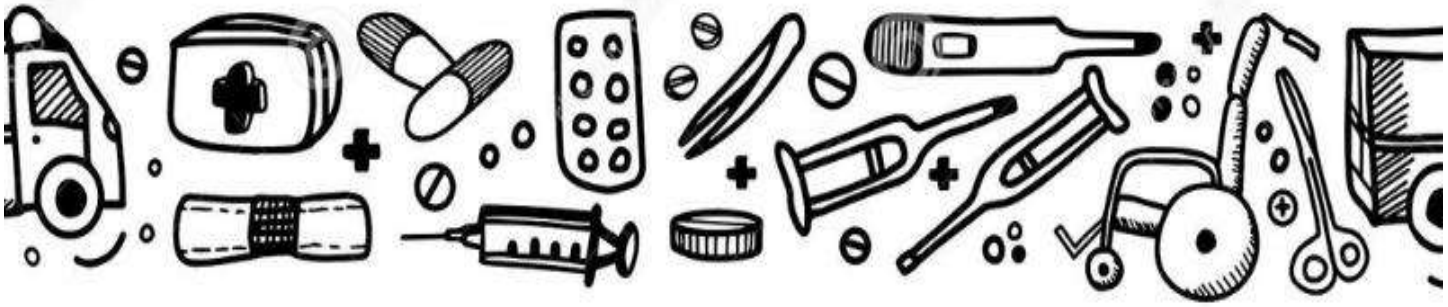
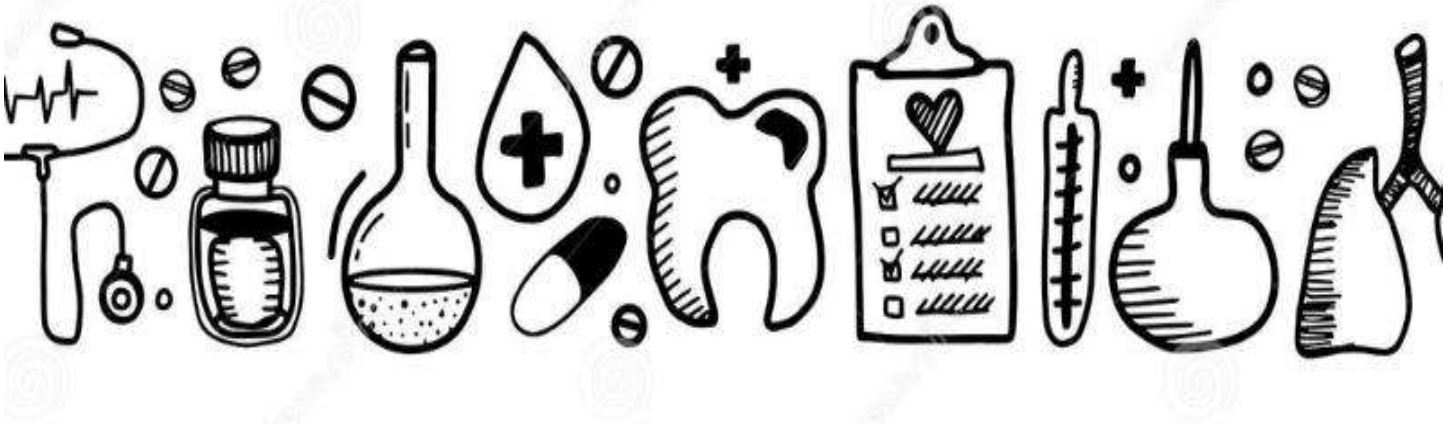
HBSRA



HBSRA Conference Proceedings 2023

Email: convener@eurasiaresearch.info
Website: https://hbsraevents.org/



Presidential Note

We are currently observing a high development in science and innovations associated to biology, life-sciences, and healthcare. To update knowledge and to develop skills on these areas it is critical for professionals, academics, and researchers to participate in international conferences such as the ones promoted by the Healthcare and Biological Sciences Research Association (HBSRA). The participation in HBSRA conferences brings diverse benefits, e.g., enables the development of international networks for collaborations, the acquisition and sharing of knowledge and ideas, to take part in debates, and to promote the development of new visions such as how science and the community can contribute further on these areas, towards the benefit of society. The Proceedings associated to HBSRA conferences are therefore an important tool to resume the work conducted along these events. We invite all the stakeholders on these areas to be an active member of our community, and especially to participate on HBSRA conferences, taken advantages of all opportunities associated with it.

Dr. Cecília R.C. Calado

President

ISEL-Instituto Superior de Engenharia de Lisbon, Portugal

Table of Contents:

I.

Healthcare and Biological Sciences Research Association (HBSRA) is an international community of researchers, practitioners, students, andprofessionals for the development and spread of ideas in the field ofhealthcare and life sciences. HBSRA is promoted by Eurasia Research. HBSRA aims to bring together worldwide researchers and professionals, encourage intellectual development, and create opportunities for networking and collaboration. These objectives are achieved through academic networking, meetings, conferences, workshops, projects, research publications, academic awards,and scholarships.
The driving force behind this association is its diverse members and advisory board, who provide inspiration, ideas, efforts and drive collaborations. Scholars, Researchers, Professionals are invited to become a member of HBSRA and join this ever-growing network, working for benefit of society and research with the spirit of sharing and mutual growth.

Salient Features:

- 15000 + and growing network of professionals
- Professional and Experienced team
- Conferences in Asia, Europe & Africa
- Events at reputed institutes and grand venues
- Lifetime membership
- Strong Social Media Platform for networking
- Young Researcher Scholarships
- Research publication in international journals

II.

PRESIDENT

Dr. Cecilia O. Martinez, Dean, College of Nursing, University of Manila, Manila, Philippines

VICE-PRESIDENT

Dr. Saliha Bozdogan Yesilot, Faculty of Health Sciences Nursing Department, Cukurova University, Adana, Turkey

Svetlana S. Muradyan, Lecturer & Chair of Special Pedagogy and Psychology of ASPU (after Kh. Abovyan),Armenia

Yoshiko Yamaguchi, Research Associate of Home Care Nursing, Faculty of Nursing, Kwassui Women's University, Nagasaki, Japan

III.

HBSRA COMMITTEE MEMBERS

1.	Dr. Cecilia O.Martinez	Dean, College of Nursing, University of Manila, Manila, Philippines
2.	Dr. Saliha BozdoganYesilot	Faculty of Health Sciences Nursing Department, Cukurova University, Adana,Turkey
3.	Svetlana S. Muradyan	lecturer of chair of Special pedagogy and psychology of ASPU after Kh.Abovyan, Russia
4.	Yoshiko Yamaguchi	Research Associate of Home Care Nursing, Faculty of Nursing,Kwassui Women's University, Nagasaki, Japan
5.	Indu M Nair	School of Biosciences, Mahatma Gandhi University, Kottayam, Kerala, India
6.	Dr. Jestoni DulvaManiago	Assistant Professor, Department of Nursing, College of Applied MedicalSciences, Sciences, Majmaah University, Al Majmaah, Ar-Rabi, Riyadh, Kingdom of Saudi Arabia
7.	Dr. Ahmed H. A.Dabwan	Senior Lecturer, Head of Chemical and Polymer Innovation Technology Cluster, Faculty of Chemical Engineering Technology, TATI University College, JalanPanchor, Teluk Kalong 24000 Kemaman, Terengganu, Malaysia
8.	Dr. Hanaa Abd ElBaky	Prof. Dr. of Plant Biochemistry, Plant Biochemistry Dept., National ResearchCentre, Cairo, Egypt
9.	Palanisamy Sivanandy	Department of Pharmacy Practice, School of Pharmacy, International Medical University, Kuala Lumpur, Malaysia
10.	Prof. Dr. MustafaMetin Donma	Namik Kemal University, Faculty of Medicine, Department of Pediatrics,Altinova 59100, Tekirdag, Turkey
11.	Abdulelah Mohammed Alhaidary	Prince Sultan Military Medical City, Riyadh, Saudi Arabia
12.	Sharmin Sultana	Nanotechnology and Catalysis Research Centre (NANOCAT), University ofMalaya, Kuala Lumpur, Malaysia
13.	Dr. Cyaria TongdenGurung	Assistant Professor in Botany (Grade 3), Department of Botany, Siliguri College, Siliguri- 734 001, Dist. Darjeeling. West Bengal
14.	Yu-Chuan Chang,R.N.	Head Nurse of Cardiovascular Center of National Taiwan University Hospital, Taipei, Taiwan, Lecturer, Department of the Ministry of Education: Chang GungUniversity of Science and Technology, Taoyuan City, Taiwan
15.	Made Indra Wijaya,M.D., M.H.A.	Hospital Director of Bali International Medical Centre (BIMC) Hospital, Bali,Indonesia
16.	Dr. S. Palanisamy	M. Pharm., Ph.D., Gcp (My)., Scope (My)., Lecturer, Department of Pharmacy Practice, School of Pharmacy,International Medical University (IMU), Kuala Lumpur, Malaysia
17.	Prof. Dr. HananAnwar Aly Taie	Research Professor of Plant Biochemistry and Head of Plant Biochemistry Department, National Research Centre, Giza, Egypt
18.	Dr. Arif Hussain	Associate Professor, School of Life Sciences, Manipal Academy of HigherEducation, Dubai, UAE

IV. Preface:

Healthcare and Biological Sciences Research Association (HBSRA) is an international forum of researchers, academicians, and practitioners for sharing knowledge and innovation in the field of healthcare and life sciences. HBSRA aims to bring together worldwide researchers and professionals, encourage intellectual development, and providing opportunities for networking and collaboration. This association meets its objectives through academic networking, meetings, conferences, workshops, projects, research publications, academic awards, and scholarships. HBSRA strives to enrich its diverse group of advisory members. Scholars, Researchers, Professionals are invited to freely join HBSRA and become a part of a diverse academic community, working for benefit of academia and society through collaboration and vision.

For this conference around 20 Participants from around 7different countries have submitted their entries for review and presentation.

HBSRA has now grown to 16,450 followers and 9500 members from 85 countries.
Membership in our scholarly association HBSRA is chargeable.
List of members: https://hbsraevents.org/membership/list-of-members
Membership Application form link:
https://hbsraevents.org/membership?association=hbsra

The proceeding is a book of abstracts, all the abstracts are published in our conference proceedings a day before the conference.

You can get our conference proceedings at: https://hbsraevents.org/proceedings

We hope to have an everlasting and long-term friendly relation with you in the future.
In this context, we would like to share our social media weblinks:
https://www.facebook.com/groups/UnitedResearchers

You will be able to freely communicate your queries with us, collaborate and interact with our previous participants, share and browse the conference pictures on the above link.

Our mission is to make continuous efforts in transforming the lives of people around the world through education, application of research & innovative ideas.

Editor: Dr. Davis Lazarus

ISSN: 2454-5872

HBSRA Full Name: Healthcare & Biological Sciences Research Association

Address: - B-305 South Block Eurasia Research World Trade Park, Malviya Nagar Jaipur, India

E-mail: convener@eurasiaresearch.info Conference website-

https://hbsraevents.org/

V. Publication Process:

All accepted original research papers in the English Language will be published in selected journals as per the publication policy, as available on the conference website. Once you receive the Invitation/ Acceptance letter that means your full paper is also accepted for publication in an International Journal, if you follow the communicated editorial instructions/ guidelines.

The journal publication will be peer-reviewed, checked for plagiarism, indexed, archived, open access, referenced by CrossRef and will carry ISSN number and DOI.

Even if your full paper is not yet ready, you may participate in the desired conference with your abstract. The abstract must contain the following:

Article Title
Full Names/ Emails/ Affiliations of the authors Abstract in 100-300 words
3-7 Keywords
You may update your submitted abstract/ title/ co-authors/ submit your full-paper on a later stage (before the conference).

You may submit your full original paper for publication in the conference journal, when it is complete, till the conference date. The last date of submission is the conference day itself. While submitting the full paper, please provide the following in the email:

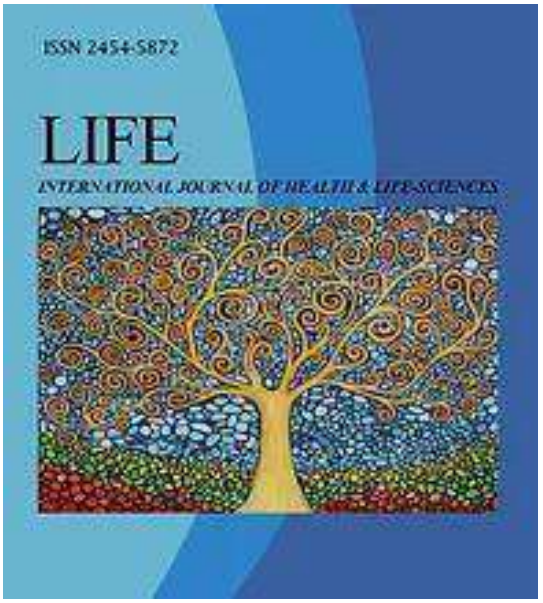
Full paper in MS Word format. (Ideally, a research paper should be 2500-3000 words).
Details of 2 reviewers with their names, affiliations, contact numbers and email IDs (If possible, send two emails for each reviewer).
Duly filled and scanned the 'Consent to Publish' form with a handwritten signature.
We follow the following steps for publication in our associated International Journals.
The publication process takes around 70 days, starting from the end of the conference.

A list of registered papers is sent to all the participants of the conference within a week's time after the conference. Please see, if your paper is included in the list. If not, please write back to us for inclusion. This list would also mention for any deficiency/incompleteness found in the submitted paper. You would be given 10 days to return your complete papers/ required information.
After this, the editorial team would send all complete papers for review (usually 5-7 reviewers). The review process takes around 30 days.
Following this, our editor would send the editorial comments/ suggestions to the corresponding author. Please improve the paper as indicated in the review and send it back to us within 10 days.
If the paper received is complete in all regards as per the comments/ suggestions, it would be sent for final publication, else we would send it again to you and finally, 5 days would be given to you for its improvement. Finally, the paper is published and the authors are informed about the published paper by email, which contains the paper URL, DOI, Citation, and other related information.
If you fail to meet the deadlines/ correct the paper as per review comments, the paper may be rejected or it will be postponed for publication in the next issue. Normally, the

entire process takes around 70 days.

Authors may request the conference secretariat for withdrawing their paper, for publishing it elsewhere (in the journal of their choice). In such cases, the requested papers are removed from the publication process. The withdrawal requests may be given to the conference secretariat before the commencement of the publication process (7 days after the conference).

Publishing



VI. Acknowledgement

Our sincere thanks go to our outstanding supporters who made this great and interesting conference possible.

VII. HBSRA Institutional Members

VIII. Keynote Speakers 2023

Some special thanks go to our outstanding Key-Note speakers, not only for their inspiring and highly interesting presentations but also for their input and contributions in the discussions andQ&A sessions during the conference:

Topic: Hospital Nurses: Their Mental Health and Intention to Leave Work

Dr. Yoshiko Yamaguchi has received her Ph.D. at. Kyushu University during the period of 2013-2016. Currently, she is working as a research associate in Home Care Nursing, at the Faculty of Nursing, Kwassui Women's University, Japan. She has successfully completed her responsibilities as a reviewer of eighty-one research articles in twenty-four journals from 2016-present. And she has been serving as an editorial board member of two journals; LIFE: International Journal of Health and Life-Sciences and Journal of Practical and Professional Nursing and has been delegated vice president of the Healthcare and Biological Sciences Research Association (HBSRA).

Dr. Yoshiko Yamaguchi
Home Care Nursing, Faculty of Nursing, Kwassui Women's University, Japan

Topic: Recent Trends in Infectious Disease Modelling

Dr. (Mrs.) W. G. Samanthi Konarasinghe, an award winning Scientist has served as a Statistical Consultant and an Academician for more than two decades. She has developed various Mathematical and Statistical techniques to the world. The Circular Model (CM) and Sama Circular Model (SCM) are two of the widely applied techniques whilst the Damped Circular Model (DCM) and Forced Circular Model (FCM) are the recently developed models. Dr. Samanthi has won the Best paper Award from International Conference on Advances in Mathematics, Computers & Physical Sciences and the International Conference on Business, Economics, Social Sciences & Humanities for her research findings. She was awarded the "IMRF BEST SCIENTIST AWARD, INDIA" for her invaluable contribution to the field of Statistics. She has been in constant demand due to her new findings, gets invitation from various destinations to share her knowledge as the keynote speaker, invited speaker etc. at international research forums in Thailand, Singapore, Malaysia, India, Australia and many other countries. Also, she was the guest of honor and the chief guest of many International research forums. Dr. Samanthi is a multi-disciplinarian; has obtained a Bachelor of Science Degree in Mathematics; Postgraduate Diploma in Industrial Mathematics; Master of Science in Applied Statistics, Master of Business Administration (MBA), and Doctor of Philosophy in Statistics, Doctor of Philosophy in Statistics. Also has the Diploma in Classical Music. She is a member of; the American Statistical Association (ASA), Statistical Society Australia (SSA), Institute of Applied Statistics, Sri Lanka (IASSL), and National Science Foundation (NSF), Sri Lanka. She is the Editor in Chief of, Journal of New Frontiers in Mathematics & Statistics; Journal of New Frontiers in Economics & Business; Journal of New Frontiers in Healthcare & Biological Sciences; Journal of New Frontiers in Education & Social Sciences, published by the Institute of Mathematics and Management of Sri Lanka. Also, an Editorial board member of the American Journal of Theoretical and Applied Statistics (AJTAS). She is an Advisory Member Technical/ Scientific Conference Committee member of the Scientific and Technical Research Association (STRA). Most interestingly, Dr. Samanthi is not only a Scientist but also an Artist; a Violinist, Painter, Writer, Drama producer, and actress. The membership magazine of the American Statistical Association; "AMSTATNEWS" wrote two testimonials on her.

Dr. (Mrs.) W. G. Samanthi Konarasinghe
Academic Director & Statistical Consultant, Institute of Mathematics and Management, Sri Lanka & Australia

Topic: Brown algae as a rich source of novel alginate-lyase producing bacteria to combat biofilm-related infection

Dr. Stalis Norma Ethica M.Si. (Orcid ID: 0000-0002-0853-0423) is a lecturer and researcher with an industrial experience background. She specializes in the use of bacterial cells and enzymes for their possible benefits as bioremediation, therapeutic or diagnostic agents, supported by encapsulation and genetic engineering technologies. Dr. Ethica earned her bachelor's and master's degrees in Chemistry from Universitas Gadjah Mada, Indonesia. Her doctorate majoring in Biotechnology was also obtained from the same university in 2014. In 2018 she obtained the advanced course on Next Generation Sequencing Bioinformatics (EMBL-EBI) in Wellcome Genome Campus, Cambridge, UK. She joined the Undergraduate Program of Medical Laboratory Technology of Universitas Muhammadiyah Semarang as a lecturer in 2015. From 2019 to present she has been serving as a full-time lecturer (assistant professor) at the Postgraduate Program of Magister of Clinical Laboratory Science of the same institution. Her projects related with the development of bioremediation agent of hospital wastewater from indigenous bacteria and the development of antithrombosis and antibiofilm agents from marine bacterial enzymes received supports from Indonesian Ministry of Research and Higher Technology.

Dr. Stalis Norma Ethica, M.Si.
Magister Program of Clinical Laboratory Science Universitas Muhammadiyah Semarang Semarang, Central Java, Indonesia

Technological and Algorithmic Solutions for In-Door Navigation Problem in Modern University Campus

Dr. Liudmyla Gryzun is a Full Professor of Information Systems Department at National University of Economics preparing IT specialists for various branches of economy. Liudmyla earned a M.A. in Applied Mathematics from the State University of Kharkiv (Ukraine); PhD and Post-Doctoral Degree in Pedagogical science from National Pedagogical University of Kharkiv (Ukraine). Her sphere of research is focused on the synchronized curriculum and holistic educational content design in higher education; Artificial Intelligence application to pedagogical problems solution; Petri networks apparatus as a tool for modelling in education; IT tools for inquiry-based and holistic learning etc. Dr. L. Gryzun's recent successful contributions include: (1) work as an international expert of the Open European-Asian Research Analytics Championship under the Program of the International Academy of Sciences and Higher Education (London, UK) (2012-2017); (2) participation in the European educational fair for STEM teachers "Science on the stage" (2019); (3) work as an invited speaker of the International internship "Digital future: blended learning" organized by DAAD German Academic Exchange Service (2022-2023); (4) work as a member (since September 2021 as a President) of the International organization Scientific and Technical Research Association (STRA), presenting the results of her research as a Keynote speaker at the at the number of Eurasia Research International conferences (2018 – 2023).

Dr. Liudmyla Gryzun
PhD & Post-Doctoral Degree in Pedagogical Science
Full Professor of Simon Kuznets Kharkiv National University of Economics, (Kharkiv, Ukraine), Information Systems Department

Digital Immortality and Future Research

Dr. Baloglu, completed her undergraduate at Technical University of Istanbul, her MBA in production management at University of Istanbul, and her PhD in Information Technology at University of Istanbul. She has experience of 15 years in production and technology management. She worked for various plants including manufacturing, service and consulting companies as middle or top manager. For instance, Ernst and Young Consulting Turkey is one of the companies, where she added important values within 5 years. Also she worked in SAP Business for a long time and managed various SAP/ERP projects in Turkey and also abroad. Now she is serving in ERP, CRM and e-business categories as senior consultant and lecturing at various universities. She gave the lectures and courses in the Universities of Bilgi, Işık and Yeditepe. Additional to these she is sometimes giving conference seminars and company trainings in her expertise areas. Dr. Baloglu has about 15 professional and academic papers, published in various technology magazines and books (10). And she currently works for Marmara University - Dept. of Business Informatics under title of Assoc. Prof and also lectures the some courses in Yeditepe University as part time lecturer such as ebusiness, innovation management, IOT, Agro IT, ERP, eSCM.

Assoc. Prof. Dr. Arzu Baloglu
IT Senior Mentor, Auditor and Author
Dept. of Industrial and Computer Engineering
Engineering Faculty, Marmara University, Istanbul, Turkey

Omics Application to Discover Biomarkers of Outcome of Critically Ill Patients

Cecília Calado, has a PhD and an MSc in Biotechnology, and a degree in Biochemistry. She is professor at the Lisbon High Engineering Institute (ISEL- Instituto Superior de Engenharia de Lisboa, https://www.isel.pt/en/), were coordinates the BSc and MSc in Biomedical Engineering and the R&D Lab. in Medical Bioengineering. She presents a broad experience in R&D in Development of Platforms to Discover Drugs and Diseases Biomarkers and Bioprocess Monitoring.

Cecília R.C. Calado
ISEL-Instituto Superior de Engenharia de Lisboa, Portugal

Epidemiology of Central Nervous Diseases

Dr. Priscilla Das have obtained my PhD from Universiti Sains Malaysia. My PhD research was in the field of Community Medicine. She also graduated from Universiti Putra Malaysia for her Msc (Master of Science Community Health) and BSc (Bachelor of Science-Major Biology). She has more than 41 academic publications and still publishing many other articles from her research work. Recently her research works have been selected in many news platforms especially in Yahoo news, Asia Research News-Research Sea news, ACN news, Medical Express, News Maker and many other news as well. She is passionate in doing research and teaching subjects taught in university. She has done the research among the hematological cancer patients in Ampang Hospital and intracranial tumour and other brain pathology /cancers in Hospital Kuala Lumpur and Hospital Universiti Sains Malaysia. She has done animal parasitology studies as well. She also has attended many sciences conferences, seminars and workshops as well.

Dr. Priscilla Das
Faculty of Medicine, SEGi University, No. 9, Jalan Teknologi, Taman Sains Selangor
Kota Damansara, PJU 5, 47810 Petaling Jaya, Selangor, Malaysia

Digital Dilemma: Navigating Youth Mental Health in the Age of Social Media

Dr. Abdelhak Senadjki is an esteemed Associate Professor of Economics at the Faculty of Business and Finance at Universiti Tunku Abdul Rahman (UTAR) in Malaysia. With his academic expertise and research experience, he has established himself as a well-respected scholar in the field of Economics. Dr. Senadjki holds a PhD from Universiti Sains Malaysia (USM) for his thesis titled 'Vulnerability to Poverty: A Study of Rural Population in Kelantan and Terengganu, Malaysia,' which he completed in 2013. He also received his Master of Economic Management from USM in 2008, and a bachelor's degree in Economics from University of Algiers in 2003. As an accomplished academician, Dr. Senadjki has received the USM fellowship from 2010 to 2013, during which he served as an academic researcher. His research interests include Energy Economics, Developmental Economics, Housing Economics, Health Economics, Employee Creativity and Innovation, and Organisational Culture. Dr. Senadjki has served in various leadership roles, including Head of Programme (Postgraduate Studies) from 01/01/2017 to 31/12/2018, Acting Head of Department of Economics from 01/02/2020 to 31/05/2020, and the Head of Postgraduate Programme PhD (Economics) from 23/03/2022 to date. Dr. Senadjki has contributed significantly to the academic community through his research and publications. He has published widely in various local and international refereed journals, WOS, Scopus, chapters in books, and research papers. His academic expertise is highly sought after, and he serves as a reviewer for several refereed journals, including the Journal of Islamic Accounting and Business Research, Journal of Development Career, International Journal of Social Economics, The Social Science Journal, Cogent Economics and Finance, Cogent Food and Agriculture, Journal of Poverty, Health Education and Behaviour Management, Sage Open, Academy of Accounting and Finance Studies Journal, Journal of Advances Management Research, International Review of Economics and Finance, Sustainability, Urban Science, Scientia Iranica, Sage Open, Social Responsibility Journal, Organizations and Markets in Emerging Economies, International Journal of Housing Markets and Analysis, Housing Studies, and others. Dr. Senadjki's contributions to the academic community have not gone unnoticed, and he has received several international and national awards. These awards include the 2019 Emerald Literati Awards, FIIB Business Review High Impact Research Award, Top Reviewer Awards (Cogent Economics & Finance), Best Papers Awards, Best Presenter Awards, and others. In addition to his academic achievements, Dr. Senadjki is also a Train-The-Trainer (TTT) Certified Trainer, showcasing his commitment to teaching and mentoring the next generation of scholars.

Dr. Abdelhak Senadjki
Associate Professor of Economics, Faculty of Business and Finance,
Universiti Tunku Abdul Rahman (UTAR) in Malaysia

"Path of Happiness" Charitable Non-Governmental Organization for People with Developmental Disabilities Aged 18-65

Svetlana is a Ph.D. in Education Sciences, Associate Professor, lecturer of chair of Special Pedagogy and Psychology of Armenian State Pedagogical University SPU after Khachatur Abovyan. She is Vice Dean for Science and International Cooperation / Faculty of Special and Inclusive Education She attended 35 Professional pieces of training in Dubai, Barcelona /Spain/, USA /Boston, San Diego/, London, United Kingdom, Germany, Moscow, Ukraine /Kramatorsk/ etc. She has published 34 scientific articles, methodical manuals. Her more than 50 scientific articles have been published in national and foreign cited journals, as well as textbooks (for people with special educational needs, their families and professionals). She was awarded more than 50 diplomas, certificates and letters of thanks.

Svetlana S. Muradyan
Associate Professor, Ph.D. in Education Sciences,
Lecturer of Chair of Special Pedagogy and Psychology of ASPU, Armenia

Potential MLC901 as Adjuvant Treatment for Spinal Cord Injury

Dr. Dewa Putu Wisnu Wardhana completed her medical degree from Udayana University, Bali, Indonesia in 2009. In 2015 she was working as a Neurosurgery specialist in the Neurosurgery Department and as a Medical Faculty of Airlangga University, Surabaya, Indonesia in 2015. She has completed her Clinical Neurosurgery (and Spine Surgery) fellowship at Brain & Spine Clinic, Gleneagles Hospital, and Mt. Alvernia Hospital, Singapore in 2016 and Clinical Spine fellowship at Center of Minimally Invasive Spinal Surgery Shin-Yurigaoka General Hospital, Kanagawa, Japan. In 2017, she completed Clinical fellowship for Skull Base Surgery from the Department of Neurosurgery, Osaka City University, Graduate School of Medicine, Osaka, Japan. She has been a Neurospine consultant since 2021. She is appointed as an Editorial board on Ganesha Medicina journal in 2021. She has also been a reviewer board member in the following journals: Jurnal Kedokteran dan Kesehatan Indonesia/JKKI 2019, Neurologico Spinale Medico Chirurgico/NSMC journal 2019, Bali Medical Journal/BaliMedJ 2019.

Dr. Dewa Putu Wisnu Wardhana
Neurosurgeon, Lecturer, Universitas Udayana, Denpasar, Bali, Indonesia

Nurses' Knowledge and Skills in Safe and Quality Care for Patients with Spinal Cord Injury

Dr. Jennifer P. Reyes completed her Bachelor of Science in Nursing at St. Jude College, her Master of Arts in Nursing major in Nursing Administration at the Philippine College of Health and Sciences, Inc., and her Doctor of Education major in Educational Administration at the Pamantasan ng Lungsod ng Maynila and currently she is taking her 2nd Doctorate Degree – Doctor of Philosophy in Nursing at Philippine Women's University. She worked as a staff nurse to Head Nurse in the clinical area for 6 years (1998-2004) before joining the academe in June 2004. She rose from the rank and file, from Instructor III to Assistant Prof. III to Associate Professor II handling different nursing subjects in the classroom and clinical areas. She assumed various administrative positions as follows: designated as Nursing Laboratory Coordinator to College Secretary to Associate Dean. In 2014-2016 she was appointed as the Dean of the College Nursing for the undergraduate (BSN) and graduate programs (MAN). She was selected as one of the Young Leaders by the National Academy of Science and Technology, Philippines Department of Science and Technology to attend and participate in the Future Health Leader Workshop last November 2015. She was also invited as one of the HEIs representatives and served as Department of Health Partners on the following DOH Academy activity programs:

1. DOH 1st Partner's Forum at Manila Pavilion Hotel, UN Ave. Manila on June 30, 2016;
2. DOH 2nd Partner's Forum at Lewis Hotel, Clark Pampanga on October 26-28, 2016;
3. DOH Academy Orientation and Consultative Meetings at Selah Garden Hotel, Pasay City on February 28, 2017.

She is also one of the core team members of the HELP Program in Partnership with the Rock of Ages Ministry and Pamantasan ng Lungsod ng Maynila College of Nursing from January 2018 up to present-time. She does volunteer work by giving health education, life and spirit seminars, and gift-giving activities to persons deprived of liberty (prisoners) in the different prisons in Metro Manila, Philippines. Moreover, she Served/Invited as an Adviser/Panelist during Oral Defense for Undergraduate and Graduate Programs (Theses and Dissertation Proposals and Final Defense) under PLM CN and PLM CED and an International Paper Reviewer Member: GRDS Publishing, and an Invited Member of External Advisory Board USLS Journal – University of St. La Salle. She is also a Research Oral Presenter/ invited Keynote Speaker and Conference Chair at different International Research Conferences and has published research papers in local and

international journals. She also co-authored published books: Title of Publication: Professional Education for Educators Across All Professions 2nd Edition (Co-Author) ISBN: 978-621-8084-45-2 and Title of Publication: Aliswag LifeLong Learning Series: Research Procedure Manual (For Graduate School) 2nd Edition (Co-Author) ISBN: 978-621-8084-45-2. Currently, she is a member of the PLM CN College Research Committee and Ang Nars Healthcare Workers CPD and Research Committee. She is also a member of different professional organizations: Life-time Member - Healthcare and Biological Sciences Research Association (HBSRA), Life-time Member - Philippine Nurses Association Inc. (PNA), Member – Eurasia Research Inc., Member – Professional Organization of Researchers and Educators of the Philippines (POREP), Member (Core Team) – Ang Nars Healthworkers Coalition, Member – Philippine Association of Nursing Authors for Clinical, Community Education and Administration(PANACCEA), Member – UNIFFIED Manila + Chapter, Member – Association of Higher Education Multidisciplinary Researchers, Inc., Member – Association of nursing Service Administrators of the Philippines, Inc. (ANSAP Inc.)

Dr. Jennifer Paule Reyes
Associate Professor II, College of Nursing
Pamantasan Ng Lungsod Ng Maynila, Manila, Philippines

IX. List of Online Conferences

Online Live International Conference 17th March 2023

Video Link for the Live Conference: Click Here

Participants from the Following Countries:

Online Live International Conference 26th April 2023

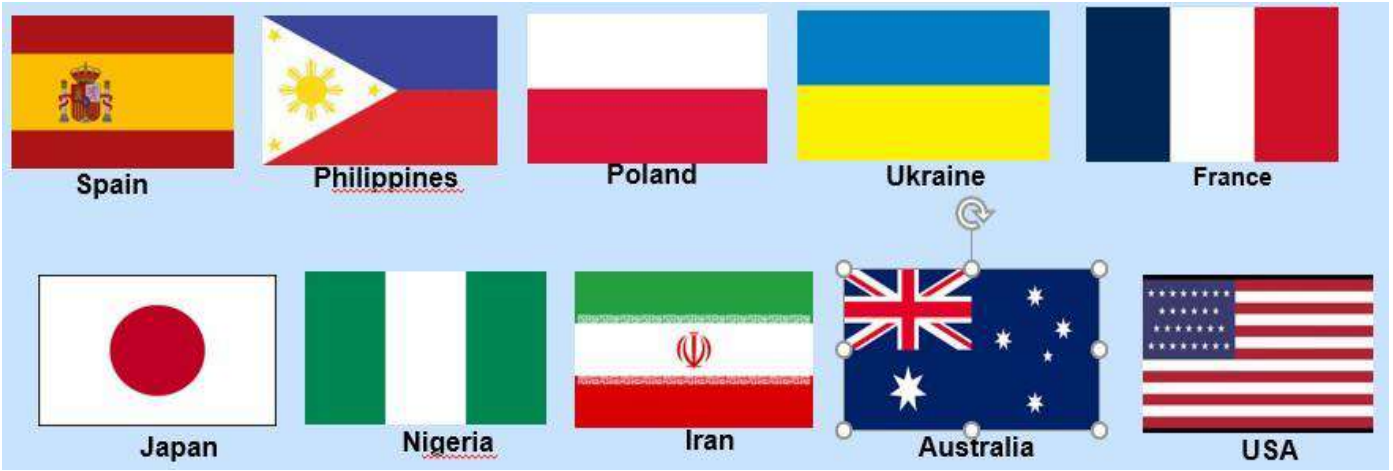
Video Link for the Live Conference: Click Here

Participants from the Following Countries:

Online Live International Conference
12th May 2023

Video Link for the Live Conference: Click Here

Participants from the Following Countries:



Online Live International Conference 24th June 2023

Video Link for the Live Conference: Click Here

Participants from the Following Countries:

Online Live International Conference 04th July 2023

Video Link for the Live Conference: Click Here

Participants from the Following Countries:

Online Live International Conference
21st July 2023

Video Link for the Live Conference: Click Here

Participants from the Following Countries:

Online Live International Conference
10th August 2023

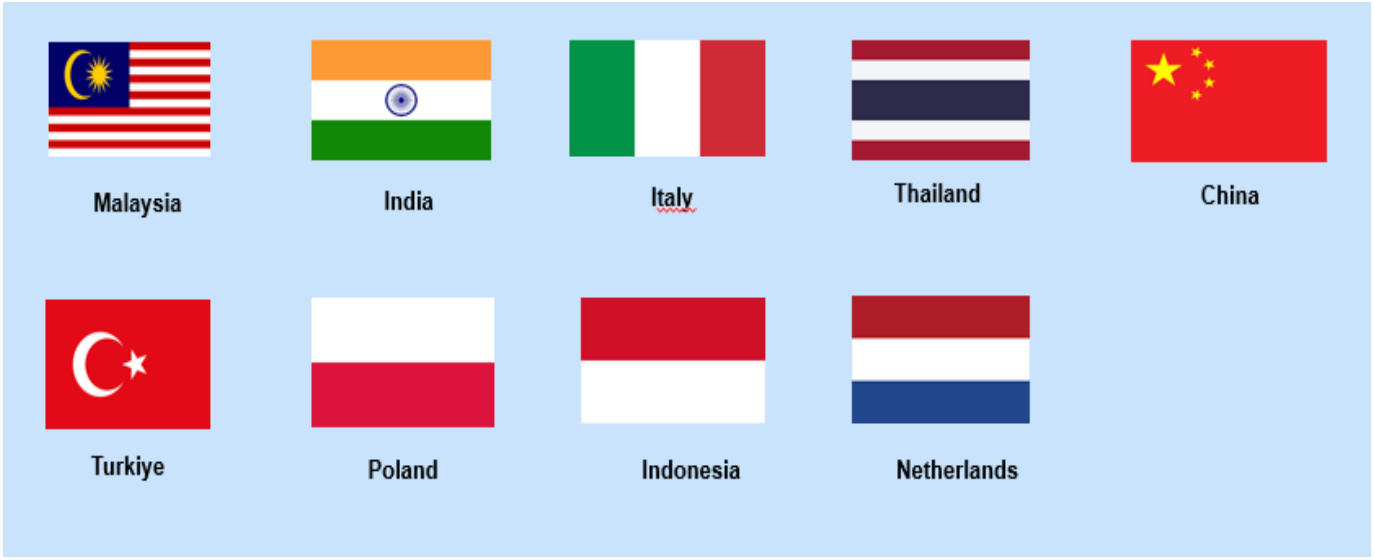
Video Link for the Live Conference: Click Here

Participants from the Following Countries:

Online Live International Conference
13th September 2023

Video Link for the Live Conference: Click Here

Participants from the Following Countries:



Online Live International Conference 06th October 2023

Video Link for the Live Conference: Click Here

Participants from the Following Countries:

Online Live International Conference
21st November 2023

Video Link for the Live Conference: Click Here

Participants from the Following Countries:

Online Live International Conference 22nd November 2023

Video Link for the Live Conference: Click Here

Participants from the Following Countries:

Online Live International Conference 04th December 2023

Video Link for the Live Conference: Click Here

Participants from the Following Countries:

Online Live International Conference
19th December 2023

Video Link for the Live Conference: Click Here

Participants from the Following Countries:

X. List of Full Papers

Stunting as a Shadow Pandemic: The Urgency of Global Attention

Steviola Hevanda
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Abstract: Globally in 2022, there will be 149.2 million stunted children under 5 years of age, 45.4 million underweight children, and 38.9 million overweight children. More than half of the children affected by wasting live in South Asia. Methods: This scientific writing uses a literature study method with a descriptive analysis approach using a systematic literature review design. This research was conducted by searching journal articles on Google Scholar, PubMed, Elsevier, and Crossref databases with the keywords Stunting, Toddlers, and Global Problems. The samples in this study were from international journals published in the last 5 years. Purpose: to further examine the indications that stunting (the problem of suboptimal child growth) is considered a serious problem that may not get the attention it deserves at the global level. The term "shadow pandemic" refers to the fact that stunting, while not as conspicuous as a well-known pandemic, has a serious and widespread impact around the world. Result: Children are considered stunted if they are below -3 SD based on the WHO Child Median Growth Standard for the same age and sex. Africa, India, Cambodia, Nigeria, and other countries are in the very high category at 30% while Indonesia has decreased. In 2022 the stunting rate in Indonesia has decreased by 3%. Conclusion: Stunting is still one of the global problems that has not been resolved until now, although it cannot be denied that there has been a decrease in the incidence of stunting in Indonesia in the last 5 years. Despite the decrease, the 24.4% incidence of stunting in Indonesia still exceeds the global target of 14% with a difference of 10.4%. The fact that stunting, although not as conspicuous as the famous pandemic, has a serious and widespread impact around the world.

Keywords: Stunting, Toddler, Global Problem.

1. Introduction: Failure to develop and grow optimally early in life leads in significant human and economic losses. Stunting raises the risk of child mortality, has a poor influence on cognitive and motor development, lowers academic success, raises the risk of excess nutrition and noncommunicable diseases, and lowers adult productivity (Torlesse et al., 2016). This cumulative effect costs African and Asian countries up to 11% of their GDP (Horton & Steckel, 2014). Stunting has the highest prevalence among nutritional disorders, including as malnutrition, wasting, and obesity, according to Nutrition Status Monitoring (PSG) data. The prevalence of stunting has risen from 27.5% in 2016 to 36.4% in 2017. According to figures from 2018, the prevalence of stunting has reached 30.8% (Riskesdas). According to the results of the Indonesian Toddler Nutrition Status Survey (SSGBI), the prevalence of stunting has dropped dramatically to 27.67% in 2019. It was 26.92% in 2020. It was 24.4% in 2021, but it fell by 2.8 percentage points to 21.6% in 2022 (SSGI, 2023). Childhood linear growth failure is the most common type of malnutrition worldwide. Stunting affects an estimated 165 million children under the age of five (UNICEF/WHO/WORLD BANK, 2021). Stunting in general, impedes the developmental potential and human capital of entire societies because of its long-term impact on adult cognitive functioning and economic productivity; thus, it is regarded as the best surrogate marker for child health disparities (Prendergast & Humphrey, 2014). Childhood malnutrition rates are worrying, particularly in resource-constrained settings. Malnutrition is linked to inadequate brain development, which has a deleterious impact on cognitive development in adulthood, including educational attainment and economic productivity. The first 1000 days of a child's life are significant because of the physical and mental development that occurs during this time. Stunting is a key predictor of young child feeding habits and is linked to deficiencies in cognitive development and school achievement worldwide. Improving children's nutritional status is still the most important characteristic that can be changed to boost their cognitive development. Stunting is seen as a risk factor that impairs a child's ability to learn in many resource-constrained areas where starvation is prevalent. Food insecurity is undoubtedly linked to lower intellectual achievement in school-age children. Malnourished children are more likely to drop out of school and do poorly on cognitive exams (Ekholuenetale et al., 2020).

2. Discussion: a. Definition of Stunting: According to UNICEF, a child is stunted if his or her height-for-age Z score (HAZ) is -2 SD according to the currently valid growth reference (below minus two standard deviations from median height for age of reference population), which means below minus two standard deviations from median height for age of reference population (UNICEF, 2019). It was also discovered that children were judged to be severely stunted if their length or height was less than -3 SD based on WHO Child Median Growth Standards for the same age and gender. Based on this theory, we can conclude that children with short stature are considered stunted (Gide, 1967). The WHO defines stunting as "the occurrence of a growth disorder indicating that a child does not reach his or her body's growth potential due to suboptimal health and nutritional status". If we combine the two defenitions above, stunting can be defined as a failure to achieve a linear growth potential as indicated by a HAZ 2SD/-3SD according to the current growth reference (currently used by the WHO Child Growth Standard 2006) due to poor health or inadequate nutrition (Gide, 1967).

b. Big Problem: **Global Stunting Problem**: In 2020, there will be 149.2 million stunted children under the age of five, 45.4 million underweight children, and 38.9 million overweight children worldwide. Except for Africa, the number of stunted children has declined in all regions. More than half of all wasted children live in South Asia, while Asia as a whole is home to more than three-quarters of all wasted children (UNICEF/WHO/WORLD BANK, 2021).

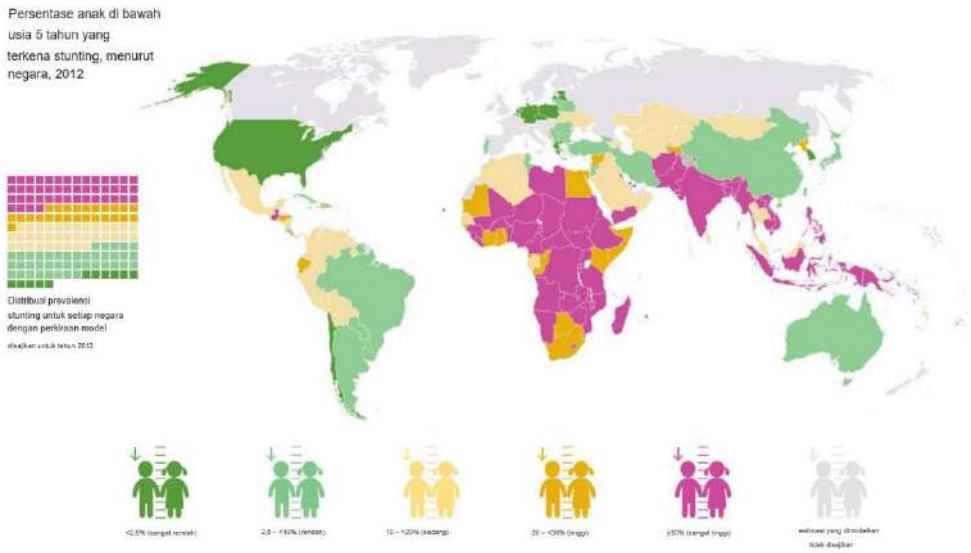

Figure 1. *Stunting prevalence distribution for each country in 2012*

(Source: UNICEF, WHO, World Bank Group, Joint Child Malnutrition Estimates, 2023 edition)

In terms of aims, the most success has been made at the country level in attaining the stunting target, with over two-thirds of nations making at least some progress. In the case of obesity, however, over half of all countries do not progress or even worsen. In 2012, the stunting rate in African countries, Indonesia, India, Cambodia, Nigeria and several other countries was in the very high category, namely 30%. In contrast to the United States and other countries which are in the very low category, which is <2.5%.

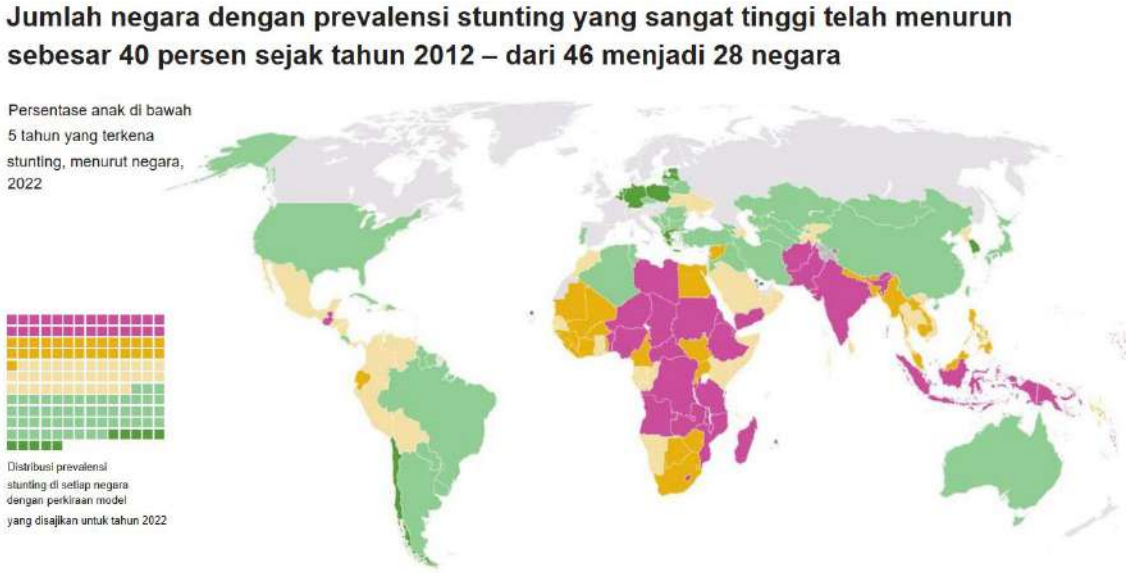

Figure 2. *Distribution of stunting prevalence for each country in 2022*

(Source: UNICEF, WHO, World Bank Group, Joint Child Malnutrition Estimates, 2023 edition)

In 2022 the stunting rate in African countries, India, Cambodia, Nigeria and several other countries will still be in the very high category of 30%. In contrast to Indonesia, which experienced a decline. According to SSGBI, the stunting rate in Indonesia in 2022 has decreased by 21.6%, but in Figure 2 it is still in the high category (red zone). The African continent did not experience a significant decline due to many influencing factors such as socio-economic, political and cultural conditions. The discrimination factor is also one of the most important among the factors above. Due to high discrimination, African people do not get the rights they should. Insufficient service facilities also influence the African continent to experience high or poor stunting rates.

Stunting Problem in Indonesia:

Figure 3. *SSGI stunting figures for 2021 and 2022 in each province in Indonesia*

(Source: Results of the 2022 Indonesian Nutrition Status Survey SSGI)

Stunting has the highest occurrence among nutritional issues, such as malnutrition, thinness, and obesity, according to Nutritional Status Monitoring (PSG) data. Stunting prevalence increased from 27.5% in 2016 to 36.4% in 2017. According to 2018 (Riskesdas) data, the prevalence of stunting was 30.8%. The prevalence of stunting reduced dramatically in 2019, according to the results of the Indonesian Toddler Nutrition Status Survey (SSGBI), to 27.67%. It was 26.92% in 2020. It was 24.4% in 2021, but it fell by 2.8 percentage points to 21.6% in 2022 (SSGI, 2023) (UNICEF/WHO/WORLD BANK, 2021). Despite the fact that Indonesia has the largest economy in Southeast Asia and the 17th largest in the world, health outcomes for Indonesian children are low. According to Ministry of Health data, the frequency of stunting in children aged five and under is remains high, at 30.8%. According to the World Bank (2020), Indonesia has performed badly in terms of reducing stunting rates when compared to higher middle income countries and other countries in the area. Given the significant frequency of stunting and its impact on children's cognitive development, Indonesia's next generation's productivity is expected to be just half of its potential.

c. Clinical Symptoms of Stunting: Symptoms of stunting can be caused by young age, normal body proportions, but the child looks young for his age, low body weight compared to his age, the presence of fat (fat mass that is disproportionate to body height) and slow bone growth. Stunting is caused by nutritional deficiencies, especially in the first 1,000 days of life, and recurrent infections from birth to the first two years of life. Stunting develops over a long period of time due to a combination of one or all of the following factors:

1. Intrauterine growth retardation
2. Not enough protein for total calorie intake
3. Hormonal changes due to stress hormones (eg cortisol)
4. Frequent infections early in life

Clinical symptoms of stunting in childhood can include:

1. His body is slow to develop, making him smaller for his age.
2. The child's weight is less than the age standard.
3. Slow physical and mental development.
4. Limited cognitive abilities.
5. Weakened immune system, susceptible to infectious diseases.
6. Delay in motor development, such as the ability to walk and run.
7. Problems with tooth and bone developmentg (Yadika et al., 2019).

d. How to measure:

1. Anthropometry: Anthropometry is a scientific field that studies the measurement of human body dimensions, including body mass, height, and length (eg length of limbs, thickness of skin folds and circumference), and also width (eg shoulders, wrists, etc.) (Senbanjo et al., 2016)(Sudja et al., 2020)(Novina et al., 2020).

a. Height Measurement (Stadiometer): The stadiometer was mounted on the wall and the child were asked to take off their shoes and headgear before recording the measurement results. With the buttocks, shoulder blades and back against the board, the head is oriented in the Frankfurt horizontal plane (FH plane) and the helmet is held securely on the head. The reading is recorded to the nearest tenth of a cm (Ahmed et al., 1990). The The head is in the Frankfurt horizontal plane when the horizontal line from the ear canal to the lower border of the orbit is parallel to the floor. This line must also cut perpendicular to the vertical board. Children should be asked to breathe deeply and stand as high as possible. Deep breathing helps straighten the spine and allows for more accurate and consistent measurements. Another measure of standing height in children is sitting height, measured from the crown of the head (highest point of the head) to the seat surface after the head is oriented in the horizontal Frankfurt plane (Kadir et al., 2023). Additional measurements to consider include arm span and seat height. The correct technique for using baby rulers and stadiometer presented in any hazardous article or sign must be evaluated and addressed appropriately. Specifically, physicians should use percentile charts to track serial growth measurements and visualize growth trajectories (Mavinkurve et al., 2021). In children over 2 years old, height was measured using a micrometer to the nearest millimeter (Novina et al., 2020). More educated people often question accurate measurements in this age group, because if children at this age were younger, height should be measured instead of lengtht. While measuring a 3-year-old's height can be difficult, weight is easy to accurately determine. The Oxford Wall Chart provides an easy and fairly accurate way to measure a child's height. The accuracy and precision of the measurements taken by the primary care provider ultimately determines the value and effectiveness of growth screening. For example, the height of a 3-year-old child was recorded as 100–00 cm. Probability of using Microtoise to predict a child's actual height between 99-2 and 101-8 cm (Ahmed et al., 1990).

b. Body Length Measurement (Infantometer): This tool measures a child's length/height and compares it with the child's height to calculate a z-score to determine the child's stunting status (Mavinkurve et al., 2021) (Bukari et al., 2022). The baby monitor measures length in the supine position in children from 0 to 2 years old and consists of three parts: a ruler, fixed headrest and mobile footrest. Specifically, this requires two qualified people to perform the measurements. When measuring, the baby's head should be parallel and the legs should be completely straight.

c. Head Circumference Measurement: Head circumference is the measurement of the circumference of a child's head at the widest part. This measures the distance above the eyebrows and ears and around the

back of the head. Head circumference was measured to the nearest 0.1 cm using a non-elastic tape measure, using the eyelids and nape of the neck as markers. Standardization of anthropometric measurement control tools is carried out periodically. Malnutrition in children is calculated from the level of stunting (height for age) and wasting (BMI for age), according to World Health Organization (WHO) guidelines. In this study, a child is considered stunted and underweight if his height for age and BMI for age are less than negative two standard deviations (-2 standard deviations) compared to the average value of each criterion in international reference standard (Senbanjo et al., 2016).

d. Measuring Body Weight with Digital Scales & Baby Scale: When measuring a child's weight using a baby scale, this is done by placing the child on the scale but with minimal clothing removal for a more accurate result. Body weight is a composite measure of all body dimensions, therefore it is used as an anthropometric weight parameter because changes in body weight can be easily seen over time. It's short, can describe current nutritional status, is easily accessible with weighing equipment, and can also be measured (Aderibigbe, 2018).

e. KMS: The Health Card (KMS) for school children developed by the Ministry of Health has problems with the limited availability of cards for each child. The use of KMS for school children includes measuring the child's weight and height, which is then recorded on the KMS, so knowing a child's nutritional status really depends on the availability of the card and the skills of the staff. The Anthropometric Wall Chart was developed based on WHO standards in 2005. Yellow is for the limit <-2 standard deviations and red is for the limit <-3 standard deviations. The Anthropometric Wall Chart tool is made with a distance of 30 cm for each age group column, made from material that is not easily damaged or torn, and is easy to install on walls in schools. The basic material is quite strong and durable (plastic material) and can be used by all children in grades 1 to 6, for quite a long time. Using the Anthropometric Wall Chart tool, place it on a flat wall and flat floor. Every child aged 6-12 years or grades 1 to 6 can measure and determine their own nutritional status by looking at the colored ribbon printed on the top of their head. If the child's position is appropriate, look at the colored ribbon on the top of the child's head. If the ribbon is yellow or red, it means the child is stunted and if it is green, it means the child has normal nutritional status. A measure of dispersion expressed in the same unit of measurement as the original score: standard deviation.

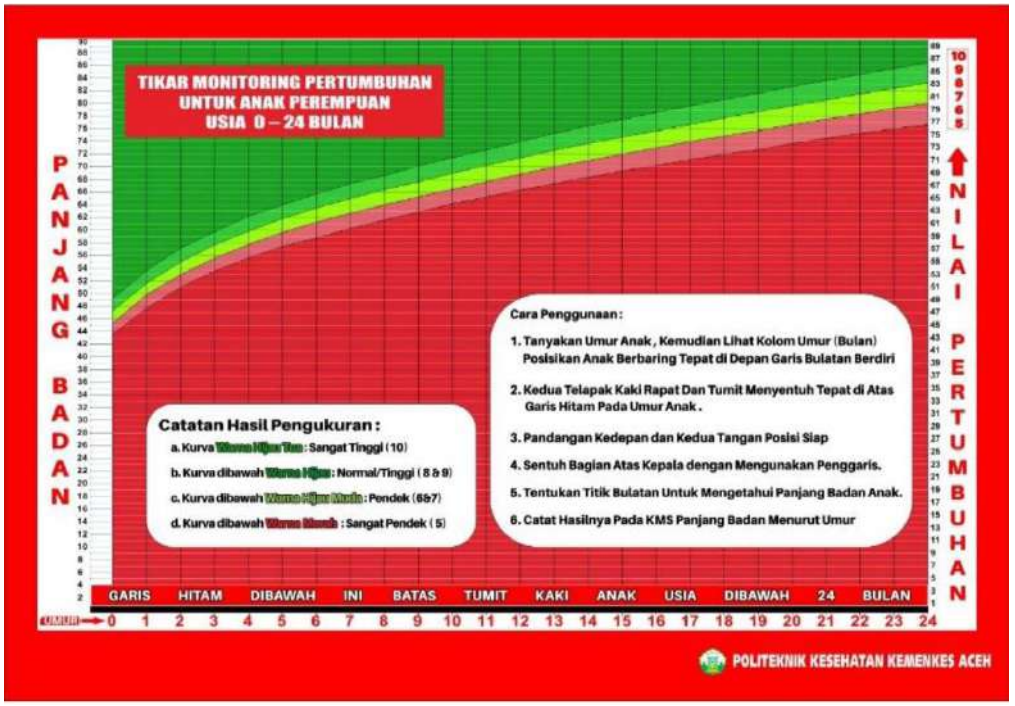

Figure 4. *Antropometri Wall Chart (AWC/KMS) mat for women (side behind)*

(Source: Alfridsyah & Ichsan, 2022)

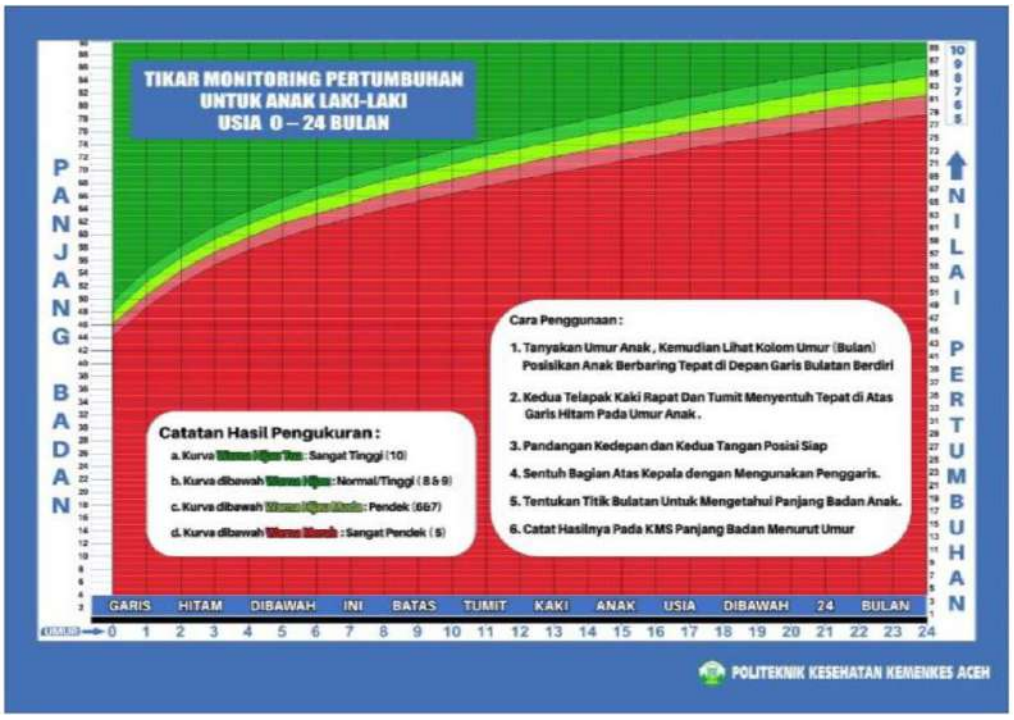

Figure 5. *Antropometri Wall Chart (AWC/KMS) mat for boys (side front)*

(Source: Alfridsyah & Ichsan, 2022)

Example of calculating the standard deviation of scores.

Height of subject (boys) (cm)	Weight of subject (kg)	Median weight for height (kg)	± 1.00 SD (kg)	Subjects' SD score
60	5.1	5.8	− 0.643	− 1.1
70	9.3	8.5	+ 0.841	+ 1.0
90	15.1	13.0	+ 1.069	+ 2.0
110	15.3	18.7	− 1.610	− 2.1

The formula for calculating the SD score of a subject with a body weight below the average weight for the subject's height:

$$\text{Subject SD score} = \frac{\text{the average weight for the subject's height-weight}}{\text{1.00 SD lower}} \quad (1)$$

The formula to calculate SD score of subjects whose weight is greater than the average weight according to the subject's height:

$$\text{Subject SD score} = \frac{\text{subject weight- average weight for height}}{\text{1,00 SD above}} \quad (2)$$

The formula for calculating the standard deviation value for a child, as well as a number using weight relative to height, is shown in the table above. Similar calculations to determine the standard deviation value for height or weight for age can be performed by substituting the subject's age, the subject's height or weight value, the subject's height or weight median weight for age, and/or weight for age and value ± 1.00 SD as requested. The results can then simply be summarized by giving the number and proportion of children

falling within the specified standard deviation for each age and sex. However, because children can be to varying degrees underweight for height (acute malnutrition) and short for their age (chronic malnutrition), it's best to get the full picture than from many different combinations. We should calculate that for children who are overweight and have above average height, the number of cells in the table should be increased (Waterlow et al., 1977).

e. Risk Factors Causing Stunting in Indonesia:

1. Parental Factors:

Parental factors include the mother's nutritional status during the child's first 1,000 days of life, social differences, the mother's level of education, and whether the mother or parents are of smaller or not. Maternal nutrition plays an important role in fetal development, the baby's health and survival, and the child's long-term health and development. During the most important period of the first 1,000 days of life, the mother is the child's only source of nutrition.

a. Low Economy: A family's income level can influence whether a family's nutritional needs are met. Studies from Ethiopia and Madagascar show a link between stunting and poverty, and low-income households tend to suffer from reduced food quality, quantity and variety (Shine et al., 2017). Family socioeconomic status, such as family income, parental education level, and parental employment, may be indirectly related to the prevalence of stunting. High-income families will have easier access to educational and medical services so that children's nutritional status can develop better. Hong believes that stunting is more likely to affect children in families who cannot provide adequate food rations for the family (Hong, 2021). The above factors are also supported by research in northeastern Brazil, Myanmar and Indonesia, which shows that family income, mother's education level, mother's short stature < 145 cm and the child's gestational age were found to be risk factors for stunting in children (Berhe et al., 2019). Additionally, having multiple family members living together can exacerbate the problem of inadequate child nutrition. Previous research shows that households with high population density have moderate risk factors for child stunting. In this study, household membership of more than 9 people was associated with severe malnutrition and stunting in rural areas, but not in urban areas. Urban adult family members are expected to have relatively flexible incomes and family concepts, including physical, interactive, and geographical absences (Huriah & Nurjannah, 2020).

b. Mother's Education: According to research (Suratri MAL et al., 2023), the second dominant factor causing stunting is the education level of the young mother. Children of mothers with low education levels are 1.6 times more likely to be stunted than mothers with high education levels. These results are consistent with the results of several studies suggesting a relationship between maternal education and stunting rates (Laksono et al., 2022)(Suratri et al., 2023). The mother's education level influences parenting style, including nutritional management during feeding and maintaining child health (De-Jongh González et al., 2021). Parents with low levels of education often do not receive adequate information about their child's growth and nutritional development, including their child's nutritional needs. Low educational level of parents can increase the risk of stunting in children. Educated mothers can receive information from outside and improve their understanding and knowledge of child care. Thus, education is closely tied to the mother's knowledge of how to implement parenting patterns and the nutritional status of the child (Wicaksono et al., 2021).

c. Mother's Height: The research results show that parental height is a determining factor in the occurrence of stunting. (Siswati et al., 2023). This is also supported by several other studies which show that short mothers are more likely to experience stunting in children in Brazil (Orellana et al., 2021) and in Indonesian children (Siswati et al., 2023).

2. Child Faktor:

a. Exclusive breastfeeding: Research result (Hasan et al., 2023)(Sari et al., 2021) shows that toddlers who are not exclusively breastfed are 2.14 and 2.02 times more likely to be stunted than exclusively breastfed children. The barrier to exclusive breastfeeding is that breast milk does not come out from the first to the third day after birth, leading to the use of formula, an inherited belief in society that is given to newborns. Honey and the child is said to be fussy (Hasan et al., 2023) (WHO & UNICEF, 2019). The low rate of exclusive breastfeeding is due to the influence of older people's habits, such as grandmothers only breastfeeding children until 4 months old, so most of the nutrition children need comes from nutritious foods. Fig. This also happened to toddlers in Padangsidimpuan town who were given formula milk by their mothers or grandmothers (Hadi et al., 2023).

b. The bad thing about giving MP-ASI: Stunting is closely related to feeding frequency, especially in the first two years of a child's life. Meal frequency can affect the quality of a child's food consumption, which in turn can affect the nutritional status of toddlers (Aguilera Vasquez & Daher, 2019). Meal frequency can be a measure of a toddler's nutritional adequacy (Ciptanurani & Chen, 2021). Children will suffer from malnutrition and slow development if their nutritional needs are not fully met. The ability to consume a variety of foods at an optimal scale is closely related to the food availability of the toddler's family. Stunting is closely related to feeding frequency, especially in the first two years of a child's life. Meal frequency can affect the quality of a child's food consumption, which in turn can affect the nutritional status of toddlers. Research result (Hadi et al., 2023) shows that meal frequency is the biggest risk factor for stunting, toddlers who eat few meals are 3,619 times more likely to be stunted than normal children. Similarly, research from Sri Lanka and Central Java found that incomplete breastfeeding was associated with higher rates of stunting. Some available facts and information show that 60% of children aged 0-6 months are not exclusively breastfed and 2 out of every 3 children aged 0-24 months are not fed MP-ASI foods (SSGI, 2023).

c. Low Birth Weight (LBW): Research result (Gonete et al., 2021; Halli et al., 2022; Mistry et al., 2019) found that there is an association between low birth weight and stunting rates in children. This is also supported by research results (Wahyuningrum et al., 2023) showing a relationship between low birth weight and stunting rates in children. Birth weight is important for your baby's health. Low birth weight infants are at higher risk of developmental delays, nutritional deficiencies, and death in the first year of life (Zoleko-Manego et al., 2021). When a child has a calorie deficit, weight loss will occur and if this deficiency is chronic, the growth rate will decrease, leading to slow growth.

3. Environmental Factor:

a. Poor household sanitation: Poor hygiene at home also contributes to risk factors for stunting in toddlers. Poor sanitation is believed to be a major risk factor for stunting in developing countries in South Asia, sub-Saharan Africa, East Asia and the Pacific (Kwami et al., 2019). According to Cumming's theory, poor water, sanitation and hygiene (WASH) conditions affect children's development (Hasan et al., 2023) Research results (Siswati et al., 2023) show that many children live in suboptimal environments, most of whom live in rural and urban areas without adequate access to clean water and poor sanitation. and the poor are facing underdevelopment.

f.Impact of Stunting:

a. Short term impact: Stunting is a long process that begins at the preconception stage, when the health of the mother greatly affects the health of the unborn child. Stunting is a consequence of chronic or persistent malnutrition due to poor maternal nutrition, poor feeding practices and poor sanitation (Dewey & Begum, 2011). For example, lack of proper nutrition during the first 1,000 days causes irreversible gaps in brain development. The outcome of brain development at the age of two largely determines a person's mental

abilities for the rest of their life, including school life success (Bloem, 2013). Stunting is also associated with increased morbidity and mortality, a weakened immune system, mental retardation, poor school performance, and reduced intellectual capacity. Stunting has biological implications for brain and nerve development, leading to a decline in cognitive values, leading to poor learning outcomes. This ultimately affects earnings in adulthood as well as economic productivity at the national level (Hall et al., 2018).

b. Long Term Impact: Stunting in children causes long-term consequences in two ways: as a direct cause of height loss in adulthood and suboptimal functioning later in life and as a key marker of underlying processes in early life that lead to poor growth and other other undesirable results (Dewey & Begum, 2011). In the long term, developmental delay in toddlers will lead to an increased risk of non-communicable diseases due to metabolic disorders in adulthood. These conditions will contribute to the increased disease burden. Additionally, stunted toddlers are more susceptible to infectious diseases, which disrupt their growth, development, and productivity as adults (Wulandari et al., 2022). Furthermore, stunting is associated with an increased risk of being overweight and developing non-communicable diseases such as diabetes and cardiovascular disease later in life. Some previous studies have also shown that children born to stunted mothers have a higher risk of death than children born to mothers with normal size (Özaltin et al., 2010). Girls who grow up stunted are more likely to have complications during childbirth as teenagers or adults because they have smaller pelvises. So, breaking the intergenerational cycle of malnutrition also requires good obstetric care, to facilitate the birth of larger children, born to mothers who may have developmental delays / stunting but then benefit from a good diet before and during pregnancy (Bloem, 2013).

4. Conclusion: Stunting remains an unsolved global problem, although the decline in its incidence in Indonesia over the past five years cannot be explained. Although declining, Indonesia's stunting rate of 24.4% is still 10.4% above the global target of 14%. The reality is that stunting, while not as large as a known epidemic, has serious and widespread impacts around the world. Risk factors for stunting after the third semester include: maternal factors, childhood factors, and environmental factors. The impact of stunting alters brain abilities and development, reduces productivity in adulthood, and can make children vulnerable to infectious diseases. Small body size at birth and stunting are associated with shorter adult height, lower lean body mass, lower educational attainment, lower intellectual functioning, lower income, and lower birth weight in children born to one mother who experienced stunted growth in childhood.

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Obesity Becomes a Global Problem

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Abstract: Obesity is a very common disease that can cause and increase cardiovascular disease, diabetes, cancer and so on. This may indicate that obesity may affect genome stability. Obesity is a disease that is a global problem, especially in countries with high incomes. Objective: The aim of this research is to identify diseases and the number of cases associated with obesity. Method: the method taken is a case study, where the author analyzes existing problems and then arranges them systematically. Conclusion: Obesity is a disease with a risk of causing other diseases. Obesity has a huge impact on physical and psychological health. There are many factors that can cause obesity, namely genetic factors, environmental factors, socio-economic factors, drug factors.
Keywords: Obesity, BMI, Fat

Introduction: Obesity is a disease with a risk of causing other diseases. In fact, diseases related to obesity are the biggest challenges world. Specifically, the genes responsible for monogenic forms of obesity are leptin, leptin receptor, melanocortin receptor 4, proopiomelanocortin, prohormone convertase 1, and Agouti-related protein. In people with obesity accumulation of DNA damage has been reported and suggested to be involved in the development of obesity-related disease s. So, it can be said that people with obesity will experience DNA damage.(Nigro et al., 2014). Overweight or what is commonly known as obesity is a condition where a person experiences a buildup of fat so that they become overweight. Measuring obesity using BMI is a simple index commonly used to classify obesity. According to WHO, in 2021 as many as 340 million people aged 5-19 years will be obese. Over the past 20 years, obesity has rapidly become a global pandemic health problem: catastrophic data comes from America and Europe where ∼35 % and ∼20 % of the population are obese, respectively. In 2018 in Indonesia, with a prevalence of people aged over 18 years who were obese, 26.60 men and 44.40 women were obese. There are various factors behind the emergence of obesity, some of which include region and economic level, sociodemographic, behavioral and genetic factors which are still the most common causes of obesity. There are various studies that have discussed obesity, but from various statements from experts it turns out that there are still several shortcomings, such as the lack of aggregate and pure data regarding obesity. In general, obesity is always associated with various health problems such as smoking and heart attacks. This research was conducted with the aim of identifying the magnitude of the problem, clinical symptoms, how to measure it, risk factors and the impacts caused by obesity. There are many biological responses to obesity such as microRNA, adiposity, oxidative stress, red blood cell profile, nutrition and microbiota are biological responses that greatly influence the causes of obesity. A multidimensional prevention strategy is the right step to take because considering that the impacts caused by obesity are very large and are interrelated with each other.

Method: The method taken is a case study, where the author analyzes existing problems and then arranges them systematically.

Discussion:

Definition of Obesity: Obesity is defined as a condition where body fat exceeds a predetermined threshold and can cause health problems. (Luli et al., 2023)Obesity is usually characterized by excess body weight. Obesity can be measured using anthropometry which is usually called BMI with the formula body weight (kg) divided by height (m^2) and waist circumference.(Harbuwono et al., 2018). If the BMI category is between 25.0 and 29.9 kg/m^2, a person is included in the overweight or obese category. Obesity is usually divided into three categories, namely: Class I obesity: BMI 30 to <35 kg/m^2. Class II obesity: BMI 35 to <40 kg/m^2. Class III obesity: BMI 40+ kg/m^2, categorized as the most severe obesity.(Wharton et al., 2020). Obesity and overweight are two different things, but both indicate excessive fat accumulation in the body, which is characterized by an increase in the Body Mass Index (BMI) value above normal. (Janssen et al., 2020)Obesity in children is the same as obesity in adults which is defined by their Body Mass Index (BMI). Obesity in children is characterized by a BMI (Body Mass Index) value between the 95th percentile on the growth curve, according to age and gender.(Fitch & Bays, 2022). Obesity itself can be caused by an imbalance in the body's control of incoming and outgoing energy, where the amount of energy coming in is more than the energy going out. (Aizawa & Helble, 1993)Apart from that, the causes of obesity are also very complex, they can be influenced by environmental, genetic and ecological factors. In children, eating patterns that are not

controlled by parents are often the cause of obesity at an early age. (Abarca-Gómez et al., 2017). Obesity has a huge impact on physical and psychological health. (Pou et al., 2022a)Obesity is also often associated with several comorbid conditions or accompanying diseases such as hypertension, excess fat in the blood, diabetes, sleep disorders and depression. Obesity in children increases the risk (Blüher, 2020).

Big Problem:
Person: In 2022 overweight and obesity are at epidemic stage in the European Region, at least almost 60% of

adults and children are affected, with almost 8% of children under 5 years of age and one in three school-aged children living with it. overweight or obese.(Cobiac & Scarborough, 2021) The prevalence decreases temporarily in the 10–19 year age group, where one in four people live with overweight or obesity. Based on gender groups, the prevalence of women in the young age group tends to be lower than that of young men. (Upadhyay et al., 2018)This trend is inversely proportional to age prevalence, where women are more at risk of obesity than men over the age of 45 years.(Hendarto, 2019). The health impacts of obesity include the mechanical effects of being overweight, such as some musculoskeletal complications, metabolic effects such as diabetes and cardiovascular risks, and impacts on mental health.(Romanelli et al., 2020).

Place: Obesity levels in various countries vary greatly, also influenced by the type of food consumed and lifestyles that limit the body's lack of movement. (Polyzos & Mantzoros, 2019)The prevalence of obesity also tends to be high in countries with high incomes, because countries with high incomes tend to consume high-calorie fast food more often.(World Health Organization. Regional Office for Europe, n.d.).

Time: The prevalence of obesity throughout the world almost tripled between 1975 and 2016. (Boutari & Mantzoros, 2022)The reason is that socio-economic status has changed drastically over time, as well as rapid population growth. (Sanyaolu et al., 2019)The World Obesity Federation predicts that in 2035 obesity cases will increase very high, where almost half of the world's population will be obese, especially in the UK, the causes are still the same, namely the socio-economic transition and population growth which will grow more rapidly.(Heindel et al., 2022).

Symptoms of Obesity: People who are obese tend to have more medical and health problems. In addition, they tend to accumulate belly fat.(Xu & Xue, 2016)Fat resistanceand hormones in the stomach cause metabolic dysfunctionlipids and carbohydrates, lipotoxicity, and apoptosis (cell deathprogrammed).(Gade et al., 2010). Symptoms and complications of obesity and its health risks include respiratory disorders such as sleep apnea and chronic obstructive pulmonary disease, as well as certain types of cancer such as prostate, colon in men, breast and uterine cancer in women, coronary heart disease, diabetes (type 2 in children - children), depression, liver and gallbladder problems, gastro-esophageal reflux disease, high blood pressure, high cholesterol, stroke, and joint diseases such as osteoarthritis, pain in the knees and lower back. People who are obese tend to have more medical and health problems. In addition, they tend to accumulate belly fat.(Xu & Xue, 2016).

Obesity Measurement:

1. Body Mass Index (BMI): Body Mass Index (BMI) which is defined as body weight (kg)/height squared (m2) is the most seriously used measure of body weight in relation to body height. (Sweeting, 2007). An indicator of obesity is accepted as a BMI of more than 30 kg/m2(Değirmenci et al., 2015). Adult weight prediction is most accurate for BMI at age 18 with decreasing accuracy for BMI under 13(Deckelbaum & Williams, 2001). BMI is used to measure fatness because muscle weighs more than fat, so a bodybuilder could have the same BMI as someone who is obese (BY S U J ATA G U P TA, n.d.). Body weight was measured wearing light clothing and without shoes, after emptying the bladder, using a digital scale to an accuracy of 100 g. Height was measured without shoes, with a stadiometer to the nearest 0.5 cm. BMI is calculated by dividing body weight (kg) by height squared (m)(Rahim Hingorjo et al., n.d.).

Underweight	15–19.9
Normal weight	20–24.9
Overweight	25–29.9
Preobesity	
Class I obesity	30–34.9
Class II obesity	35–39.9
Class III obesity	≥40
Abbreviation: BMI, body mass index	

(Source: Nuttall, 2015)

In adults, 'obesity' is now defined by international convention to indicate having a BMI < 30 kg/m2 (or 'grade 2 obesity'), while a BMI > 25 kg/m2 is defined as 'overweight' (or 'grade 1 obesity'). ') and a BMI of 18•5–25 kg/m2 is 'normal', so by definition a BMI > 25 kg/m2 is not normal (World Health Organization, 1995)(Lean, 2000). Although it is an index of obesitymost commonly used in scientific publications and indexeschoice by WHO. BMI also has the weakness of not being able to differentiate between fat and muscle mass, so there are riskstends to be too high in muscular athletes and too small inelderly people whose muscle mass is replaced by fat indifferent levels(Akpinar et al., 2007).

Body Mass Index Chart for Adults

BMI	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35
Height (inches)	**Body Weight** (pounds)																
58	91	96	100	105	110	115	119	124	129	134	138	143	148	153	158	162	167
59	94	99	104	109	114	119	124	128	133	138	143	148	153	158	163	168	173
60	97	102	107	112	118	123	128	133	138	143	148	153	158	163	168	174	179
61	100	106	111	116	122	127	132	137	143	148	153	158	164	169	174	180	185
62	104	109	115	120	126	131	136	142	147	153	158	164	169	175	180	186	191
63	107	113	118	124	130	135	141	146	152	158	163	169	175	180	186	191	197
64	110	116	122	128	134	140	145	151	157	163	169	174	180	186	192	197	204
65	114	120	126	132	138	144	150	156	162	168	174	180	186	192	198	204	210
66	118	124	130	136	142	148	155	161	167	173	179	186	192	198	204	210	216
67	121	127	134	140	146	153	159	166	172	178	185	191	198	204	211	217	223
68	125	131	138	144	151	158	164	171	177	184	190	197	203	210	216	223	230
69	128	135	142	149	155	162	169	176	182	189	196	203	209	216	223	230	236
70	132	139	146	153	160	167	174	181	188	195	202	209	216	222	229	236	243
71	136	143	150	157	165	172	179	186	193	200	208	215	222	229	236	243	250
72	140	147	154	162	169	177	184	191	199	206	213	221	228	235	242	250	258
73	144	151	159	166	174	182	189	197	204	212	219	227	235	242	250	257	265
74	148	155	163	171	179	186	194	202	210	218	225	233	241	249	256	264	272
75	152	160	168	176	184	192	200	208	216	224	232	240	248	256	264	272	279
76	156	164	172	180	189	197	205	213	221	230	238	246	254	263	271	279	287
		Healthy Weight						**Overweight**					**Obese**				

(Source:About the Body Mass Index (BMI), n.d.)

2. Waist size: Waist circumference is a simple method for assessing fatstomach that is easy to standardize

and apply clinically. (Ross et al., 2020). Waist circumference (cm) was taken horizontally within 1 mm, using a plastic measuring tape at the midpoint between the costal margin and the iliac crest in the midline of the axilla, with the subject standing and at the end of a slow expiration(Rahim Hingorjo et al., n.d.). This measurement is taken midway between the lower rib and the iliac crest (Verweij et al., 2013). To measure central obesity, waist circumference (WC) appears to be a better indicator than BMI. WC measurements are easy to perform, and correlate more strongly with intra-abdominal fat content and cardiovascular risk factors. The World Health Organization and the International Diabetes Federation (IDF) recommend measuring WC in the horizontal plane midway between the lowest rib and the iliac crest (WC-mid)(Ma et al., 2013). Several studies have assessed waist circumference at the minimum waist point(World Health Organization., 2011). The World Health Organization (WHO) sets the healthy limit for waist circumference in Asian countries at 90 cm for men and 80 cm for women.(Darsini et al., 2020).

D Impact of Obesity: The following are several aspects of the impact of obesity, including:
I. Metabolic Impact: Abdominal circumference of a certain size (men >90cm and women >80cm) will have an impact on increasing triglycerides and decreasing HDL cholesterol, as well as increasing blood pressure, this condition is called metabolic syndrome.(Alsulami S et al., 2019).
II. Impact of Other Diseases: 1. Asthma worsening (Hoey, 2014).
2. Gallstone formation (Palacios et al., 2021).
3. Sleep apnoea (stopping breathing while sleeping) (Rtveladze et al., 2014).
4. Low back pain (low back pain) (Prado et al., 2016).
5. Knee and hip osteoarthritis (mechanical related)(An et al., 2020).
III. Psychosocial Impact: Obese children generally rarely play with their peers, tend to be alone, are not included in games and are awkward or withdraw from social contact (Heslehurst, 2011). This psychosocial problem is caused by internal factors, namely depression, lack of self-confidence, negative self-perception or low self-esteem because he is always the object of ridicule by his friends (Connaughton et al., 2016). External factors also have a big influence because from an early age the environment judges fat people as lazy, stupid and slow.(Medawar & Witte, 2022).

Obesity Risk Factors: The risk factors for obesity include:
I. Genetic Factors: The high rate of obesity in parents who have obese children is believed to be a fairly important factor. Research has shown that 60-70% of obese teenagers have one or both parents who are also obese (Thame et al., 2010). A genetic factor that is known to have a strong role is parental fatness. Obese children usually come from obese families. If both parents are obese, around 80% of their children will become obese (Corona et al., 2017). If one parent is obese, the incidence will be 40%, and if both parents are not obese, the prevalence of obesity will decrease to 14%. The increased risk of becoming obese may be caused by the influence of genes or environmental factors in the family(Lee & Yoon, 2018). II. Environmental factor:

1. **Dietary habit:** Excessive energy intake causes overweight and obesity. Types of food with high energy density (high in fat, sugar and low in fiber) cause energy imbalance.

2. **Physical Activity Patterns:** Sedentary physical activity patterns (lack of movement) cause the energy expended to be less than optimal, thereby increasing the risk of obesity.(De Vries Mecheva et al., 2023).

III. Socioeconomic Factors: The dominant economic factors in food consumption are family income and food prices. Increasing income will increase opportunities to buy food with better quality and quantity, otherwise income decreases.(Sybilski et al., 2015). The family will cause a decrease in food purchasing power both in quality and quantity (Nurfatimah, 2014).

IV. Drugs and Hormonal Factors:
1. Medicines: Steroid-type drugs that are often used for long periods of time to treat asthma, osteoarthritis and allergies can cause an increased appetite, thereby increasing the risk of obesity (Barzin et al., 2018).

Medicines that contain hormones to increase fertility and as a contraceptive have the risk of causing fat accumulation in the body which can lead to obesity.(Telleria-Aramburu & Arroyo-Izaga, 2022).

2. Hormonal: Hormones that play a role in obesity include the hormones leptin, ghrelin, thyroid, insulin and estrogen. (Pou et al., 2022b).

Conclusion: Obesity is a disease with a risk of causing other diseases. Obesity has a huge impact on physical and psychological health. There are many factors that can cause obesity, namely genetic factors, environmental factors, socio-economic factors, drug factors.

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Iron Deficiency Anemia in Children

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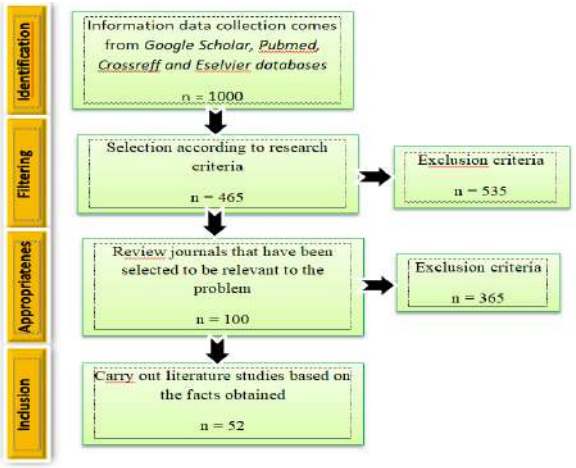
Abstract: Anemia occurs when there is a shortage of red blood cells or when there is insufficient hemoglobin in the blood. WHO estimates that in 2019, the prevalence of anemia in children aged 6–59 months was 39.8% (95% CI 36.0%-43.8%), representing 269 million children worldwide. The methodology used in this academic paper is a systematic literature review based on an analytical descriptive approach to the literature. For this study, we searched for literature on anemia and iron deficiency in children by searching Google Scholar, PubMed, Elsevier, and Crossref. In this research, we used data from international journals published during the previous five years. The aim of this study is to explore the topic of iron deficiency

anemia in children by examining the definition, clinical symptoms, risk factors and consequences. Conclusion: In children and newborns, anemia is the most common hematological condition. A reduced number of circulating red blood cells or a lack of iron to maintain normal physiological function are further definitions of anemia. In healthy, well-nourished asymptomatic infants and young children, IDA most often manifests as mild to moderate microcytic and hypochromic anemia. Risk factors for iron deficiency anemia in children include prematurity, poor nutrition, and gastrointestinal disease. In young people, iron deficiency is a chronic condition with no clear early warning signs. Children become pale and weak, eat less, and tire more quickly when blood deficiency occurs. One of the most concerning impacts of iron deficiency is its association with delayed mental, emotional and physical maturity. We conclude that dietary iron deficiency is the most widespread nutritional deficit and affects a quarter of the world's population
Keywords: Anemia, Iron Deficiency, Child

1. Introduction: Anemia is a serious public health problem across the globe, affecting an especially high percentage of young children, adolescents, and pregnant and postpartum women. Thirty percent of women between the ages of 15 and 49 have anemia, as do thirty seven percent of pregnant women and forty percent of children between the ages of 6 and 59, according to the World Health Organization (WHO). In 2018, the incidence of anemia among Indonesian children ages 6–59 months was 38.4%, among those ages 5–14 years old it was 26.8%, and among those ages 15–24 years old it was 32.0%. In 2018, there was a about 2% rise in the incidence of anemia sufferers in Indonesia, with the greatest increase happening in children. In 2018, women accounted for 27.2% of the total anemic population.(Indonesian Ministry of Health, 2018)**.** More than 500 million women (15–49) over the world were anemic in 2019, with the worldwide prevalence of anemia estimated at 29.9% (95% CI: 27.0%-32.8%). The prevalence was 29.6% (95% CI 26.6%-32.5%) among non-pregnant women of childbearing age, and 36.5% (95% CI 34.0%-39.1%) among pregnant women. Meanwhile, the prevalence of anemia in children aged 6–59 months is 39.8% (95% CI 36.0%-43.8%) worldwide. This equates to an estimated 269 million children throughout the world. In Africa, 60.2% (95% CI 56.6%-63.7%) of children under the age of five have anemia.(Gudiño León. et al., 2021). Children with anemia have a lower chance of developing normally, and adults with anemia have a lower chance of being able to work, both of which have negative effects on the national economy (Yackobovitch-gavan & Ben-hefer, 2022). As a consequence of the link between pregnant women and children aged 6–59 months with iron deficiency anemia, this condition increases the risk of complications during pregnancy and delivery, including preterm birth, low birth weight, and diminished iron storage in infants, which may lead to developmental abnormalities.That's according to a bunch of researchers (Szudzik et al., 2018). Millions of children's health, quality of life, and development and learning may be negatively impacted if efforts to eliminate anemia were unsuccessful. Since children are a country's most valuable resource and are looked at as potential agents of change in terms of global economic growth, it is crucial that the incidence of anemia in children be emphasized.

2. Methods: This study used a PRISMA (Preferred Reporting Items for Systematic Reviews and Meta-analyses) compliant systematic literature review, which is conducted systematically according to a predetermined set of steps. A systematic review is a methodology that use previously created reviews for assessment, structure, classification, review, and categorization, as well as evidence. There is a certain protocol that must be followed while doing a systematic review. There were 1000 literature studies used in this research, 103 literature studies were selected for the research questions and the second stage of selection was carried out according to the research questions of 52 titles. Each literature study consists of relevant journals. The search method used to collect several literature articles is by using an electronic website or online database facility via the Publish or Perish application page by loading the Google Scholar, Pubmed, Crossreff and Eselvier databases. The research journals selected were between 2018 and 2023 (the last 5 years). Keywords used to identify published articles are: Anemia, Iron Deficiency, Children. Article inclusion criteria are definition, clinical symptoms, impact, risk factors and measurement of anemia, research articles from 2018-2023 and full text, and international journals in English. Meanwhile, exclusion criteria include articles published before 2018, articles not in English, articles in the form of a thesis or thesis and articles without full text. The selection flow diagram used in journal searches in this research is:



3. RESULTS & DISCUSSION:

3.1 Definition of Anemia: When it comes to hematological disorders, anemia is by far the most prevalent among young children. In 2016, anemia impacted about half of all children less than 5 years old and nearly a quarter of the world's population."(Chaparro & Suchdev, 2019)"Preschool-aged children, in particular, are at heightened risk for complications and death due to anemia. Anemia may have many different causes, both genetic and environmental, and these factors vary greatly amongst groups.Camaschella (2019)Multiple analyses of the literature have shown that toddlers have the greatest prevalence of anemia and the most severe symptoms. This is because the brains of children under the age of five go through a period of fast development that necessitates the storage of iron, folic acid, and vitamin B12. Anemia is not a single illness but rather a broad category of related pathologies.Tan et al. (2020)Quantitatively, anemia is characterized by a low number of circulating erythrocytes; functionally, it is characterized by an insufficiency of these oxygen-carrying cells to satisfy the body's metabolic demands.It has been shown thatIf your hemoglobin (Hb), hematocrit, or absolute number of red blood cells is below the normal range for your age and gender, you may have anemia.(Stucchi et al., 2018)**.** Common diagnostic criteria for anemia include a hemoglobin (Hb) concentration or hematocrit that is less than two standard deviations below the mean for the patient's age and sex. A lack of iron or a reduction in the absolute quantity of circulating red blood cells are other definitions of anemia. Iron deficiency, the most common cause of anemia worldwide, is characterized by microcytic and hypochromic red blood cells in peripheral blood smears. Some factors that contribute to iron deficiency differ by age group, gender, and economic standing. Patients often report feeling tired and short of breath after physical activity.It has been shown (Engidaye et al., 2019)Reversing the underlying cause and providing more iron are both effective treatments. Children less than 5 years old are often given iron supplements orally, however intravenous iron may be necessary in certain circumstances. Hospital stays for patients with iron deficiency anemia tend to be longer, and they often have more complications.(Wawer et al., 2018) (Long & Koyfman, 2018) (Govindappagari & Burwick, 2019)**.** More than 25% of people worldwide suffer from anemia. An iron deficiency is thought to be the cause of around half of all instances of anemia (Olupot-Olupot et al., 2022). Iron deficiency anemia is more common in developing countries than it is in the United States among men under the age of 50. In the United States, 10% of women of childbearing age have menstrual dysfunction, while 9% of children aged 12–36 months have an iron deficiency, with anemia affecting 33% of these youngsters. In the United States, iron deficiency anemia is very rare, while it is more prevalent in low-income communities.(Eichner, 2018). The following are the hemoglobin threshold values according to WHO which are used to define anemia in different age groups: children 6 months to 5 years: 11 g/dl; children 5–12 years: 11.5 g/dl; children 12–15 years: 12 g/dl; non-pregnant women: 12 g/dl; pregnant women: 11 g/dl; And boys ≥15 years: 13 g/dl.

3.2 Clinical Symptoms of Anemia: The anemia caused by iron deficiency is the last stage of the condition and the first to respond to treatment with iron. Some clinical indications and symptoms, such exhaustion, cognitive impairment, or reduced energy, have been linked to iron deficiency without anemia.(Lee et al., 2021). In asymptomatic infants and young children who are otherwise healthy and well-nourished, ADB most

often manifests as mild to moderate microcytic and hypochromic anemia.A study by Andriastuti et al. (2020) Anemia induces a generic pallor of the mucous membranes, which might be mistaken for a slowly progressing pallor and be ignored in certain cases. Epithelial symptoms including koilonychia, glossitis, and angular stomatitis may indicate IDA. Extreme cases of anemia are very unusual, and they manifest with symptoms including poor nutrition, irritability, fatigue, and cardiomegaly. Children with severe anemia often have splenomegaly and have trouble growing.(Nadhiroh et al., 2023). Anemia may cause a wide range of symptoms, including delays in cognitive and motor development, increased susceptibility to illness, decreased physical stamina, fatigue, headaches, irritability, and, in older children, restless legs syndrome.Numerous studies (Alamneh et al., 2023) indicate that some of these symptoms may have lasting consequences. Iron deficiency raises the probability of a clot forming in the blood. Children with severe anemia are at increased risk for developing life-threatening acute consequences, including hypotension, tachycardia, tachypnea, respiratory distress, and congestive heart failure. If any of these signs or symptoms are present, the patient must be admitted to the hospital very once (Ajakaye & Ibunoluwa, 2020). Pseudotumor cerebri and papilledema are uncommon side effects of severe anemia, as are elevations in intracranial pressure. When iron levels are restored, these symptoms disappear.(Newhall et al., 2020). Anemia's signs and symptoms change in kind and intensity as its duration and prevalence evolve. Seizures, heart failure, and congestive heart failure are all potentially fatal complications of acute and severe anemia in patients. Pallor, dyspnea, weariness, exercise intolerance, dizziness, anorexia, and syncope are among symptoms often associated with chronic anemia. Jaundice and black urine might develop if hemolysis takes place. Children's neurocognitive development and behavior may be negatively impacted by iron deficiency or iron deficiency anemia, both of which can be caused by chronic anemia. Because compensatory mechanisms have already been triggered, patients with mild to moderate chronic anemia may exhibit no symptoms related to the degree of anemia.(Gallagher, 2022). Fatigue, decreased physical capability, and difficulty breathing are all indications of anemia. Anemia is a symptom of nutritional deficiencies and other health issues. As reported by many researchers (Alamneh et al., 2023), Fatigue, dizziness, chilly hands and feet, headaches, and shortness of breath, particularly after exertion, are common and non-specific symptoms of anemia.(Neef et al., 2021). Pale mucous membranes (in the mouth, nose, and tongue), pallid skin and beneath the nails, fast breathing and pulse, dizziness on standing, and easy bruising are all indicators of severe anemia. (WHO 2023). (World Health Organization, 2023). Anemia in children can have a variety of clinical symptoms, including:

1. The child may tire more easily and have less energy than usual.

Figure 1: *Fatigue*

2. The child's skin and mucous membranes (such as lips and gums) may appear pale.

Figure 2: *Pale*

3. Children may experience frequent headaches.

Figure 3: *Frequent Headaches*

3.3 Risk Factors:

3.3.1 Perinatal risk factors: Only iron that is absorbed after crossing the placenta may be used during the intrauterine period. Most healthy infants have iron reserves of around 80 mg/kg, with about two-thirds of the iron linked to hemoglobin. The normal range for hemoglobin is between 15 and 17 g/dl. A healthy infant's body stores enough iron to last for the first five to six months (McMillen et al., 2022). Several circumstances increase the chance for developing IDA in the early months of infancy by decreasing iron storage at birth or acting via other mechanisms. Fetal-maternal hemorrhage, twin-twin transfusion syndrome, various perinatal hemorrhagic episodes, and low dietary iron intake during infancy are all risk factors for neonatal and infant iron deficiency anemia. A considerable reduction in the risk of IDA may be achieved by delaying cord clamping (by around 120-180 seconds after birth).(Bruckner et al., 2021). Infants born to mothers with low iron stores are at greater risk for anemia later in life. The amounts of iron in cord blood samples tracked with those of the mother's hemoglobin and ferritin, according to research by MK Georgieff (Georgieff, 2020). When a woman has severe anemia, her breast milk contains less iron than when she has mild or moderate anemia. In areas where there is a high rate of maternal IDA, it is suggested that pregnant women take iron supplements. Pregnant women at risk of IDA should have access to a wide range of iron-fortified dietary options.(Sidhu et al., 2016). owing to a reduced total blood volume as a result of factors such as a decrease in ferritin concentrations, poor gastrointestinal absorption, and increased blood loss owing to phlebotomies, prematurity is a risk factor for iron deficiency anemia.(Raffaeli et al., 2020) is the cited work. In premature newborns, the third trimester, when iron is typically deposited, is cut short. An increased risk of iron deficiency is shown with the use of erythropoietin for the prevention and treatment of anemia of prematurity.(Burz et al., 2018). Infants born at term or prematurely might develop anemia due to a depletion of iron reserves brought on by chronic fetal-maternal bleeding or twin-twin transfusion syndrome (TTTS). Fetal blood (0.1 ml) is often detected in the maternal circulatory system. Fetal blood leakage into the mother's circulation seems to be caused by placental abruption or trauma, although it may also occur spontaneously and for unknown reasons. Fetal-maternal hemorrhage may present itself in many ways, depending on the volume and velocity of the blood loss (Annopornchai et al., 2019). Rarely, a pregnancy with monochorionic twins (or higher multiple pregnancies) may have TTTS. This occurs when one twin donates blood to their sibling via a vascular connection formed in the placenta. The donor twin is often smaller and anemic whereas the receiver twin is typically larger and has a hemoglobin differential of 5 g/dl or more. Fetuses with advanced TTTS have a death rate of 60-100%, and those that do survive are at high risk for cardiac, neurological, and developmental issues.(Barbachowska A. et al., 2018).

3.3.2 Dietary factors: A child's feeding habits and their overall nutrition have a significant impact on whether or not they may acquire IDA. Iron metabolism may be affected by a number of dietary variables (Shija et al., 2019). Consumption of unaltered cow's milk in infants less than 12 months and occult intestinal blood loss due to cow's milk protein-induced colitis are the most prevalent causes.(Ha et al., 2018). Infants who are given non-iron-fortified baby formula or transitional meals often have low iron stores as they grow. The incidence of IDA was found to be highest (20%) in newborns given formula without iron, lowest (0.6%) in infants provided iron-fortified formula, and intermediate (50%) in infants fed breast milk in a research conducted in Chile. (15%)As reported by (Ruangkit et al., 2021). Infants who received more than 600 ml of non-formula cow's milk per day or more than six breast-feedings per day were more likely to develop IDA, according to another research.In 2023 (Elda Skenderi et al.). Breast milk has the largest levels of iron in the

first month of life, and then the levels drop down steadily after that. The exact figure varies from person to person. Breast milk has the same concentration of iron regardless of the mother's diet.(Al-Halani et al., 2023). One of the most notable risk factors for IDA is the early introduction of unaltered cow's milk (nonformula). This increases the risk of intestinal blood loss, especially in the event of colitis, as compared to babies given formula or breast milk (Mubarik et al., 2018). Children at risk for anemia in preschool are those who consume more than 720 ml of cow's milk daily. Cow's milk is not suggested for newborns or young children because of its low iron content, poor absorption, and the danger of increased intestinal blood loss(Zikidou et al., 2022). Children who are still being fed from a bottle at the age of two to three are at a higher risk of developing iron deficiency, according to research by Sutcliffe et al.(Maguire et al., 2013). The kind of dietary iron is critical for its absorption in the intestines. The bioavailability of iron from heme iron sources, such as fish, meat, and poultry, is greater than that of non-heme iron sources, including fruits, vegetables, and whole grains. Intestinal iron absorption may also be affected by a number of dietary components (Dika et al., 2020). In contrast to heme iron, the non-heme iron found in foods like bread, cereals, fruits, and vegetables is better absorbed when consumed with vitamin C (Paulino et al., 2021). Vegetarian children are at increased risk for IDA. Foods high in phosphates, oxalates, carbonates, and phytates (seeds and grains), as well as the tannins found in different varieties of tea, all work together to reduce the intestinal absorption of iron and ferric iron. Because heme polymerizes into macromolecules, pure heme is not well absorbed. To ensure that heme is always absorbable, globin blocks the development of insoluble heme polymers. Degraded globin peptides may bind iron and stop it from being polymerized and precipitated. Combining different iron supplements may increase absorption. (i.e., spinach with meat).(Yar et al., 2023).

3.3.3 Digestive diseases: The duodenum is essential for iron digestion and absorption. Iron malabsorption issues may arise from a variety of medical diseases, including celiac disease, Crohn's disease, giardiasis, and proximal small bowel resection.Both Brooke and Miraflor (2018). Since iron, folic acid, and vitamin B12 insufficiency are common in children with celiac disease, it has been recommended that they undergo further screening with tissue transglutaminase antibodies.(2019) Balaban, A., et al. Iron deficiency is also linked to conditions that induce diarrhea and vomiting, which may lead to significant blood loss. Colitis caused by cow's milk protein, IBD, duodenal/gastric ulcers, and long-term usage of NSAIDs like aspirin are all examples. Sixty percent to eighty percent of those with IBD also have iron insufficiency.(Dulkadir, 2023).

3.4 Impact of Anemia: Iron deficiency in children often manifests gradually with few obvious early signs. Children grow pale and feeble, eat less, and fatigue quicker when blood shortages develop. They'll be underweight, sick all the time, and could even get pica.That was the conclusion reached by researchers (Grellety & Golden, 2016). The correlation between iron deficiency and delayed behavioral, cognitive, and psychomotor development is the most worrisome. Numerous research conducted over the last three decades have supported this relationship, however it is still uncertain whether iron deficiency is the only source of this shortfall. This time last year, a panel of experts had decided that "there is significant causal evidence linking iron deficiency anemia and child development."(Orsango et al., 2021).Anemia is linked to several other factors that have been shown to have negative effects on infant development, such as poverty, low birth weight, malnutrition, lack of education among mothers, and a lack of stimulation in the home.(Brooke & Miraflor, 2018). Children with severe chronic iron deficiency in infancy are more likely to have impaired cognitive function and worse results on school performance tests, a finding that holds true across nations. This study suggests that deficits during important times of development and differentiation might lead to permanent problems. cognitive processing unit (Khan et al., 2021). However, socioeconomic and psychological disadvantage may also contribute to lower levels of functioning. Touhy PC et al.'s findings represent a significant advance in the field (Touhy et al., 2023)]. Even in children with severe anemia and iron deficiency, they found that iron supplementation significantly influenced development, with substantial gains in motor and verbal development at 12 months. Stronger causal conclusions are possible due to the study's high sample size and double-blind approach (Kejo et al., 2018).

3.5 Measurement Instruments for Anemia:

Questionaire about anemia in pregnant women

1. Age of the respondent : .....
2. Age at the time of marriage : .....
3. Gestational age : .....
4. Education of the respondent
   a. No school c. Junior high school e. College
   b. Elementary school d. Senior high school
5. Number of children you have
   a. 1-3 c. Above 7
   b. 4-7
6. Type of pregnancy
   a. Single c. Triple
   b. Twin d. Quarterplet
7. HB% of the respondent
   a. 3-4 g/dl c. 7-10 g/dl
   b. 5-6 g/dl d. Above 10 g/dl
8. Gestational month
   a. 1-3 month c. 6-7 month
   b. 4-5 month d. 8-9 month
9. Age of last children born
   a. <1 year c. 2 year
   b. 1 year d. above 2 year
10. Current status of the respondent
    a. House wife c. Both a and b
    b. Doing job
11. Eating habits of the respondent
    a. 2 times a day c. 4 times a day
    b. 3 times a day d. More frequent
12. Daily tea intake of the respondent
    a. Once a day c. 3 times a day
    b. 2 times a day d. More frequent
13. How often you eat fresh fruits, vegetables, and milk?
    a. Daily c. Weekly
    b. 2 times a week d. Very rare
14. Are you using any sort of iron supplement?
    a. Yes b. No
15. Are you suffering from frequent nausea and vomiting?
    a. Yes b. No
16. Do you often feel dizzy?
    a. Yes b. No
17. Your daily eating habits are?
    a. Just like previous c. Less than previous
    b. Double than previous
18. Your average hour of rest per day
    a. 5-6 hour c. Above 8 hour
    b. 7-8 hour
19. Do you have previous history of miscariage?
    a. Yes b. No
20. Nature of work you daily done?
    a. Light and normal b. Exhaustive
21. Are you suffering from any sort of stress or worry?
    a. Yes b. No

Figure 4: *Perinatal Risk Factors Questionnaire (Abbasi, 2021)*

Food Frequency Questionnaire (FFQ) about anemia

Food Material		Food frequency					Portion of food	
		>1 times a day	1 times a day	4-6 times a week	1-3 times a day	Never	Average portion food	Weight (gr)
Foods that contain non heme iron	Soybeans							
	Peas							
	Mung beans							
	Spinach							
	Mustard							
	Broccoli							
	Potato							
	Cereals							
	Formula milk							
	Non formula milk							

Food material		Food frequency					Portion of food	
		>1 times a day	1 times a day	4-6 times a week	1-3 times a day	Never	Average portion food	Weight (gr)
Foods that contain heme iron	Meat							
	Fish							
	Chicken							
	Beef liver							
	Chickens liver							
	Clams and oysters							

Figure 5: *Semi-Quantitative FFQ Questionnaire*

Questionnaire about Screening anemia

No	Question	Yes	No
1	Do you often feel dizzy, and your eyes are dizzy?		
2	Have you ever fainted?		
3	Have you ever felt like you cant stand in cold situation?		
4	Do you get sick easily?		
5	Lower eye conjungtiva pale		
6	Pale palms		
7	Pale lips and tongue		

Figure 6: *Anemia Screening Questionnaire in Children (Daniel, 2015)*

4. CLOSING:

4.1 Conclusion: Reduced red blood cell count or insufficient iron to keep them functioning normally describe this hematological condition known as anemia. There are an estimated 269 million anemic children in the globe, with a worldwide prevalence of anemia of 39.8% (95% CI 36.0%-43.8%) among children aged 6-59 months. Weakness, shortness of breath, dizziness, chills, discomfort, and a generally unhealthy appearance are the most often reported signs of illness. Children with iron deficiency have a delay in normal growth and development, a paler and weaker appearance, decreased appetite, and increased fatigue. More over a quarter of the world's population suffers from iron insufficiency, making it the most widespread dietary deficit. In addition to its involvement in oxygen binding and transport, iron is essential for cell development and differentiation, gene control, enzyme reactions, and the manufacture of neurotransmitters, among many other physiological processes. Acute signs of iron insufficiency arise after a period of steady deterioration.

4.2 Suggestions: Teachers are advised to provide education to children about the importance of having breakfast before going to school and increasing consumption patterns of foods that contain lots of iron such as fish, eggs, crabs, shellfish and vegetables and fruit which are easily available in coastal areas and increasing clean living behavior. And healthy at home and at school.

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Concept of the Contents of My Plate by Indonesian Communities in Diabetes Mellitus Patients

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Abstract: Diabetes Mellitus (DM) is a chronic multifactorial metabolic disease. Several risk factors for diabetes mellitus include age, education level, smoking status and body mass index. In Indonesia, the incidence of diabetes mellitus has increased from year to year. Impaired absorption of insulin in people with diabetes mellitus requires sufferers to be able to pay more attention to many things in fulfilling daily nutrition. The contents of my plate can be a choice of eating concepts for diabetics. Objective This research is to find out how the concept of eating with the contents of my plateis for people with Diabetes Mellitus. Method in this study using the method Study literature, where the researcher collects and quotes the necessary information from various sources of scrutiny. Results From this research, metabolic syndrome in Diabetes is a condition in which a person experiences hyperglycemia. Liquid glucose and insulin in patients can no longer function and carry out their work in the body as they should. In Type 2 diabetes sufferers where the disease starts from the sufferer's unhealthy lifestyle. The nutritional intake of people with diabetes mellitus must be considered, because if not this disease can become a disease that can cause other diseases. This can be overcome by dieting for sufferers, dieting in the sense of maintaining the sufferer's daily food intake which in this case can be done with the concept of my plate contents Conclusion From this study it can be seen that people with diabetes mellitus have a high risk of contracting other co-morbidities. With a good lifestyle, the risk factors for other co-morbidities can be minimized. This makes it important to pay attention to food consumption with the concept of what's on my plate for diabetics.
Keywords: Food Consumption, Diabetes Melitus, Eating

1. Introduction: Data from the International Diabetes Federation (IDF) Atlas in 2021 states that Indonesia ranks 5th with the largest number of people with diabetes in the world. This figure has almost doubled in just two years, compared to 10.7 million in 2019. The prevalence of diabetes mellitus is increasing. Today it is estimated that nearly 550 million people worldwide suffer from diabetes. In a 2019 report, it was estimated that 463 milion people have diabetes and this number is projected to reach 578 million by 2030, and 700 million by 2045. Projections for the future have indicated that the global impact of diabetes is likely to continue increasing considerable.(Webber, 2013). . Projections for the future have indicated that the global impact of diabetes is likely to continue increasing considerably. The current diabetes rate is expected to double within 20 years.(Aggarwal et al., 2022). The epidemic is not evenly distributed around the world. Although the worldwide prevalence of diabetes is 3-4%, some countries and regions have diabetes prevalence rates of more than 10%.(Stefánsson & Einarsdóttir, 2015) Type 2 diabetes mellitus (T2DM) is strongly connected with obesity(Lesiewska et al., 2021) A person with excessive weight gain can increase the risk of diabetes mellitus and cardiovascular disease(Sofer et al., 2015). Controlling glycemic levels that can reduce complications and improve the quality of life of people with diabetes. (Anon n.d.). A person with diabetes mellitus should pay more attention to control their glycemic levels. The basic strategies for glycaemic control in adult-onset diabetes mellitus depend on the type, condition, age, and degree of complications of diabetes and metabolic disorders (Davies et al., 2019). The explanation above is a reference for researchers to go deeper into what kind of diet can be followed by people with diabetes mellitus. For people with diabetes mellitus, the contents of my plate can use the T model which consists of 1/2 portion of carbohydrates, 1/4 fibre and 1/4 protein. With the existence of this method in Indonesia, researchers want to spread more widely about the isi piring ku method which is the concept of eating from Indonesia.

2. Method: The relevant data for this study is gathered using the literature review method. For a good understanding of the hypotheses and theories that have been obtained for this research from international journal publications as well as NBC, Google Scholar, PubMed, and Elesvier, it was necessary to investigate numerous international journals.

3. Results and discussion:

3.1. Definition: 3.1.1 Metabolic syndrome: The term "metabolic syndrome" (MetS) refers to a range of

related medical problems. (Taghipour et al. 2019). People who have at least three of the following conditions, including hypertension, diabetes mellitus, and central obesity, are said to have metabolic syndrome. obesity. In addition, cardiovascular and renal diseases are also part of metabolic syndrome diseases (Alshelleh et al., 2019).

3.1.2 Diabetes Mellitus (DM): A multifactorial chronic disease of the metabolism, diabetes mellitus. According to data, there were 463 million adults worldwide with diabetes in 2019 between the ages of 20 and 79, some of them were already diabetics. Diabetes mellitus is characterized by a decrease in the overall expression of angiogenic factors such as in the heart, vascular system and wounds(Tan et al., 2021) And by 2045 it is estimated that there will be 629 million people suffering from diabetes. According to the World Health Organization (WHO), the number of people with diabetes increased from 108 million in 1980 to 422 million in 2014. Diabetes prevalence is rising more quickly in low- and middle-income nations than in high-income nations. Diabetes is now the main factor in renal disease, heart disease, stroke, blindness, and amputation of limbs. . Type-1 diabetes is characterized by an insufficient insulin production by the body as a result of pancreatic cell injury. The reason of this reaction is currently unknown, however genetic and environmental factors may both play a role. Type-2 is where the pancreatic cells are unable to produce enough insulin for the proper functioning of the body cells experiencing resistance to insulin use. In this case, it is necessary to adopt a healthy lifestyle with regular exercise and a low-calorie diet because the risk factors for type 2 diabetes are generally due to the lifestyle of the sufferer. Risk factors for type 2 diabetes include: Obesity or overweight (Chellappan et al., 2023).

3.1.3 Diet: Those with diabetes mellitus should follow certain dietary guidelines and get enough nourishment. Diet is a term used to describe the kind, quantity, and makeup of food that a person consumes on a regular basis. Consuming foods high in protein, fat, sugar, or carbohydrates can increase your chance of developing diabetes mellitus. The more food consumed, the more likely it is to cause diabetes mellitus. In addition, most sufferers of Type-1 diabetes mellitus has a normal diet because type-1 disease is based on genetic factors and type-2 has a poor diet, namely more nutritional status (obesity), the factor of not implementing a healthy lifestyle (Asyumdah et al., 2020).

3.1.4 Food: In diabetes mellitus, a high intake of fiber and complex carbohydrates is necessary. Because complex carbohydrates and fiber are processed long enough in digestion and can delay sustainable hunger, this is what makes sugar levels in the body more stable. (Fajarini and Sartika 2019) Recommended DF (diatery fiber) intake The American Diabetes Association recommends fiber intake in people with diabetes should be in line with recommendations for the general population, to increase intake to 14 g fiber/1000 kcal daily, or about 25 g/day for women and 38 g/day for men. No specific recommendations are made regarding the preferred type of DF consumption, although it is recommended that ≥50% of all grains consumed should be whole grains(Weickert & Pfeiffer, 2018). Recommended dietary composition variations are 50-60% complex carbohydrates, 25-45% fiber, up to 30% fat, 1g/kg/day (general patients) or 0.8g/kg/day (nephropathy and macroalbuminuria) protein. Oil use should be no more than 3 teaspoons a day and less than 5g/day for sodium intake. Patients also use the diabetic plate method, which is half a plate of vegetables, a quarter of protein, and a quarter of complex carbohydrates (Wicaksana et al., 2020). In one of the results of the study, it was said that there was a relationship between the consumption of a high- fiber diet by diabetics with a decrease in the area under the plasma glucose and insulin concentration curve for 24 hours. High dietary fiber intake is also recommended by the ADA because it improves glycemic control, reduces hyperinsulinemia and lowers plasma lipid concentrations in patients with type 2 diabetes (Mao et al., 2021).

3.2 Problem Magnitude: Recent data in the 9th edition of the IDF Diabetes Atlas found that there were 351.7 million working-age people (20 - 64 years old) with diagnosed diabetes in 2019. This number is expected to increase to 417.3 million by 2030 and to 486.1 million by 2045. The largest increase will occur in the region as the economy moves from low to middle-income status. The world's largest diabetes mellitus

populations are China, India, and the United States and are expected to remain so by 2030. Indonesia ranks seventh with 10.7 million people with diabetes mellitus (Indrahadi et al., 2021)

2019			2030			2045		
Rank	Country or territory	Number of people with diabetes (millions)	Rank	Country or territory	Number of people with diabetes (millions)	Rank	Country or territory	Number of people with diabetes (millions)
1	China	116.4 (108.6–145.7)[i]	1	China	140.5 (130.3–172.3)	1	China	147.2 (134.7–176.2)
2	India	77.0 (62.4–96.4)	2	India	101.0 (81.6–125.6)	2	India	134.2 (108.5–165.7)
3	United States of America	31.0 (26.7–35.8)	3	United States of America	34.4 (29.7–39.8)	3	Pakistan	37.1 (15.8–58.5)
4	Pakistan	19.4 (7.9–30.4)	4	Pakistan	26.2 (10.9–41.4)	4	United States of America	36.0 (31.0–41.6)
5	Brazil	16.8 (15.0–18.7)	5	Brazil	21.5 (19.3–24.0)	5	Brazil	26.0 (23.2–28.7)
6	Mexico	12.8 (7.2–15.4)	6	Mexico	17.2 (9.7–20.6)	6	Mexico	22.3 (12.7–26.8)
7	Indonesia	10.7 (9.2–11.5)	7	Indonesia	13.7 (11.9–14.9)	7	Egypt	16.9 (9.0–19.4)
8	Germany	9.5 (7.8–10.6)	8	Egypt	11.9 (6.4–13.5)	8	Indonesia	16.6 (14.6–18.2)
9	Egypt	8.9 (4.8–10.1)	9	Bangladesh	11.4 (9.4–14.4)	9	Bangladesh	15.0 (12.4–18.9)
10	Bangladesh	8.4 (7.0–10.7)	10	Germany	10.1 (8.4–11.3)	10	Turkey	10.4 (7.4–13.3)

i 95% confidence intervals are reported in brackets.

Table 1: *Top 10 countries or territories for number of adults (20-79 years) with diabetes in 2019, 2030 and 2045*

Source: IDF Diabetes Atlas (2019)

The International Diabetes Federation reported in 2020 that more than 6% of the approximately 172 million adults in the country had diabetes. .).In 2017, Indonesia ranked 6th with diabetes mellitus, which reached 10.3 million people. There will be an increase in the number of people with diabetes mellitus from 10.3 million in 2017 to 16.7 million in 2045.(Chalidyanto, 2021) Based on the Indonesian Basic Health Research in 2013 and 2018, the national prevalence of diabetes (population aged 15 years and over) states that the proportion of people with diabetes mellitus in the population aged over 15 years has increased, recorded at 6.9% and increased by 2% in 2018 (Indrahadi et al., 2021). The proportion of people with diabetes mellitus in Indonesia was observed in the province of Jakarta as a comorbidity of type 2 diabetes with 76.5% of people with diabetes mellitus. Similarly, the highest proportion of people with Diabetes Mellitus based on doctor's diagnosis in people aged ≥15 years is Jakarta with a percentage (3.4%), and with the lowest percentage in Nusa Tenggara Timur (0.9%).(Mao et al., 2021). This is influenced by the socioeconomic development over the past 40-50 years that has dramatically changed lifestyles from traditional to modern, leading to a lack of physical activity due to technological advances, to the affluence of consumption of foods rich in fat, sugar, and calories, and high levels of mental stress. All of these can affect insulin sensitivity and lead to obesity (Wicaksana et al., 2020).

3.3 Clinical Symptoms: Based on research conducted by (Afroj A. Shaikh et al., 2022) there are several signs and symptoms of Diabetes Mellitus including:

No	sign	Symptoms
1	Extreme hunger (P (Polyphagia)	Dry mouth and skin
2	Excessive thirst (P (Polydipsia)	Foot pain
3	Frequent urination (P(Polyuria)	Yeast Infection
4	Slow wound healing	Genital and skin infection
5	Akantosis Nigrikans	fatigue
6	Weight loss	Nausea
7	De hydration	Pain in Stomach
8	Pai Pain	Vometing
9	Flushed face	Blurred Vision

In the study (Dwivedi et al., n.d.) the symptoms of diabetes are caused by increased blood sugar. Common symptoms of diabetes include: increased thirst, weight loss, frequent urination, blurred vision, extreme fatigue sores that do not heal.

1. Male Symptoms: In addition to the common symptoms of diabetes, men with diabetes may experience decreased sex drive, erectile dysfunction (ED), and poor muscle strength.
2. Symptoms in Women: Women with diabetes may also experience symptoms such as urinary tract infections, yeast infections, and dry and itchy skin.

Type 1 Diabetes:

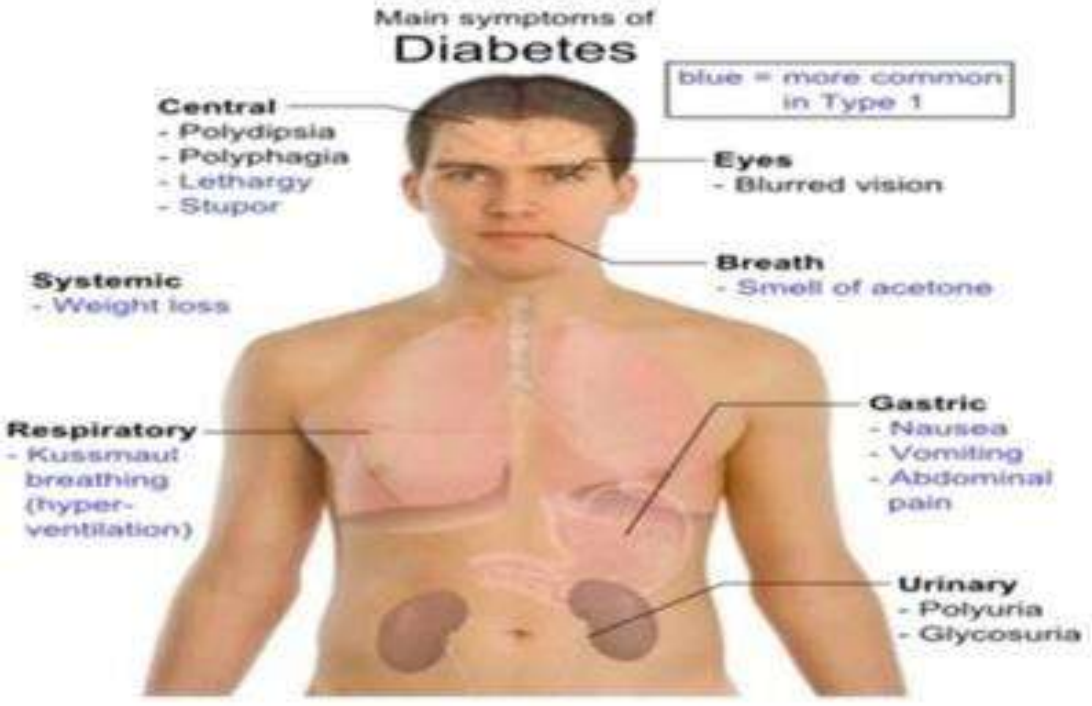

Fig.3. Symptoms of Diabetes

In people with type 1 diabetes, symptoms appear suddenly and dramatically. A serious condition called diabetic ketoacidosis, a complication where the body produces too much acid, can develop quickly. In addition to the common diabetic symptoms of excessive thirst and urination, early symptoms of diabetic ketoacidosis also include nausea, vomiting, fatigue, and abdominal pain, especially in children (Grunbaum, 2023) Breathing tends to become deep and rapid as the body tries to correct the acidity of the blood (see Acidosis), and the breath smells like acetone. Without treatment, diabetic ketoacidosis can progress to coma and death, sometimes quickly. After type 1 diabetes starts, some people experience a long but temporary phase where blood glucose levels are close to normal (honeymoon phase) due to partial restoration of insulin secretion.

Type 2 diabetes: People with type 2 diabetes may not show symptoms for years or decades before diagnosis. Symptoms may be subtle. Increased urination and thirst are moderate at first, but gradually worsen over weeks or months. The person eventually feels very tired, tends to experience blurred vision, and may become dehydrated. In the early stages of diabetes, blood glucose is sometimes very low, a condition called hypoglycemia. Since people with type 2 diabetes produce insulin, they usually do not suffer from ketoacidosis even if type 2 diabetes has gone untreated for a long time.(Grunbaum, 2023)
In rare cases, blood glucose levels are very high (can even exceed 1000 mg/dL [55.5 mmol/L]). This increase is often caused by some other type of stress, such as infection or medication use. When blood glucose becomes too high, a person can become severely dehydrated, which can lead to confusion, drowsiness, and seizures, a condition called hyperosmolar hyperglycemic state. Many people with type 2 diabetes are diagnosed through routine blood glucose tests before they have very high blood glucose levels. Both types of diabetes (Type 1 and 2 diabetes) can have very similar symptoms if there is a significant increase in blood glucose. (Grunbaum 2023). Symptoms of high blood sugar include: 1. Increased thirst. 2. Increased urination. 3. Increased hunger. Glucose is detected in the urine when blood glucose levels are greater than 160 to 180 mg/dL (8.9 to 10.0 mmol/L). The kidneys excrete more water to dilute the high amount of glucose when the level of glucose in the urine rises. People with diabetes frequently urinate (polyuria) because their kidneys produce an excessive amount of urine. Polydipsia, or excessive urine, results in abnormal thirst. The person might lose weight once the extra calories are eliminated through urine. To make up for it, they frequently experience extreme hunger (Grunbaum 2023). Other symptoms of diabetes include. 1. Blurred vision. 2. Sleepiness. 3. Nausea. 4. Decreased resistance during physical activity. In the early stages of T2DM, there are usually no symptoms of diabetes. Common symptoms of diabetes are as follows: 1. Increased thirst as water and electrolytes in the body decrease (polydipsia). 2. Increased hunger due to reduced glucose levels in tissues (polyphagia). 3. The condition of urine containing glucose usually occurs when the blood glucose level is 10 mg/dL (glycosuria). 4. Increases the osmolarity of the glomerular filtrate and reabsorption of water is inhibited in the renal tubules resulting in increased urine volume (polyuria).5. Dehydration due to increased glucose levels causes hypertonic extracellular fluid and water in the cells to escape. 6. Fatigue due to impaired CHO utilization results in exhaustion and loss of body tissue despite normal or increased food intake. 7. Weight loss is caused by loss of body fluids and the use of muscle tissue and fat will be converted into energy. 8. And other symptoms include reduced vision, cramps, constipation, and candidiasis infection. (Hardianto, 2021).

3.3 Risk Factors: Family history, obesity, race/ethnicity, age greater than or equal to forty, prior impaired fasting glucose or impaired glucose tolerance, hypertension, hyperlipidemia, and history of gestational diabetes mellitus are all common risk factors for diabetes..(Almotairi, 2022)). The largest determinant of diabetes mellitus incidence is family history. The possibility of developing diabetes mellitus exists in people with a family history of the disease. Age is the second risk factor influencing the prevalence of diabetes mellitus, though. (Mayasari & Indahyati, 2021). Based on research conducted by(Safitri et al., 2021) there are several risk factors for Diabetes Mellitus, including: Common risk factors for diabetes mellitus include family history, obesity, race/ethnicity, age greater than or equal to forty years, previous impaired fasting glucose or impaired glucose tolerance, hypertension, hyperlipidemia, and history of gestational diabetes mellitus.(Almotairi, 2022)). The largest determinant of the prevalence of diabetes mellitus is family history.

People who have a family history of diabetes mellitus are more likely to develop the disease themselves. Age, on the other hand, is the second risk factor influencing the prevalence of diabetes mellitus. (Mayasari & Indahyati, 2021). Based on research conducted by (Safitri et al., 2021) there are several risk factors for Diabetes Mellitus, including: 1. Age - People aged >35 years are at risk of developing diabetes in urban areas. People aged >35 years have a 5.60-fold risk of developing diabetes compared to people aged ≤35 years. This is consistent with the observation that the incidence of diabetes mellitus increases with age, especially after 40 years (Amoussou-Guenou et al., 2015). 2. Education Level - Diabetes prevalence in metropolitan regions is correlated with low levels of education. Compared to individuals with high education levels, those with poor education have a 1.69 times higher risk of having diabetes. 3. Smoking Status - Based on IFLS 5 data, smoking does not increase the risk of developing diabetes in urban Indonesia. According to this study, the majority of diabetics profess not to smoke. 4. Body Mass Index - Metabolic syndrome is a concern for those with overweight and obese BMI categories (i.e., those with high blood lipid levels, high diastolic blood pressure, and large waist circumference). The study found no correlation between the prevalence of diabetes in metropolitan areas and any of the BMI categories (underweight, normal, overweight, and obese).In addition, based on research conducted by (Siahaan et al., 2023) there are several risk factors for Diabetes Mellitus, including: 1. Age - The age group >50 years has a 0.336 times higher risk of developing type 2 DM than the age group <50 years. In research (Liyanage, 2019) the highest age group at risk of developing Diabetes Mellitus is between 41 to 55 years. 2. Consumption of Meat and Fried Foods - High levels of trans fats, saturated fats, and cholesterol can be found in meat and fried foods. Blood levels of adiponectin, which increase insulin sensitivity, are reduced as a result of high-fat eating. Patients with low adiponectin levels have a higher prevalence of diabetes and obesity. 3. Diet - An imbalance in the body's intake of carbohydrates and other nutrients results from unhealthily balanced diets that include junk food, fried meals, and sugar-sweetened beverages. Type 2 DM is the result of the pancreas working too hard as a result of excessively high sugar levels. 5. Alcohol consumption - Alcohol can affect glucose metabolism by inhibiting the process of gluconeogenesis and glycogenolysis which triggers hypoglycemia. This hypoglycemia condition triggers excessive consumption of food including carbohydrates that can cause an increase in blood glucose levels in DM patients. 6. Smoking habit - Smoking habit increases the risk of 0.835 higher suffering from diabetes than non-smokers. This is because the nicotine content in cigarettes increases the formation of free radicals that cause inflammation and reduce insulin sensitivity. E. Measurement Method - SF-FFQ Questionnaire: By aggregating the anticipated number of servings that teenagers ingested via a one-time interview procedure, this measure evaluates the frequency of food consumed over the course of the previous month. F. Impact of Diabetes Mellitus - Diabetes mellitus is the leading cause of premature death worldwide.(Vlad and Popa 2012) Diabetes mellitus can reduce quality of life and life expectancy, it can also cause microvascular complications and macrovascular complications that lead to blindness, kidney failure, myocardial infarction, stroke, and the need to amputate limbs.

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Development of Guidance Activities in an Elementary School

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Abstract: This study aims to develop guidelines for guidance activities in elementary schools and disseminate knowledge guidelines to teachers to organize guiding activities for students. This article defines guidance activities, types of guidance jobs, guidance services, guidance principles in elementary schools, the role of guidance teachers in elementary education, types and characteristics of guidance activities, ideas for developing guidance activities, and the role of personnel involved the development of guidance. Guidance activities are activities organized to encourage and develop students to grow to their full potential, and the development of guidance activities in elementary schools must receive cooperation from administrators, teachers, parents, students, and external agencies. The activities must align with the problems, needs, interests, and nature of each student. A student-centered should help students to their own and give them the freedom to think and make their own decisions, help them develop thinking and decision-making skills to solve problems, deal with what is happening appropriately, and live in society happily.
Keywords: Guidance, Activities, Development, Services, Nature, Types

Introduction: Guidance activities became part of student development activities in the core curriculum in 2008. The school must provide for students in conjunction with teaching to develop students' key competencies in five areas: communication, thinking, problem solving, life skills, and technology. However, elementary schools have done less to recognize the importance of guiding activities and have not provided enough guidance classes for students compared to secondary schools or extension schools. This deficiency means that students lack opportunities for “guiding activities.” Guidance activities are activities that promote and develop abilities and must focus on the particular needs of the individual student. The organization of activities must be consistent with a student's problems, needs, interests, and nature.

Guidance activities must cover all five aspects of guidance services, individual data collection services, information services, consulting services, personnel placement, and follow-up services. Successful guidance activities require cooperation from many parties, including administrators, teachers, parents, teachers of librarians, school nurses, and external agencies. All parties play an essential role in the development of guidance activities. It is imperative to develop or organize guiding activities for students; teachers are important because they are the ones closest to the students. Teachers, including guidance teachers, homeroom teachers, and classroom teachers, are integral to the process. Guidance teachers are responsible for providing advice to teachers and parents of students in providing knowledge, advice, and guidelines for knowing and understanding students through various methods such as homeroom and education guidance activities. The classroom teacher and the course teacher are responsible for helping to contact students so that they can get to know each other and have a good attitude towards guidance services. This includes cooperation with guidance teachers in collecting student information and organizing guidance activities for students and teaching and learning activities that focus on giving students the freedom to think and make decisions on their own and, understand emotions, feelings, know how to think, and have a decision-making process to solve problems on their own, know how to set goals and plan life in terms of education, professional and personal, and social interests, be able to adapt quickly to all changes, be able to face problems and challenges, deal with what is happening appropriately, and live in society happily.

Definition of Guidance Activities: Guidance activities have been defined in various ways. For example, Jetsada Bunma Home (2020, p. 41) defined guidance activities as "various activities organized to encourage and develop students to grow to their full potential." The organized activities must align with the needs of learners and society by considering the difference between individuals, enhancing life skills, emotional maturity, multi-cognitive learning, and building good relationships. Therefore, the guidance activities cover various activities of the guidance service, including organized in-class and outside-of-class. Nutthawee Nongnuch (2009) said guidance activities were the mass of experiences that allow each client or group to act or participate in achieving goals by which they will develop or strengthen themselves and prevent or solve problems appropriately in education, professional, personal, and social realms.

Guidance Services: Aspects of Guidance Services: Atchara Erbsuksiri (2021, p. 214) summarized three aspects of guidance services as follows: Education guidance is a process of assisting students on specific learning matters like further education guidelines and creating clarity in learning and helps students to make appropriate choices and adapt themselves in their studies. Vocational guidance is a process of helping students to get to know the world of the profession so that students can make plans and decide on a career that matches their aptitudes, interests, and needs. Personal and social guidance is a process to help students understand themselves and their surroundings, such as physical personality and composition, making friends, taking care of health, etc., to live and adapt happily to society.

Types of Guidance Services: Wananya Kaewkaewpan (2020) stated that guidance services are divided into five types as follows: 1. An Individual Inventory Service helps teachers get to know and understand their students better by recognizing the differences between individuals and employing various techniques and methods, such as observation and interviews. 2. An Information Service provides information, news, and knowledge to students by presenting information in various forms like signs, communications, electronic media exhibitions, inviting speakers, and study tours. 3. A Counseling Service is considered at the heart of guidance services and provides counseling to students with personal problems, continuing education, and future careers. 4. A Placement Service systematically provides internal and external scholarships for students. 5. A Follow-up Service monitors student behaviors and development and relies on the cooperation of the teacher's advisor in following up with students, such as following up on student entrance exam results.

Guidance Principles at the Elementary Level: Pornwalai Ariyarasamesap (2011) discussed the principles of guidance services at the elementary school level and said that guidance services should be organized to help all students equally and acknowledge differences between students. Teachers will have a proactive duty to guide students to choose and make decisions in solving various problems and help students to help themselves. Guidance must be included in teaching and learning activities for each subject, and the content taught should be related to present and future situations through guidance activities. All teachers must work together with homeroom teachers, and successful guidance activities require the cooperation of parents

and the community.

The Role of Guidance Teachers in Primary Education: Somporn Wongwithoon (2012) stated that guidance teachers are essential in mentoring teachers and parents of all students. Guidance teachers are responsible for coordinating with those involved inside and outside of an educational institution and take the lead in organizing guidance activities and supervising students. Guidance teachers provide information, knowledge, advice, and techniques. Guidance should be based on psychological principles to understand and screen students through various methods such as observation, interviews, and questionnaires. Guidelines for taking care, helping, promoting, and developing students should be provided to all teachers. These included guidelines for organizing homeroom activities or activities for all groups of learners in line with their abilities, aptitudes, and interests. Understanding the nature of each student's differences can help students develop themselves to their full potential.

Types and Characteristics of Guidance Activities: The Office of the Basic Education Commission (2016, pp. 15-19) has classified the types of guidance activities into three types as follows: 1. Individual Guidance Activities approaches seek to meet individual needs by recognizing students' differences. This guidance relies on the main principles based on service to the recipients. In the scope of service, personal and social development, educational development, and professional development should be provided 2. Group Guidance Activities are those that have been designed to provide an experience for groups of students with the same or similar interests. Students learn together in class to apply knowledge to develop skills and abilities through activities orientation, play activities to explore career paths, and interpersonal communication development activities like friends helping friends activities. Group Guidance activities are designed to prevent problems. The scope covers personal and social development in educational development, and group activities should be characterized by meeting the needs of small and large student groups. 3.Guidance Activities are special projects that respond to the needs of groups of students with specific special needs or who require a service method. These differ from the individual counseling or guidance activities mentioned above, which must be organized and experienced systematically. Guidance activities may require time, opportunity, or suitable learning resources such as vocational camp projects or guiding parents of students with special needs in hospitals.

Concepts for Developing Guidance Activities: Saiyud Mikrit and Chatchai Pitakthanakom (2017) discussed development guidance activities concerning education, professional, personal, and social levels. The following are the principles that should be followed. 1. There is a clear structure and arrangement of guidance activities based on a survey of student needs. There are regular guidance activities, and the objectives are a set of activities that are evaluated clearly. Age, gender, education level, and socio-economic status should be considered. 2. Activities that focus on content rather than fun should be organized. Students should have the opportunity to discuss and practice skills rather than merely lecturing or giving examples. 3. Academic principles should be employed to check the quality of the guidance activities package, and various psychological techniques should be applied.

Roles of Those Involved in Developing Guidance Activities: Administrators: Supin Chaikaew (2018, pp. 227-237) stated that the successful development of guidance activities requires the cooperation and assistance from personnel of all departments, such as administrators, first class teachers, subject teachers, guidance teachers, parents, librarians and nurses, in which each department has different roles and responsibilities. School administrators play an important role in advancing educational institutions. First, they provide the budget, place, equipment, and various tools of guidance. Second, they must initiate work, set guidelines for school guidance, and appoint and coordinate the responsibilities of the guidance committee. Third, administrators must support guidance counselors and offer them the opportunity to attend training seminars or organize training to educate them. Fourth, school administrators must continually assess the guidance service in meeting student and community needs. Fifth, school administrators must recruit guidance teachers with the appropriate qualifications and suitable personalities. Last, school administrators are responsible for setting the teaching and learning schedule following the guidance activities such as organizing homeroom activities.

Classroom Teachers: A classroom teacher is essential in organizing the guidance activities and providing an environment necessary for students to adapt. Therefore, classroom teachers have several roles and

responsibilities towards guidance services. They are to: 1. Study and understand the objectives and scope of the guidance program; 2. Cooperate and coordinate with the guidance department in gathering information and conducting meetings; 3. Help coordinate and publicize for students to know and understand and have a good attitude towards service. 4.Advise and encourage students to use the guidance service; 5.Cooperate with the guidance department in organizing homeroom activities by providing information about learning the etiquette of being in society; 6.Participate in the new student orientation program by helping educate students about the rules and regulations;7.Use various guidance techniques and tools, such as observations, interviews, and study, to understand student behavior; 8.Help refer students who deserve counseling to the guidance department; and 9.Act as a communication medium between the parents of the students and the school to promote cooperation in helping or solving students' problems.

Subject Teachers: Subject teachers have the following roles and responsibilities in providing guidance services to students: 1. They are responsible for providing a teaching atmosphere that helps students learn better. 2. The subject teacher must try to explain the importance of the subject and occupations related to the subjects studied to the students. 3.They must assist the guidance teacher in collecting information about each student and organizing student guidance activities. 4. They sometimes must serve as a mentor and a resource for students. 5. They liaise with parents of students and support students in using the guidance service. 6. They must be a mentor for students in organizing various activities.

Guidance Counselor: Guidance counselors play a direct role and have several responsibilities. They are to: 1. Be a leader in the implementation of guidance activities in schools by providing comprehensive guidance services: collection, information, consultation, personalization, and follow-up services; 2. Coordinate and work with school administrators to organize training for knowledge about guidance to school personnel; 3. Provide public relations activities like inviting school personnel to be interested in guidance work and using the guidance service; 4. Educate teachers, personnel of various departments of the school, and parents about the purpose and importance of the guidance service; 5. Acting as a contact for cooperation from agencies, institutions, or people in the community in organizing guidance activities such as requesting to see places and seeking scholarships for economically disadvantaged students; 6. Educate students about the guidance service and disseminate information among various groups of people to inform them of the progress; and 7. Measure and evaluate guidance work to develop more appropriate guidance activities.

Parents: Parents are the closest people to students. Parents should cooperate closely with schools to help promote the smooth development of students. Parents have the following roles and responsibilities towards the guidance service. They should 1. Cooperate with guidance teachers in collecting information about children in need and provide accurate information, not concealed; 2. Cooperate with guidance teachers in adjusting children's behavior willingly; 3. Give full support to children's teaching and learning activities; 4. Always take care and support children in receiving guidance services; and 5. Inform the school when there a problem or conflict exists.

Development of Guidance Activities: Kanchana Noiwimol (2017) studied the development of guidance activities to promote the education and career development of Mathayomsuksa 3 students. Noiwimol developed a set of guidance activities to promote education and career development for Mathayomsuksa 3 students, according to specified criteria. Students studied through a series of educational and occupational activities. Learning outcomes after learning were significantly higher than before, and students expressed high satisfaction with the educational and career promotion activities. Sareewan Suparerkchatkul (2020) studied enhancing the optimism of adolescent students through guidance activities. Suparerkchatkul found that students were overall optimistic, and each aspect was at a medium level. Students who participated in the guidance activities were more optimistic after the experimental intervention than those who did not. Jirapat Thipanya (2020) studied the effect of using guided activities according to the metacognition strategy to enhance the self-efficacy perceptions and decision-making skills of grade 5 students. Thipanya found that the self-efficacy perception and decision-making skills of Prathomsuksa 5 students after participating in the guidance activities according to the metacognitive strategy were higher than before they participated. Hellen chelagat kuchi, Joshua manduku, and Hellen sang (2017) studied the effectiveness of guidance activities in managing undisciplined behavior in schools for secondary education. They found that guidance activities can help regulate the behavior of a good level student. Digdem M. SiYEZ Alim KAYA and Asli UZ BAS

(2012) surveyed the teacher feedback on the classroom guidance program. The study found that many elementary teachers were interested in classroom guidance activities, but most high school teachers were reluctant to participate in class guidance activities. However, 80% of primary and secondary teachers said that most classroom guidance activities were essential to students. In primary and secondary teachers, 84.3% of primary school students wanted advice on classroom guidance activities, and 49.6% of elementary school teachers wanted advice on teaching and learning programs in the classroom.

Summary: The development of guidance activities will be successful when cooperation from many parties, including school administrators, teachers, parents, and students, is received. Guidance teachers play an essential role in developing guidance activities. This is because knowledge and understanding of the science of psychology are critical in helping young students and developing direct guidance principles. However, in the current situation, most elementary schools do not have school guidance teachers. Class teachers and subject teachers play critical roles in learning, and they can learn to understand student behavior via various techniques such as observation, interviews, and tests. The social dimension has a primary role in organizing guidance activities for students to suit their age range and align with their needs. Each student's interests must be recognized to organize activities, and teachers must consider student differences and organize appropriate activities to encourage independent thinking and decision-making so students think about and solve problems by themselves, quickly adapt to changes, and live happily in society.

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Systematic Analysis for the Relationship between BMI and Tuberculosis

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Abstract: Abnormal body mass index (BMI) is an established risk factor for the onset of active tuberculosis. An increase in Body Mass Index (BMI) by one unit was found to be associated with a reduction of 2% in the incidence of tuberculosis, as evidenced by statistical significance ($P < 0.001$). The adjusted odds ratio of tuberculosis was found to be 4.96 (with a 95% confidence interval of 4.87 to 5.05) in individuals categorized as underweight, whereas those classified as obese had a considerably lower odds ratio of 0.26. This study affirms an association between abnormal body mass index (BMI) and tuberculosis as a significant risk factor.
Keywords: BMI, Tuberculosis, Egger's Test, Binary Random-Effects, Cochran Mantel–Haenszel Test
Introduction: Tuberculosis (TB) and abnormal BMI are two major public health problems worldwide.1 TB is an infectious disease caused by Mycobacterium tuberculosis and abnormal BMI is a complex metabolic disorder characterized by body fat accumulation. TB and abnormal BMI share common risk factors such as malnutrition, diabetes, and socio-economic status. This systematic review aims to analyze the relationship between abnormal BMI and TB.
Methods: In order to gather relevant information, a two-participant review team conducted a data extraction process on chosen studies. The extraction process involved the retrieval of crucial elements such as the primary author's name, date of publication, country of origin, enrollment dates, aggregate sample size with gender distribution, age estimation methodology (median, mean, or highest frequency in age range), tuberculosis category, the presence of comorbidities (particularly HIV and diabetes), as well as the percentage distribution of diverse body mass index (BMI) categories across patient (tuberculosis) and control (non-tuberculosis) groups. The categorization of adult populations as underweight, normal weight, overweight, and obese, according to their body mass index (BMI), was conducted in accordance with the internationally recognized criteria outlined by the World Health Organization (WHO).2 These criteria were established by reference to the following threshold values: BMI ≤18.50, 18.50-24.99, 25.00-29.99, and ≥30.00 kg/m2, respectively.2 The analysis did not incorporate patients diagnosed with diabetes. In order to mitigate potential heterogeneity and bias in our findings, we opted to exclusively analyze studies that employed the same BMI categorization utilized in our meta-analysis. In order to determine the prevalence rates of varying BMI categories among both cases and controls, the proportions reported in selected studies were extracted as a percentage of the total number of subjects within each group.The utilization of Egger's test3 was employed in order to evaluate the existence of publication bias, as well as the inclination for effect sizes that have been estimated in studies with diminished sample sizes to deviate from those effect sizes that have been estimated in larger-scale studies. The results obtained from the Egger's test encompassed both t-value and P-value in relation to publication bias. Additionally, the regression intercept, standard errors, 95% confidence intervals (CI), and P-value for publication bias were included in the analysis for publication purposes. The Egger's test, which is deemed statistically significant, utilized a threshold level of $P < 0.1$ as the criterion for detecting any presence of publication bias. The principal measure of interest pertained to the assessment and comparison of the overarching incidence of diverse BMI groups among individuals afflicted with tuberculosis and their respective control counterparts. The study conducted meta-analyses to evaluate the aggregated prevalence, including 95% CI, of diverse Body Mass Index (BMI) categories among subjects categorized as cases and controls. The present study employed the Comprehensive Meta-Analysis software (CMA) version 3.9 (Englewood, NJ, USA)4 to conduct meta-analyses.

Specifically, variances of raw proportions or percentages were amalgamated via a binary random-effects model,5 acknowledging the existence of population heterogeneity and postulating that the association between body mass index (BMI) and tuberculosis incidence is not homogeneous across different populations. The utilization of forest plots was employed to depict the incidence of distinct body mass index (BMI) categories in individuals afflicted with tuberculosis versus individuals serving as controls, as sourced from the studies under consideration. The present study undertook the estimation of the odds ratios (ORs) accompanied by the 95% confidence intervals (CI) pertaining to the incidence of tuberculosis, while taking into account the different categories of body mass index (BMI). Additional adjustments were made for sex, age, and HIV status. The aforementioned estimations were carried out utilizing the Cochran Mantel–Haenszel test,6-9 as previously reported in literature. The statistical tests implemented in this study were conducted in a two-sided manner, utilizing the SPSS Statistics software, Version 21.0, developed by SPSS Inc. of Chicago. Estimation of projected tuberculosis occurrence in correlation with body mass index was performed in accordance with previous methods,10 and the model were duly modified to incorporate the variables of gender, age and human immunodeficiency virus infection status. The evaluation of the heterogeneity among the chosen academic literature was conducted by means of the Q test,11 which discerns between the existence or lack of heterogeneity. The Q test, nonetheless, fails to present a comprehensive analysis of heterogeneity and is incapable of recognizing it within the limited number of studies that have been identified for certain comorbidities.12 Henceforth, the I2 index was computed to supplement the Q test and explicate the extent of heterogeneity observed across studies. The I2 index values have been previously recommended to be divided into four categories: low (0-30%), moderate (30-60%), substantial (60-90%), and considerable (>90%).13.

Results: In individuals diagnosed with tuberculosis, the incidence of being underweight was demonstrated to be three times higher in comparison to the control group with statistical significance (P = 0.001). On the other hand, the fraction of overweight and obese individuals was found to be two times lower in comparison to controls, also with statistical significance (P = 0.001). An augmented body mass index (BMI) of one unit demonstrated a notable inverse correlation with tuberculosis prevalence, indicating a 2% decrease (P < 0.001) in its occurrence. The adjusted odds ratio of developing tuberculosis in individuals classified as underweight was 4.96, with a 95% confidence interval of 4.87 to 5.05. Conversely, those categorized as obese had an adjusted odds ratio of 0.26.14.

Discussion: Further research is required to bridge the gaps in knowledge regarding undernutrition and tuberculosis, as stated in the WHO's guideline for nutritional care and support of tuberculosis patients.15 A better understanding of the impact of undernutrition on the time taken for sputum culture conversion, relapse, and mortality is needed.16 The repercussions of undernutrition on individuals in close proximity to tuberculosis patients and the possibilities for decreasing the risk of transmission through nutritional interventions must also be explored. It is imperative to conduct additional studies on the role of nutritional supplementation to determine the caloric requirements of patients with tuberculosis and the metabolic and immunological effects of malnutrition and refeeding. Furthermore, the precise mechanistic basis for undernutrition-mediated changes in host resistance against tuberculosis needs to be determined. Well-designed studies from diverse contexts are necessary to investigate the potential of nutritional supplementation in enhancing treatment outcomes and adherence in individuals with active tuberculosis.17.

Limitations: This systematic review has some limitations that should be considered when interpreting the results. First, most of the studies included in this review were cross-sectional, which limits the ability to establish causality. Second, the studies were conducted in various countries with different TB prevalence rates and healthcare systems, which may limit the generalizability of the findings. Third, the studies used different definitions of abnormal BMI and TB, which may affect the comparability of the results. **Conclusion**: In conclusion, this systematic review provides evidence for a positive association between BMI and TB. The findings suggest that abnormal BMI should be considered as a risk factor for TB and that public health interventions aimed at reducing abnormal BMI may also have a positive impact on TB prevention and control. Further research is needed to investigate the underlying mechanisms of the association between abnormal BMI and TB, and to develop targeted interventions to reduce the burden of TB in abnormal BMI

individuals.17
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Assessment of the COVID-19 Vaccines Third Dose Recipients in Jordan

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Abstract: Background: COVID-19 Vaccines stages increased from one to the third dose, increasing worries regarding the safety of coronavirus vaccinations.
Objective: Assess the influence of COVID-19 vaccine third dose recipients in Jordan.

Methodology: A cross-sectional study was conducted by distributing a questionnaire among 614 participants (57.2%) males and (42.8%) females of the COVID-19 vaccine third dose recipients in Jordan, (69.9%) of the sample given Pfizer-Biontech vaccine (25.7%) Sinopharm vaccine, and the AstraZeneca (2.3%), Sputnik V (2.01%), and Moderna (0.0%). They analyzed data statistically to assess the severity of side effects using SPSS version 28.

Results: Participants generally reported that (17. 6%) had different side effects after receiving the third dose of the vaccines. Statistical analysis indicated that (50.3%) of people who received the third dose had fewer side effects than the first and second doses. In this study (63.50%), females were more likely to suffer from the side effects of the COVID-19 vaccine than males . There are side effects significantly associated with genders, such as nausea ($p = 0.02$), chills ($p = 0.04$), hair loss ($p < 0.001$), blurred vision or red eyes ($p < 0.001$), and Hyperosmia ($P=0.05$). As for the side effects after receiving the third dose related to vaccine type were revealed to be significantly associated with muscle pain ($P=0.047$).

Conclusion: COVID-19 Vaccine Third Dose significantly decreased the side effects, which were non-threatening to human life. The research finding will raise awareness of vaccine benefits, increase the number of third-dose recipients, reduce the risk of pandemic effects, and help better coved -19 management in Jordan.

Significance: This paper comprehensively describes vaccines' side effects and efficacy after receiving the third dose in Jordan. That provides a valuable benchmark for increasing public knowledge of COVID-19 vaccines in Jordan, increasing public confidence in the safety of COVID-19 injections, and accelerating the vaccination program in Jordan.

Keyword: COVID-19, Vaccines, Third Dose Vaccine, Post-Vaccination, Side Effects, COVID-19 Vaccines

Introduction: The mysterious disease began to emerge in China, and the first case of the Covid-19 virus was announced in late 2019, specifically in Wuhan. After that, it spread at a breakneck speed worldwide, causing widespread fear and global concern (Fang et al. , 2020; BANKO, 2020; Stawicki et al., 2020) . Despite adopting the appropriate precautions, many countries could not manage and diminish the virus, and as a result, it spread throughout the entire world and destroyed numerous industries (Spennemann & Whitsed, 2021; Verma & Gustafsson, 2020). From this perspective, the World Health Organization described it as a severe global pandemic that may be represented by the emergence of new diseases, such as diseases that affect the respiratory system, which was recently called the Coronavirus (Ryalino, 2020). Furthermore, it was quickly recognized as a new virus with structural similarities to the virus that causes severe acute respiratory syndrome (SARS) that broke out in the last 18 years (Rodriguez et al., 2020; Coleman et al., 2016). Due to the rapid swell of the coronavirus disease worldwide, most nations, including Jordan, have taken all necessary precautions to reduce and prevent it (Alnazly et al., 2021). These precautions include adhering to quarantine and self-isolation, wearing masks, social distancing, staying at home, imposing curfews, using disinfectant substances, and implementing e-learning for schools and universities (Liu et al., 2020; Teslya et al., 2020). However, these preventive measures are insufficient in confronting this epidemic and limiting its transmission, so it is necessary to reach treatments and preventative solutions to reduce infection with the virus and eliminate it (Khuroo et al., 2020). The Food and Drug management licensed the first coronavirus vaccine from Pfizer-Biontech in December 2020 (Bernardini et al. 2022; Fortner & Schumacher, 2021). After that, the Jordanian Ministry of Health announced the national vaccination campaign and granted everyone on Jordanian soil the right to receive the Corona vaccine free of charge. It will be distributed without authorization or fees on January 13, 2021. So far, the number of those who received the third dose of the coronavirus vaccine in Jordan has reached 657,256 doses (the Jordanian Ministry of Health, 2023). Many rumors have arisen due to the rapid production of COVID-19 vaccines (Cleve, 2021). There are rumors that COVID-19 vaccines are associated with various post-vaccination side effects, such as infertility;

this is still circulating and disputed on social media platforms (the Jordanian Ministry of Health, 2023). Jordanians' ability to participate in COVID-19 vaccinations has been studied previously. According to the data, only 36.1 percent of people were interested in participating in immunization clinical trials (Abu-Farha et al., 2020). Another study discovered that misinformation about COVID-19 and conspiracy theories harm vaccine fears among Jordanians. It may be a significant obstacle to the effective management of the epidemic. So Intimidation and anxiety about vaccines have been linked to reliance on social media for information regarding COVID-19 vaccines (Sallam et al., 2021; Almomani & Al-Qur'an, 2020). As a result, since different vaccines are used in the Jordan National Immunization Program, monitoring side effects and post-vaccination opinions is crucial to address vaccine hesitation and rumors. So, the study aims to look at the side effects that persons in Jordan reported after getting the third dosage of various COVID-19 vaccines, as well as their impressions.

Literature Review: The literature review results indicated a helpful criterion for increasing public knowledge of COVID-19 vaccines. These findings suggest that government and health agencies should implement appropriate educational strategies to increase community consciousness of the value of vaccines in preventing viral infection. In December 2020, Pfizer-Biontech received FDA approval for its first coronavirus vaccine (Fortner & Schumacher, 2021). Intimidation and concern about vaccines have emerged (Sallam & et al., 2021). Previous studies have confirmed that side effects are consistent with those reported during clinical trials, demonstrating that both vaccines have safety profiles (Hatmal et al., 2021). Another study revealed; those coronavirus vaccines are well tolerated, risk-free, and generate an immune response against the virus most of the time. Most post-vaccine adverse effects were mild to moderate, showing that the body develops immunity to provide protection (Elgendy et al., 2022). The manufacturer's statistics and the distribution of adverse effects among Czech healthcare professionals were quite similar, particularly regarding the latter's association with the second dose and younger age groups. Compared to the manufacturer's report, some local and systemic adverse effects were generally more common (Riad et al., 2021). These studies may help reduce concerns about the resulting vaccines; By disproving myths and ideas about adverse vaccine effects after vaccination, these findings may increase public confidence in the safety of COVID-19 injections and accelerate the world's vaccination program.

Summary Table:

Paper title	Author	Result
Public Willingness to Participate in COVID-19 Vaccine Clinical Trials: A Study from Jordan	Fortner & Schumacher, 2021	In December 2020 Pfizer-Biontech received FDA approval for the first coronavirus vaccine.
High Rates of COVID-19 Vaccine Hesitancy and Its Association with Conspiracy Beliefs: A Study in Jordan and Kuwait among Other Arab Countries	Sallam et al. 2021	Intimidation and anxiety about vaccines
Human mobility restrictions and the spread of the Novel Coronavirus (2019-nCoV) in China	Fan et al. 2020	The first case of the Covid-19 virus was announced in late 2019, specifically in Wuhan.

Side Effects and Perceptions Following COVID-19 Vaccinationin Jordan: A Randomized, Cross-Sectional Study Implementing Machine Learning for Predicting Severity of Side Effects	Hatmal et al. 2021	Participants who received the Oxford-AstraZeneca and Pfizer-BioNTech vaccines reported side effects that were consistent with those reported during clinical trials, demonstrating that both vaccines have safety profiles.
Side Effects and Efficacy of COVID-19 Vaccines among the Egyptian Population	Elgendy et al. 2022	Coronavirus vaccinations were well-tolerated, risk-free, and generated an immune response against the virus majority of the time of the majority of post-vaccine adverse effects were mild to moderate, which showed that the body was developing immunity to provide protection.
Prevalence of COVID-19 Vaccine Side Effects among Healthcare Workers in the Czech Republic	(Riad et al. 2021)	The manufacturer's statistics and the distribution of adverse effects among Czech healthcare professionals were quite similar, particularly in terms of the latter are correlation with the second dose and younger age groups. Compared to the manufacturer's report, some local and systemic adverse effects were more common overall.

Methodology: Study Design and Participants: A cross-sectional study (online survey) involving subjects vaccinated with the third dose of vaccines was conducted in Jordan (Pfizer Biontec, Sinopharm, AstraZeneca, Sputnik V, Moderna) regardless of nationalities, race, occupations, and places of residence. Adults (18 years and over) were asked to participate in this survey - data was collected from March 13 to July 26, 2022.

Study Tool: After studying the extensive literature, the questionnaire was generated using Google Forms and disseminated via social media. Participants were asked if they had received their third dose of the COVID-19 vaccines (Pfizer Biontec, Sinopharm, AstraZeneca, Sputnik V, and Moderna). Participants were granted a brief overview of the study and told that all responses were voluntary and would remain confidential. This survey discovered and treated many potential side effects after getting a booster dose. They added Several additional questions to collect participant data and assess their general health status before and after vaccination. Prepared a list form for this study, and the questionnaire consisted of: The first part: includes the primary data of the study sample and consists of the demographic characteristics of the model (age group, marital status, age and gender, educational level, work sector, and health status). Part Two: Contains information about receiving the third dose of the coronavirus (COVID 19) vaccine, including the type of COVID-19 vaccine that survey participants received. The last part of the survey concentrated on the participants who visited hospitals after taking the third dose. It consisted of three parts, each part included a set of paragraphs to study the side effects on recipients of the third dose of the Corona virus vaccine, and the first part included the primary data of the study sample and included the demographic characteristics of the sample. The second part includes information about receiving the third dose of the Corona Virus (Covid-19) vaccine. And in the third part, contains an assessment of side effects after receiving the third dose of Coronavirus.

Sample Volume: The usual sample size as of March 13, 2022, based on a 50% response rate, 95% confidence interval, and 5% margin of error, was calculated from the online sample size calculator. A total of 668,749

residents of Jordan were vaccinated at the end of the study period (COVID-19 Statistical Report - Jordan, 2022). Therefore, the required sample size was 384. The current study received 614 responses, an increase of 59.9%, indicating sample accuracy.

Survey Credibility and Reliability: A panel of referees and academics with relevant experience reviewed the questions and paragraphs of the questionnaire for correctness and good writing. Finally, the information was collected using the study sample after taking notes and confirming the final image of the questionnaire. Finally, we calculated Cronbach's alpha reliability coefficient to test the availability of stability and internal consistency between answers to questionnaire questions. It reached (70.9%), indicating a high degree of credibility and inner strength for the solutions that can be relied upon in completing the study procedures and testing hypotheses, knowing that the acceptable alpha coefficient value is 60% or more.

Statistical Analysis: Statistical methods were selected in line with the nature of the study hypotheses, using the Statistical Package for Social Sciences (SPSS version 28.0) to analyze the data collected. Use descriptive statistics such as ratios and frequencies to comprehensively describe the answers of the sample members to the various elements of the questionnaire; On the inferential side, a chi-square test was performed to display categorical and continuous variables.

Results and Discussion: This study evaluates side effects and detailed characterization after the third dose of COVID-19 vaccination in Jordan. Based on the papers of previous studies' findings, the coronavirus vaccine is relatively safe, and the side effects are mild and temporary. However, many side effects appear after receiving the Corona vaccine (Hatmal et al., 2021; Omeish et al., 2022). The most common side effects of the COVID-19 vaccines are fever, headache, fatigue, insomnia, muscle discomfort, decreased appetite, diarrhea, chills, increased sweating, body aches, pain, hair loss, nausea, memory loss, blurred vision, red eyes, and increased sensitivity to odors, abdominal pain, skin sensitivity, or itching. Moreover, the long-term side effects of vaccines are still indistinct (World Health Organization, 2021 Kostoff et al., 2020). In this paper's findings, there was more male (57.2%) participants in this study than female (42.8%) participants. The age range of 30 to 39 years had the most participants. High blood pressure (8.1%), diabetes (6.0%), arthritis (3.9 %), thyroid problems (3.9%), obesity (3.4%), and respiratory diseases (2.3%) were the most prevalent chronic conditions among individuals. Many adverse reactions have been noted after receiving the third dosage of the COVID-19 vaccine, including fatigue, headaches, and flu-like symptoms. The results showed that the side effects in females were almost more than in males (Table 5). regardless of the type of vaccine, side effects have been reported after taking the third dose, and the results of this study showed that the symptoms after taking the third dose were mild compared to symptoms of the first and second doses (Hatmal et al., 2021). After receiving the corona vaccine, side effects are considered normal due to the start of prevention and protection in the immune system (Elgendy et al., 2022). However, this study found a significant association between the resulting side effects of COVID-19 vaccines between males and females; Side effects tend to be more noticeable after the third dose (Hause et al., 2021). Table 6 shows the side effects reported after receiving vaccinations related to the type of vaccine. It turns out that many people were Infected after the third dose (72.1 %) of Pfizer-BioNTech compared to other vaccines. According to Omeish et al. (2022), most of the people in Jordan's side effects were associated with the AstraZeneca vaccine, followed by the Pfizer vaccine, and the next one is the Sinopharm vaccine. At this point, when comparing our study with previous studies, we find the side effects related to the types of the vaccine in the third dose less than in the first and second dose; this means the third dose is effective, safe for the body, and leads to reducing the percentage of infected. This study aimed to assess the influence of COVID-19 vaccine third dose recipients in Jordan; in light of the statistical treatment of the study data, it reached the following results:

Demographic Data: The study included demographic information about a sample of 614 participants registered based on gender, age, educational level, marital status, and workplace, as most participants were males (57.2%). The scientific level is high, as most participants had a Bachelor's degree, constituted about

(51.8%) of the research sample, and about (57.0%) of the employed work in the public sector. In addition, the participants were of different age groups (Table 1). Participants' Health Information Reported that two-thirds of the participants (68.6 %) were of average weight, that (45.9 %) of the study sample were non-smokers, and it seemed that (78.8 %) did not suffer from chronic diseases. Furthermore, the study sample shows that (95.0 %) do not suffer from allergies to any food. It also appears (that 95.1%) are not allergic to any medication (Table 2).

Table 1: *Classification of participants involved in the study based on their demographic data (N = 614)*

cc		**N**	**N %**
Age (years)	18-29	202	32.9%
	30-39	238	38.8%
	40-49	87	14.2%
	50-59	63	10.3%
	>=60	24	3.9%
Gender	Female	263	42.8%
	Male	351	57.2%
Educational level	High school or less	136	22.1%
	Diploma	95	15.5%
	Bachelor	318	51.8%
	Postgraduate	65	10.6%
Marital status	Single	205	33.4%
	Married	409	66.6%
Working place	Public sector	350	57.0%
	Private sector	230	37.5%
	Don't work	34	5.50%

Table 2: *Classification of study participants based on participants' health information (N=614)*

Variable		**N**	**N %**
weight	slim	126	20.5%
	Average	421	68.6%
	Fat	67	10.9%
Do you smoke?	No	282	45.9%
	cigarettes	147	23.9%
	hookah	164	26.7%
	Electronic cigarettes	60	9.8%
Do you suffer from any chronic diseases?	No	481	78.6%
	diabetes	37	6.0%
	high blood pressure	51	8.3%
	Cardiovascular disease	6	1.0%
	Chronic respiratory diseases	14	2.3%
	obesity	21	3.4%
	arthritis	24	3.9%
	Osteoporosis	9	1.5%
	autoimmune diseases	7	1.1%
	Thyroid disorder	24	3.9%
	cancer	2	0.3%
Do you suffer from an allergy to any type of foods mentioned?	no	566	92.2%
	Peach, kiwi	8	1.3%
	Dairy products	4	0.7%
	Legumes	4	0.7%
	Guava	7	1.1%
	strawberry	6	1.0%
	black sesame	2	0.3%

Do you suffer from an allergy to any kind of medication mentioned?	no	584	95.1%
	Voltaren + ibuprofen	11	1.8%
	Irvine	1	0.2%
	penicillin	13	2.1%
	Amoclan	5	0.8%

Receiving the Third Dose of the Corona Virus (Covid-19) Vaccine: Participants reported having had COVID-19 before vaccination (51.0 %), and only (28.0%) reported receiving their annual influenza vaccination. The results show that the most significant percentage (48.2 %) was for those who received the PfizerBiotech vaccine from the first and second doses, followed by the Sinopharm, the vaccine with (37.3 %) of the second dose. As for the complete immunization, they received (69.9%) of the Pfizer-BioN-Tech vaccine, and he received (25.7%) of the Sinopharma vaccine from the study sample. They discovered that (17.6%) of the study sample contracted the virus after taking the third dose (Table 3).

Table 3: *Percentages of the study sample's responses to the information questionnaire of receiving the third dose of the Corona Virus (Covid 19) vaccine*

Variable		**N**	**N %**
Have you received the seasonal flu shot?	Yes	172	28.0%
	No	442	72.0%
Did you receive the vaccine outside Jordan?	Yes	37	6.0%
	No	575	94.0%
Did you have COVID-19 before being immunized with the coronavirus vaccines?	Yes	313	51.0%
	No	301	49.0%
Did you get COVID-19 after the third dose vaccination?	Yes	108	17.6%
	No	506	82.4%
Would you advise others to receive the booster dose?	Yes	350	57.0%
	No	264	43.0%
	Pfizer Biontech	296	48.2%
What type of vaccine did you receive in the first dose?	Sinopharm.	229	37.3%
	Astrazeneca	61	9.9%
	Sputnik V	20	3.3%
	Moderna	4	0.7%
	Johnson & Johnson	4	0.7%
What type of vaccine did you receive in the second dose?	Pfizer Biontech	296	48.2%
	Sinopharm.	229	37.3%
	Astrazeneca	59	9.6%
	Sputnik V	22	3.6%
	Moderna	5	0.8%
	Johnson & Johnson	3	0.5%
What type of vaccine did you receive in the third dose?	Pfizer Biontech	425	69.2%
	Sinopharm.	159	25.9%
	Astrazeneca	6	1.0%
	Sputnik V	13	2.1%
	Moderna	7	1.1%
	Johnson & Johnson	4	0.7%

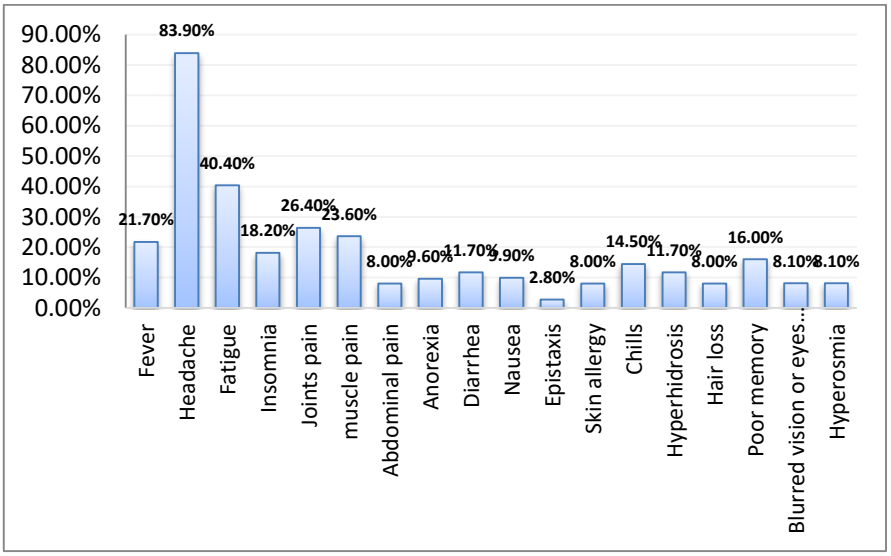
Side Effects after Receiving the Third Dose. The results appeared that (3.6%) of the study sample was diagnosed with low platelets. Moreover, it turns out that (50.3%) had fewer symptoms after receiving the third dose than the symptoms of the first and second doses. Moreover, only (9.8%) of study participants reported having increased drug and food sensitivity after receiving the third dose. Most of the

participants felt more reassured (53.7%) after receiving the third dose, and also (36.3%) of the respondents believed that maintaining preventive measures is still necessary after vaccination (Table 4).

Table 4: *The Side Effects after Receiving the Third Dose*

Variable		N	N %
Did the third dose increase your sense of protection?	Yes	33.	53.7%
	No	248	40.3%
Are you still wearing a mask after receiving the third	Yes	223	36.3%
	No	391	63.7%
Did the drug or food sensitivity increase after receiving the third dose?	Yes	60	9.9%
	No	554	90.2%
Were the symptoms after receiving the third dose less than the symptoms of the first and second dose?	Yes	309	50.3%
	No	305	49.7%
Have you been diagnosed with any type of clot (blood clot)?	Yes	26	4.3%
	No	588	95.8%
Have you been diagnosed with a low platelet count?	Yes	22	3.6%
	No	592	96.4%

Post Vaccination Side effects: The most common side effects were headache (83.9%), tiredness and fatigue (40.4%), joint pain (26.4%), muscle pain (23.6%), fever (21.7%), insomnia (18.2%), poor memory (16.0%), respectively. As for others, side effects were less common among the vaccinated participants (Figure 1).



The Potential Applications of US mRNA Vaccines in China and Implications for a "Universal" Covid Vaccine

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Abstract: The resurgence of Covid outbreak in China at the start of 2023 with the new XBB variants made people question the effectiveness of the Sinopharm vaccine. In this paper, I tried to investigate the applicability of the US mRNA vaccinations in the Chinese population, and the implication of the development of a universal Covid vaccine. I blasted the selected BA.2.12.1 strain's genome and spike protein sequences of China's, Japan's and the US's (NY, CA, WA, AZ) strains from the NCBI SARS-CoV-2 database. Blast results

showed a high percentage (>0.95) of alignment among the complete genome and spike protein sequences from all the selected regions, which supported the ideas of the applications of one mRNA vaccine to target the dominant strain in different countries. On the other hand, the identification of certain point mutations (R343T, G679R) in the functional and structural part of the spike protein underlined the high mutability of the virus as it spreads across continents. These findings suggested that while mRNA vaccines could be more effective for the prevailing strain in China and potentially the rest of the world, in order to make a firm conclusion and medical plan for the implementation, it still required additional trials and research with more data.
Keywords: mRNA vaccines, COVID-19, Universal Covid Vaccine

1. Introduction:

1.1 History and Development of SARS-CoV-2: Coronavirus 19 (COVID-19) originating in Wuhan, China in 2019, is caused by the severe acute respiratory syndrome coronavirus type 2 (SARS-CoV-2). The first ever Covid case identified was in Wuhan, China at a seafood market, and it was often proclaimed that the Covid-19 virus was brought to humans from consuming bats. SARS-CoV-2 virus is a single-stranded RNA virus with both structural (S, E, M, N) and nonstructural protein (nsp 1, nsp3, nsp 12, nsp13, nsp14, etc.) (Li et.al., 2020). S (surface or spike) protein that covers the surface of SARS-CoV-2 is responsible for the binding and infection of host cells. As a result, given the importance of the spike protein, many companies and academic institutions studied and created RNA vaccines based on the S glycoprotein, these newly developed vaccines have demonstrated their ability to generate neutralizing antibodies and have been deemed effective in fighting against the virus (Daniel Martínez-Flores et. al, 2021). During 2020, the highly infectious Alpha and Beta strains were the major strains. The Alpha strain (B.1.1.7) was the first of the highly publicized variants that appeared in Great Britain in November 2020 and spread worldwide that caused infections to surge in December of that year. The strain was identified as a Variant of Concern by CDC at the end of 2020 when it was 30% to 50% more contagious than the original covid strain identified in Wuhan, China. Variant of Concern (VOC) is a level of classification by the CDC which helps them to monitor and classify different variants into different levels of alert and concern. Variants designated as VOC demonstrate characteristics such as high transmissibility, severe symptoms that lead to hospitalization or death, and reduction in the effectiveness of treatments or vaccines (CDC, 2023). The Beta strain was first identified in South Africa at the end of 2020, and it had a similar infectiousness compared to the contemporary Alpha strain (Yale Medicine). In 2021, the most severe variant was identified as the Delta Variant with unprecedented mutations. The Delta variant was more contagious than both the Alpha and Beta variants and caused a resurgence of covid cases worldwide from June to December 2021. According to a study from the Lancet, the number of hospitalization risks in England doubled over the summer of 2021 than the number of hospitalizations from the Alpha variants. After the prevalence of the Delta variant worldwide, another new mutation-derived variant was found in the US, which was named the Omicron variant. The Omicron variant became predominant in 2022 and resulted in another resurgence of covid cases in multiple countries and regions such as the US, China and the UK. Compared to the previous mutated strains, the Omicron sub-variant was less lethal with a much lower mortality rate. On the other hand, the omicron strain had a much higher infectious rate and a larger area of impact, which is shown by the large number of infected cases from almost every country worldwide (Catherine Hyams et. al, 2022). At the end of 2022, the covid cases had reached a peak with the on-going Omicron strain and a large range of regions were being affected with covid cases and death counts. In March 2023, regions like China, Singapore, and Indian experienced another resurgence of covid cases brought by the XBB recombinant strain, which was mutated from 2 other highly contagious Omicron sub-variants (Low De Wei, 2023). Due to the minimal harm done by the XBB variant and the relaxation of covid policy, most infected people in China underwent no covid test, which resulted in a lack of data in China for XBB.

1.2 Vaccine development: Since the identification of the SARS-CoV-2 virus, countries and institutions have created various vaccines to target the major strains and reduce infection and mortality rate.

Table 1: *Summary of Covid-Vaccines Developed and Used By China and the USA*

Name	Types	Countries of development	Efficacy	Source
Pfizer	RNA	USA	88%	(CDC, 2021)
Moderna	RNA	USA	93%	(CDC, 2021)
NovaVex	Subunit Protein Vaccine	USA	90%	(WHO, 2022)
Johnson & Johnson	Protein Vector	USA	72%	(WHO, 2022)
AstraZeneca	Viral Vector	USA	72%	(WHO, 2022)
CoronaVac	Inactivated virus vaccine	China	86.4%/92.9% for 2 doses	(Yuchen Wei et. al, 2023)
Sinopharm	Inactivated virus vaccine	China	67%	(Hafez Al-Momani et. al, 2022)

China uses the inactivated virus vaccine, and the most dominant usage of vaccination is the Sinopharm vaccine, which is a type of Covid vaccination that injects dead or weak virus into the recipient's body in order to stimulate immune system response. Such vaccination is effective for specific variants such as the Delta or Omicron variant but won't be much more effective if encountered with mutated variants. The Sinopharm vaccine requires two dosages in order to become effective, which was recorded in a study that showed a 79% efficacy against hospitalization. According to WHO, the vaccine efficacy in individuals aged 60 years and older against symptomatic disease after 213 days was 80% (95% CI: 5–98%), which proved to be effective in the population (WHO, 2022). In the US, there were a variety of vaccinations that were created to combat the pandemic, which resulted in the different usage of vaccinations in different countries compared to China. The US developed a different type of covid-19 vaccination which is the mRNA vaccination that injects not viral bodies but mRNA sequences that may stimulate the development of antibodies in the patients. The mRNA vaccine provides instructions for the cells on how to make the spike proteins found on the surface of the Covid-19 virus, which causes the body to produce antibodies that target the covid-19 virus. The antibodies serve as a marker for the pathogens which once the patient is again exposed to such a virus, the immune system would recognize the pathogen and alert the body for immune responses. The mRNA vaccine was mainly provided by Pfizer and Moderna, and it has a higher efficacy (Pfizer-BioNTech: 88%; 95% CI = 85%–91%; Moderna: 93%, [CI] = 91%–95%) compared to the Sinopharm vaccine used in China (CDC, 2021). Another widely used covid-19 vaccine in the US is the vector vaccine made by the Johnson & Johnson and AstraZeneca company, which is a type of vaccine that places a modified version of the virus in order to trigger immune system responses. Similar to the mRNA vaccine, the viral vector vaccine triggers the immune system to create antibodies and defensive white blood cells, which are helpful when fighting the viral infection after exposure. The viral vector vaccine has an efficacy of 71% (95% CI = 56%–81%) with only 1 dosage and the efficacy can be improved to 94% after the application of 2 dosages (WHO, 2022). The major difference between China and the US in terms of vaccination development is that the US was rapidly improving their medication and updating the currently existing vaccination for better protection against the newly mutated virus. In the US, approximately after the outbreak of the omicron variants in the country, the bivalent vaccine booster was developed and put into use by the general public. This vaccine specifically targets Omicron sub-variants BA.4 and BA.5 (FDA, 2023). The updated vaccine can more effectively combat the Omicron outbreak and provide a higher level of protection against exposure and infection. In contrast, in China, the Sinopharm vaccine was used for the entire population from the beginning of the Delta outbreak to the XBB outbreak in

the beginning of 2023, which lasted in a span of 2 years without any improvement or target oriented developments. As shown in Figure 1, China experienced very few reported data based on the firstly developed “zero covid policy”, which was an attempt to eliminate covid cases throughout the country and hospitalize the potential exposure population. Such policy was effective in terms of controlling the covid cases but with a huge amount of monetary cost and human effort, which eventually led to the fully “open-up” policy without any restriction to the covid exposure and vaccinations. However, the inverting of the situation immediately caused spikes in covid cases throughout the entire country, which indicate the ineffectiveness of the previously designed vaccination against the latest mutated virus (Megha, 2023). This study investigated the necessity for China to acquire new vaccines such as Pfizer, Moderna, or the bivalent vaccine due to the low efficacy of its own vaccines. In the paper, I chose to analyze the data retrieved from the Omicron outbreak in both the US and China, from June 2021 to December 2022 because of the availability of large amounts of data and studies regarding the massive outbreak. By identifying and analyzing the dominant strains in the US and China, I wanted to infer the applicability of US vaccines to Chinese citizens based on the effectiveness and the similarities between the covid strains identified in both regions. In the paper, I chose to analyze the sequencing data retrieved from the Omicron outbreak in both the US and China, from June 2021 to December 2022 because of the availability of large amounts of data and studies regarding the massive outbreak. In addition, I decided to compare the data and sequence of the latest covid samples recorded in China in 2023 with BA.4 and BA.5 to see the applicability of bivalent vaccines for the current outbreak.

2. Method: In order to investigate the applicability of US produced vaccines (Pfizer, Moderna and Bivalent booster) in regions like China where it previously used its own vaccine, I wanted to compare the genome and protein sequence of the dominant strains found in these regions, which would be targeted by the vaccines. I wanted to investigate if the same covid strain would mutate as it spread in different regions, which would potentially affect the vaccine usage. I utilized the NCBI SARS-COV-2 database and blasting software to identify and compare the selected covid strains in our regions of interest. For the graphical representations, they were done by python Jupyter Notebook with the instruction and help from my mentor. Based on the public data on covid strains and the time of outbreak, in the span from April 2021 to December 2022, one of the most prevailing strains was the BA.2.12.1 covid strain, which is a sub-variant of the Omicron virus. For the purpose of the study, I selected nucleotide sequences from China, Japan, and 4 states in the US (NY, CA, WA, AZ), and blasted them with each other to compare their similarities and differences. Only 2 complete sequences from China and 4 complete sequences from Japan were selected due to the lack of data. In comparison, due to the large sequencing efforts of covid strains, there were many available sequences from the US. I was able to select 10 complete sequences of the BA.2.12.1 covid strain in the span of 2022 in each selected state. The four states were chosen based on the availability of the sequencing data, their large populations and regional variations in the US. Japan, which had been using US produced vaccines, was included in the analysis as another potential region of covid mutation. In addition, I cross blasted the spike proteins amino acid (AA) sequence. Point mutations were identified by looking at the blasting results. For each region, multiple complete sequences of BA.2.12.1 were selected for blasting to eliminate the random mutations. Only mutations that occur for over 90% of the results were identified. For investigating the latest outbreak in China, I first looked at the newest reported case of BF.7.14 strain in the US which is the OQ978950 strain reported on May 14, 2023, and compared the specific strain with the previously found strains to see if any mutations or changes have occurred to the virus. Then, I used the NCBI website to find ten different BA.5 samples and ten different BA.4 samples of nucleotide sequences, blasted with the OQ978950 sample, and recorded the percentage of similarities and their standard deviation. After comparing the nucleotide sequences of the viral genome, I specifically targeted the spike protein (surface glycoprotein) sequences using FY.3.1 sample WKL08853 and BF.7.14 sample WHA34978 on NCBI website. The two protein sequences were blasted against 10 different BA.4 and BA.5 surface glycoprotein sequences separately. The percentages of alignment were recorded in the table, and after all, the average percentage of alignment with standard deviation was calculated as representation of the data strains.

3. Result: For BA.2.12.1, the blast results showed almost identical (0.99) similarities between the sequence of the entire genome of the strains from different regions. On the other hand, there were slight regional differences between the sequence of the spike protein. The results were displayed in Table 2 and visualized in the heatmap (figure 2). In general, all of the comparison data showed a higher than 0.90 similarity between the spike protein. For regions like China, Japan, and CA, they demonstrated almost identical spike protein sequences (0.99-1). The lowest blast alignment (0.93) was between the WA and AZ with NY strains respectively. For WA, it has a 0.93 similarity compared to AZ which is also relatively low. Consequently, I analyzed point mutations that repeatedly occurred in the blast results between strains (Table 3). The identified mutations were N161K and G679R for China and Japan's strains. The differences among the spike protein sequences among the US's strains were mostly due to incomplete sequencing. In addition, other mutations such as deletions and additions that cause large frame shifts were not considered for the study. For the latest outbreak in China, BF.7.14 had an average 0.95±0.06 alignment with BA.5 and 0.99±0.028 alignment with BA.4. Furthermore, the blasting of spike protein sequences showed potential differences between these strains. The latest FY.3.1 sample (WKL08853) showed 0.95±0.013 alignment with BA.4 spike proteins and 0.985±0.005 with BA.5 spike proteins. Meanwhile, the latest BF.7.14 sample collected on January 2, 2023, showed 0.955±0.01 with BA.4 spike proteins and 0.96±0.003 with BA.5 spike proteins. The low standard deviation in the data underlined the consistency of the blast results.

4. Discussion: From the beginning of the pandemic to the latest covid-19 outbreak in China in the beginning of 2023, the variants of concern had always been changing and rapidly mutating as result of the promptly developed vaccination and differences in between situation and circumstances of countries. Starting from the Alpha and Beta variants in China and the UK to the Omicron spikes in the US, the variants all present differences in their genetic expression and viral protein, which led to variation in their infection and mortality rates in different regions. In this study, for the period of interest, the most commonly found and infectious sub-variant BA.2.12.1 (Omicron) was put into comparison in between the strains and samples found in the US, China, and Japan. The blast results showed a high percentage of alignment in between the local strains. The average spike protein sequence alignment exceeded 0.92. The high alignment of the protein and genetic sequences provided evidence for the argument of the utilization of US-produced vaccination in other regions like China and Japan, these vaccines would be beneficial to people when fighting against the newly mutated strains, since the lack of improved vaccination left the Chinese citizens with a much higher risk of exposure and danger after infection. Spike protein sequences were studied across different local strains to compare similarities and differences. In SAR-CoV-2, spike protein is around the size of 180-200kDA with an extracellular N-terminus, a transmembrane domain, and an intracellular C-terminus (Bosch et.al., 2003). The extracellular domain binded to the surface receptor, angiotensin-converting enzyme 2 (ACE2) in human cells for viral entry (Huang, et.al 2020). The blast results between the protein sequences of BA.2.12.1 spike protein from China, Japan and the US showed a high percentage of similarity (Table 2), with certain point mutations (N161K, G679R) unique to the Asian strains. Based on the spike protein model, the protein is composed of 1273 amino acids. There are 2 large subunits in the protein: S1 (14-685 residues) for receptor binding and S2 (686-1273 residues) for membrane fusion. Both N161K and G679R were in the S1 subunit of spike proteins for receptor binding but not in the functional domain (Table 5). Some other mutations were also identified (F2X, R343T, A876V), but none of the mutations were found consistently in the protein. The lack of regional mutations of the strain, especially in the RBD, would support the use of US mRNA vaccines in China and Japan. Nonetheless, the effects of the mutations in the structural part of the protein shouldn't be overlooked that they could potentially affect the receptor binding ability and decrease the vaccine effectiveness. Moreover, these mutations highlight the high mutability of the virus as it spreads across continents. For example, R343T was a mutation in the RBD of the protein and might contribute to changes in the RBD with other mutations. Consequently, when comparing BF.7.14 and FY.3.1 strains with BA.5 and BA.4 strains, the spike protein alignment all exceeded 0.95, even higher than some of the alignment between regional BA.2.12.1 strains. While this similarity cannot guarantee the certainty of the effectiveness of bivalent vaccine on the current outbreak in China, such high uniformity would be great indications for the likelihood of applications of the vaccine. Nonetheless, further studies would be required for consolidating

the results. Overall, the close alignment of China and the US provides good evidence and possibility of the applicability of the US vaccines in China. In addition, Japan had always been using US RNA vaccines for combating covid. Given the similarities between China and Japan's strains, the implementation of US vaccinations such as the Pfizer and Moderna mRNA vaccine and the bivalent boosters would possess high likelihood of success and effectiveness in the Chinese citizens. On the other hand, the study had revealed that local strains could develop mutations in the structural and potentially the functional part of spike protein. As a result, a decrease in vaccine efficacy of USA vaccines would be expected when used in China or other countries even when all regions share the same dominant strain.

5. Conclusion: After combating the pandemics for over two and a half years, most of the world have called for the end of the pandemic by reopening countries' borders and removing covid-19 regulations. Nonetheless, the virus is still in the air. With the reduction of lethality but high transmission rate and mutability, SARS-Cov-2 is still a major public health concern. In addition, the potential overlapping of influenza and covid outbreak in the future may further burden the public health care system. As a result, the need for vaccine and treatment development is still high for new strains. Global efforts and cooperation are necessary in dealing with highly transmissible diseases. Scientists have been trying to develop the so-called "universal" influenza vaccine (Nachbagauer & Krammer, 2017). This concept shall also be considered for covid vaccine development due to the fast transmission of virus from one country to another and not all countries have the ability to manufacture their own vaccines in time to combat the virus. This study supported this idea by showing the low regional variability of dominant strain as it spread across continents. Nonetheless, potential mutations may still undermine the effectiveness of vaccines. Therefore, necessary sanitary actions like wearing masks and frequent hand washing during the covid and influenza seasons are still highly encouraged. Introducing foreign vaccinations would need to go through a series of trial and error in order to establish the most fundamental safety issues, but these vaccinations would provide a strengthened baseline for the global population against the pandemic. In addition, the mRNA vaccine has proven to be effective and efficient for all age groups to combat highly mutable SARS-Cov-2 viruses when compared to more traditional vaccines. Countries such as China should be more active towards the development of the mRNA vaccines. Meanwhile, this study also highlighted the need for more sequencing and public health data, such as the number of infections and vaccinations, to fully examine the mutations in the virus genome and the corresponding phenotypical changes. For example, there is a lack of sequencing data from China for the recent covid outbreak, which hinders the scientific community from analyzing the major strain. These data,which should be made more transparent and accessible, are important for developing future vaccines, especially mRNA vaccines.

6. Tables:

Table 2: *Percent Similarity between Regional BA.2.12.1 Strains with Standard Deviation.*

Regions	China	Japan	USA NY	USA CA	USA WA	USA AZ
# of strains	2	4	10	10	10	10
China	-	1	0.98±0.014	0.99	0.97 ±0.033	0.98 ±0.017
Japan	1	-	0.98±0.014	0.99	0.97 ±0.033	0.98 ±0.017
USA NY	0.98±0.014	0.98±0.014	-	0.98±0.014	0.93 ±0.036	0.94 ±0.021
USA CA	0.99	0.99	0.98±0.014	-	0.97 ±0.033	0.98 ±0.017
USA WA	0.97 ±0.033	0.97 ±0.033	0.93 ±0.036	0.97 ±0.03	-	0.93 ±0.034

USA AZ	0.98 ±0.017	0.98 ±0.017	0.94 ±0.021	0.98 ±0.017	0.93 ±0.034	-

Table 3: *Position of Point Mutations. Point Mutations in the Spike Protein Regions Identified From the Cross Blasting Between Different Strains. Only Point Mutations, Appearing In 90% Of The Results, Were Shown.*

Regions	China	Japan	USA NY	USA CA	USA WA	USA AZ
# of strains	2	4	10	10	10	10
China	-	-	N161K, G679R	N161K, G679R	N161K, G679R	N161K, G679R
Japan	-	-	N161K, G679R	N161K, G679R	N161K, G679R,	N161K, G679R
USA NY	N161K, G679R	N161K, G679R	-	-	-	-
USA CA	N161K, G679R	N161K, G679R	-	-	-	-
USA WA	N161K, G679R,	N161K, G679R,	-	-	-	-
USA AZ	N161K, G679R	N161K, G679R	-	-	-	-

Table 4: *Percent Comparison of BA.4 and BA.5 protein sequence with the Latest FY.3.1 and BF.7.14 spike protein in China. Blasting results of the 2 different spike protein sequences of the latest prevalent FY.3.1 and BF.7.14 strain found in China to BA.4 and BA.5 in the US. Individual blasting results were listed with the average and standard deviation at the last row.*

BA.4 Sample of spike protein	% Similarity with sample WKL08853	% Similarity with sample WHA34978	BA.5 Sample of spike protein	% Similarity with sample WKL08853	% Similarity with sample WHA34978
WKT27639	0.99	0.99	WHS89080	0.96	0.95
WJP81058	0.99	0.98	WKF16943	0.96	0.96
WJJ47712	0.98	0.98	WJP60339	0.96	0.96
WII99904	0.98	0.99	WIJ09769	0.96	0.96
WIJ04758	0.99	0.98	WJP34028	0.96	0.96
WGO72935	0.98	0.99	WII99796	0.96	0.96
WGS90790	0.99	0.99	WIJ30834	0.96	0.96
WGV36408	0.95	0.98	WID10437	0.93	0.96
WHL52108	0.97	0.98	WAN07672	0.95	0.96
WGH55563	0.98	0.99	WGL13173	0.95	0.96
Average	0.95±0.013	0.985±0.005	Average	0.955±0.017	0.96±0.003

Table 5: *The Domain And Functions Are Residues Of Spike Protein (Huang Et.Al, 2020).*

Subunit	Residue	Domain and functions
	1-13	N -terminus signal peptide

S1	14-305	N-terminal domain
	319-541	Receptor-binding domain (RBD)
S2	788-806	Fusion peptide (FP)
	912-984	Heptapeptide repeat sequence 1 (HR1)
	1163-1213	Heptapeptide repeat sequence 2 (HR2)
	1213-1237	Transmembrane domain (TM)
	1237-1273	Cytoplasm domain

7. Figures:

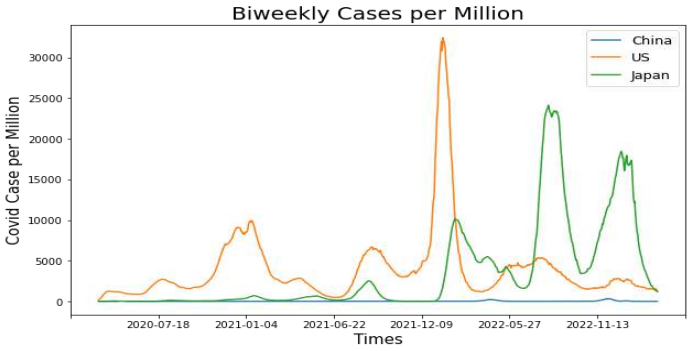

Figure 1: A line plot of the biweekly cases by million in each country from April 2021 to December 2022. The blue line was China, the orange line was the US, and the green line was Japan. The number on the y-axis is the recorded average number of covid cases in every one million people per two weeks.

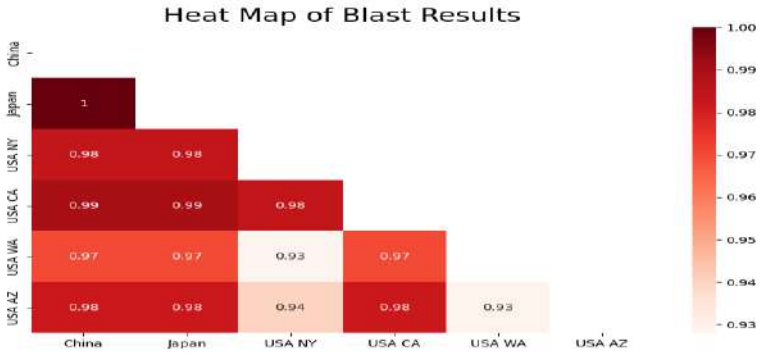

Figure 2: A heat map representation of the blast results of the BA.2.12.1 omicron subvariant strains in different countries and regions (Table 1). The blast result shows the percentage of similarity in the protein sequence of the spike protein. All the results recorded in the heat map are the average taken from blasting 10 different strains in one region with the other 10 different strains in the other region. Except for China, there are only two strains recorded so they are used as the target sequence and blasted with the others. A result of 1 represents no difference between the sequence in both regions such as Japan and California.

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Gastrointestinal Lesions and Its Associated Factors in Adult Males With Iron Deficiency Anaemia: A Cross-Sectional Study From Tertiary Care Centre of North India

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Abstract: Around 30% of the world's population suffers from iron deficiency anaemia (IDA). The standard evaluation for IDA involves upper and lower endoscopy, which allows for the confirmation of pathology of the gastrointestinal tract (GIT) induced due to IDA through iron malabsorption mechanism or loss of blood.
Assessing the prevalence of lesions of GIT of significant nature among males having IDA, was the goal of our study.
Methods: Our cross-sectional study was conducted for two years and involved 152 males (adults) with confirmed cases of IDA from the Outpatient (OPD) and In-patient (IPD) in the present hospital. Following collecting consent (both informed and written in nature), patient-specific data was collected in a standardized form, and a blood sample was taken for laboratory testing. The analyses were done at a 5% level of significance; an association was considered significant if the p-value < 0.05.
Results: The average age of the study participants was 59.6 years. The commonest lesions reported were antral gastritis (9.9%) and H. pylori gastritis (7.2%) in upper GI; and haemorrhoid (9.2%) and anal fissure (3.9%) in lower GI. The overall prevalence of any GI lesions was 65.1%. The GI lesions were significantly associated higher among men with age > 50 years (73.7%). The presence of occult blood in stools (p < 0.0001) and parasites in stools (p=0.0001) were significantly related to the presence of GI lesions.
Conclusion: GI lesions are frequently detected in males with IDA. Whether it is symptomatic male or asymptomatic male with anaemia refractory to iron treatment, GIT should be evaluated in them.
Categories: Pathology
Keywords: Endoscopy, Males, Inflammatory Bowel Diseases, Gastrointestinal Tract Lesions, Iron Deficiency Anaemia

Introduction: Around 30% of the world's population suffers from iron deficiency anaemia (IDA) [1]. IDA is extremely common in adults, despite being more prevalent in children and neonates. In India, IDA affects 53.2 % of non-pregnant women and 21.7 % of men [2]. According to age, gender, race, and ethnicity, the prevalence of IDA varies significantly [3]. Loss of blood due to menses and loss of iron during pregnancy results in the majority of IDA cases in premenopausal women. Low iron intake, insufficient iron absorption from the gastrointestinal tract (GIT), and chronic blood loss are all factors that contribute to iron deficiency [4].

However, occult bleeding from GIT causes IDA in males and women with menopause. A guaiac-based faecal occult blood test (FOBT) becomes positive with a daily loss of 10 mL of blood, while positive results for FOBT totally depend on the bleeding source site [5].
Among half of IDA patients, bleeding lesions in the GI tract are found. With a prevalence of 10%-17%, malignancies of GI are more frequent in older males and women with menopause with IDA [6,7]. In IDA patients, markers for GI malignancy are advanced age, male sex, increased serum lactate dehydrogenase (LDH), and reduced ferritin levels. Female gender, right-sided tumours, and a tumour diameter greater than 3 cm are all predictors of IDA in patients with colorectal cancer [3]. Although anaemia in IBD is mostly combined effect of IDA and anaemia of chronic disease (ACD), IDA alone remains a significant factor through reduced intake of iron owing to exclusion of food products which can aggravate symptoms of IBD; GI bleed (chronic); impaired iron absorption in Crohn's disease of the duodenum or upper jejunum; and an enhanced response of erythropoietin which is not paired with the accessible iron, leading to a non-effective erythropoietic process [8-10].
The standard evaluation for IDA involves upper and lower endoscopy, which allows for the confirmation of GIT pathologies that induced IDA through iron malabsorption mechanism or loss of blood. GIT (upper and lower) evaluation recommendations, on the other hand, are based mostly on data collected in a similar group of males and postmenopausal women [11-13]. Currently, there have been no published data in India on the burden of lesions of GIT in males (adults) having IDA, and the existing recommendations for GIT examination in this population are primarily based on the opinions of experts [11]. Assessing the prevalence of lesions of GIT of significant nature among males having IDA, was the goal of our study, as well as determining the factors (clinical and laboratory) for its occurrence.

Materials and Methods: Study setting and design: Our cross-sectional study was conducted for two years between June 2019 to May 2021, in the Pathology Department of a hospital in North India. Also, ethical board approval was obtained prior to the conduct of this study (Letter number NIMS/2019/04/223, Noida).

Study subjects and sample size: Our study enrolled laboratory-diagnosed cases of IDA male patients (Hb <13g/dL and 18 years or above) from the OPD and IPD as subjects. Patients were diagnosed as having IDA, if laboratory values showed at least serum iron concentration < 10 µg/mL with a transferrin saturation ≤ 20%, and/or mean corpuscular volume (MCV) < 80 fL and/or a serum ferritin concentration ≤ 30 ng/mL. A required size was determined to be 97, based on assumption, a 50% prevalence of lesions related to GIT among patients with IDA (as no specific related research was found by us in the Indian scenario) and a 10% absolute precision (absolute). Before patients were enrolled, consent (both informed and written) was got for every patient. Using a consecutive sampling procedure, a total of 152 patients participated in our study over the course of the study period. Patients with microcytic hypochromic anaemia other than IDA were excluded from the study.

Data and sample collection: The patients were subjected to clinical examination (signs) after obtaining a detailed history of diseases such as symptoms, prior medication and associated comorbidities and patient-specific data such as demographics and anthropometric measurements were recorded in a standard proforma. A blood sample (10 mL) was obtained for every patient for laboratory investigations such as reticulocyte count (RC), complete blood count (CBC), peripheral blood smears (PBS), total iron-binding capacity (TIBC), serum iron (Fe), ferritin (Fer), liver and renal function (RFT and LFT), and lactate dehydrogenase (LDH). Stool samples were collected for examination of occult blood and ova, cysts. Also, computed tomography (CT) scans, x-ray, ultrasonography (USG) for the abdomen, serum hepcidin levels, antibodies tests (anti-tissue transglutaminase [anti-TTG] or anti-gliadin, proctoscopy, endoscopy (both upper and lower GIT), and examination of bone marrow (including staining for iron), was done in selected patients as per indications.

Statistical analysis: All data were imported into an MS Excel document and analysed with SPSS version 21. Patients' baseline demographics, clinical profiles, and laboratory data were used to analyse the results.

Continuous variables were reported as mean ± SD, whereas categorical data were represented as numbers and percentage (percent). The Kolmogorov-Smirnov test was used to determine whether the data were normal. Non- parametric tests were employed if normality was refused. In our study having a significant lesion of GI lesion was considered a dependent variable, and a comparison of independent variables (haematological findings, demographic, anthropometric details, clinical signs and symptoms, and medication and comorbidities) with the dependent variable was carried out using Chi-Square analysis. Statistical tests were conducted at a 5% significance level; any correlation was considered significant for a p-value < 0.05.

Results: In our study, the average age of the study participants was 59.6 years, and 63.1% of subjects were above 50 years of age. The vegetarian dietary intake was observed in 64.5% of subjects. The mean BMI of the males with IDA was 21.9 kg/m2. A history of NSAID and PPI medication at least three months prior to the enrolment in the study was reported in 5.9% and 14.5% of subjects. Among 41.4% of men comorbidities such as hypertension (20.4%), diabetes (14.5%) and thyroid dysfunction (3.9%) were noticed (Table 1).

TABLE 1: *Baseline Characteristics of the Study Subjects*

Variables	Number/Mean	%/SD
Age (in years)	59.6	20.9
Age group		
<50 years	55	36.1
>50 years	97	63.9
Diet		
Vegetarian	98	64.5
Mixed	54	35.5
BMI (kg/m2)	21.9	3.8
History of medication		
No	121	79.6
NSAID	9	5.9
PPI	22	14.5
Comorbidities		
No	89	58.6
Yes	63	41.4
If yes, comorbidity type*		
Hypertension	31	20.4
Diabetes	22	14.5
Thyroid dysfunction	6	3.9
Others	16	10.5

*Multiple responses
BMI: Body mass index, NSAID: Non-steroidal anti-inflammatory drugs, PPI: Proton pump inhibitor

Among enrolled subjects, 69.1% reported to have any symptoms and 66.4% had GI symptoms. Upper GI symptoms were observed in 21.1% of subjects which included heart burn (13.8%) and epigastric pain (8.6%). The lower GI symptoms were observed in 45.4% of subjects, which included most frequently rectal bleeding (21.1%), constipation (20.4%), followed by change in bowel habits (5.9%) and diarrhoea (3.3%). The physical examination showed hepatosplenomegaly and epigastric sensitivity in 4.6% and 9.9% of subjects respectively (Table 2)

Table 2: *Signs and Symptoms among Study Subjects*

Variables	Number	%
Any symptoms*		
Yes 105 69.1		
No	47	30.9
GI Symptoms$		
No	51	33.6
Yes	101	66.4
If yes		
Upper GI symptoms$	32	21.1
Heart burn	21	13.8
Epigastric pain	13	8.6
Lower GI symptoms$	69	45.4
Diarrhoea	5	3.3
Constipation	31	20.4
Change in bowel habits	9	5.9
Rectal bleeding	32	21.1
Physical examination findings		
Hepatosplenomegaly	7	4.6
Epigastric sensitivity 15 9.9		

*Includes GI symptoms, weight loss > 10 % in the previous year, abdominal pain, abdominal distention or bloating, weakness and easy fatigability

$ Multiple responses

GI: Gastrointestinal

The haematological findings related to IDA showed the mean values for haemoglobin, MCV, ferritin, and transferrin as 9.86 ± 1.56 (g/dL), 75.8 ± 9.7 (fL), 6.9 ± 5.8 (ng/ ml), 7.2 ± 3.1 (g/L), respectively. The faecal examination showed occult blood in 36.8% of subjects and parasites/ova/cysts 13.8% of subjects (Table 3).

Table 3: *Laboratory Findings of the Study Subjects*

Laboratory parameters	Number/Mean	%/SD
Haematological		
Haemoglobin (g/dl) 9.86 1.56		
MCV (fL)	75.8	9.7
Ferritin (ng/ ml)	6.9	5.8
Transferrin (g/L)	7.2	3.1
Faecal		
Occult Blood	56	36.8
Parasites/Ova/Cysts 21 13.8		

MCV: Mean corpuscular volume

The upper GI endoscopy was indicated in 55.3% of men with IDA. The findings showed that upper GI endoscopy was normal among 11.8% of subjects. Antral gastritis (9.9%) and H. pylori gastritis (7.2%) were the commonest lesions observed in upper GI endoscopy. The lower GI endoscopy was indicated in 41.4% of men with IDA. The findings showed that lower GI endoscopy was normal among 19.7% of subjects.

Haemorrhoid (9.2%), anal fissure (3.9%) and colonic polyp (3.3%) were the commonest lesions observed in lower GI endoscopy. The endoscopy also showed GI lesions such as inflammatory bowel disease (1/152), colonic cancer (1/152) and gastric cancer (1/152) in men with IDA. Overall prevalence of any GI lesions was 65.1% among study subjects (Table 4).

Table 4: *Upper and Lower GI Lesions among the Study Subjects*

Lesion	Number	%
Upper GI endoscopy		
Not done 68 44.7		
Done	84	55.3
If done, findings		
Normal	18	11.8
Antral gastritis	15	9.9
H. pylori gastritis	11	7.2
Duodenitis	8	5.3
Pangastritis	8	5.3
Coeliac disease	5	3.3
Gastric ulcer	4	2.6
Duodenal ulcer	3	2.0
Atrophic gastritis	3	2.0
Interstitial colitis	3	2.0
Gastric polyp	2	1.3
Erosive gastritis	2	1.3
Gastric cancer	1	0.7
Lower GI endoscopy		
Not done	89	58.6
Done	63	41.4
If done, findings		
Normal	30	19.7
Haemorrhoid	14	9.2
Anal fissure	6	3.9
Colonic polyp	5	3.3
Diverticulitis	4	2.6
Chronic colitis	2	1.3
Inflammatory bowel disease	1	0.7
Colonic cancer	1	0.7
Any GI lesion 99 65.1		

GI: Gastrointestinal

The GI lesions were significantly associated higher among men with age > 50 years (73.7%) as compared to men having age < 50 years (26.3%). The BMI was higher among subjects (23.1 ± 5.2 kg/m2) with GI lesions as compared to those without GI lesions (20.3 ± 4.1 kg/m2). GI lesions were more common among vegetarians (58.6%) as compared to those having mixed dietary intake (41.4%). The subjects who had history of PPI medication, had higher chances of GI lesions (19.2%) as compared to those who had no PPI medication. Also, the patients with GI symptoms (75.8%) had higher chances of GI lesions as compared to those without any symptoms (24.2%). The presence of occult blood in stools (p<0.0001) and parasites in stools (p=0.0001) were significantly related to presence of GI lesions (Table 5).

Table 5: Association of the Clinical, Laboratory and Baseline Characteristics with the GI Lesions among the Study Subjects

Variables	GI lesion [Number (%)]		P value
	Yes (n=99)	No (n=53)	
Age			
<50 years	26 (26.3)	29 (54.7)	0.0005
>50 years	73 (73.7)	24 (45.3)	
BMI (kg/m2)	23.1 ± 5.2	20.3 ± 4.1	0.0009
Diet			
Vegetarian	58 (58.6)	40 (75.5)	0.038
Mixed	41 (41.4)	13 (24.5)	
History of medication			
NSAID	6 (6.1)	3 (5.7)	0.920
PPI	19 (19.2)	3 (5.7)	0.028
Comorbidities			
No	57 (57.6)	32 (60.4)	0.738
Yes	42 (42.4)	21 (39.6)	
Any GI symptoms			
Yes	75 (75.8)	26 (49.1)	0.008
No	24 (24.2)	27 (50.9)	
Haematological			
Haemoglobin (g/dL)	8.6 ± 1.7	10.2 ± 1.4	<0.0001
MCV (fL)	74.9 ± 8.2	75.6 ± 7.8	0.610
Ferritin (ng/ml)	6.3 ± 5.7	5.9 ± 4.3	0.655
Transferrin (g/L)	8.3 ± 2.9	7.7 ± 3.5	0.260
Faecal			
Occult Blood	25 (25.3)	31 (58.5)	<0.0001
Parasites/Ova/Cysts	6 (6.1)	15 (28.3)	0.0001

BMI: Body mass index, NSAID: Non-steroidal anti-inflammatory drugs, PPI: Proton pump inhibitor, GI: Gastrointestinal, MCV: Mean corpuscular volume

Discussion: A GI evaluation was performed on 152 males with IDA in this study. The majority of the subjects had significant GI lesions. The distribution was similar in the upper and lower GI tracts. The most prevalent GI lesions were antral gastritis and haemorrhoids. The presence of any GI symptom and the usage of a proton pump inhibitor were both linked to the presence of GI lesions. In the current study, males with IDA had a

65.1 % (99/152) prevalence of GI lesions. Significant GI lesions were shown to be frequent in a homogeneous group of postmenopausal women and adult men, with a prevalence of 40%-70% in postmenopausal women and adult men and close to 50% in premenopausal women [14]. The commonest reason for IDA in postmenopausal females and males (adult) is GIT mucosal lesions that induce persistent blood loss, with GIT malignancy being common in this age group [15,16]. Loss of blood due to menses and malabsorption of iron owing to celiac disease and gastritis (atrophic or H. pylori) are the most common factors for IDA in premenopausal women [17].

Although the present study finding should be interpreted with caution due to the single-centric nature, the findings of our research recommend the investigation of GIT among adult males with laboratory-confirmed IDA. The commonest GIT lesion observed in the present study among patients was antral gastritis (9.9%). A similar study by Cook et al. showed commonest lesions of upper GIT included gastritis, esophagitis, ulcers (gastric or duodenal), and duodenitis, among both genders (male and female) of any age group having IDA [18].

H. pylori gastritis was found in 7.2% of the males with IDA in this study. H. pylori gastritis was an earlier identified factor for IDA, due to its capability for iron absorption impairment [19,20]. The link between H. pylori infection and IDA was established by demonstrating IDA reversal following H. pylori eradication [21]. Another prevalent finding in this analysis was celiac disease (3.3%), and the ratio of its proportion in the study to the proportion in the general population was 4:1, but an even greater frequency of 8.7% had previously been observed in IDA patients [22,23].

The most common lower GIT lesions detected in this investigation were haemorrhoids (9.2%), anal fissures (3.9%), and colonic polyps (3.3%). It has also been observed that haemorrhoids and anal fissures are prevalent lower GI lesions and that they are one of the main sources of rectal bleeding and may induce IDA [24,25]. Although just one subject (0.7%, 1/152) had inflammatory bowel illness, IDA is a common consequence of IBD. The prevalence of IBD revealed in the study by Goodhand et al. ranged between 16% and 68% [26].

Any GI-related symptom (p=0.008) was shown to be significantly associated with the presence of GI lesions in this study. A few studies have previously provided a correlation between any GI symptoms (heartburn, epigastric discomfort, diarrhoea, constipation, and changes in bowel habits) and the diagnosis of GI lesions [15,27]. In this study, the usage of PPI was associated with a higher percentage of GI lesion diagnoses (p=0.028). Since the reduced secretion of gastric acid is still clinically not proven as an attribute to IDA, this reflects such an association exists due to more frequencies of symptoms related to GIT, which necessitate the use of these medications, rather than the direct effect of gastric acid hyposecretion on iron absorption [28,29].

Limitations: This is the first local research that we are aware of that has identified GI lesions among men with IDA. The research is not without limitations. The sample size was limited and less heterogeneous because all of the participants were from a single institution. Furthermore, upper and lower GI endoscopy was not advised for all the patients in this study, and studies suggest that even individuals with stool occult blood negative can have GI lesions, thus researchers may overlook these GI lesions.

Conclusions: GI lesions are frequently detected in males with IDA. Whether it is symptomatic male or asymptomatic male with anaemia refractory to iron treatment, GIT should be evaluated in them. The order of the assessment may be dictated by specific complaints. Despite the fact that nutrition-related deficiencies are a major causative reason for IDA around the world, just diagnosing IDA and not diagnosing the causative factors is not unacceptable. Significant attention shall be given to malignancy of GITs such as cancer of the colon or rectum, where IDA can be the only presenting symptom and diagnosis can be overlooked when the condition is not carefully investigated.

Additional Information: Disclosures

Human subjects: Consent was obtained or waived by all participants in this study. Noida Institute of Medical Sciences issued approval NIMS/2019/04/223. Animal subjects: All authors have confirmed that this study

did not involve animal subjects or tissue. Conflicts of interest: In compliance with the ICMJE uniform disclosure form, all authors declare the following: Payment/services info: All authors have declared that no financial support was received from any organization for the submitted work. Financial relationships: All authors have declared that they have no financial relationships at present or within the previous three years with any organizations that might have an interest in the submitted work. Other relationships: All authors have declared that there are no other relationships or activities that could appear to have influenced the submitted work.

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XI. List of Abstracts

The Anti-Inflammatory Effect of Lectin Isolated from Castanea Crenata Against Lipopolysaccharide (LPS) Induced Renal Stress in Rats

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Abstract: Novel Anti-inflammatory agents are used for the treatment of various conditions, such as infections, cancer, rheumatoid arthritis, etc. The screening for better agents and evaluating their Anti-inflammatory potential is becoming a field of major interests all over the world. Lectins are proteins or glycoproteins highly distributed, especially in plants these bioactive molecules play many roles (defense, growth, regulation of membrane glycoprotein synthesis, recognition and intercellular communication) and that express various biological activities the reason it can be used as future agents for the treatment of human diseases. Castanea crenata is one of the natural biosourced plants, which known and used in the traditional medicine for its therapeutic properties.The study was designed to investigate the possible protective role of Castanea crenata lectin in lipopolysaccharide renal inflammatory, where the effects of Castanea crenata lectin on LPS induced oxidative and renal stress were evaluated by serum creatinine, and uric acid levels and kidney tissue lipid peroxidation, GSH levels, SOD, GSH-Px, GST and catalase activities. The Administration of LPS induced significant increase in serum: creatinine and uric acid concentration reviling renal inflammatory. LPS also induced oxidative stress, as indicate by decreased kidney tissue of GSH level, SOD, GSH-Px, GST and catalase activities along with increase the level of lipid peroxidation. Furthermore, the treatment with the lectin of Castanea crenata was markedly reduced the elevated serum levels of both of creatinine and uric acid and relieved the effects of LPS on oxidative stress markers and reduced the histological changes caused by LPS in kidney, which indicates that Castanea crenata lectin could have a beneficial effect against LPS induced nephrotoxicity and oxidative stress in rat.
Keywords: Lectin, Castanea crenata, Anti-inflammatory effect, Rat, Lipopolysaccharide (LPS)

Moderating Effects of Stress Coping: Evaluating the Relationships between Personality and Prescription Drug Abuse amongst Young Adults

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Abstract: Background: Young individuals (18 to 25 years old) abuse prescription drugs at the highest rates. College or university audience may come with added risk. Previous studies indicate that personality plays a significant role in the prediction of much addictive behavior. Method: The four characteristics of anxiety symptoms, hopelessness, sensation seeking, and impulsivity have continuously been linked. The major focus on overall prescription drug use, inconsistent operationalization of misuse, and failure to account for alcohol use restrict published studies on personality as a predictor of prescription drug abuse. Small and general sample sizes have been used. Result: We wanted to know more about how personality influenced total use, use that was approved by a doctor, and misuse of prescription sedatives/tranquilizers, opioids, and stimulants. Young adults in Karachi, Pakistan were included in the large (N = 1755) sample (mean age = 18.6

years; 68.9% female). We hypothesized that sedatives/tranquilizers would be associated to anxiety sensitivity, opioids to hopelessness, stimulants to sensation seeking, and impulsivity to all three. Except for the impulsivity to opioid use path, our "any use" model's predictions were entirely supported. Sensation seeking predicted stimulants for misuse, anxiety sensitivity (marginally) predicted sedatives/tranquilizers, and impulsivity predicted all three. Conclusion: Our models advocate for the use of interventions that are tailored to each young adults' personality. Targeting anxiety sensitivity for sedative/tranquilizer misuse, sensation seeking for stimulant misuse and impulsivity for unrestrained prescription drug misuse are specifically suggested by the studies. Interventions that promote early coping skills that address all four qualities may be effective in reducing prescription drug uptake and misuse in the future.
Keywords: Drugs, Prescription Drugs, Sedatives, Tranquilizers, Young Adults

Purification, Molecular Characterization and In-Silico Analysis of Enterocins, A Class Iia Bacteriocin Produced by Enterococcus Faecium With Broad Antibacterial Activity

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Abstract: Due to their potential for use as natural preservatives to enhance food safety and stability and prevent antibiotic resistance in multidrug resistant organisms, bacteriocins generated by lactic acid bacteria have attracted a lot of research. Ten promising Gram-positive isolates were examined in this study. Four Enterococcus food isolates exhibiting antibiotic activity against the Pseudomonas aeruginosa PA01, PA02, and PA03 MDR strains were chosen from this group. Four food isolates were determined to be Enterococcus faecium strains KAE01, KAE03, KAE05 and KAE06 based on analysis of the 16S ribosomal RNA gene. Genotypic and phenotypic screening were used to determine whether the bacteriocin gene was present in these enterococcal isolates. Results showed that all four isolates have the EntA and EntP genes, which encode extracellular surface proteins. Antibiotic resistance phenotypes showed that every MDR isolate was resistant to different antibiotics. Ammonium sulphate precipitation and fast protein liquid chromatography (FPLC) techniques were used to purify the enterocins. These enterocins have a molecular weight of 55 kDa, according to SDS-PAGE. Additionally, these enterocins shown a broad spectrum of antibacterial activity spanning a pH range of 2.0–10.0 as well as a wide range of thermostability, reaching up to 100°C for 1hr and 121°C for 15 min. According to the findings, proteinase K, trypsin, pepsin, and alkaline protease were all capable of degrading all four enterocins. When used against P. aeruginosa PA01, PA02, and PA03, SEM analysis revealed that enterocin KAE01 caused changes in the morphology and, to a greater extent, the cell membrane is the target of isolated enterocins. The native bacteriocins EntA and EntP were anticipated to have three-dimensional (3D) structures. Since three simulated structures showed nearly identical secondary structural motifs, such as a beta helix at the C terminus, an alpha helix at the N terminus, and coils at the intermediate residues. Additionally, penicillin-binding proteins (PBPs) that play a significant role in the formation of cell walls were the subject of protein-protein docking simulations. Peptides had good potential for PBP inhibition, according to docking data. Peptides have been seen to bind at allosteric sites in various circumstances. To gain a thorough understanding of the allosteric communication caused by peptide binding in the protein structure, molecular dynamics simulations and adaptive sampling were therefore proposed. These findings imply that isolated enterocins have promise for use in the food sector as a bio-preservative and as a tool to fight antibiotic resistance in multidrug resistant pathogens.
Keywords: Enterococcus Faecium, Bacteriocin, Antimicrobial Resistance, Antagonistic Activity, Pseudomonas Aeruginosa

A Study to Evaluate the Pattern of Antimicrobial Utilization and Biomarkers in Intensive Care Unit (ICU) Patients in A Tertiary Care Hospital

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Background: Critical care pharmacology is intended to reconcile important features of intensive care unit (ICU) management including polypharmacy, altered drug disposition and adverse drug events (ADEs). Modern research has established that the critical care patients have drastically deranged redox balance and inflammatory disturbances. The AMAs might further aggravate the scenario and be implicated in various ADEs and drug-disease interactions.
Objectives: A prospective study designed to analyse antimicrobial utilisation pattern and evaluate the oxidative stress and inflammatory biomarkers in Intensive Care Unit (ICU) patients receiving antimicrobials.
Methods: This is an analytic study to be conducted over 2 years; started after due approval from the Ethics Committee. A total of 300 patients from medical or surgical ICU receiving AMAs are included in the study after obtaining written informed consent. The AMA utilization (DDD/100 bed days) and associated adverse drug events (ADE) will be recorded. The subjects will also be analysed for a panel of oxidative and inflammatory biomarkers.
Summary: Increasing APACHE II scores are associated with increase in oxidative stress and inflammatory markers, implicating role of oxidative stress and inflammation in disease severity. Beta lactums percentages are the most commonly prescribed antibiotics in MICU followed by other classes. In SICU beta lactums percentage are once again most prescribed antibiotics followed by other classes. 3 adverse drug reactions were reported among the 100 critically ill patients, which were mild in severity.
Expected outcome: The study will identify the antimicrobial utilization pattern and cost of treatment in ICU patients. The study will reflect the safety profile of antimicrobials used. The data will evaluate the correlation of oxidative stress and inflammatory biomarkers with AMA associated adverse reactions.

Perceived Self-Efficacy among Parents Caring for Children with ASD in Middle Childhood

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Research Objectives: Autism spectrum disorder (ASD) is a complex neurodevelopmental disability that negatively affects approximately one in 44 children eight years old in the United States. Long-term daily demands of caring for children with ASD may exert significant psychological and emotional distress on parents, which may further impact their perceived self-efficacy in providing care. This study aimed to examine whether and the extent to which children's health-related stressors serve as predictors of parental stress appraisal and self-efficacy in caring for children diagnosed with ASD in middle childhood.
Methodology: A retrospective, cross-sectional secondary data analysis study was conducted using the 2019-2020 National Survey of Children's Health from the U.S. as the principal data source.
Findings: In 2019 and 2020, 3.1% of US children aged 6-11 had a current diagnosis of ASD (N = 694); 49.1% with mild severity, 40.2% with moderate severity, and 10.8% with severe ASD. Results showed strong correlations between parental stress and perceived self-efficacy, and between children's health-related factors and parental stress levels. Structural equation modeling further revealed that children's general health status and severity of ASD are significant predictors of parental stress, which in turn predicts 23.5% of the variance in parental self-efficacy (chi-squared = 6.01, df = 2, p = .05; CFI = 0.99; RMSEA = 0.05, 90% CI = [0.05, 0.08]).
Research Outcomes: The actual impact of an external stressor (e.g., having a child with ASD) on parents' self-appraisal of caring for their children is mediated by parents' primary appraisal of the stressor (e.g., parental stress).
Future Scope: Future research should explore how family relationships and emotional/spiritual support could moderate the impact of child health-related parental stress on their perceived self-efficacy. Such understanding could further inform the design of effective well-being interventions for parents and caregivers who struggle with caring for children with ASD.
Keywords: Self-Efficacy, Parental Stress, Autism Spectrum Disorder, Middle Childhood

FG4592 Plays a Beneficial Role in Ischemic Stroke by Multiple Targets

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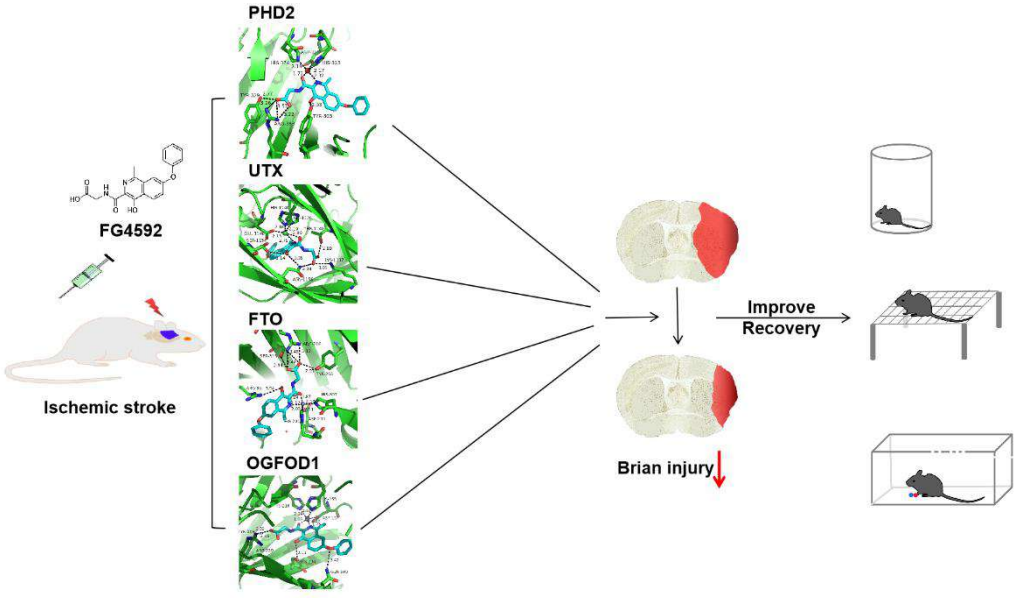
Abstract: **Background**: Acute ischemic stroke is a significant global burden of neurological diseases but lacks effective strategies, except for reperfusion treatments. The hypoxia-inducible factor (HIF) prolyl hydroxylases (PHDs) participate in the pathophysiological process of ischemia. In the past two decades, some researchers have sought to determine the neuroprotective function of preclinical PHDs inhibitors in stroke models.
Purpose: However, whether FG4592, the first clinically approved PHDs inhibitor, can alleviate ischemic injury is still undetermined.
Methods: In this study, FG4592 was used to treat mice after transient or permanent ischemic stroke, and the infarct volume and neurological behaviour of mice were tested. The potential neuroprotective mechanisms of FG4592 were further explored.
Finding: In present study, the post-treatment of FG4592 decreased the infarct volume and improved the neurological defects after the transient or permanent ischemia. Meanwhile, the delayed administration of FG4592 also showed neuroprotective function in alleviating brain infarct volume. As the classical pharmacological effects, FG4592 upregulated the HIF signal pathway in the peri-infarct area of mice 24 h after reperfusion. Moreover, FG4592 activated the autophagy flux pathway and alleviates apoptosis after I/R injury. Furthermore, With the help of online prediction and molecular docking, multiple 2OG-dependent non-heme iron dioxygenases were found to be potential targets of FG459.
Research Outcomes: This study provides crucial evidence that the first approved PHDs inhibitor, FG4592, can prevent brain injury and improve the recovery of neurological defects in mice after transient or permanent ischemic stroke, which may be mediated by multiple targets.
Future Scope: The definite mechanisms of potential targets need to be explored in further studies.
Keywords: FG4592, Ischemic Stroke, Multiple Targets



Pushen Capsule Treatment Promotes Functional Recovery After Ischemic Stroke

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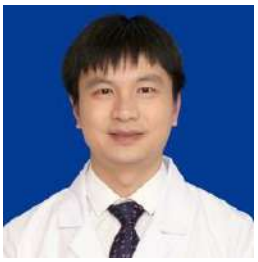
Abstract: As a leading cause of long-term disability, ischemic stroke urgently needs further research and drug development. Traditional Chinese Medicine (TCM) has been used for the treatment of various diseases for a long time in China and has increasingly attracted worldwide attention due to its efficacy and low side effects. In this study, we focused on the Chinese compound medicine Pushen capsule (Pushen) and found several effects on mice stroke models, including reducing the infarct volume, improving the blood–brain barrier, and promoting functional restoration. Furthermore, TCM network pharmacology analysis was performed, and quercetin, tricin, luteolin, physcion, and kaempferol were identified as the key active ingredients in Pushen that treated ischemic stroke. Mechanistically, in the brain, these key ingredients could bind with the transcription factor c-Myc and thereby regulate the expression of Adora2a, Drd2, and Ppp1r1b, which are enriched in the cAMP signaling pathway. Additionally, integrated analysis of the intestinal flora by 16S rDNA sequencing and serum metabolomics analysis indicated that long-term administration of Pushen reversed the dynamic changes in intestinal flora structure after ischemic stroke. Taken together, our study confirmed that Pushen was effective for treating ischemic stroke and has promising for clinical applications.
Keywords: Traditional Chinese Medicine (TCM), Ischemic Stroke, Pushen Capsule, Functional Recovery, C-Myc

Effect of Mobile-Based CBT on LDL in Ascvd: Protocol for a Multicenter, Randomized Controlled Trial



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Abstract: **Research Objectives**: The objective of this trial is to compare the low-density lipoprotein cholesterol (LDL-C) outcome in atherosclerotic cardiovascular disease (ASCVD) patients receiving mobile device-based cognitive behavior therapy (CBT) to conventional interventions.
Methodology: This trial is designed as a multicenter, prospective randomized controlled trial with a 6-month follow-up. Mean LDL-C level and the percentage of different LDL-C levels, General Self-Efficacy Scale (GSEs), quality of life index (QL-index), etc., between the two groups at baseline, 1, 3, and 6 months will be measured.
Findings: This trial should demonstrate that the implementation of mobile-based CBT intervention will be potentially effective in lowering LDL-C levels in ASCVD patients.
Research Outcomes: In patients with ASCVD receiving standard treatment, the efficacy of mobile-based CBT intervention will be compared with conventional interventions, including changes in objective parameters of LDL-C levels. The differences in self-efficacy and quality of life between the two groups will be measured by scales and questionnaires.
Future Scope: The novel mobile-based intervention is expected to reduce LDL-C level at a population level due to the high accessibility and availability of technologies. Moreover, this CBT treatment can potentially fill the existing gaps of limited professional lifestyle interventions in ASCVD patients.
Keywords: ASCVD, LDL, Mobile-based, CBT

Challenges in Nigeria Health System and the Need for Integrating Adequate Medical Intelligence and Surveillance System

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Abstract: **Objectives**: As an important element of National Security, Public Health is not only functions to provide adequate and timely Medical Care but also track, monitor and control disease outbreak. The Nigerian health care had suffered several infections disease outbreaks year after year. Hence, there is need to tackle the problems. This article aims to review the state of Nigeria health care system and to provide possible recommendations for the Nigerian health care system, this article also aims at reviewing the dynamics of health care in the limited states, Britain and Europe with regards to methods of Medical Intelligence/Surveillance.
Materials and Methods: Medical Intelligence and Surveillance represent a very useful component in the health care system and control diseases outbreak, bio attack, Covid-19, Ebola, Laser-fever e.t.c. There is increasing role of automated-based medical Intelligence and Surveillance system, in addition to the traditional manual pattern of document retrieval in advance medical setting such as those in Western and European Countries.
Conclusion: Nigerian health care system is poorly developed. No adequate and functional surveillance system are developed. To achieve success in health care in this modern era, a system well-grounded in routine surveillance and medical intelligence as the backbone of the health sector is necessary, besides adequate Management Couple with Strong Leadership Principles.

Effect of High-Intensity Interval Training on Cardiovascular Function in Postmenopausal Women

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Objective: The purpose of this study was to investigate the effect of HIIT on cardiovascular function in postmenopausal women.

Methods: A systematic literature search was conducted in PubMed, Web of Science, Cochrane and Embase, for up to January 1, 2023. Studies were included if they considered postmenopausal women, examined the effects of HIIT on at least one measure of heart rate at rest (HRrest), blood pressure, blood lipids and glucose, and was Randomized controlled trial. Studies were excluded if they were not written in English, their subjects had cancer or metabolic diseases, or articles didn't have extractable data. Two investigators independently assessed methodologic quality using the PEDro scale. Preintervention and postintervention sample sizes, means, and standard deviations of PROs were extracted.
Results: A total of seven studies that were included in the analysis. The mean quality scores
obtained after evaluation of each trial included in our meta-analysis was 6.29. Most of the studies were of high quality, having a score above seven points. HRrest dropped in the HIIT group (MD=-3.02, CI: -5.73 to -0.32, p=0.93, I2=0), and HDL went up (MD=0.19, CI: 0.03 to 0.35, p=0.77, I2=0). In SBP (MD= 4.63, 95% CI: 0.04 to 9.22, p=0.89, I2 = 0%), DBP (MD=3.20, 95% CI:0.32 to 6.09, p=0.92, I2=0%), glucose(MD=-0.03, 95% CI: -0.20 to 0.15), p=0.32, I2=1%) and blood lipids (except for HDL) , there was no significant difference between the HIIT group and the control group.
Conclusion: Based on these results, it appears that HIIT can significantly improve cardiovascular function in postmenopausal women in some ways such as HRrest and HDL, however, the evidence that HIIT improves cardiovascular related problems in postmenopausal women may be insufficient, and more studies are needed to confirm whether HIIT can effectively improve other cardiovascular functions.
Keywords: High Intensity Interval Training, Postmenopausal, Cardiovascular Function

Effectiveness of Telerehabilitation versus Face-To-Face Rehabilitation in Subjects Treated with Shoulder Arthroscopy: A Systematic Review and Meta-Analysis

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Introduction: Shoulder arthroscopy has become the primary treatment modality for many shoulder disorders due to the unique advantages [1]. And rehabilitation after surgery is crucial. Compared with traditional in-person rehabilitation, telerehabilitation has advantages in the accessibility and convenience of access to physical therapy [2]. Previous study has shown the effectiveness of telerehabilitation in many musculoskeletal pain conditions [3]. Thus, telerehabilitation may have similar effects on shoulder function and patient-reported outcomes as traditional rehabilitation in subjects treated with shoulder arthroscopy. To confirm the hypothesis, we conducted this systematic review and meta-analysis.
Methods: Six databases consisting of PubMed, Web of Science, CNKI, Cochrane Library, PEDro, and Embase before January 2023 were searched. Independent reviewers selected randomized controlled trials that compared the effects of telerehabilitation with face-to-face treatments in individuals with shoulder arthroscopy. Patient-reported outcomes (PROs), range of motion (ROM), motor function, and adverse events were reported. Effect size of PROs and motor function was synthesized using the standardized mean difference (SMD) with a 95% confidence interval (CI). Effect size of ROM was synthesized using the weight mean difference (WMD) with a 95% CI.
Results: A total of 58 data points (covering 2611 individuals) from 7 studies were included in this meta-

analysis. Our results showed that the difference between the effect of telerehabilitation and face-to-face rehabilitation on ROM (abduction: WMD = -2.02, 95% CI = -7.85 to 3.81, p = 0.50, I2 = 54%; flexion: WMD = 1.02, 95% CI = -1.11 to 3.15, p = 0.35, I2 = 22%; external rotation: WMD = -1.19, 95% CI = -4.16 to 1.77, p = 0.43, I2 = 0%) was not significant. Additionally, the difference between the effect of telerehabilitation and face-to-face rehabilitation on patient-reported outcomes (SMD = -0.12; 95% CI = -0.30 to 0.06; p = 0.020; I2 = 66%) and motor function (SMD = -0.19; 95% CI = -0.57 to 0.19; p = 0.34; I2 = 0%) was also not significant.
Conclusion: Both forms of rehabilitation have similar effects on improving patient-reported outcomes, ROM, motor function. Hence, telerehabilitation appears to be another option for patients after shoulder arthroscopy.
Reference: [1] Paxton E S, Backus J, Keener J, et al. Shoulder arthroscopy: basic principles of positioning, anesthesia, and portal anatomy[J]. The Journal of the American Academy of Orthopaedic Surgeons, 2013, 21(6): 332–342. [2] Mahmoud I A M S. Usability of Telemedicine in Physical Therapy Rehabilitation: Systematic review. [J]. JMIR rehabilitation and assistive technologies, Canada: 2021. [3] Valentijn P P, Tymchenko L, Jacobson T, et al. Digital Health Interventions for Musculoskeletal Pain Conditions: Systematic Review and Meta-analysis of Randomized Controlled Trials[J]. Journal of Medical Internet Research, 2022, 24(9): e37869.

In Recent Years, Bangladesh Has Suffered from an Increase in Breast Cancer

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Abstract: In Southeast Asia, women are could not get breast cancer care still now. Because no national-level hospitals are working on this. Most breast cancer diagnoses are each year in Bangladesh are based on lumps. No information of awareness in the breast cancer screening process. Avoiding the breast cancer screening process are many causes like religious believes, cultural barriers. Although Bangladesh's 6th most reason of death is cancer. The cancer-related death rate is 7.5 percent in 2015 and it will increase to 13 percent by 2030. Bangladesh also have shortage of radiotherapy machine, trained oncologist and cancer related research. About 66% percent of patients are from 30 to 65 years old. There are many causes of breast cancer in Bangladesh. Mostly are delay first children, less than 18 years old with BMI 25 kg/m2 are the significant risk factor of breast cancer. Most studies to date suggest that being overweight and obesity are associated with a lower risk of premenopausal breast cancer but are associated with a greater risk of postmenopausal breast cancer. Weight gain in adulthood appears to be associated with an increased risk of postmenopausal breast cancer. Overweight and obesity in adulthood and in particular weight gain during early adulthood may play an important role of breast cancer.
Keywords: Cancer, Breast Cancer, Bangladesh Cancer

Impact of Role Ambiguity and Occupational Stress on Nurses' Job Satisfaction

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Abstract: Aim: To measure role ambiguity and occupational stress on nurses' job satisfaction.
Study Design: Cross sectional survey; Convenience sampling**.**
Methods: Sample of 240 nurses were drawn from private and public-sector hospitals. Role ambiguity (Rizzo, House, & Lirtzman, 1970), Occupational Stress (Yang, Wang, & Chi, 2011) and Job satisfaction (Carbonell & Escudero, 2013) were used as instruments of measurement.
Results: Role ambiguity with estimate of 0.039 had no significant effect on job satisfaction. Occupational stress with estimate of -0.058 has no significant effect on job satisfaction.

Practical implication: Conclusion: The study is integral to have in the field of occupational health psychology and to make sure that nurses are satisfied in their work whether employed in private or public hospitals.
Keywords: Role Ambiguity, Occupational Stress, Job Satisfaction, Nursing

Employing Evidence-Based Approaches for Digital Health Communication Policies and Practices

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Abstract: **Background**: Digital health communication refers to the use of technology and digital tools to promote health and wellness, facilitate communication between patients and healthcare providers, and improve the overall quality of healthcare. Evidence-based solutions are important to ensure that digital health communication is effective and safe.
Objective: The goal of this research program is to create gold-standard solutions for patients and public to help them access credible health knowledge from the web and facilitate patient-provider communication.
Methodology: The research program includes the following methods: 1) systematic reviews, 2) content analysis, 3) focus groups, 4) surveys, and 5) RCT.
Research Outcomes: Through this multi-phase project, new knowledge has been generated to support the creation of patient-friendly quality standards and policy frameworks. The interventions derived from this project will establish best practices and policies for disseminating trustworthy health information on the web. This will reduce disparities in access to health knowledge and combat online misinformation. Furthermore, we anticipate that the resulting interventions will serve as gold standard for developing similar interventions that are tailored to specific contexts and patient populations.
Keywords: Digital Health, Health Communication, Health Literacy, Reliability, Benchmark, Framework

Prevalence and Risk Factors of Overweight and Obesity and Physical Activity Patterns among Elderly Individuals in Southern Thailand: A Community Cross-Sectional Study

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Abstract: **Objective**: To investigate the prevalence of overweight and obesity and physical activity (PA) patterns and to assess the factors associated with obesity among elderly individuals in the southernmost province of Thailand.
Materials and Methods: An epidemiological community-based cross-sectional study was conducted among elderly individuals aged 60 years and older. The eligible participants completed a face-to-face inquiry of the study's questionnaire related to personal characteristics and PA. Local assistant researchers collected these data. BMI was categorized according to the Asian-Pacific cut-off points. Statistical computing was performed with RStudio, and a p-value of less than 0.05 was considered significant.
Results: The prevalence of overweight was 20.3%, and that of obesity was 35.2%. The overweight prevalence and obese prevalence among male and female elderly individuals were 22.7% and 30.3%, and 18.6% and 28.6%, respectively. The obesity prevalence was non-significantly high in the female group. The majority of the elderly participants were non-working. The share of non-working participants was the highest among females and increased with age. The prevalence of lack of exercise was the highest among females. Daily physical activity hours (DPAH) and vigorous-intensity exercise decreased among the female group and the elderly group. Only 47.8% of the present study participants met the PA sufficiency criteria. The 70 to 79, and older than 80 years age group were less likely to be obese than the earlier-stage elderly group (adjusted OR 0.56, 0.31). Furthermore, personal income of 4,001 to 6,000 Baht per month and smokers had a lower likelihood of being obese than the poor elderly group and those who were not smokers (adjusted OR 0.55, 0.37).
Conclusion: The prevalence of overweight in these areas was moderate, and that of obesity was quite high. The male overweight and obese prevalence were analogous to those of female elderly individuals. The majority of the elderly participants were non-working. Most were females and increased with age. The majority met PA insufficiency criteria. Personal and health habit factors were associated with obesity among elderly individuals.
Keywords: Elderly; Overweight and obesity; Physical activity patterns

Physical Activity and Healthy Aging in the Elderly

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Abstract: This study aimed to give information about the physical activities applied in the elderly and healthy aging. In the study, research findings and reports on physical activity in the elderly were used. The decrease in birth rates and increase in life expectancy around the world causes an increase in the number of the elderly population. Increasing life expectancy brings with it many health problems. It is essential to promote

a healthy lifestyle and develop and maintain functional ability in order to reduce/prevent the health problems of the elderly and ensure their healthy aging. There is a need for older adults who participate actively and healthily in life. In this respect, adequate and balanced nutrition and active physical life come to the fore as a healthy lifestyle for elderly individuals. Maintaining physical health and functional capacity is of great importance to facilitate the activity and daily activities of the elderly. Regular physical activity is one of the most important protectors of active and healthy aging. Exercise types recommended for the elderly include aerobic/endurance, strengthening/resistance, balance, flexibility exercises, and multi-component physical activities. As a result of the studies, it seems possible to increase the physical activity intensity of older adults, as well as to provide active aging by improving the cognitive, mental, and functional aspects of older adults.

Keywords: Elderly, Physical Activity, Healthy Aging.

Virtual Reality for Preoperative Explanations: Impact on Satisfaction of Healthcare Providers

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Purpose: To assess the effect of virtual reality (VR) technology for preoperative explanations on healthcare providers' satisfaction and compare it to the conventional verbal explanation.
Methods: From April to December 2019, this study involved 20 nurses from the Chungnam National University Hospital plastic surgery ward in Daejeon, South Korea. Patients who were admitted to our plastic surgery department between April 21, 2019, and May 31, 2019, served as the study's participants. After excluding the unsuitable patients, 40 patients were randomly allocated to 20 ward nurses, 2 each as a control group, and a preoperation explanation was provided. Each of the two patients in the control group was admitted to the hospital the day before surgery, and a satisfaction survey was carried out the next day. Afterward, the experimental group received an explanation through VR content, and an explanation was given in the same manner using VR content. A paired T-test was used to statistically compare the satisfaction before and after using VR by converting the Likert scale for each item in the survey into a score. Additionally, a chi-square test was performed to statistically determine whether there were any significant differences between the control and experimental groups for each item's proportion of positive replies (Likert scale 4 or above).
Results: With a p-value of less than 0.05 in the paired-t-test, the experiment group showed statistically higher satisfaction than the control groups across all 7 survey items when comparing each item. **Conclusion**: This study shows how effective preoperative patient explanations with the proper technology can be, which is essential for healthcare providers. It is necessary to conduct further research on how to quantify objective

indicators rather than subjective surveys to measure the effect more accurately and circumvent its limits.
Keywords: Virtual Reality, Preoperative Care, Education, Randomized Controlled Trial

Medical Data Distribution Platform Based on Subscription Economy (MEDI-BASE)

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Research Objectives: The aim of this study is to improve the utilization of medical data by establishing a subscription-type medical data distribution platform based on the market economy to create a medical data distribution ecosystem.
Methodology: The concept of this study is to establish a medical data distribution platform based on the subscription economy, and to maintain security through a platform management system based on low-code technology. The cooperation on data construction was requested from the central region hospital consultative council in Korea which consists of 9 general hospitals. De -identified image data (PNS Water's view) of each hospital was collected and a RaaS (Research as a Service) environment based on cloud (Amazon Web Services, AWS) was built. Consumers can subscribe to data for a certain period of time through the platform to conduct research within the platform, and the results are designed to be exported to the outside world.
Research Outcomes: The Ntuple Co., Ltd. and HYPHEN Co., Ltd. and 3 general hospitals participated and conducted empirical study on the design and development of 'MEdical data DIStribution platform BAsed on Subscription Economy (MEDI-BASE)'. As a result, a total of 23,074 de -identified data were collected, and the architecture for RaaS and billing system for subscription were designed and established.
Future Scope: It is necessary to apply and design medical data other than image data through the MEDI-BASE established in this study. And, further discussions on pricing by each data should be made in consideration of the market economy. Finally, in order to actively data distribution between each medical institution, it is necessary to introduce and apply a standard medical terminology system to the established MEDI-BASE, as a long-term perspective.
Keywords: Medical Data, Distribution Platform, Subscription Economy, Low-Code

Accuracy and Availability of Automated Urine Output Monitoring in the Operating Room Using a Smart Balance

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Purpose: Urine output (UO) is an important intraoperative parameter that is not yet electronically monitored. We compared an automatic urinometer (AU) based on a smart balance with a manual urinometer (MU).
Materials and methods: This prospective study investigated the hourly UO of 35 preoperative patients with an indwelling urinary catheter using AU, MU, and cylinder measurements. Data were analyzed using the

Bland-Altman method. A questionnaire related to the use of the AU was completed by medical staff (n=25). **Results**: Compared to the cylinder measurements, the differences in measurements by the AU and the MU were -6.31±15.03 mL/h (p=0.018) and 20.26±26.81 mL/h (p = 0.001), respectively. The r values for the comparison of cylinder measurements with AU and MU values were 0.985 (p<0.001) and 0.968 (p<0.001), respectively. Bland-Altman analyses showed that cylinder measurements had better agreement with AU measurements than with MU measurements. Also, the medical staff reported that use of the AU was easier to learn than use of the MU (p<0.001).
Conclusions: Compared to the MU values, AU values were noninferior; they had significantly less bias and temporal deviation. Additionally, the medical staff reported that the use of the AU was easier to learn than the use of a MU.

Stimulation of the Proteolytic Activity of the 20S Proteasome in Type II Diabetes

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Abstract: Amyloidosis is a group of diseases directly related to abnormalities in the transformation of misfolded proteins, often associated with faulty proteolytic systems. One of such systems is 20S proteasome bound with the 19S regulatory particles. Under oxidative stress conditions, these complexes dissociate, and the 20S proteasome itself has to play the main role in protein degradation. Additionally, in these conditions its activity is usually inhibited. For many years it was believed that the formation of fibrillar forms of proteins was responsible for the observed inhibition [1], while in the light of recent research it seems that it is rather smaller, oligomeric forms that are cytotoxic. In 2018, Thibaudeau's group demonstrated the inhibitory effect of amyloid beta oligomers closely related to the Alzheimer's disease, on the activity of the 20S proteasome. They managed to overcome this inhibition using activators based on the Rpt subunit of the 19S regulatory particle [2]. Due to our large pool of compounds with an extremely good potential to activate the human 20S proteasome, we decided to test their capability of overcoming inhibitory effect of oligomers related to the development of type II diabetes. We synthesized human amylin, an amyloidogenic peptide related to diabetes, on a solid phase, characterized its oligomeric forms and checked their inhibitory effect on the 20S proteasome. From the pool of our peptide activators, we selected the best ones to test their ability to break the inhibitory effect of amylin oligomers on the human 20S proteasome. For these studies, we used fluorogenic substrates. Later, the two best activators were also tested in cell lysates and shown to overcome the inhibition induced by cytotoxic oligomeric forms.
Acknowledgments: This study was financially supported by the NCN-funded grant 2019/33/B/NZ7/00112 and UG-funded grant BMN Nr 539-T070-B069-23.
References: [1] Stefani, M. and Dobson, C. (2003) Protein Aggregation and Aggregate Toxicity: New Insights into Protein Folding, Misfolding Diseases and Biological Evolution. Journal of Molecular Medicine, 81, 678-699. [2] Thibaudeau T.A., Anderson R.T., Smith D.M. (2018) A common mechanism of proteasome impairment by neurodegenerative disease-associated oligomers. Nature Communications 9: 1097
Keywords: Amyloidosis, Proteasome 20S, Oligomers, Activator

Peptidomimetic Activators of the 20S Proteasome, Capable of Penetrating Cell Membranes and Crossing the Blood-Brain Barrier

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Abstract: Neurodegenerative diseases such as Alzheimer's disease, Parkinson's disease are an extremely serious and growing social problem. In healthy cells, abnormal proteins are degraded by proteolytic systems, mainly the 20S proteasome. This huge enzyme complex is responsible for removing, misfolded and mutated proteins from cells. Unfortunately, with age, the effectiveness of the proteasome weakens. A promising therapeutic strategy to avoid or reduce this could be proteasome activation using synthetic compounds. Potential therapeutics must be effective, capable of penetrating the cell membrane barrier, and resistant to enzymatic degradation. Compounds with such characteristics could restore proteostasis in patients suffering from age-related diseases. Currently, there are no drugs that can combat the causes of these diseases. We synthesized peptidomimetic compounds, which were designed by introducing various modifications to the base sequence: a 14-amino acid peptide containing the C-terminal fragment of the natural proteasome activator, the Blm10 protein. We verified the effect of the the modulators‘ability to activate both the 20S proteasome isolated from human erythrocytes and being a component of the HEK293T cell lysate. The most effective modulators stimulated the proteasome up to 18 times. Stability studies of the compounds in human plasma were also carried out. Through the introduction the cell-penetrating moiety (CPP) to their sequences activators are capable of penetrating cell membranes. Using the PAMPA we verified the ability of activators to cross the blood-brain barrier.
Keyword: proteasome 20S, neurodegenerative diseases, activators
Acknowledgments: This study was financially supported by the NCN-funded grant 2019/35/O/NZ7/00227 and BMN project nr: 539-T070-B075-23

Assessment of Effect and Safety of Beta Blockers in Hypertensive Patients

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Abstract: Hypertension is a universally occurring systemic disease. It affects about 1 billion people worldwide. Approximately 20-27% adult populations are sufferers. The number of old populations having systemic hypertension is on rise. It involves approximately 30–45% of people. It is considered to be primary precipitating factors for cardiovascular (CVS) and kidney diseases. Various research papers in geriatric population have mentioned the importance of Beta- blockers for the effective treatment of essential hypertension. Lewington et al in its meta- analysis showed a positive co- relation between cardiovascular events and usual blood pressure above a baseline level of approximately 115/75 mmHg at all ages and in both genders. Although the strength of the association is weakened with age, the absolute difference in cardiovascular risk between the highest and lowest usual blood pressure levels is much greater in older subjects. There are few contrast studies also which opposes the use of beta blocker as first line treatment for hypertension and their effects have not been found to be better than placebo due to their modest effect on stroke and no significant decrease in mortality or coronary heart disease. Considering this we selected present study to study effect and safety of beta blockers in hypertensive patients.

Bioremediation of Distillery Spent Wash (Melanoidin)-A Noble Approach for Sustainable Agriculture

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Abstract: Melanoidin from distillery spent wash are natural condensation products of sugar and amino acids produced by non-enzymatic Maillard amino-carbonyl reaction taking place between the amino and carbonyl groups in organic substances. From environmental aspects melanoidins are very important due to their structural complexity, dark colour and offensive odor, which pose serious threat to soil and aquatic ecosystem This causes the problem, like reduction of sunlight penetration, decreased photosynthetic activity and dissolved oxygen concentration whereas on land, it causes reduction in soil alkalinity and inhibition of seed germination. Bioremediation is an ecofriendly technology for treating chemical spills and hazardous waste. It is considered highly desirable to exploit the biodegradation potential of soil microorganisms from polluted sites. Application of microorganisms like, Aspergillus niger, Leuconostocs sps , Bacillus sps, Staphyloccous aurius and Pseudomonas aeroginosa will be the cost effective biotechnology for treatment of water polluted by spent wash containing melanoidin. Experimental studies revealed that the individual organisms and their mixed consortia degraded the 75 to 80% concentrated spent wash, after the optimization of various physicochemical parameters the mixed consortia exhibited enhanced activity as compared to the individual cultures alone. The treated effluents were characterized by COD reduction, HPLC analysis.

Keywords: Melanoidin, Aspergillus Niger, Leuconostocs SPS, Consortia, Distillery Spent Wash, HPLC

Bioinformatics Tool for the Characterization and Typing of Salmonella Genome Assemblies

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Abstract: Salmonella, one of the most prominent foodborne pathogens, can cause serious illnesses such as bacteremia, gastroenteritis, fever and diarrhea. And managing the outbreak of Salmonella requires swift response and accurate analysis. Given that the genome size of Salmonella is approximately 5 Mbp (considered not large compared to 3 Gbp of human genome) and process efficiency of the whole genome sequencing have considerably improved (less cost and more speed), analyzing the whole Salmonella genomes is a decent choice which can yield very high resolution of genome examination. This research project proposes a bioinformatics tool to characterize and type a group of Salmonella genome assemblies in a reasonably short amount of time (~ 80 seconds per genome) in which the output results are sequence-based typing (serotyping, MLST and cgMLST), determined antibiotic resistance genes (and their related antibiotic drugs), pathogenicity islands of Salmonella, and CRISPR (locus 1 and 2). Moreover, this tool generates dendrogram based on both CRISPR and SNP profiles in which it can specifically aid in the surveillance and investigation of Salmonella outbreak.
Keywords: Whole genome sequencing, Salmonella, Bioinformatics tool, Serotyping, Antibiotics, CRISPR, Pathogenicity islands.

Molecular Characterization and Genetic Population Structure Studies of Two Endangered Medicinal Plants Using DNA Markers

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Abstract: A genetic diversity and population structure study of endangered medicinal plants of Clerodendrum serratum and Dendrobium denudans was conducted for the first time in Manipur, North East India, using different DNA markers. SCoT (12 primers) and iPBS (12 primers), and CBDP (10 primers) markers were employed for genetic analysis of 8 populations (Ukhrul-UKL, Thoubal-TBL, Tengnoupal -TNPL, Senapati-SNPT, Moirang-MRNG, Imphal East-IMPE, Imphal West-IMPW, and Churachandpur- CCP) of C. serratum, while 12 primers each of ISSR and SCoT markers were applied for 8 populations (Ukhrul-UKL, Thoubal-TBL,

Chandel-CDL, Senapati-SNPT, Churachandpur- CCP, Imphal East-IMPE, Imphal West- IMPW and Kangpokpi-KPP) of D. denudans. Mantel test revealed a positive correlation between CBDP and iPBS (r=0.22), SCoT and CBDP (r=0.48), and iPBS and SCoT (r=0.62) for C. serratum and ISSR and SCoT (r=0.21) for D. denudans indicating the effectiveness of each marker system and reliability of their combined usage for generating accurate and consistent results. DNA marker analysis disclosed a high gene flow (Nm = 1.277 for C. serratum and Nm = 1.140 for D. denudans) between the populations, resulting in low genetic differentiation (Gst = 0.28 for C. serratum; Gst = 0.30 for D. denudans) among populations. Mantel test disclosed a non-significant correlation between the geographic and genetic distances between the plants. AMOVA showed the existence of 66% (for C. serratum) and 70 % (for D. denudans) genetic variation within the population and the remaining variation of 33% (for C. serratum) and 30% (for D. denudans) among the populations. UPGMA dendrograms constructed based on pooled marker data produced clusters similar to the pattern generated by PCoA analysis. STRUCTURE analysis based on combined marker data gave 5 genetic clusters (K = 5) for C. serratum and D. denudans. For C. serratum, UKL, CCP, and MRNG were grouped in cluster I with moderate admixture, while TBL, in cluster II did not display any genetic admixture. Whereas the moderately admixed TNPL and IMPW were assigned in clusters III and IV, respectively, the highly admixed SNPT and IMPE were grouped in cluster V. For D. denudans, less genetic admixture was observed with SPT, CDL, and IMPW showing different lone genetic pools. GENELAND further assigned 98 and 85 individual genotypes of C. serratum and D. denudans into 2 and 8 main genetic clusters, respectively. The genetic information derived from the present investigation will offer proper recommendations for effectively managing and conserving the endangered plants of C. serratum and D. denudans.

Keywords: DNA Markers; Genetic Diversity; Population Structure; Medicinal Plants; Conservation

XII. List of Listeners

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XIII. List of Upcoming Conferences

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