alternative to conventional cigarettes that are safe and non-addictive, has found that they are actually unsafe and can cause health issues such as nausea, vomiting, headaches, dryness around the mouth, eyes, and mucous membranes.^[17] In our research, there is a positive

correlation between smoking habits and the incidence of Dry Eye Disease in rural areas ($p=0,0004$).

Several literature states that excessive use of electronic devices can cause dry eyes. A study in Serbia with a population of 18–34-year-old students found a prevalence of Dry Eye Disease (DED) of 60.5%. Electronic devices have a significant relationship with the occurrence of DED, and the longer the duration of electronic device use, the higher the prevalence of DED.^[18] To assess the effect of smartphones on the onset of DED symptoms, tear film and oxidative stress in the eyes, Choi conducted a case-control study, and the results showed that using electronic devices for more than 4 hours would worsen DED symptoms and lead to oxidative stress in the eyes.

5. Conclusion

The habit of smoking and excessive use of electronic devices can cause damage to the tear film layer, resulting in DED symptoms. It is necessary to explain this to the public, both in rural and urban areas.

References

1. International Dry Eye WorkShop. The definition and classification of dry eye disease: report of the Definition and Classification Subcommittee of the International Dry Eye WorkShop. *Ocul Surf*. 2007;5:75-92.
2. Echieh CI, Etim BA, Echieh CP, Oyeniyi T, Ajewole J. A comparative assessment of Dry Eye Disease Among Outdoor Street Sweepers and Indoor Office Cleaners. *BMC Ophthalmology* 2021;21:265. doi.org/10.1186/s12886-021-02025-y
3. Liu N, Liu L, Li J, Sun Y. Prevalence of and Risk Factors for Dry Eye Symptom in Mainland China: A Systematic Review and Meta-Analysis. *J. Ophthalmol* 2014;1-8. http://dx.doi.org/10.1155/2014/748654
4. Alkabbani S, Jeyaseelan L, Rao AP, Thakur SP, Warhekar PT. The Prevalence, Secerity, and Risk Factors for Dry Eye Disease in Dubai – a cross sectional study. *BMC Ophthalmology* 2021;21:219. https://doi.org/10.1186/s12886-021-01978-4
5. Lee AJ, Lee J, Saw S-M, Gazzard G, Koh D, Widjaja D, Tan DTH. Prevalence and Risk Factors Associated with Dry Eye Symptoms: a population-based study in Indonesia. *Br J Ophthalmol* 2002;86:1347–1351
6. Stevens S. Schirmer's test. *Community Eye Health*. 2011 Dec;24(76):45
7. Li X, Wang Z, Mu J, Puerkai H, Nulahou A et al. Prevalence and Associated Risk Factors of Dry Eye Disease in Hotan, Xinjiang: A Cross Sectional Study. *BMC Ophthalmology* (2023); 23:214. https://doi.org/10.1186/s12886-023-02955-9
8. Ranjan R, Shukla SK, Singh CV, Mishra BN, Sinha S et al. Prevalence of Dry Eye and Its Association with Various Risk Factors in Rural Setup of Western Uttar Pradesh in a Tertiary Care Hospital. *Journal of Preventive Medicine*, 6, 57-63. http://dx.doi.org/10.4236/ojpm.2016.61005
9. Osa E, Ablordepey RK, Horstmann J, Kumah DB, Steven P. Clinical Dry Eye and Meibomian Gland Features Among Dry Eye Patients in Rural and Urban Ghana. *Clinical Ophthalmology* 2020;14:4055-63
10. de Paiva CS. Effects of Aging in Dry Eye. *Int Ophthalmol Clin*. 2017; 57(2): 47–64. doi:10.1097/IIO.0000000000000170
11. Ozdemir M, Temizdemir H. Age and gender related tear function changes in normal population. 2010. *Eye* 24; 79-83
12. Sharma A, Hindman HB. Aging: A Predisposition to Dry Eyes. 2014. *Journal of Ophthalmology*. http://dx.doi.org/10.1155/2014/781683
13. Bikbov MM, Kazakbaeva GM, Rakhimova EM, Rusakova IA, Fakhretdinova AA et al. The prevalence of dry eye in a very old population. *Acta Ophthalmologica*. 2022; 100: 262-8. doi: 10.1111/aos.14937
14. AlMarshedi MM, Alshammari SA. The Prevalence of Dry Eye Disease and Related Factors Among Adult Patients Attending Primary Healthcare Centers in Riyadh, Saudi Arabia. *Cureus* 14(11): e31400. DOI 10.7759/cureus.31400
15. Panggat KMS, Covar RV SL. Prevalence of Dry Eye Disease in an Urban Community. *Philipp J Ophthalmol*. 2015;40:29-35
16. Grus FH, Sabuncuo P, Augustin A, Pfeiffer N. Effect of Smoking on Tear Protein. *Graefe's Arch Clin Exp Ophthalmol*. (2002) 240:889–892. DOI 10.1007/s00417-002-0539-y
17. Meo SA, Al Asiri SA. Effects of Electronic Cigarette Smoking on Human Health. *European Review for Medical and Pharmacological Sciences*. 2014; 18: 3315-3319
18. Aćimović L, Stanojlović S, Kalezić T, Krmjaja BD. Evaluation of Dry Eye Synptoms and Risk Factors among Medical Students in Serbia. *Plos One* 2022;17(10): e0275624. https://doi.org/10.1371/journal.pone.0275624
19. Wu H, Wang Y, Dong N, Yang F, Lin Z et al. Meibomian Gland Dysfunction Determines the Severity of the Dry Eye Conditions in Visual Display Terminal Workers. *Plos One* 2014;9(8): e105575. doi:10.1371/journal.pone.0105575
20. Choi JH, Li Y, Kim SH, Jin R, Kim YH et al. The influences of smartphone use on the status of the tear film and ocular surface. *Plos One*. 2018;13(10): e0206541. https://doi.org/10.1371/journal.pone.0206541

Ida Eff Dry eye Noviani

ORIGINALITY REPORT

19%

SIMILARITY INDEX

17%

INTERNET SOURCES

15%

PUBLICATIONS

0%

STUDENT PAPERS

MATCH ALL SOURCES (ONLY SELECTED SOURCE PRINTED)

3%

★ Luna Aćimović, Svetlana Stanojlović, Tanja Kalezić, Bojana Dačić Krnjaja. "Evaluation of dry eye symptoms and risk factors among medical students in Serbia", PLOS ONE, 2022

Publication

Exclude quotes On

Exclude matches < 10 words

Exclude bibliography On