LongevityAsia

# SYMPOSIUM REPORT

## LIVING LONGER, LIVING BETTER: SYMPOSIUM ON LONGEVITY & HEALTH

(VIRTUAL SYMPOSIUM)

**September 20-21, 2024**

## ORGANIZERS

International Institute for Population Sciences, Mumbai

Rhenix LifeSciences Hyderabad

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# About the Symposium

The LongevityAsia symposium was held in virtual mode from **September 20-21, 2024**. It was a significant event that brought together a diverse group of experts, researchers, and policymakers. The symposium was organized by the **Centre for Ageing Studies at International Institute for Population Sciences (IIPS), Mumbai** in collaboration with **Rhenix LifeSciences, Hyderabad**. The virtual format allowed participants from various regions to engage in meaningful discussions about the critical issue of ageing populations, particularly in the Asian region. Given the rapid increase in life expectancy due to advances in healthcare, technology, and social support systems, the symposium was timely and essential. With a rapidly ageing population, particularly in countries like India, the focus on improving not just the lifespan but also the quality of life in these additional years is increasingly important. The symposium created a platform to address these issues and contribute to the global discourse on ageing.

The primary goals of the symposium were to discuss various challenges and opportunities associated with ageing populations, particularly focusing on improving the quality of life for the elderly in Asia. It aimed to explore key topics such as healthcare innovations, socio-economic factors, policy impacts, and the role of technology in supporting elderly populations. Additionally, the symposium sought to stimulate research and collaboration in the field of longevity and health, encouraging interdisciplinary approaches to address the complexities of ageing in diverse cultural and socio-economic settings. By gathering thought leaders in ageing and longevity research, the event aimed to foster dialogues and discussion on enhancing health, well-being, and social inclusion for older adults.

Furthermore, the symposium emphasized the role of research, particularly the use of wearables, smart homes, and personalized medicine, in contributing to better healthcare outcomes and longevity. In addition to academic and policy discussions, the symposium also featured awards for students and early-career investigators to encourage further contributions to the field.

## Major Themes:

- Ageing, Health and Well-Being
- Socioeconomic Status & Cultural Diversity in Ageing
- Technological Innovations for Ageing
- Healthcare Policies for the Elderly

# About the Organizers

## International Institute for Population Sciences (IIPS), Mumbai, India

The International Institute for Population Sciences (IIPS) was established in 1956 jointly by the Government of India, the United Nations and Sir Dorabji Tata Trust as a Demographic Training Centre to serve as a regional centre for teaching, training and conducting research in the area of population studies for the ESCAP regions. IIPS is the only recognized Deemed to be University under the administrative control of the Ministry of Health and Family Welfare, Government of India.

The Institute strives as a centre of excellence on all population and relevant issues through high-quality education, teaching and research. IIPS offers six regular courses, namely, Diploma in Health Promotion Education (DHPE), Post-Graduate Diploma in Community Health Care (PGDCHC), M.A./ M.Sc. in Population Studies (two-year), M.Sc. in Biostatistics and Demography (two-year), Master of Science in Survey Research & Data Analytics (two-year), and Ph.D. The Institute also offers MA in Population Studies through Distance Learning. The Institute conducts short-term courses from time-to time for various international and national organizations on population and health issues.

Apart from the teaching activities, the Institute also conducts a large number of research projects on various aspects of population like National Family Health Surveys (NFHS), Longitudinal Ageing Study in India (LASI), Study of Global Ageing and Adult Health (SAGE), Global Youth Tobacco Survey, Gender Equity and Health, and several other projects.

### Centre for Ageing Studies

The Centre for Ageing Studies comprises an interdisciplinary group of faculty with research interests in various issues related to population ageing. It includes more than 30 PhD scholars currently working on their doctoral theses on various ageing issues, using both primary and secondary data. The faculty and research scholars of the Institute have published numerous scientific papers on various dimensions of ageing in leading national and international journals.

The Centre aims to develop a robust scientific knowledge base on contemporary social, economic, psychological, and public health issues affecting ageing populations in India, grounded in empirical evidence and scientific analysis. It collaborates with other ageing centers worldwide for capacity building, joint research, dissemination, and advocacy. Additionally, the Centre advises the Indian government and other organizations, including NGOs, on policy aspects and the monitoring and evaluation of ongoing welfare programs for the elderly in India.

## Rhenix LifeSciences

Rhenix Lifesciences is a boutique R&D strategy firm with a specific focus on Longevity and P4 Medicine. We work with a broad range of collaborators across the globe in life sciences and social sciences. Our core research is focused on personalized and precision medicine within oncology and leveraging wearables such as smartwatches and CGMs to improve clinical outcomes. We support our collaborators in streamlining their scientific and clinical research strategies to improve scientific and clinical outcomes.

Rhenix Lifesciences comprises interdisciplinary scientists and engineers who establish clinical, scientific and tech infrastructure to support and improve patient outcomes. Our internal research is focused on personalized cancer vaccines and digital medicine. This includes building bioinformatics pipelines using genomics to develop personalized neoantigen cancer vaccines. Our digital medicine research is focused on leveraging wearables such as Fitbit, Withing's and CGMs to predict clinical incidents. We built statistical and AI pipelines to bring clinical insights by combining various datasets to improve Quality of Life (QoL) and clinical outcomes.

# Organizing Committee

**Dr. Shashaanka Ashili**
**Sr. Scientist**
**CureScience**
**USA**

**Dr. Dhananjay W. Bansod**
**Professor**
**International Institute for Population Sciences (IIPS), Mumbai, India**

# Secretariat

**Divyalakshmi Ramakrishna, MDS**
Scientific Director, Rhenix LifeSciences, India

**Numair Arshad**
Content Writer, Rhenix LifeSciences, India

**Deepak Goli**
PhD Scholar, IIPS, Mumbai, India

**Raghunath Mandi**
PhD Scholar, IIPS, Mumbai, India

# Volunteers

**Chaithra Y K**
HR Lead and Data

**Abhishek Mohanty**
Digital Marketing Manager, Rhenix

**Chaya Y K**
Data Analyst Intern, Rhenix

**Ayushi Joshi**
Graphics Designer, Rhenix LifeSciences,

**Uma Rakshita Pala**
Research Trainee, Rhenix LifeSciences,

**Ranjan Singha**
PhD Scholar, IIPS Mumbai

**Vishalatchi Parthiban**
Research Assistant, Rhenix LifeSciences,

**Subham Sharma**
PhD Scholar, IIPS, Mumbai, India

**Raza Mohammad**
PhD Scholar, IIPS, Mumbai, India

**Sandip Das**
PhD Scholar, IIPS, Mumbai, India

**Venkata Raja Malla**
PhD Scholar, IIPS, Mumbai, India

**Roni Sikdar**
PhD Scholar, IIPS, Mumbai, India

# Message from the Organizers

It is my honor to welcome you to the first ever symposium on Longevity in Asia, with a specific focus on bringing scientists from both health and social sciences. I am thrilled to collaborate with International Institute of Population Sciences (IIPS) and Rhenix Life Sciences – Hyderabad in making this event a reality.

Longevity as a theme encompasses multiple dimensions. The most important aspect is increasing life expectancy. On the other hand, Ageing and Quality of Life (QoL) are integral to achieve Longevity. In the research world, Ageing and QoL are defined and dealt with separately by both social and health sciences. A successful integration of these two factors in defining Longevity is our dream. The symposium is tailored to achieve such a unification.

We explored multiple disciplines ranging from translational sciences to public health and further into impact of cultural diversity and tech innovations. It was a journey for granular understanding of the impact of multiple academic disciplines on Longevity. Our curated distinguished speakers and esteemed panelists were selected to enhance and shape this journey. One of our goals in presenting a unified theme of Longevity is to inspire the next generation of scientists. We are glad that the students and early-stage scientists across India and other countries participated enthusiastically and shared their on-going research and engaged the speakers and panelists throughout the symposium.

I would like to express my gratitude to our distinguished speakers, panelists and participants for sharing their insights on the different themes and directions. I am confident it inspired the community and impacted the research of fellow scientists.

As we go forward, we look forward to engaging and contributing to the scientific community in more meaningful ways, specifically in supporting younger scientists with grants and other opportunities.

The symposium was a successful event with over 350 participants from across different countries and continents. I would like to express my sincere thanks to Prof. Dhananjay Bansod from IIPS and his team – Deepak Goli and Raghunath Mandi and Dr. Divyalakshmi Ramakrishna from Rhenix Life Sciences and her team – Numair Arshad and Chaitra Y.K. for their enormous efforts in making this event such a success. We look forward to meeting you all at a similar gathering in the coming years.

Sincerely,

**Dr. Shashaanka Ashili, PhD**
**Sr. Scientist**
**CureScience, USA**

# Message from the Organizers

It is my great pleasure to welcome you all to this important event, focusing on Longevity and Health in Asia. As we gather here, it is important to reflect on how advancements in medical science, technology, public health and lifestyle changes have significantly impacted human health and extended our life spans over the past century. However, longevity without good health brings new challenges, and our goal is to explore how we can ensure not only longer lives but also healthier, more fulfilling ones.

This gathering is not just a platform for exchanging ideas but a call to action. We are tasked with translating research into reality and ensuring that the advancements we make are accessible and inclusive for all. The road to longevity must be paved with equity and compassion, ensuring that every individual, regardless of background, has the opportunity to live a healthy, fulfilled life.

The theme of Longevity and Health is more relevant now than ever before. With increasing lifespans, it is essential to focus not only on quantity of life but on quality, ensuring that the extra years we are gaining are lived in good health, with vitality, and purpose.

Our discussions over two days, explored a broad range of crucial topics, from socioeconomic and cultural diversity to technological innovations, healthcare policies, and overall health and well-being. We examined both the science and the practical strategies that can help us lead longer, healthier lives.

This event is not just an opportunity to learn but also to connect with like-minded individuals, share ideas, and collaborate on shaping the future of health and longevity. Our incredible lined up of experts, researchers, and practitioners who shared their insights on how to create a future where long life is accompanied by good health.

I would like to extend my heartfelt gratitude to our distinguished speakers, panellists, and participants for sharing their expertise and experiences with such enthusiasm. My special thanks also to the organizing team for making this event possible and ensuring its smooth execution.

As we leave here today, let us take with us not only the knowledge we have gained but also a renewed sense of purpose. Whether you are a scientist, a practitioner, or simply passionate about health, your role in promoting longevity and well-being is essential.

Thank you for being a part of this symposium, for your curiosity, and for your commitment to advancing the frontiers of health and longevity. We hope you leave inspired to continue the important work ahead, and look forward to seeing the impact of the ideas generated here in the days to come.

Sincerely,
**Dr. Dhananjay W. Bansod**
**Professor**
**International Institute for Population Sciences (IIPS), Mumbai, India**

# Participants

## LongevityAsia Symposium 2024

## Key Statistics


Population ageing is a global phenomenon, and we received overwhelming response from participants across the globe. Our two-day symposium provided a dynamic platform to discuss diverse issues related to longevity and health, emphasizing the growing global commitment to addressing these critical challenges.

# Guest Speakers

**Dr. K. R Gangadharan**
Founder, Heritage Foundation India

Dr. K. R Gangadharan is a distinguished geriatrician and a pioneer in the field of geriatric medicine in India. He founded the Heritage Medical Centre in Hyderabad in 1994, which has become a leading institution for elderly care. With a strong focus on improving the quality of life for senior citizens, Dr Gangadharan has been instrumental in advancing dementia care and promoting awareness about ageing-related issues. He is an honorary professor at the Centre for Ageing and is actively involved with the Dementia India Alliance, contributing significantly to research and advocacy in geriatric health. His dedication to enhancing healthcare for the elderly has earned him recognition and respect in the medical community.

**Shashaanka Ashili, PhD**

Sr. Scientist, CureScience, USA

Dr. Shashaanka Ashili is a scientist, entrepreneur, and founding CEO of CureScience. He led the organization in forming global partnerships and innovative projects, including the Appomics initiative on wearables and apps. He is a strong advocate of patient empowerment, he established patient-centric resources at CureScience and focuses on personalized and precision medicine, especially in longevity and quality of life. As an interdisciplinary scientist with an eye toward commercialization, Dr. Ashili is evangelizing and improving science and healthcare access in Asia, primarily in India. During COVID-19, he partnered with the premier Institute in India (IITG) under “Scientists Beyond Borders” initiative in launching affordable medical devices.

His research contributions are reflected in numerous publications in esteemed scientific journals.

## Dr. Sathyanarayana K. M

Technical Specialist, United Nations Population Fund (UNFPA)

Sathyanarayana holds a doctoral degree in population sciences and has a professional experience of over three decades. He has worked in various technical and management capacities in national and international settings specifically in population and development in the Asia-Pacific Region. During his tenure with UNFPA India, he led the UN support to the Indian Census in 2011 and initiated a project for building knowledge base on population ageing in India and supported the conduct of a national-level survey in 2011.

In 2013, he moved to the UNFPA DPRK Office as a Technical Specialist for Population and Development and conducted one of the largest socio-demographic surveys in DPRK besides providing support in pre-census activities and has managed several educational and capacity building initiatives to strengthen the education and statistical systems in the country. He has undertaken supported the Cambodian Government in developing Population and Development Policy and has reviewed UNFPA's regional initiative on Population and Development.

He has several national and international publications and has co-edited a book on "Population Ageing in India" published by the Cambridge University Press.

## Dr Nikhil Gandasi

Assistant Professor, Indian Institute of Science, Bangalore

Dr Nikhil Gandasi is an Assistant Professor in the Department of Molecular Reproduction, Development and Genetics at Indian Institute of Science, Bangalore. He completed his PhD from Uppsala Universitet in 2011. His major research interests are Cell Metabolism and related disorders. He has numerous publications in various international reputed journals and presented his research findings in various national and international conferences.

## Dr. Cota Navin Gupta

Assistant Professor, IIT Guwahati

Dr.Navin Gupta is currently an Assistant Professor with the Department of Biosciences and Bioengineering, IIT Guwahati working in the areas of brain computer interfaces, imaging genetics for psychiatric disorders, multimodal/multivariate algorithm development and designing wearable medical solutions for patient mobility.

He completed his Postdoctoral learning in the area of schizophrenia imaging genetics on a joint National Institute of Health (NIH) grant between Mind Research Network, USA and Georgia State University, USA publishing in numerous high impact journals. Previously he obtained his PhD from Brain Computer Interfaces and Neural Engineering (BCI-NE) Group, University of Essex fully funded by the competitive Overseas Research Student (ORS) award for international students and University of Essex scholarships. His PhD work involved designing an offline P300 BCI system. During his doctoral work he also explored integrating electroencephalogram and near infrared spectroscopy modalities

## Francois-Xavier Pellay, PhD

CEO and CSO, Bimini Biotech doo, Croatia

Dr François-Xavier Pellay. He holds a PhD in Biology and Health from the University of Lille. He is an expert in the science of anti-ageing & longevity. Former Group leader at the Mediterranean Institute of Life science led by Prof. Miroslav Radman. Dr Pellay is also a serial biotech entrepreneur, he is currently the cofounder CEO of a new venture, the Cell Culture Lab (founded in 2020, based in Split, Croatia), dedicated to skin rejuvenation.

Based on the original research of Dr Pellay, Cell Culture Lab mission is to offer the most efficient solutions applied in aesthetic medicine for skin rejuvenation and long-term anti-wrinkle treatment.

## Grégoire Mercier, Ph.D.

Economic Evaluation Unit, Montpellier University Hospital

Grégoire Mercier is a French Harkness Fellow in Health Care Policy and Practice. He is the founder and current head of the Economic Evaluation Unit at Montpellier University Hospital, a multidisciplinary team in charge of producing real world and experimental evidence on the efficiency and organizational impact of innovative health care strategies. He is also a researcher at the CEPEL (UMR CNRS/Montpellier University), a social sciences team primarily focused on public policy. Mercier's research focuses on equity in healthcare and on the assessment of healthcare coordination using real world data. He served as principal investigator on a research project supported by the French Ministry of Health looking at potentially avoidable hospitalizations and has developed a new indicator that is now part of the national guidelines on healthcare coordination. At the inter-regional level, Mercier is leading the first health services research program aimed at bridging the gap between research and policy. His publications include 60 peer-reviewed articles in journals such as *Health Affairs, BMC Health Services Research,* and *Plos One.*

## Varun Dwaraka, PhD

Head of Bioinformatics, TruDiagnostic, USA

Dr. Varun Dwaraka serves as the Director of Bioinformatics at TruDiagnostic, where he leads a team dedicated to developing and implementing advanced machine learning methods to identify epigenetic biomarkers. These models are crucial for understanding the molecular biology of aging and investigating the associations between aging, disease, and overall mortality risk.

Dr. Dwaraka holds a Bachelor of Science in Molecular, Cellular, and Developmental Biology from the University of California, Santa Cruz, and a PhD in Biology from the University of Kentucky. At TruDiagnostic, Dr. Dwaraka also serves as a Principal Investigator, leading the scientific investigations conducted by the company, with a current H-index of 8 as of August 2024. His scientific endeavors have earned him a full membership to the prestigious Sigma Xi Scientific Research Honor Society, and recognition as a 2023 Foresight Fellow in Biotechnology and Health Expansion, an accolade awarded by the Foresight Institute.*Health Affairs, BMC Health Services Research,* and *Plos One.*

## Prof. S. Siva Raju

Professor Centre for Excellence in CSR

Prof. Siva Raju is a Professor at the Centre for Excellence in CSR at the Tata Institute of Social Sciences and formerly served as the Deputy Director of the TISS Hyderabad Campus. He holds postgraduate degrees in Population Studies and Statistics, as well as a PhD in Regional Development and Health and Family Welfare. His research interests encompass Corporate Social Responsibility, Resettlement and Rehabilitation, Population and Development, Research Methodology, and the health and development of ageing populations. Prof. Raju has authored several significant publications, including works on corporate social responsibility in India, gerontological social work, and the health status of the urban elderly. He has also produced a Status Report on the older poor in India, presented at the Second World Assembly on Ageing by the United Nations.

## Charu Monga, PhD

Assistant Professor, Indian Institute of Technology Delhi, India

**Charu Monga** is an Assistant Professor at the Department of Design, Indian Institute of Technology Delhi. She has a Ph.D. in Design from Indian Institute of Technology Guwahati where she has investigated design details in vernacular heritage structures towards cultural construction. Her Bachelors and Masters is from College of Arts, Delhi University also Film and Television Institute of India, Pune. Her research interests include visual communication, animation, filmmaking, digital media, CGI and game design. Her current research focuses upon investigating a variety of virtualization techniques to promote cultural construction towards heritage preservation, innovation, empowering educational areas and science communication.

## Dr. Mahesh Bhatt

Surgeon, Author, and Public Health Consultant practising medicine

Dr. Bhatt is a seasoned surgeon, author, and public health consultant with over 30 years of experience in the medical field. He is the MD and CEO of the MMBSHS Trust, a charitable organization based in Dehradun, India, dedicated to public health, research, and community development in the Uttarakhand Himalayas. After retiring as Joint Director of State Government Health Services in 2017, he became the President of Vigyan Bharti (Uttarakhand Chapter), promoting science and innovation until 2021. Dr. Bhatt's work focuses on the spiritual dimension of health, climate change, medical ethics, and public health systems. He is an accomplished author, having written several books, including "Spiritual Health and Spirituality: Neurobiology at Our Best" and "The Year 2020: The Corona and Chaos." His contributions to the field have earned him recognition as a Peace Ambassador and multiple awards, including the Lifetime Achievement Award in Science and Medicine in 2020.

## Prof. T.V. Sekher

Professor, International Institute for Population Sciences

Prof. Sekher is a Professor and Head of the Department of Family and Generations at the International Institute for Population Sciences (IIPS), Mumbai, India. With a specialization in demography, his research focuses on ageing, gender roles, and social changes in South Asia. Prof. Sekher has significantly contributed to the field through numerous publications and research projects, including the Global Ageing and Adult Health study and various surveys under Government of India. He has authored and edited ten books and published over 100 research articles, establishing himself as a leading voice in social demography. His leadership roles include serving as President of the Indian Association for Social Sciences and Health from 2018 to 2022. Dr. Sekhar’s work continues to influence policy and practice in public health and demographic studies.

## Prof. Mala Kapur Shankardass

Retired Professor, University of Delhi

Prof. Shankardass is a distinguished sociologist, gerontologist, and health and development social scientist who is recognized for her significant contributions to the fields of social gerontology, health, and social science. With a career spanning several decades, she served as a professor at the University of Delhi until her retirement in March 2021. Prof. Shankardass has authored over 100 research articles and 10 books, focusing primarily on issues related to ageing, health, and social dynamics. She consults with United Nations agencies and is a resource person with various ministries of government in India and NGOs regarding ageing issues. Her work has been instrumental in advancing the understanding of gerontology in India, advocating for the rights and well-being of older adults. Through her research and teaching, she has inspired many students and professionals in the field, leaving a lasting impact on studying ageing and social policy.

## Pawan Patro, PhD

Research Fellow, National University of Singapore

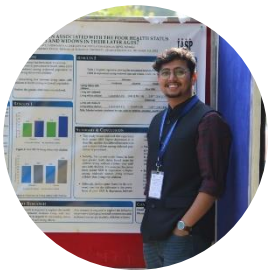
Pawan Patro is a Senior Research Fellow (Bioinformatics) at National University of Singapore (NUS) working on Artificial intelligence/Machine learning to develop large language models. Prior to my current position at NUS. He worked as a Postdoctoral Research Associate at University of Southern California (USC) specializing in functional genomics, QTL mapping, Genome wide association studies (GWAS), Transcriptome wide association studies (TWAS) and Next-generation Sequencing (NGS) data analysis with particular interest in RNA-seq and ChIP-seq data. He had done my doctoral training in Bioinformatics at National University of Singapore (NUS).

## Vijay Padaul, PhD

Sr. Scientist, Rhenix Lifesciences, Hyderabad, India

Vijay Padaul is a Senior Scientist at Rhenix, where he leads bioinformatics, genomics, and Next Generation Sequencing research-related activities, in the organization. He is currently working on the neoantigen cancer vaccine pipeline projects.

Vijay holds a Ph.D. in Life Sciences from TMC-ACTREC, Homi Bhabha National Institute, Navi Mumbai. His Ph.D. study focused on Cancer Genomics. Previously, Vijay has worked as an Assistant Professor at graduate and post-graduate degree colleges as well. At Rhenix, he has gained experience in scientific, operational, and administrative matters.



## Dr. Babul Hossain

Post doctoral researcher, LIH Luxembourg Institute of Health, Luxembourg

Dr. Babul Hossain is a Postdoctoral research fellow at Luxembourg Institute of Health, Luxembourg. He completed his master's from JNU and then his PhD from the International Institute for Population Sciences (IIPS), Mumbai.
Currently, he is working on social determinants of health and gender inequality. His major research interests are population ageing, widowhood, mortality, multimorbidity, etc. He has published 29 research papers in internationally reputed journals and disseminated his research findings at various national and international conferences.

# Program Schedule

## Day 1 | 20th September 2024 (Friday)

**09:00-09:30 AM Inaugural Session**
09:00-09:15 AM Welcome Address by Dr. Shashaanka Ashili
09:15-09:30 AM Welcome Address by Prof. Dhananjay W. Bansod

### Theme 1 Ageing, Health and Well-Being

**09:30-11:15 AM Plenary Session 1**
**Chairperson: Prof. T. V. Sekher**
09:30-09:50 AM P4 Medicine
Dr. Shashaanka Ashili
09:50-10:10 AM Graceful Ageing
Dr. K. R. Gangadharan
10:10-10:30 AM Emerging Demographics in the Asia-Pacific Region: Policy Perspectives
Dr. Sathyanarayana K.M
10:30-10:50 AM Peeking into single cells of the islet to understand diabetes
Dr. Nikhil Gandasi
10:50-11:05 AM Healthy Ageing through Adult Vaccination
Prof. Srirama Krupanidhi
**11:05-11:15 AM Tea Break**

**11:15-01:00 PM Technical Session 1**
**Chairperson: Prof. Mala Kapur Shankardass**
11:15-11:35 AM Ongoing research at Neural Engineering Lab IIT Guwahati
Prof. Cota Navin Gupta
11:35-11:50 AM Prevalence of Falls, Fear of Falling and its association with Physical function among older adults: Factors associated with Falls and implementation of Fall Prevention Strategies.
Dr. Varalakshmi Manchana
11:50-12:05 PM Cognitive Aging and Lifespan Emotion Regulation
Dr. Richa Nigam
12:05-12:15 PM Quality of Life of the Elderly Population in Urban Areas of Haveri District: A Geographical Study
Nirmala
12:15-12:25 PM Management Strategies of Loneliness among Older Adults in Kerala, India: A Qualitative Study.
Flemy Verghes
12:25-12:35 PM Understanding healthy ageing in India: insights from multivariate regression trees
Ayushi Das
12:35-12:45 PM Do social networks in later life improve the mental well-being of left behind older parents? Evidence from India
Manoj Dakua

**12:45-01:00 PM Q/A Session**
**01:00-02:00 PM Lunch Break**

**02:00-03:15 PM Technical Session 2**
**Chairperson: Prof. Dhananjay W. Bansod**
02:00-02:15 PM Tremendous Fidelity of Vitamin D3 in Age-related Neurological Disorders
Dr. Pragya Komal
02:15-02:30 PM Community Based Care Models Can Lead Wellbeing & Welfare of Elderly in Rural Area
Dr. Pankaj Kumbhar
02:30-02:45 PM Gut microbiome and Aging
Dr. Vandana Gupta
02:45-03:00 PM Multivalent peptide vaccines to combat vector borne infectious diseases.
Dr. Vikas Kushwaha
**03:00-03:15 PM Q/A Session**
**03:15-03:30 PM Tea Break**

## Theme 2 Socioeconomic Status & Cultural Diversity in Ageing

**03:30-04:30 PM Plenary Session 2**
**Chairperson: Dr. Shashaanka Ashili**
03:30-03:50 PM Skin as a model for organ rejuvenation
Dr. Francoise Xavier Pellay
03:50-04:10 PM Environmental risks on Longevity
Dr. Gregoire Mercier
04:10-04:30 PM Happiness and Stress for Health and Longevity
Prof. Vinod Kumar

**04:30-06:00 PM Technical Session 3**
**Chairperson: Dr. Vijay Padaul**
04:30-04:40 PM Socio-economic determinants and prevalence of chronic morbidity and multimorbidity among elderly population in Kolkata
Sree Sanyal
04:40-04:50 PM Examining the Determinants and Clustering of Old-age Mortality in India
Ronak Paul
04:50-05:00 PM Onset of Chronic Diseases Across Varying Birth Cohorts: Unravelling the Health and Longevity of Indian Adults
Rashmi
05:00-05:20 PM Potential Biomarkers of Longevity
Dr. Varun Dwaraka
05:20-05:30 PM Mapping Anemia Inequality: A Regional Analysis of Socio-Economic Factors Among Women of Reproductive Age in India
Pushpendar Singh
05:30-05:40 PM Rural-urban Disparities in Alcohol Consumption and its Association with Multimorbidity among Older Adults in India: Evidence from LASI

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| | Preeti |
| 05:40-05:50 PM | Psychological Well-being in Elderly Indian Populations: The Role of Family<br>Vandita Ranjan |
| **05:50-06:00 PM** | **Q/A Session** |

# Day 2 | 21st September 2024 (Saturday)

## Theme 3 Technological Innovations for Ageing

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| **09:00-11:00 AM** | **Plenary Session 3**<br>**Chairperson: Dr. Shashaanka Ashili** |
| 09:00-09:20 AM | Promoting Positive Ageing in India: Some Observations<br>Prof. S. Siva Raju |
| 09:20-09:40 AM | Design Engineering Challenges with Aging<br>Dr. Charu Monga |
| 09:40-10:00 AM | Household Headship, Filial Expectations and Mortality in Older Widows in India: Evidence from the Longitudinal Survey Data Analyses<br>Dr. Babul Hussain |
| 10:00-10:20 AM | Spiritual Dimensions of Health in Healthy Ageing & Longevity<br>Dr. Mahesh Bhatt |
| 10:20-10:40 AM | Genomics as a key enabler of personalized medicine<br>Dr. Vijay Padaul |
| 10:40-11:00 AM | Unravelling molecular underpinnings of cancer using omics data<br>Dr. Pawan Patro |
| **11:00-11:10 AM** | **Tea Break** |

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| **11:10-01:00 PM** | **Technical Session 4**<br>**Chairperson: Prof. Vandana Gupta** |
| 11:10-11:25 AM | Deciphering the role of NSMCE2 E3 SUMO ligase in replication fork dynamics and chemoresistance: Insights from Indian breast cancer clinical samples and cellular model studies<br>Dr. Vivek Tripathi |
| 11:25-11:40 AM | Combating Ageing with Algae<br>Dr. Archana Tiwari |
| 11:40-11:55 AM | Synergistic Impact of Metformin and Natural Ingredients on Blood Glucose Dynamics in Type 2 Diabetes: A Path to Optimized Therapy<br>Dr. Ashoka Hadagali |
| 11:55-12:05 PM | Condition of Widows and Cognitive Ability among Older Adults in India: A Study Based on Longitudinal Ageing Study in India (2017-18)<br>Ananya Khan |
| 12:05-12:15 PM | Gender Differences in Mental Health Outcomes Among Elderly Widowed Individuals in India Using Large-Scale Data<br>Hirangi Madhavan |

12:15-12:25 PM Understanding Life Satisfaction of the Elderly with Multimorbidity in India: Insights from the Longitudinal Ageing Study in India (LASI) Wave-1
Subham Sharma
12:25-12:35 PM The potential role of biosurfactant as nutricosmeceutical in ROS-induced skin damage
Daiji Brahma
**12:35-01:00 PM Q/A Session**
**01:00-02:00 PM Lunch Break**

## Theme 4 Healthcare Policies for the Elderly

**02:00-03:00 PM Plenary Session 4**
**Chairperson: Prof. S. Siva Raju**
02:00-02:20 PM Health of Elderly in India: Emerging Challenges
Prof. T.V. Sekhar
02:20-02:40 PM Sustainable Ageing Perspectives: Combating Ageism, Abuse, & Empowering Strategies
Prof. Mala Kapur Shankardass
**02:40-03:00 PM Q/A Session**

**03:00-04:15 PM Technical Session 5**
**Chairperson: Prof. Srirama Krupanidhi**
03:00-03:15 PM Evaluation of acute antidiabetic activity of Pimpinella tirupatiensis tuberous root aqueous extract in STZ induced diabetic rats
Lavanya Reddy
03:15-03:30 PM Antibacterial potential of common wild herbs against MDR Staphylococcus aureus from cattle's with mastitis
Dharamvir Chouhan
03:30-03:45 PM Evaluation of the antidiabetic and antioxidant activities of the whole plant of Cleome viscosa with reference to in vitro and in vivo studies

Rajeswara Reddy
03:45-04:00 PM Exploring the Impact of Viral Infections on Amyloidosis Development
Rimpy Kaur Chouhan
04:00-04:15 PM Unveiling Therapeutic Opportunities: Subtractive Genome Analysis of Providencia stuartii for Drug Target Identification and Epitope Mapping
Hina Bansal
**04:15-04:30 PM Tea Break**

**04:30-06:00 PM Technical Session 6**
**Chairperson: Dr. Varalakshmi Manchana**
04:30-04:40 PM Regional Variations and Determinants of Quality of Life Among Older Adults in India: Insights from LASI-Wave I
Paramita Majumdar

| | |
|---|---|
| 04:40-04:50 PM | Assessing quality of life among older people and its association with food insecurity in India<br>Papai Barman |
| 04:50-05:00 PM | Does Female Older Adults Live Longer and Happier than Male in India: An Analysis of Gender Disparities in Happy Life Expectancy<br>Sadanand Karun |
| 05:00-05:10 PM | Therapeutic effect of oxy-exo aloe in diabetic wound injury<br>Mumtaj Bano Miya |
| 05:10-05:20 PM | Smart fall detection jacket for elderly<br>Khadeeja M J |
| 05:20-05:30 PM | Flavonoids as potential therapeutics for Parkinson's Disease<br>Sima Biswas |
| 05:30-05:40 PM | Regulatory T-cells ageing fuels generalized vitiligo progression<br>Firdosh Shah |
| 05:40-05:50 PM | Wealth Disparities and Cognitive Impairment Among the Elderly in India: Analysing the Contributing Factors<br>Madhurima Sharma |
| 05:50-06:00 PM | Correlates of socioeconomic status and activity levels of Rural Older Widows<br>K. Maheswari Manu |

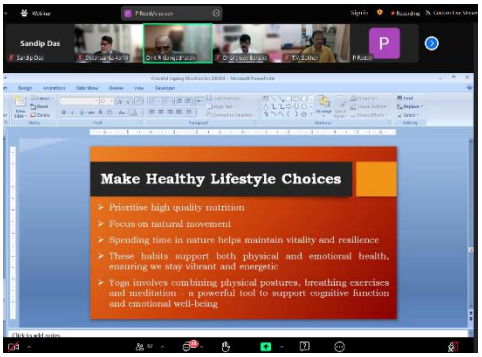
**06:00-06:10 PM Q/A Session**

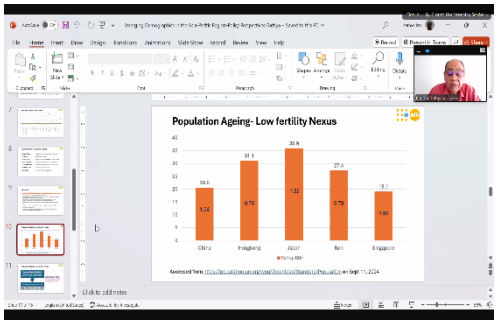
**06:10-06:30 PM Closing Ceremony**

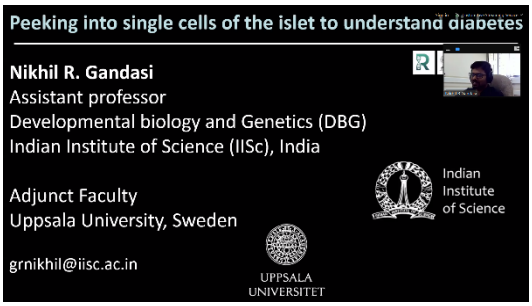
# Session-wise summary of the symposium

## Theme 1: Ageing, Health and Well-being

**The plenary session 1**, chaired by Prof. T. V. Sekher, the head of the Department of Family and Generations at IIPS, featured a distinguished panel of experts who shared their insights on various aspects of ageing and health. The session commenced with a discussion on the intricate relationship between neurodegeneration and ageing, highlighting advancements in treatments for neurological health. Following this, the importance of graceful ageing was emphasized, advocating for improved care for the elderly, particularly in dementia management. Emerging demographics in the Asia-Pacific region were also presented, focusing on relevant policy perspectives to address the needs of older adults. Additionally, research on understanding diabetes at the single-cell level offered insights into cellular metabolism and related disorders. The session concluded with a discussion on the critical role of adult vaccination in promoting healthy ageing. This engaging and informative session underscored the multifaceted challenges and opportunities associated with ageing, setting the tone for further discussions throughout the symposium.

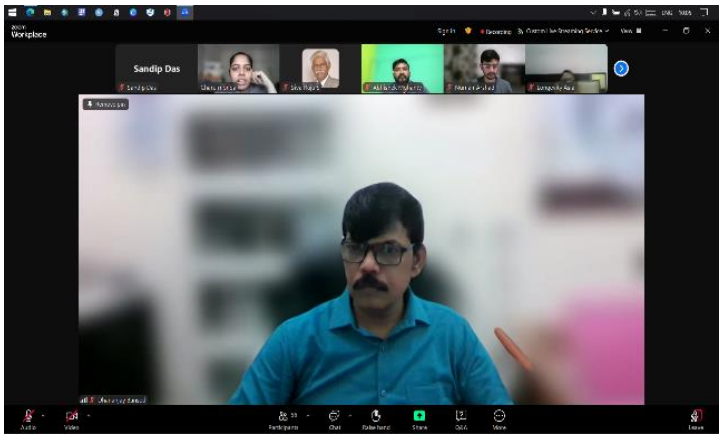


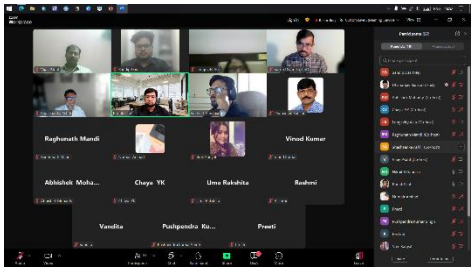
**Technical session 1**, chaired by Prof. Mala Kapur Shankardass, a distinguished gerontologist, features a series of presentations addressing critical issues in the context of ageing and health. The session begins with insights into ongoing research at the Neural Engineering Lab, highlighting the intersection of technology and elder care. Following this, a presentation discusses the prevalence of falls among older adults, examining their physical implications and potential preventive strategies. The discourse shifts to cognitive ageing, exploring emotional regulation across the lifespan. Additional presentations cover the quality of life of the elderly in urban settings, management strategies for loneliness among older adults, and a comprehensive analysis of healthy ageing through advanced statistical methods. The session concludes with an interactive Q&A segment, fostering discussion among attendees.

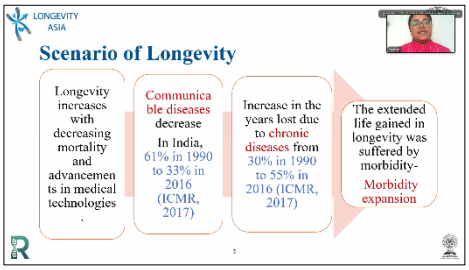
**Technical Session 2**, chaired by Prof. Dhananjay W. Bansod, a public health expert, this session investigates the social and economic dimensions of the growing ageing population in India. It opens with a discussion on the exploration of vitamin D3's impact on age-related neurological disorders, followed by insights into community-based care models designed to enhance the well-being of the elderly in rural areas. The session also addresses the relationship between gut microbiome health and ageing, concluding with innovative approaches to combating infectious diseases through multivalent peptide vaccines. This session provides a comprehensive overview of the challenges and solutions surrounding the ageing population in India, encouraging collaboration and further research.



## Theme 2: Socioeconomic Status & Cultural Diversity in Ageing

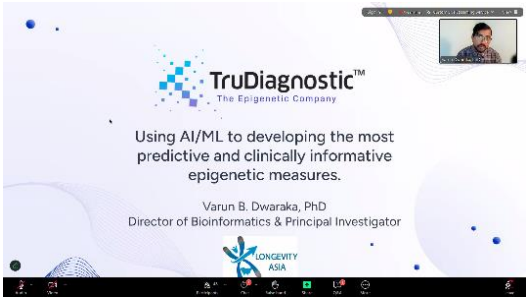
**Plenary Session 2**, Chaired by Dr. Shashaanka Ashili, the session featured three distinguished speakers who explored key factors influencing longevity. Dr. Francoise Xavier Pellay discussed skin as a model for organ rejuvenation, highlighting its potential in regenerative medicine. Dr. Gregoire Mercier examined the impact of environmental risks on longevity, emphasizing the role of pollution and climate factors. Finally, Prof. Vinod Kumar presented insights on happiness and stress in relation to health and longevity, shedding light on the psychological dimensions of ageing. The session provided a multidisciplinary perspective on ageing, fostering engaging discussions among participants.

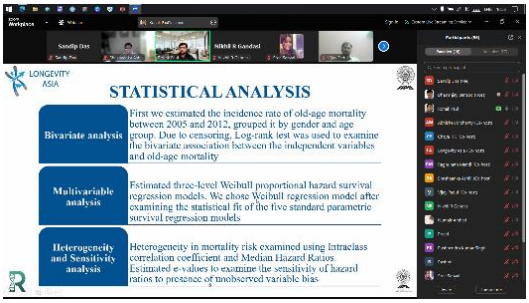





**Technical Session 3**, chaired by Dr. Vijay Padaul, Sr. Scientist at Rhenix LifeSciences, Hyderabad this session investigates the socioeconomic factors influencing health outcomes in ageing populations. The session opens with a presentation on the socioeconomic determinants and prevalence of chronic morbidity and multimorbidity among the elderly in Kolkata, highlighting critical health challenges faced by this demographic. Following this, the discussion examines the determinants and clustering of old-age mortality in India, providing insights into the complex interplay of factors affecting longevity. Another presentation explores the onset of chronic diseases across varying birth cohorts, shedding light on the health and longevity of Indian adults. A guest speaker presents cutting-edge research on potential biomarkers of longevity, offering a scientific perspective on the genetic and molecular aspects of the ageing process. The session continues with analyses of anaemia inequality among women of reproductive age and rural-urban disparities in alcohol consumption and its association with multimorbidity among older adults. The session concludes with a focus on psychological well-being in elderly populations, emphasizing the role of family dynamics in enhancing mental health. The

interactive Q&A session encourages further dialogue on these pressing issues, fostering a collaborative exploration of solutions to improve health outcomes for ageing individuals.

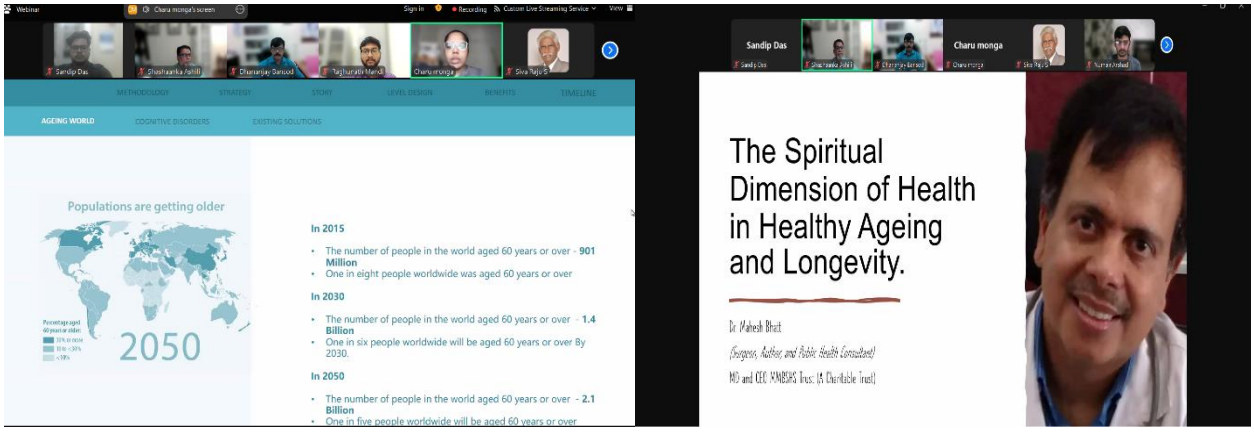


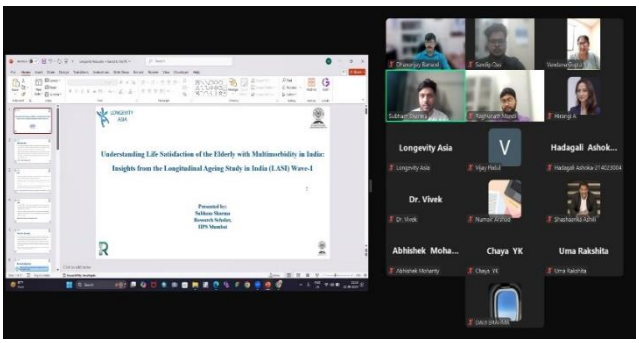

## Theme 3: Technological Innovations for Ageing

**The plenary session 3** was chaired by Dr. Shashaanka Ashili, a scientist, entrepreneur, and founding CEO of CureScience. This session focused on various technological innovations aimed at improving the lives of older adults. The presentations commenced with observations on promoting positive ageing in India, highlighting the importance of societal and systemic support for the elderly. Challenges in design engineering specific to ageing populations were discussed, emphasizing the need for innovative solutions that cater to their unique requirements. Insights into demographic dynamics were shared, particularly concerning household headship, filial expectations, and mortality among older widows in India, using data from longitudinal surveys. The session also explored the spiritual dimensions of health and their significance in healthy ageing and longevity, recognizing the holistic approach needed to address the well-being of older individuals. Furthermore, the role of genomics as a pivotal factor in enabling personalized medicine was underscored, with an emphasis on advancements in cancer genomics and bioinformatics. The session concluded with a discussion on unravelling the molecular underpinnings of cancer through omics data, showcasing the potential for technological advancements to enhance healthcare for ageing populations. Overall, the session provided valuable insights into the

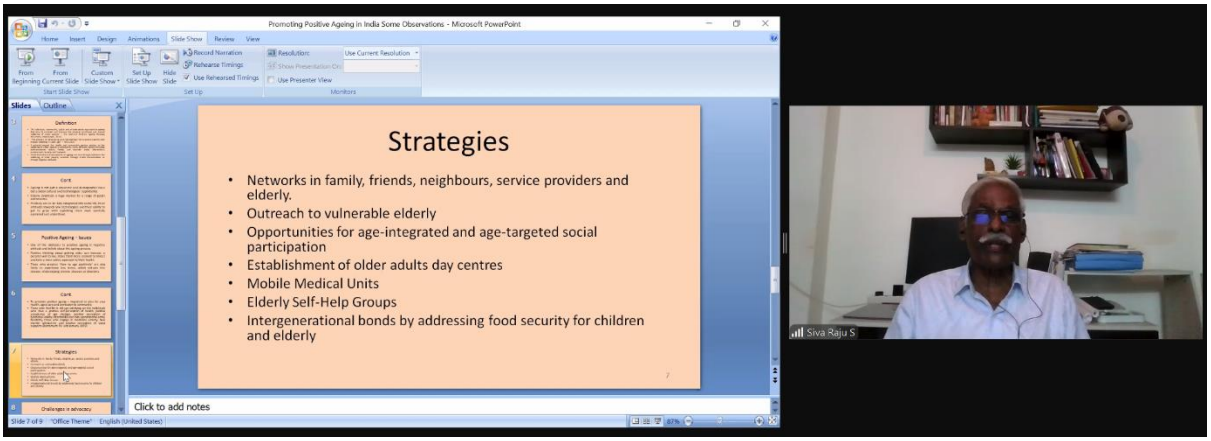
intersection of technology, health, and ageing, emphasizing the need for interdisciplinary collaboration to address the challenges faced by the elderly.




**The technical session 4**, chaired by Prof. Vandana Gupta, a distinguished professor from the University of Delhi, focused on innovative research addressing ageing and health challenges. It began with a presentation exploring the role of a specific E3 SUMO ligase in replication fork dynamics and chemoresistance, highlighting findings from clinical samples related to breast cancer. This was followed by a discussion on the potential of algae as a natural solution for combating ageing, emphasizing its significance in health interventions. Another presentation examined the synergistic effects of metformin and natural ingredients on blood glucose dynamics in Type 2 diabetes, proposing pathways for optimized therapeutic strategies. Research insights into the cognitive abilities of widows in India underscored the social and mental health challenges faced by this demographic. The session also included a presentation on gender differences in mental health outcomes among elderly widowed individuals, utilizing large-scale data to identify significant disparities. Another researcher discussed life satisfaction among elderly individuals with multimorbidity, drawing on insights from the Longitudinal Aging Study in India. The final presentation focused on the potential role of biosurfactants as nutricosmeceuticals in addressing reactive oxygen species-induced skin damage, highlighting innovative approaches to skincare

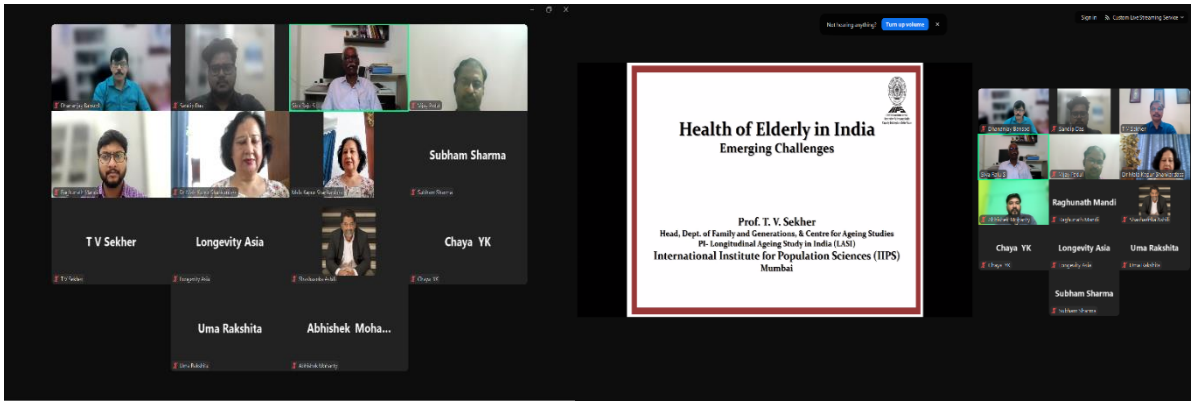


in ageing populations. The session concluded with an engaging Q&A segment, fostering collaborative knowledge sharing among participants.




## Theme 4: Healthcare Policies for the Elderly

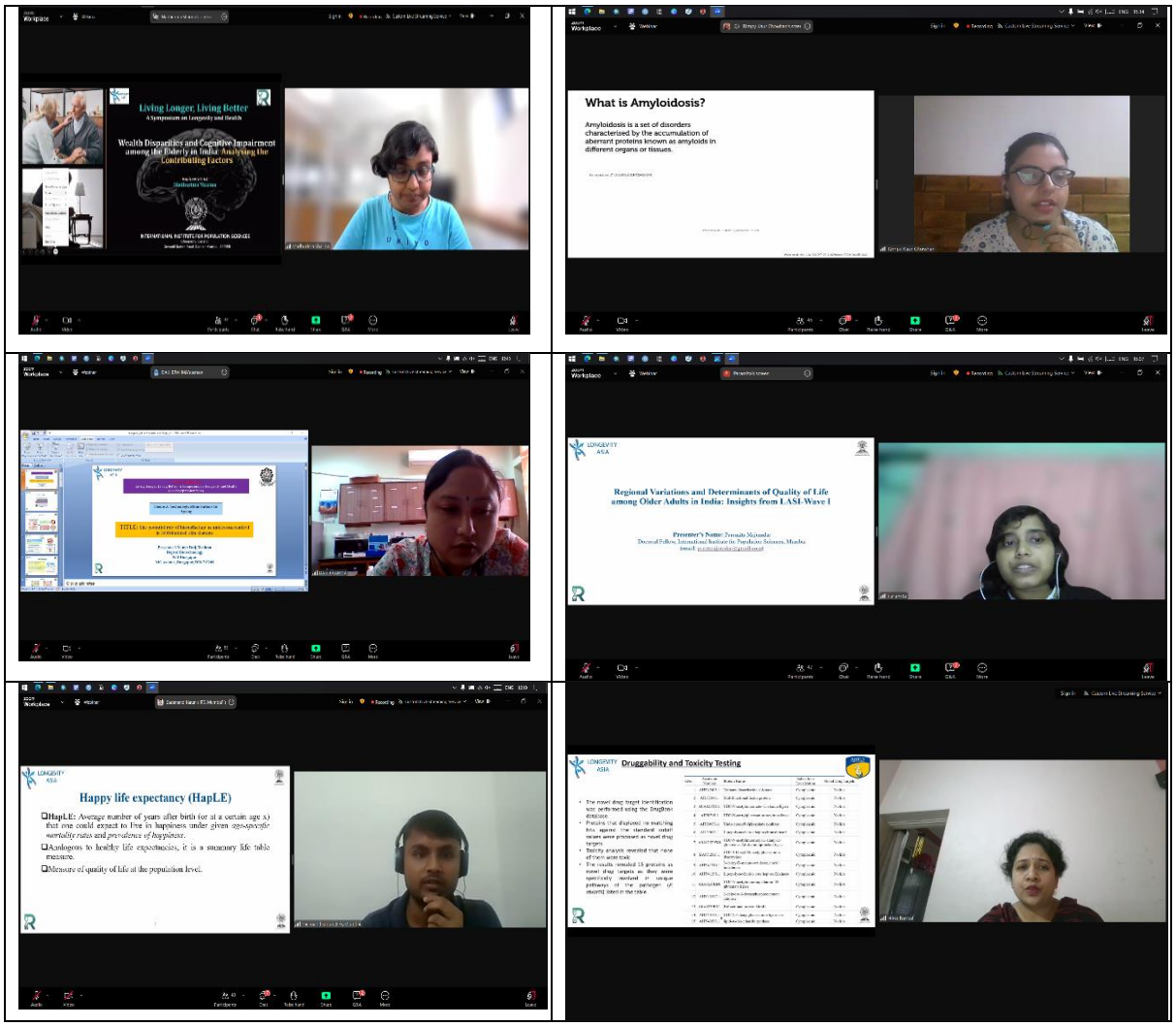
The fourth plenary session, chaired by Prof. S. Siva Raju, a professor specializing in population and development, focused on critical healthcare policies for the elderly. The session commenced with a presentation on the health challenges facing the elderly in India, addressing emerging issues and their implications for public health policies and social welfare programs. This was followed by a discussion on sustainable aging perspectives, emphasizing the importance of combating ageism and elder abuse and implementing empowering strategies to improve the quality of life for older adults. This segment provided valuable insights into the intersection of ageing, gender, health, and development, underscoring the need for a comprehensive approach to address the challenges faced by elderly populations in India. The discussions fostered a collaborative atmosphere, encouraging participants to share ideas and strategies for advancing healthcare policies tailored to the needs of older adults.



**The technical session 5**, chaired by Prof. Srirama Krupanidhi, a retired dean and head of the Department of Biotechnology, showcased a diverse array of research focusing on health and therapeutic applications. The session began with a presentation on the acute antidiabetic activity of an aqueous extract from the tuberous roots of Pimpinella tirupatiensis, tested in STZ-induced diabetic rats, highlighting its potential as a natural treatment for diabetes. Following this, the antibacterial properties of common wild herbs against multi-drugresistant Staphylococcus aureus from cattle with mastitis were discussed, emphasizing the importance of herbal remedies in combating antibiotic resistance. Another presentation evaluated the antidiabetic and antioxidant activities of the whole plant of Cleome viscosa, with both in vitro and in vivo studies supporting its therapeutic potential. The session continued with an exploration of the impact of viral infections on the development of amyloidosis, shedding light on the intricate relationships between infections and protein-misfolding diseases. Finally, a study presented on drug target identification and epitope mapping through subtractive genome analysis of Providencia stuartii revealed promising therapeutic opportunities. This session highlighted the intersection of traditional knowledge and modern scientific inquiry, providing valuable insights into potential health interventions.

**The technical session 6**, chaired by Dr. Varalakshmi Manchana, Assistant Professor from the University of Hyderabad with a focus on ageing and health, a variety of presentations addressed critical issues related to the quality of life and health of older adults in India. The session began with an examination of regional variations and determinants of quality of life among older adults, drawing insights from the Longitudinal Ageing Study in India (LASI) Wave I. This was followed by a study assessing the association between quality of life and food insecurity among older individuals, highlighting the impact of nutritional access on well-being. The discussion then shifted to gender disparities, analyzing whether female older adults in India enjoy longer and happier lives compared to their male counterparts, shedding light on the complexities of happiness and life expectancy across genders. Another presentation focused on the therapeutic effects of oxy-exo aloe in diabetic wound injury, offering insights into potential treatments for common complications associated with diabetes. Innovative solutions were showcased, including a smart fall detection jacket designed

for the elderly, which aims to enhance safety and independence. The session also covered the role of palmitoylated polyphenol-loaded nanoparticles in neurodegeneration and their potential to boost synaptic health, alongside a discussion on flavonoids as therapeutics for Parkinson's Disease. Further presentations explored the effects of ageing on regulatory T-cells and their role in the progression of generalized vitiligo, as well as wealth disparities contributing to cognitive impairment among the elderly. The session concluded with an analysis of socio-economic status correlating with activity levels in rural older widows and a discussion on the interplay between happiness, stress, health, and longevity. This session highlighted the multifaceted nature of ageing, combining research on health, technology, and social determinants to address the needs of older adults



## Harsh Chaturvedi Memorial Award

Dr. Harsh Chaturvedi Memorial (HCM) student award is established in loving memory of Dr. Harsh Chaturvedi, Assistant Professor at IIT Guwahati, who passed away in November 2023. Dr. Harsh Chaturvedi was working in key research areas like Flexible Foldable Electronics, Energy Storage, Energy Prediction and Grid integration, Hybrid Nanomaterials for Green Energy applications and published in national and international scientific journals. Dr. Harsh Chaturvedi (1980-2023) graduated with a PhD from UNC Charlotte, NC, USA. He returned to India as a Ramanujam Fellow and continued his research at ISER Pune. He became a faculty member at IIT Guwahati, where he continued his research activities. Dr. Harsh Chaturvedi always cherished mentoring students and found ways to contribute to their success.

***In his honour, a student competition was conducted. A total of 21 students presented their papers on varied topics based on Longevity and Ageing in all 4 sessions in two days of the virtual symposium on 20-21 September 2024. The winners were selected by the participants' votes and announced after the LongevityAsia-24 symposium. Winners were awarded a certificate of Appreciation and a cash prize.***

## List of Awardees

**Khadeeja M J**
Adi Shankara Institute of Engineering and Technology Kerala, India

**Madhurima Sharma,**
International Institute for Population Sciences, Mumbai, India

**Sima Biswas**
University of Kalyani India

**Rashmi**
International Institute for Population Sciences, Mumbai, India

**Paramita Majumdar, International** Institute for Population Sciences, Mumbai, India

**Firdous Shah**
C. G. Bhakta Institute of Biotechnology, India

**Preeti**
International Institute for Population Sciences, Mumbai, India

# Abstracts:

### Unravelling molecular underpinnings of cancer using omics data

Chinari Pawan Kumar Patro
Research Fellow, National University of Singapore (NUS)

Aging and cancer are strongly interconnected biological process with incidence of cancer dramatically increasing with age. Cancer has been known as one of the leading causes of death. Even though significant progress has been made in various cancer by elucidating the causal mechanisms, detailed mechanisms underlying the formation of different cancers are yet to be unveiled. Next-generation sequencing (NGS) has always shown great potential to unravel molecular underpinnings in various cancer studies and to elucidate the underlying molecular mechanisms. Multiple omics studies comprising either genomics, transcriptomics, proteomics or metabolomics have shown the robustness of their usage for finding several mechanisms and pathways related to cancer. In this talk I will present how genomics and transcriptomics data can be used to find intricacies related to glioblastoma multiforme (GBM), one of the most devastating forms of brain cancer. The study utilizes sequencing data such as RNA-seq data and Genome-wide association study (GWAS) data to find the expression and splicing QTLs leading to the identification of susceptibility genes of GBM. QTLs are quantitative trait loci that either effect the expression or splicing of the cis acting genes. The study also utilizes ChIP-seq data to show the functional level effect of the QTLs on the target genes impacting at promotor and enhancer levels. In a different study, we have also shown studying the relevance of RNA-seq data in chordoma. In summary, publicly available datasets containing omics data should be capitalized to study and find molecular underpinnings of cancer.

### Genomics as a key enabler of personalized medicine

Vijay Padual
Rhenix Lifesciences

Longevity can be achieved in the background of good genetics and following a lifestyle favorable for longevity. The effect of diet and lifestyle on lifespan has been studied extensively. Various studies have identified a strong genetic component to longevity. Instead of aiming for achieving longer lifespan, the focus should be to achieve longer health-span. Apart from the effect of inherited genetic components, the longer healthy lifespan can be achieved by active prevention of diseases and recovery from diseases. In the past century the progress in modern medicine has enabled highly effective medical care, which has evidently contributed to longer population lifespans. Treatment strategies used in modern medicine follow one-size-fits-all approach where same medicine is prescribed to all patients with same disease symptoms. These

treatments show high variability in response in the patient population. This variation in drug response could be due to underlying genetic variability in patient population. To increase the effectiveness of treatments patient's genetic background could be taken into consideration. This paves the way for personalized medicine.

Genomics is an emerging and fast-growing field which focuses on the study of genome architecture of an organism. A Person's genome constitutes of entire DNA genetic material which harbors genes and gene expression control elements. Elucidation of an individual's DNA sequence and its further analysis enables to identify SNPs which are associated with or found to be causative to certain diseases. This information can also be used to identify the susceptibility of the person to certain diseases and disorders in his lifetime. The genetic sequence information can be immensely helpful to devise personalized disease prevention strategies which could further be helpful to achieve longer healthy lifespan for the individual.

Apart from germ-line genetic data, the somatic genetic changes in cancer tissues can also be detected by utilizing genomic strategies. Several somatic DNA mutations and chromosomal aberrations which could serve as driver events for the emergence and progress of cancer have been identified by genomic analysis of cancer tissues. The cancer genome data can be used to devise personalized treatment strategies and predict patient prognosis. One of such cutting-edge personalized cancer treatment strategies include personalized neoantigen peptide vaccine therapy which aims to train the immune system to identify and kill cancer cells which express mutant proteins. Both the germ-line and somatic genomic analysis could serve as a key enabler of personalized medicine to achieve increased lifespan of the patients'.

## DNA based programmable nanodevices to instruct biological systems

Dhiraj Bhatia
Associate Professor, Department of Biological Sciences and Engineering,
Indian Institute of Technology Gandhinagar, IIT Gandhinagar

My laboratory ask how nanometer-sized biomolecules transmit and integrate information across much larger length scales of the orders of cells and tissues. We seek to explore how collections of macromolecules work together to establish a common functional system like cellular pathways, organelles, living cells and further into tissues, organs and entire organisms. Different biomolecules establish long-range orders in living systems by self-assembling into much larger structures, such as molecular complexes, membranes, and cytoskeletal organelles, intra- and inter-cellular contacts, and long range contacts. The main theme of our lab will be understand the assembly principles of biological systems and the roles they play in living cells, tissues and full organisms...and further developing technologies to modulate the same.

To address these problems, we adapt multidisciplinary, bottom-up approach using DNA nanotechnology. DNA has immense potential to arrange the matter at nanoscale

with extreme robustness and spatial specificity. The compatibility of DNA to interface with other biomolecules like proteins, carbohydrates, lipids, small molecules make DNA a natural choice of material for bottom-up self-assembly. Thus, we will merge the complex programmability of DNA nanotechnology with the structural and functional diversity of other biomolecules. Our interdisciplinary research, along with national and international collaborations with experts, will leverage expertise from chemistry, nanotechnology, biophysics, biology, engineering, and medicine.
The overarching goal of my team would be to translate laboratory findings into the development of new therapeutic strategies.
Keywords: Structural DNA nanotechnology, 3D cages, Monofunctionalized quantum dots, Single particle tracking, Biomedical engineering
Biosketch: *Dr Dhiraj Bhatia obtained his PhD from NCBS-TIFR in Bangalore, India, in DNA nanotechnology. Post PhD he went to Curie Institute in Paris to join the team of Ludger Johannes initially as a Curie fellow and later as an HFSP long-term fellow where he learnt the cellular and biological applications of DNA nanodevices. In 2018, he moved to India to start his own laboratory at the Indian Institute of Technology Gandhinagar where he is an Associate Professor and was Ramanujan fellow till 2023. His lab focusses on translational aspects of DNA nanotechnology to develop tools to program biological systems for biomedical applications. He is currently the member of INYAS-INSA and also scientific advisor for the startup company Q-Nano-Sol Biotech (QNANOSOL Pvt Ltd).*

## Skin as a model for organ rejuvenation

Francois-Xavier Pellay, PhD
CEO & CSO, Bimini Biotech

Several approaches are currently under development to target and reverse the root cause of aging. Among these, one of the most promising option is cell replacement therapy which directly address the hallmark of ageing called “stem cell exhaustion”. Here we use the skin as a complex organ to demonstrate that this approach can lead to biological rejuvenation. We improved and optimized the “Autologous Fibroblasts Injection” method in order to get rejuvenated cells prior to injection and we showed how such strategy leads to skin rejuvenation, not only for wrinkles and loss of elasticity but also overall improvement in skin health.
Our future research aims at using the same strategy to target other organs through the rejuvenation and injection of other cell types.

## Peeking into single cells of the islet to understand diabetes.

Nikhil R Gandasi
Department of Developmental Biology and Genetics, Indian Institute of Science, Bengaluru.

A well-functioning pancreas preserves glucose homeostasis and prevents diabetes. Glucose homeostasis is maintained by secretion of insulin from pancreatic beta cells that lowers blood glucose after a meal. Although mechanisms behind secretion of insulin have been studied for years a clear subcellular view on secretion had remained elusive. My previous work was focused on elucidating the steps leading to secretion of insulin from the individual secretory granules localized in beta cells using high-resolution total internal reflection fluorescence microscopy techniques. Secretory granules localized at the plasma membrane were visualized to discover granule pools in individual beta cells responsible for secretion of insulin. Molecular determinants that include SNARE and accessory proteins which are part of secretory machinery pools were identified. The changes in the molecular determinants leading to disrupted insulin secretion in human type-2 diabetic beta cells were discovered. This discovery led to understanding the abnormalities in human type-2 diabetic islet cells affecting mechanisms of insulin secretion.

Most of work in islet research is focused on insulin but there is lack of understanding how other islet hormones that preserve glucose homeostasis. Recent evidence and preliminary data from my lab suggest that the preserving the islet environment conserves glucose homeostasis. Islet environment is affected by paracrine and autocrine factors, vascular networks, glucose concentrations and extracellular vesicles influencing the islet micro-environment. We have been pursuing with high-resolution microscopy approaches to understand the islet environment. This would provide novel insights into islet dysfunction during T2D at multiple levels such as single cells of islet, whole islet, islet cell interactions and pancreas functioning.

## Ongoing Research at Neural Engineering Lab, Dept of BSBE, IIT Guwahati

Cota Navin

Comprehensive understanding of healthy and diseased brain is now possible at multiple scales and dimensions with neuroimaging clinical big datasets like Electroencephalogram (EEG), Magnetoencephalography (MEG), Near-infrared spectroscopy (NIRS) and Magnetic Resonance Imaging (MRI). Identification of reliable biomarkers from these clinical big datasets pertaining to Parkinson's, Depression, Schizophrenia, Mental workloads etc may lead to early detection and hence focused treatment of mental illness. Novel neural engineering methodologies and portable data acquisition systems are necessary to provide these necessary insights about human brain function and structure.

With above backdrop, this talk will give a brief overview about the ongoing research work at Neural Engineering Lab, Dept of Biosciences and Bioengineering, IIT Guwahati.

## Growing aging population in Maharashtra and it's Social and Economic Implication

Dr. Nilesh P. Chopade
L.N.A. Deshmukh Arts and Commerce College, Amravati.

India, the second most popular country in the world, has experienced a demographic transition over the past 50 years. It is estimated that the proportion of Indians aged 60 years and above will increase from 7.5 % in 2010 to 11.1 % in 2025. India had more than 91.6 million elderly people in 2010. The Aging population is likely to reach 158.7 million elderly people in 2025, impacting the countries health system. According to the elderly population of Maharashtra state, the preparation of population above 60 years is 9.88 % in which male population is 9.02% and female population is 10.81 %. There is a difference in statistics between rural and urban areas a growing aging population creates many problems.

This unprecedented growth in the elderly population will have significant implications for India's health, economy and society. 2/3 people in Maharashtra live in villages and their needs are different from those in urban areas, so it is necessary to plan for the welfare of the elderly in rural and urban areas as well as for future problems facing the country. Also implementation of policies and programs is one of the immediate priorities of the government and stakeholders.

**Keywords:** Demography, Increase, Elderly, statistics, implication.

## Gut Microbiome and Aging

**Vandana Gupta**
Department of Microbiology, Ram Lal Anand College, University of Delhi

Aging is a natural process which can be manipulated to some extent through the understanding of the intricate interactions between environmental and genetic determinants. Evidence towards the role played by the gut microbiome in causing age-related alterations in human beings and vice versa is ever accumulating. The succession of the gut microbiota occurs during the lifecycle of an individual and also leads to interconnected metabolic variations. In this study a review of the available literature on variations in gut microbiome with age is summarized. Alpha diversity and metabolites increase in the older adults with age. With aging *Akkermansia, Butyricimonas*, *Odoribacter*, Christensenellaceae, *Lactobacillus* etc. were reported to increase, whereas the populations of core short-chain fatty acid producers such as *Bacteroidaceae, Faecalibacterium,* Prevotellaceae, *Lachnospiraceae* were down

regulated. Beta diversity considerably varied with the developmental stages. Pathways related to amino acid synthesis and carbohydrate metabolism were affected with aging. Factors such as physiological worsening, diet, medication and social interactions influence the age-related modifications in the gut microbiome. Gut microbiome-based interventions for older people will include restoration of healthy microbiome along with dietary modification. A conclusive interpretation on the dysbiosis with aging cannot be drawn due to insufficient published reports, but it is evident that microbiome plays a role in healthy aging.

**Keywords:** Gut microbiome, dysbiosis, aging, alpha diversity, metabolic pathways

## Community Based Care Models can Lead Wellbeing & Welfare of Elderly in Rural Area

Dr.Pankaj Kamal Shankar Kumbhar
Department of Sustainability Studies, MIT-World Peace University Pune,

It is expected by UNDESA (United Nations Department of Economic and Social Affairs) in 2008, that the Indian population of elderly 60 and above will grow up to 11.1 % in 2025. In today's context changing patterns of social systems such as shifting from Joint family to Nuclear family leading elderly more vulnerable. Therefore, the well-being and comprehensive welfare of elderly has become an issue of great concern. Aging population is a crucial issue in India in order to provide care, support and welfare of this elderly population.

In the coming decades by 2050, the elderly population in India will reach around 330 million as per LASI survey. This fast growing elderly population coupled with enhancing life expectancy, improved affordability, health issues of elderly and family structure in rural areas would be overbearing to manage the uneven elderly care and wellbeing ecosystem. Therefore, there is need of hours to develop the comprehensive structure with proper implementation of policies and programs to ensure wellbeing and welfare of elderly. At this point of time experienced assets of our society wish to comfort their families and community with dignified life. But unfortunately we do not have such an ecosystem at the community level where the needs of this population would be catered. Developed countries like the UK, USA, Swedan and Germany are developing community care based models for the elderly to make their life peaceful with dignity.

Government of India have taken many initiatives by introducing old age welfare schemes and policies such as National Social Assistance Porgramme, National Programme for Health Care of the Elderly and National Action Plan for Senior Citizen. National Social Assistance Programme which consists of five social assistance programmes in which Indira Gandhi National Old Age Pension Scheme (IGNOAPS) is one of the core social old age pension schemes initiated by the government in 1995 to provide social security for the senior citizens from below poverty line. Nearly 30% of senior citizens from BPL families getting benefits from the Indira Gandhi National Old Age Pension Scheme (IGNOAPS), estimated a recent government survey on the

country's ageing population. The ground reality is that awareness and enrolment for this scheme among the old age people are lower. It needs hours to make the old age friendly ecosystem with transparency and accountability towards the well-being of elderly. Community based care models and working together approach with will power can lead to effective wellbeing and welfare of elderly in rural areas. The present paper is based on a secondary source of information to systematically review and analyse the situation of elderly in rural areas and will suggest proper implementation of community based care models to ensure an effective ecosystem for enhancing the quality of life of elderly.

**Keywords**: Community Care Models, Well-being, Welfare, NSAP, IGNOAPS, Situational Analysis, Quality of life, Senior Citizens.

## Synergistic Impact of Metformin and Natural Ingredients on Blood Glucose Dynamics in Type 2 Diabetes: A Path to Optimized Therapy

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**Background:** Metformin, a commonly prescribed biguanide antihyperglycemic, is used alongside diet and exercise to manage glycemic levels in Type 2 diabetes(T2D). Its pharmacokinetics and pharmacodynamics (PK-PD) have been widely studied. Several natural ingredients have also been found to exhibit hypoglycemic effects through mechanisms such as enhancing insulin secretion, improving β-cell function, increasing glucagon-like protein-1 (GLP-1) secretion, reducing intestinal glucose absorption, regulating glycolipid metabolism, and decreasing gluconeogenesis in the liver. However, the PK-PD of these natural ingredients have yet to be fully explored.

**Objective:** The study aimed to assess the effects of combining metformin with natural ingredients, both individually and together, in patients with type 2 diabetes (T2D).

**Methods:** This study utilized the mathematical model by Dalla et al. (2007) to examine the impact of metformin and the combination of metformin with natural ingredients on plasma glucose levels in T2D patients. The model was validated for blood glucose dynamics and adapted to include the effects of metformin and various natural ingredients. The effective doses and PK-PD of each natural ingredient were integrated with metformin to explore potential dose reductions and overall blood glucose control. The analysis included changes in model parameters, plasma glucose levels, peak glucose, and the area under the curve (AUC).

**Results:** In T2D individuals with fasting blood glucose (FBG) levels of 150 mg/dL, the combination of 250 mg of metformin with fenugreek, guduchi, and almonds significantly reduced blood glucose levels compared to combinations with cinnamon, ginger, garlic, and sweet potato. Fenugreek (1g), almonds (12g), and guduchi (10g)

reduced plasma glucose AUC, peak glucose, and 4-hour postprandial glucose (PPG) by 47%, 49%, 46%; 49%, 54%, 70%; and 25%, 26%, 28%, respectively, when consumed daily for two months. Furthermore, combining 10g of almonds, 5g of guduchi, or 1g of fenugreek with 100 mg of metformin achieved the same antidiabetic effect as 300 mg of metformin alone, reducing the required metformin dosage by 200 mg. Additionally, a blend of natural ingredients, including almonds, fenugreek, guduchi, bitter melon, ginger, sweet potato, and cinnamon, produced similar effects to 300 mg of metformin.

**Conclusions:** Combining metformin with natural ingredients provides a more effective and sustainable approach to improving glucose homeostasis compared to metformin alone. This combination therapy could significantly reduce the metformin dosage required while maintaining effective blood glucose control in patients with T2D.

**Keywords:** Fasting blood glucose, Mathematical model, Metformin, Natural ingredients, pharmacodynamics, pharmacokinetics, Type 2 diabetes

## Association of Socioeconomic Status and Activity Levels among the Rural Older Widows

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**Background:** The changes in the traditional family system and shifting social values have not only caused problems for the aged but also for the vulnerable groups such as women and widows. The feminisation of ageing has begun all over the world and a consistent age-related increase is seen in widowed older individuals.Most of the time, widowhood is seen as a problem mostly affecting elderly women. Older widows are reluctant to participate in social or physical activities because of cultural and societal standards, or they withdraw themselves and get isolated. **Research Methods:** The present study is an empirical attempt to assess the correlates between socioeconomic status and activity levels among the rural elderly widows residing at Kurumbalur village of Perambalur. It is a descriptive study and purposive sampling method was adopted to select 60 samples. Interview schedule method was adopted to collect the data from the required respondents. **Results:** The major findings of the study revealed that there is a significant difference among the age of the respondents and various dimensions of activity such as physical ($F=3.311$, $\mathbf{p}< 0.05$), psychological ($F=4.314$, $\mathbf{p}< 0.05$) , and social activity ($F=3.491$ $\mathbf{p}< 0.05$) and there is a significant association between the income of the respondents and activity levels. **Conclusion:** As the widows get older, they may experience a decline in their general level of activity, mental health, and physical health as a result of inadequate support from their families. Cognitive decline was less likely to affect women who were physically active at baseline and so the physical and psychosocial activities must be seen as a unified concept and assessed together.

**Key words**: Ageing, Widows, Women, Activity, Socioeconomic status

## Deciphering the role of NSMCE2 E3 SUMO ligase in replication fork dynamics and chemoresistance: Insights from Indian breast cancer clinical samples and cellular model studies

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In breast cancer research and diagnostics, a critical challenge is the accurate and early detection of molecular markers associated with tumor progression and chemoresistance. NSMCE2, an E3 SUMO ligase and functional component of the SMC5/6 complex, plays a non-redundant role in DNA damage repair and replication-fork stabilization. Dysregulation of NSMCE2 expression in breast tumor cells can significantly impact the chemotherapeutic efficacy and clinical outcomes in the successful treatment of cancer patients. My laboratory focuses on elucidating the role(s) of NSMCE2 E3 SUMO ligase in replication-stress- associated DNA-damage response underpinning chemoresistance and developing a potential diagnostic marker for early detection and personalized treatment strategies to improve clinical outcomes. For this purpose, we have custom-designed oligos and quantified NSMCE2 expression in freshly received breast cancer patient tissue samples. Further, we correlated NSMCE2 overexpression with key clinicopathological features, including hormone receptor status (ER, PR, HER2) and the Ki67 proliferation index, to accurately classify major breast tumor subtypes including TNBC, Luminal-A, and Luminal B. Additionally, we are also examining the correlation between NSMCE2 expression and cancer subtypes associated with BRCA1/BRCA2 mutations in the same patient cohort to predict the therapeutic efficacy of replication stress-inducing chemotherapeutic drugs, PARP inhibitors, particularly in cases with impaired homologous recombination and compromised replication fork protection pathways. In conclusion, this study aims to elucidate the role of NSMCE2 E3 SUMO ligase in breast cancer therapy resistance and explore its potential as a diagnostic marker for early detection, thereby aiding personalized therapeutic strategies to improve the healthcare of cancer-suffering patients.

**Keywords:** Breast cancer, NSMCE2 E3 SUMO ligase, replication stress, DNA-damage response (DDR), genome instability, chemoresistance

## Healthy Ageing Through Adult Vaccination

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The United Nations Decade of Healthy Ageing (2021–2030) directed its 193 Member States to honor the services rendered by the older people by providing them integrated healthcare seeking the support from the respective healthcare professionals. The proportion of elderly population in India is anticipated to increase from 8% in 2015 to 19% by 2050. They are more susceptible to infections due to age-related decline in their immunity—termed as immuno-senescence. In addition, the prevalence of one or more co-morbid conditions in the elderly renders them more vulnerable to infectious diseases and possibly bring out the spread of endemic infections in the local communities. Hence, there is an utmost need to implement the prophylactic healthcare procedures for the older people to resist the onset of adverse clinical symptoms due to senescence-associated secretory phonotype (SASP) led to inflammaging.

One of the strategies to be adapted for healthy ageing, as also suggested by the World Health Organization, is through the adult immunization. Innocently, it is under the pretext that mass immunization is only for children, which is a false assumption that is rampant in the society and hence there is a resistance among the elderly for vaccination. Nearly 80% of adults are unaware of the prophylactic procedures that arrest the recurrence of vaccine preventable diseases and the same in turn possibly helps elders free from myocardial infarction, reduction in hospitalization and nursing. There is an ample scope to improve a wide acceptance of adult vaccination through the introduction of mobile vaccination vans and camps, educating adults through WhatsApp messages and app-based reminders. A few selected vaccines to be implemented for healthy ageing are Influenza, Pneumococcal, Human papillomavirus (9-26 years), Zoster, DPT (Diphtheria, Pertussis and Tetanus) and MMR (Measles, Mumps and Rabies).

**Keywords:** Healthy Ageing, SASP, Immuno-senescence, Adult Vaccination, App-based reminders.

## INTERGENERATIONAL RELATIONSHIPS

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Intergenerational relationships are not all about likes and dislikes or about solidarity and discord between the generations. It is also about transfer of material and non-material assets and traditional values from older generation to the next generations. Born in the world is a surest way to exit this world and therefore transfer of all necessary values-abstract or material from generation to generation is a crucial source

of legacy and heritage. It is assumed at times that younger members of society regard older people as non-productive and burdensome and older people being not in tune with the changing times, remain indifferent or even critical of younger persons. However, the fact remains that our world encourages a Society for All Ages for the mutual good of all generations. Indeed “Towards a Society for All Ages" was the theme of the United Nations' (UN) International Year of Older Persons in 1999.

This blog is not about dislikes and discord. It is about the potential of intergenerational bonding in creating a healthy and happy environment for elderly and young people alike. Tending to or playing with grandchildren as a positive emotional, social and cognitive stimulus is a routine exercise of happiness for the elderly in Indian homes. Many Senior living communities also promote intergenerational bonding in their own ways. Experiments have been conducted such as establishing institutionalised organizations like old age homes in the vicinity of schools so that children can come out in recess to play and cuddle with the elderly residents of old age home and promote mutual bonding and happiness. Organization of Walk and other events involving elderly and new generations including children on special days such as International and National days of older persons also symbolize this relationship. Bonding between parents to children, mentors to mentees and teachers to pupils serve the same purpose.

Among all societies and particularly at places in oriental countries like India, where ageing is considered positive and elderly are honoured and respected, both parties have advantage. Young are taught from the wisdom and experience of elderly while the old learn the technological knowledge and fresh ideas from the young. Volunteering, gardening, playing and laughing together when both parties work on the same passion is a source of mutual joy and allows seniors to stay physically and mentally active longer with lesser disability. Listening to older member of the family in decision making on financial, social, religious and other matters gives a sense of meaning and purpose to seniors while younger members learn the art of successful negotiation and knowledge of the past. Exposure of new generation to declining functions of ageing persons and consequent need of helping them raise the level of empathy among the young-a contributory factor for a compassionate society.

From the health point of view, intergenerational activities positively influence the elderly well-being, depression, self-reported health, and self-esteem. Many people have opined that association of elderly with children promotes intellectual ability, physical well-being and a purposeful life for elderly and mitigates their social isolation and loneliness. A study to assess the effect of interaction with children on the elderly well-being in an Indian setting was carried out by Dsouza, Chakraborty and Kamath and was published in 2023 in Clinical Epidemiology and Global Health under the title of Intergenerational communication and elderly well-being. It revealed that the interaction with the children effectively promotes the elderly well-being and highlighted the need for activities that help raise the well-being and quality of life among the institutionalized elderly.

## Therapeutic Opportunities: Subtractive Genome Analysis of *Providencia stuartii* for Drug Unveiling Target Identification and Epitope Mapping

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*Providencia stuartii* is a gram-negative bacterium classified under the Enterobacteriaceae family. This bacterium is associated with various types of infections in humans especially in immunocompromised patients and those with long-term catheterization such as urinary tract infection (UTI), wound infections, respiratory tract infections, etc. Hence it is important to understand its transmission and spread in healthcare settings. Using the information of various enzymatic pathways, essential enzymes and their potential as a drug target, this study aims to develop a novel therapeutic strategy against infections caused by the bacteria. The current research used a subtractive genome analysis approach to identify essential enzymes that are unique to the pathogen and can be used as a potent drug target against *P. stuartii* pathogenesis. We first compared the metabolic pathways of the host (Human) and the pathogen and identified 28 unique pathways present only in the pathogen. A total of 358 essential enzymes were identified from the unique pathways. Next, a protein-protein interaction network was constructed and analyzed to find the highest-rated module, which had 25 key enzymes. Further, the additional screening of key enzymes including subcellular localization, toxicity analysis, drug ability testing, functional association, and epitope mapping were performed to determine their feasibility to be predicted as a potent drug target and vaccine candidates. By applying a subtractive approach with these various criteria, we finally identified 15 potential drug candidates and 3 vaccine candidates against *P. stuartii*. In conclusion, the present study revealed the identified enzymes as the potent drug targets against *P. stuartii* pathogenesis.

**Keywords:** Subtractive Genomics, Essential Enzymes, Metabolic Pathways, Subcellular Localization, Functional Association, Pathogenesis.

## Evaluation *of* acute antidiabetic activity of *Pimpinella tirupatiensis* tuberous root aqueous extract in STZ induced diabetic rats

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A multitude of plants possess the capacity to exhibit anti-diabetic properties, while their actual anti-diabetic effects remain unverified. These species encompass Pimpinella tirupatiensis. Pimpinella tirupatiensis is a native plant variety found in the eastern ghats of India. To produce experimental diabetes, STZ (40 mg/kg bw) was administered. Plasma glucose (FBG) levels were determined using an electronic glucometer (accucheck) at 0 hours (before to medication delivery), 1 hour, 3 hours, 5 hours, and 7 hours (post-drug administration). Among the three extracts and three doses, the aqueous extract shown the most effectiveness at a dosage of 750 mg/kg after 1 hour. This observed effect was sustained for the subsequent 5 hours. This activity may be attributed to flavonoids, tannins, polyphenolic compounds, alkaloids, and other constituents present in the root that may synergistically or individually enhance the elimination of glucose. Our research indicates that diabetic individuals may find AE of Pt to be a safe and valuable alternative antihyperglycemic drug derived from plants.
**Key words:** Diabetes, *Pimpinella tirupatiensis*, Acute anti-hyper glycemic effect

## Tremendous Fidelity of Vitamin D3 in Age-related Neurological Disorders

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Vitamin D3 (VD) is a secosteroid hormone and shows a pleiotropic effect in brain-related disorders where it regulates redox imbalance, inflammation, apoptosis, energy production, and growth factor synthesis. Vitamin D3's active metabolic form, 1,25-dihydroxy Vitamin D3 (1,25(OH)2D3 or calcitriol), is a known regulator of several genes involved in neuroplasticity, neuroprotection, neurotropism, and neuroinflammation. Multiple studies suggest that VD deficiency can be proposed as a risk factor for the development of several age- related neurological disorders. The evidence for low serum levels of 25-hydroxy Vitamin D3 (25(OH)D3 or calcidiol), the major circulating form of VD, is associated with an increased risk of Alzheimer's disease (AD), Parkinson's disease (PD), Huntington's disease (HD), dementia, and cognitive impairment. Despite decades of evidence on low VD association with neurological disorders, the precise molecular mechanism behind its beneficial effect remains controversial. The focus of the present talk will be on the myriad benefits of VD on mental health.
**Keywords**: Vitamin D3 · Vitamin D receptor · Neurodegeneration · Parkinson's disease · Alzheimer's disease · Huntington's disease

## Prevalence of Falls, Fear of Falling and its association with Physical function among Older adults: Factors associated with Falls and implementation of Fall prevention Strategies.

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Falls are a growing and common but often a neglected public health challenge in older adults. Falls and fear of falling is often detrimental, resulting to injuries, disability, increased burden of morbidity and health care, compromised quality of life. Falls are mostly associated with one or more risk factors, such as reduced mobility, difficulty in gait and balance, fear of falling, health and environmental risks and use of multiple medications etc. The cross sectional community based study aims to examine the prevalence of falls, fear of falls (FoF), factors in fall risk, its association with physical function among older adults. Methods: The data were collected from 340 adults aged ≥ 60 years, living for more than 6 months in the selected urban and rural communities and meeting inclusion criteria. Participants were recruited by purposive sampling through house to house survey. History and experience of falls, its consequences and factors influencing was measured by semi structured questionnaire and fear of falling with a single-item instrument, standard tools were applied to assess physical function. Results: Findings of the study indicate that about 60.8% of them were having fear of falls. Overall, 10.8% reported one or more fall experience in the past 12 months, and 6.8 % had more than twice falls and fall-related injuries in the last year. Fear of falling had significant relationship with perceived general health, mobility, balance impairment and activities of daily living. Fall related expenditure and financial burden due to immobility was one of the major factors affecting older people. Slippery and risk prone physical environment at home and social spaces, vision, health related issues, lack of social care resources were predictors for fall risk. Conclusion: Falls and FOF is highly prevalent among older adults living in communities. FOF is strongly correlated with physical function and balance performance and fall experience. Hence, identifying the risk factors of falls and fear of falling at primary care level and implementation of targeted multidisciplinary and multidimensional fall prevention strategies are essential to promote healthy aging and quality of life in older population.

**Keywords**: Fear of Falls, Falls, Physical function, Balance performance, Fall risk Preventive strategies and Older adults.

**Evaluation of the antidiabetic and antioxidant activities of the whole plant of *Cleome viscosa* with reference to *in vitro* and *in vivo* studies**

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The objectives of the work were to analyze the phytochemical makeup, in vitro antioxidant activity, in vivo antidiabetic activity, and isolated pure pooled fractions F-A, F-B, C, and D of the methanolic extract of Cleome viscosa. Polyphenolic substances responsible for the observed effects were classified using HPLC and FT-IR techniques individually. Fraction F-D has superior polyphenol concentration and antioxidant activity compared to the other fractions. F-D suppressed the activity of both -Glucosidase and -Amylase enzymes, thereby accelerating the rate at which glucose cleared the dialysis tube after the initial 27-hour incubation period. At 5 hours, the highest proportion of decreases in FBG levels were observed with F-D at a dosage of 40mg/kg b.w. Our analysis revealed that the F-D consisted of two identified and six unidentified molecules, which seem to exert a substantial influence on antioxidant and antidiabetic mechanisms.

**Keywords.** *Cleome viscosa*; antidiabetic activity; HPLC; FT-IR; polyphenols.

**Title: Multivalent peptide vaccines to combat vector borne infectious diseases.**

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Infectious diseases, caused by pathogens such as bacteria, viruses, fungi, or parasites, present significant health and economic challenges. These diseases not only strain healthcare systems but also keep communities in poverty, eroding their resilience. The rise of drug resistance and mutations in pathogens has complicated efforts to combat these diseases, especially through traditional vaccines. Conventional vaccines, based on live, attenuated pathogens or their subunits, come with various limitations, such as safety risks and high costs. To overcome these problem, advancements in computational biology have revolutionized vaccine design. This approach significantly reduces the time and expense associated with developing vaccines. A promising method in this field is immunoinformatics, which involves the in-silico prediction of epitopes—the key components that stimulate an immune response. By identifying immunodominant epitopes from various antigenic proteins, researchers can create a polyepitope vaccine that includes cytotoxic T-cell lymphocytes (CTL), helper T-cell lymphocytes (HTL), and interferon-gamma (IFN-)-inducing epitopes. After designing the vaccine, its immunogenicity and safety are confirmed by evaluating its physicochemical, allergenic, and antigenic properties. Molecular docking and

dynamic simulation methods assess the stability of the vaccine's interaction with Toll-like receptors (TLRs), which are critical for initiating an immune response. Finally, in-silico immune simulations are conducted to ensure the vaccine candidate can effectively trigger a robust immune response. Immuno-informatic approach offers a promising solution for developing safer, more efficient vaccines that can help fight infectious diseases, potentially transforming global health outcomes.

Keywords: Infectious diseases, prophylactic vaccines, cytotoxic T-cell lymphocyte, Helper T-cell lymphocyte, Toll-like receptors

## Combating Ageing with Algae

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Algae are valuable repositions of a myriad of extremely valuable metabolites with potential as therapeutics, cosmeceuticals and nutraceuticals. The increasing toxicity and mutagenicity in synthetic antioxidants used as drugs have also accelerated the demand for natural and sustainable sources of biomolecules. Moreover, uncontrolled increase in oxidative and cellular stress, autoimmune-mediated neuronal loss, as well as demyelination have led to fast occurrences of hypertensive, neurodegenerative disorders and accelerated ageing. In addition to playing a pivotal role in regulating aquatic diversity, ecology, and environment, algae have also become one of the most abundant and largest resources for rich natural products. Though several studies have reported the therapeutic role of algal derived high value compounds, a very few have included an exhaustive and holistic comparison of the bioactivities of different algal species isolated from Indian subcontinent. We aim to bio prospect the antioxidant, antimicrobial as well as the anti-cancer potential of different solvent-based extracts of five biotechnologically and commercially important marine algal species. Furthermore, gas chromatography assisted with mass spectrometry-based characterization of the biochemical profiles of each extract have also been explored suggesting their relevance as new therapeutic drugs. The most active constituents identified by gas chromatography- Mass spectrometry (GC MS) was palmitic, heptadecaenoic, octadecanoic, linoleic, and eicosapentaenoic acid, 2,4- Di tertbutyl phenol and desulphosinigrin amongst others. Findings from this study provide an insightful and holistic overview on spectrum of microalgal bioactivities correlated with their chemical composition. Therefore, this study stands instrumental for proposing algal derived compounds as natural and safer antioxidants, anti-ageing, cosmeceutical, nutraceutical and pharmaceutical potential.

**Keywords**: Algae, Ageing, Antioxidants, Cosmeceutical, Nutraceuticals.

## Antibacterial potential of common wild herbs against MDR *Staphylococcus aureus* from cattle's with mastitis

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Mastitis, the inflammation of mammary glands is a major production limiting disease of dairy animals all over the globe. Mastitis is a common and costly disease in dairy cattle by various bacteria, including Methicillin- resistant *Staphylococcus aureus* (MDR *S. aureus*). Antibiotic resistance is a significant challenge in the treatment of MDR *S. aureus* mastitis. Therefore, there is a need to explore alternative treatments such as wild herbs that have been used traditionally for their antimicrobial properties. The control of mastitis becomes difficult in prevailing circumstances. In the absence of any mastitis control program and presence of high antibiotic resistance, searching for new cost-effective treatment line is essential.

The present study evaluates the antibacterial efficacy of *some common wild herbs in a locality* against multidrug resistant *Staphylococcus aureus from mastitic cattle*. Four different wild herbs were screened for their antibacterial activity against multidrug resistant strains of *S. aureus* isolated from mastitic cattle's. Crude Aqueous extracts of *Ocimum sanctum* leaves, *Tridax procumbens* leaves, *Solanum xanthocarpum* leaves, *Argemona maxicana* leaves and Aloe Vera leaves gel *were* tested for antimicrobial activity *in vitro* by using agar well diffusion method.

The herbal remedies, study demonstrates the potential of common wild herbs, particularly *Ocimum sanctum*, *Tridax procumbens*, *Solanum xanthocarpum*, *Argemona maxicana* and *Aloe Vera* gel extract are used these 5 out the *Ocimum sanctum* are comparatively more effective than others one.

**Key words:** Mastitis, *S.aureus*, wild herbs, *Ocimum sanctum, Tridax procumbens, Solanum xanthocarpum, Argemona maxicana and Aloe Vera*

## Cognitive Aging and Lifespan Emotion Regulation

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Emotion Regulation is focused on either maintaining or enhancing emotional well-being. The western cultures report older adults to have higher levels of emotional well-being in comparison to younger adults however this trajectory of emotional well-being is debatable in Asian cultures. The current study explores explicit versus implict affect regulation across young, middle aged and older adults in the Indian context. Everyday affective experiences are operationalised in the form of self-reports on an experience sampling measure and implict affect representations are observed through an affective Implicit Association Test. The findings indicate a general preference for positive affect, with a higher prevalence of prohedonic over contrahedonic motivation, and a tendency to feel

pleasantness in response to positive affect in daily life. Middle-aged and older adults reported experiencing more positive than negative affect, aligning with the socioemotional selectivity theory and suggesting this may be a universal phenomenon. However, the current research observed reduced reports of mixed and contrahedonic motivation in contrast to what is reported in the western population. Additionally, older adults exhibited distinct implicit affect representations, contributing to the positive trajectory of emotional aging. The universal increase in EWB with age suggests a widespread phenomenon, yet the socio-cultural mechanisms driving this trend may vary across cultures.

**Keywords:** Cognitive Aging, Emotion Well Being, Affective experience, Implicit Affect representation, Prohedonic motivation, Contrahedonic motivation

## Exploring the Impact of Viral Infections on Amyloidosis Development

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The Covid-19 pandemic has sparked significant interest in its potential role in initiating or exacerbating cardiovascular conditions, including cardiac amyloidosis. Cardiac amyloidosis involves the deposition of amyloid fibrils in heart tissue, leading to thickened and stiffened ventricle walls, which can result in heart failure and conduction abnormalities[i]. Recent research suggests that Covid-19 may accelerate the progression of existing amyloid deposits by triggering systemic inflammation, causing endothelial dysfunction, and directly impacting cardiac tissue[ii,iii]. However, the direct influence of Covid-19 on the onset or advancement of cardiac amyloidosis remains unclear. The resemblance in symptoms and complications between Covid-19 and amyloidogenic cardiopathy has prompted speculation that SARS-CoV-2 proteins could interact with human host proteins, potentially initiating amyloidosis in cardiac tissues. Evidence supporting this includes findings that coronavirus proteins accelerate amyloid formation in serum Amyloid A protein[iv] and a neurodegenerative proteins, alpha synuclein[v]. Our study reveals a concerning nexus between Covid-19 and development or exacerbation of cardiac amyloidosis. Gaining insight into these novel pathogenic mechanisms following SARS-CoV-2 infection will aid in the development of safer peptide-based vaccines, refinement of treatment strategies, and enhancement of clinical outcomes.

## The potential role of biosurfactant as Nutri cosmeceutical in ROS-induced skin damage

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Skin diseases caused by ultraviolet (UV) radiation and bacterial infection have significantly contributed to higher morbidity and mortality rate. They have been reported to damage various components of the skin cell membrane predominantly, playing a significant role in skin aging. On the contrary, several skin diseases causing microbe can damage skin by changing the cell membrane integrity. To counteract, the damaging effect of UV and microbes on skin, metabolites have been reported to play an important role through antioxidant and antimicrobial mechanism. In our study, biosurfactant produced by *Kocuria marina* DAGII have been applied to explore its antioxidant activity against and antimicrobial activity against skin disease causing bacteria. Various biosurfactant screening assays confirmed the biosurfactant production by *Kocuria marina* DAGII. Characterization study using TLC, FTIR, and NMR showed the complex glycolipid nature of biosurfactant containing sugars, peptides and lipids. The scavenging assay showed antioxidant property of biosurfactant against DPPH and ABTS radical with an $IC_{50}$ value of The 1.29 ± 0.50 mg/ml and 0.56± 0.67mg/ml, respectively. Antimicrobial activity of biosurfactant against *Pseudomonas aeruginosa* (0.766±0.05cm), *Staphylococcus epidermidis* (0.66±0.057 cm), and *Staphylococcus aureus* (0.13± 0.057 cm) confirmed good antimicrobial activity against the tested pathogens suggesting that a biosurfactant could have a potential dual role as an antioxidant and antimicrobial agent. Furthermore, for topical delivery of biosurfactant hydrogel encapsulation was carried out due to its ability to mimic skin extracellular matrix and good water holding capacity. Several preliminary tests showed favorable results for hydrogel encapsulated biosurfactant suggesting that it could be considered for further study.
**Keywords:** Beta-cryptoxanthin, Biosurfactant, Hydrogel, Antioxidant, Antimicrobial

## Rural-urban Disparities in Alcohol Consumption and its Association with Multimorbidity among Older Adults in India: Evidence from LASI

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In India, the prevalence of alcohol consumption among older adults dealing with multiple health conditions varies between rural and urban areas due to social and cultural factors. The distinct patterns observed underscore the necessity for tailored research and interventions to address multimorbid older patients in diverse geographic contexts. This study used data from the Longitudinal Ageing Study in India (LASI) wave 1 (2017–18). A total of 7,608 adults aged ≥ 60 years who were diagnosed with two or more chronic conditions (such as hypertension, diabetes, cancer, chronic lung

disease, chronic heart disease, stroke, bone/joint disease, any neurological or psychiatric diseases, and high cholesterol) were included in this study. Descriptive statistics, bivariate analysis, logistic regression estimates, and the Fairlie decomposition method were used to accomplish the study's objectives. The prevalence of Alcohol consumption among older adults with multimorbidity was 9.48% lower in rural areas than in urban areas. Older adults with multimorbidity belonging to the OBC group were 40% more likely to consume alcohol. Moreover, those with multimorbidity and any form of disability in activities of daily living (ADL) were less likely to consume alcohol than those without disability. In contrast, those with multimorbidity and perceived good general health were less likely to consume alcohol consumption than those with poor self-perceived health. Additionally, decomposition analysis revealed that education, caste status, IADL disability, and perceived discrimination were the primary factors contributing to the differences in alcohol consumption prevalence among older adults with multimorbidity between rural and urban areas. We found significant rural-urban differences in alcohol consumption among older Indians with multimorbidity. The findings underscore the need for targeted interventions that address alcohol consumption.

## Regulatory T Cells' Aging Contributes to Generalized Vitiligo Pathogenesis

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Generalized vitiligo (GV) is a skin depigmentation disorder caused by the loss of melanocytes. Regulatory T cells (Tregs), which are responsible for peripheral tolerance, exhibit changed numbers and functions in GV patients, most likely because to the ageing process. As a result, the study was focused on evaluating the relative telomere length of Tregs in 96 GV patients and 90 controls using qPCR, as well as correlating relative telomere length with Treg suppressive activity *in vitro*. Interestingly, we discovered a substantial reduction in relative telomere length in Tregs from GV patients compared to controls ($p = 0.0001$). Additionally, age-based analysis revealed a significant reduction in relative telomere length in old GV patients (>40 years) compared to young GV patients (0-20 years; $p = 0.0027$). Furthermore, age of onset analysis indicated that early onset GV patients (0-20 years) had shorter relative telomere length than late onset GV patients (>40 years; $p = 0.0036$). The correlation study revealed a positive connection between relative telomere length and *in vitro* Treg suppressive ability ($r = 0.68$ & $r = 0.45$; $p < 0.0001$). Furthermore, *in vitro* Treg suppressive ability was considerably decreased in older GV patients ($p = 0.003$) and early-onset GV patients ($p = 0.0074$). Overall, our work indicated for the first time that Tregs' ageing caused by telomere shortening may be responsible for altered Treg cell functions and numbers in GV.

**Keywords:** Generalized Vitiligo (GV); Regulatory T cells (Tregs); Ageing; Relative telomere length; Telomere shortening

## Condition of Widows and Cognitive Ability among Older Adults in India: A Study Based on Longitudinal Ageing Study in India (2017-18)

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Widows represent a significant segment of India's elderly population, confronting unique socio-economic challenges that impact their cognitive health. The study examines the condition of older widows (aged 60 and above) and their cognitive ability (CA) using data from the Longitudinal Ageing Study in India (2017-18). The study evaluates the educational background, health status, social security, and cognitive performance of older widows in India and its states. Further it identifies key determinants affecting CA, including sociodemographic factors, economic status, behavioral factors, and biophysical conditions.

Findings reveal high illiteracy rates and significant functional limitations in the northern and northeastern states of India showing the most pronounced issues. The study highlights that widows experience lower cognitive abilities compared to their married counterparts. Further the influence of age, community, residence, education, social participation, economic status, asset ownership, and other factors on CA of widows has been observed. The study points to the detrimental impact of bereavement and role loss over cognition, with further disparities observed among different religious and reserved communities.

The study highlights the need for targeted policies to improve the cognitive health and well-being of older widows in India by focusing on education, economic empowerment, and social support, enhancing their quality of life and reducing cognitive decline.

Keywords - Widows, Older Adults, Cognitive Ability, India

## Flavonoids as potential therapeutics for Parkinson's Disease

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Parkinson's Disease (PD), a severe neurodegenerative disorder, is characterized by the declination of dopaminergic (DA) neurons of substantia nigra pars compacta in the mid brain. Mutation(s) in Parkin protein is (are) responsible for the onset of Autosomal Recessive Juvenile Parkinson's (ARJP) Disease. Till date, there is no available treatment of PD without any side-effects. Therefore, the focus has been shifted to identifying natural product inhibitors for the treatment of the disorder. Flavonoids, a class of natural products, have proven neuroprotective effects. Some of the flavonoids have their abilities to influence the activities of central nervous system. Therefore, many studies are being conducted to analyze their effectiveness to lower the progression of such age-related neurodegenerative diseases. This study was conducted to identify some key flavonoids to be used as potential therapeutics for PD.

From the literature, we picked up the flavonoids active on the nervous systems of human beings. We employed a literature mining approach to build a Structure Activity Relationship (SAR) to measure their efficacies. We performed molecular docking simulations using the flavonoids as the ligands and computed their binding free energy values. Our study would therefore point towards future drug designing endeavors to come up with plausible therapeutics against PD onset.

### Psychological Well-being in Elderly Indian Populations: The Role of Family

Vandita Ranjan

This study explores the psychological well-being of elderly individuals in India within the context of family structures. As India faces rapid demographic changes, including a growing elderly population, understanding the mental health implications for older person is crucial. Utilizing data from the Longitudinal Ageing Study in India (LASI) 2017-2018, the research investigates the prevalence of depression and life satisfaction among the elderly, analysing how factors such as household size, living arrangements, and socioeconomic status influence these outcomes.

The study finds that elderly individuals living in nuclear families or alone report higher levels of depression and lower life satisfaction compared to those in extended families. Smaller household sizes are associated with lower depression but also lower life satisfaction. Socioeconomic status, particularly wealth and education, plays a significant role in both reducing depression and enhancing life satisfaction. Additionally, gender and the presence of children, particularly both sons and daughters, influence these mental health outcomes.

Regionally, the findings reveal significant disparities in mental health, with the Central and East regions reporting higher levels of depression and lower life satisfaction, while the West and North East regions fare better. The research underscores the complex interplay between family structure, socioeconomic factors, and regional disparities in determining the psychological well-being of the elderly in India. The findings suggest that policies promoting social support, intergenerational solidarity, and targeted mental health interventions are essential to address the diverse needs of India's aging population.

**Keywords:** Elderly well-being, Family structure, Depression, Life satisfaction, Longitudinal Ageing Study in India (LASI), Aging population

## Understanding Life Satisfaction of the Multimorbid Elderly in India: Insights from the Longitudinal Ageing Study in India (LASI) Wave-1

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**Background and Objectives**

Very little is known about how elderly people with multimorbidity subjectively evaluate their lives and the factors that affect their life satisfaction. Life satisfaction and the factors contributing to well-being in old age constitute a major concern for the older population and gerontological research. To enhance the life satisfaction of the multimorbid elderly, the present study explores the levels and the factors affecting the life satisfaction of the multimorbid elderly in India.

**Data and Methods**

The study used the first wave of the Longitudinal Ageing Study in India (LASI), 2017-18 and extracted information from 7,582 eligible multimorbid individuals, aged 60 years and older. Life satisfaction was constructed using Diener's Satisfaction with Life Scale (SWLS) scale. The Cronbach's alpha of the scale was 0.90, indicating a very high internal consistency. The life satisfaction variable was used as a continuous variable with a range of 5 to 35 where higher values reflect higher life satisfaction and vice-versa. Descriptive, bivariate analysis, chi-square tests and multivariate linear regression have been used. Moreover, the assumption of multivariate linear regression was checked using the Jarque-Bera test of normality, the Breusch-Pegan Test of heteroscedasticity, and the Variance Inflation Factors (VIF) potential for multicollinearity.

**Results and Discussion**

The national mean ($\bar{x}$) life satisfaction score was found to be 23.90 (total score ranges between 5 to 35) and the standard deviation (SD = 7.81) for the elderly with multimorbidity. The higher mean life satisfaction score was reported in Gujarat, followed by Maharashtra, and Himachal Pradesh while the lower mean life satisfaction score was reported in the states of Rajasthan, Andhra Pradesh, and Telangana. Age, sex, education, income, living arrangement, marital status, caste, self-rated health, social participation, physical exercise, and depression were found to be the significant factors affecting the life satisfaction of the elderly with multimorbidity.

**Conclusion and Policy Implication**

The study provides comprehensive insights into the levels and factors influencing the life satisfaction of the elderly population living with multimorbidity. By examining a wide range of demographic, socioeconomic, health-related, and psychosocial factors, the study identified key determinants that significantly impact the life satisfaction of this vulnerable population. Policymakers should address socioeconomic disparities, foster social connections, and integrate mental and physical health interventions to enhance the life satisfaction of the multimorbid elderly, which is important for achieving the goal of successful ageing.

**Keywords** – life satisfaction, multimorbidity, elderly, LASI, India

## Perception of Elderly People About Institutional Care

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The ageing population in India is growing rapidly, especially in urban areas where the dynamics of family structures and support systems are evolving. This study investigates the perceptions of institutional care among elderly people in urban areas, specifically Gurugram urban and East Delhi. It also seeks to explore how the elderly, increasingly confronted with the choice between traditional family care and institutional care, perceive these options in a rapidly modernising society.

This study employs a qualitative approach, having conducted in-depth interviews with 12 elderly individuals aged 60 and above. The sample includes a diverse group of participants, encompassing both male and female, working and non-working, and economically well-off residents (upper class, higher middle and middle class) of the sampling area.

Preliminary findings of our study suggested that perceptions of institutional care were complex and, more often than not, ambivalent. The findings also highlight the role of socio-economic status in shaping these perceptions, with upper class and higher middle class participants exhibiting a greater openness to considering institutional care, albeit with reservations about quality and emotional fulfilment whereas middle-class elderly individuals often perceive institutional care with mixed emotions, balancing between practicality and cultural expectations. The study revealed that while some viewed institutional care as a necessary support system due to decline of traditional joint families, others felt a deep-seated reluctance, associating it with social stigma and a perceived lack of familial affection.

This study is an attempt to contribute to the broader discourse on ageing in urban India by providing insights into the factors that influence elderly individuals' attitudes towards institutional care. It tries to underscore the need for policy-makers to consider perceptions when designing elder care programs and emphasise the importance of culturally sensitive approaches to elder care in the urban Indian context. The findings of this study have potential implications for the future of elder care services in India, particularly in addressing the gap between traditional expectations and modern realities.

**Keywords:** Elderly; Institutional Care; Elder Care; Ageing.

## Management Strategies of Loneliness among Older Adults in Kerala, India: A Qualitative Study.

Flemy Verghes

**Introduction:** The prevalence of loneliness among older adults is increasing alarmingly in developing countries, especially in India. However, there is a lack of research specifically focusing on loneliness in the Indian context, particularly in the state of Kerala.

**Methods:** This qualitative study explored the strategies for managing loneliness, using in-depth interviews among 18 stakeholders. In-depth interviews were conducted among six groups of stakeholders namely, older adults with loneliness (n=4), medical officers from primary health centres (PHC) (n=2), local self-government representatives (LSG) (n=3), accredited social health activists (ASHA) (n=4), representatives of non-governmental organizations (NGO) working for older adult (n=2) and caretakers of older adults (n=3). In-depth interviews were conducted until data saturation was reached in each category of stakeholders. The translated interviews were uploaded into ATLAS.ti trial version 24.1.0 software and the analysis were done using a thematic analysis approach.

**Results:** The themes that evolved in the qualitative study were promoting practices for an active lifestyle, improving social harmony and connectedness, providing basic necessities to increase self-reliance and understanding relationship expectations. Sub-themes that came under the themes were opportunities for social engagement, accessible and better services, spiritual practices and recreational activities, attitude of the community, support from the community, fulfilling basic necessities through various government initiatives, ensuring financial security, support and attitude of the family and avoid isolation of the older adults.

**Conclusion:** Most older adults have a feeling of fulfilment when they are living along with their children and spouses. There is an increased need to make the community and policymakers aware of the loneliness among older adults and make necessary policy changes. Possible strategies for managing loneliness among older adults as opined by the stakeholders are, promoting practices for an active lifestyle, improving social harmony and connectedness, providing basic necessities to increase self-reliance and understanding relationship expectations.

**Keywords:** Ageing, Loneliness, Management of loneliness, Qualitative.

## Mapping Anemia Inequality: A Regional Analysis of Socio-Economic Factors Among Women of Reproductive Age in India

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Prof. Santan Nayak[2]

This study investigates the prevalence and regional disparities of anemia among reproductive-age women in India, examining the influence of socio-economic, demographic, and cultural factors. Utilizing data from the National Family Health Survey-5 (NFHS-5) and employing the Alkire Foster Methodology (2011) to calculate the Multidimensional Poverty Index (MPI), the research provides a comprehensive region-wise analysis. Descriptive analysis and logistic regression are employed to explore the relationship between anemia and variables such as multidimensional poverty, household characteristics, dietary practices, healthcare access, and socio-cultural factors. Findings reveal significant regional variations in anemia prevalence, with the Eastern region exhibiting the highest rate (65.51%) and the Union Territories the lowest. A strong correlation exists between MPI and anemia, with regions experiencing higher poverty levels also demonstrating higher anemia prevalence. Logistic regression analysis identifies multidimensional poverty, rural residence, dietary practices, and access to prenatal care as significant predictors of anemia. Notably, women from multidimensionally poor households and rural areas are less likely to be free from anemia. Dietary diversity, particularly non-vegetarianism, is associated with a lower likelihood of anemia. This study underscores the complex interplay of socio-economic, cultural, and regional factors influencing anemia among reproductive-age women in India. The findings emphasize the urgent need for targeted interventions addressing these disparities, particularly in the most affected regions. Policymakers can utilize these insights to develop effective strategies to combat anemia and improve the well-being of women across India.

**Keywords:** Anemia, Multidimensional Poverty Index, Reproductive-Age Women, Regional Disparities, NFHS-5 Data

## Understanding healthy ageing in India: insights from multivariate regression trees

Ayushi Das[1], Preeti Dhillon[2]

Background: Population ageing represents a significant global challenge, particularly pronounced in countries like India.
Aims: This study aims to explore how factors such as socio-economic status, behavior, and health influence healthy ageing across the Indian older population.

Methods: In this study, we utilized the Longitudinal Ageing Study in India – wave 1 dataset for analysis purposes. Scores were generated for five dimensions of healthy aging, including physical, functional, mental, cognitive, and social aspects and these scores were treated as the target variables. Multivariate Regression Trees analysis was employed to identify the behavioral and socio-demographic factors associated with each dimension of healthy ageing.
Results: Years of education emerge as crucial across all dimensions, positively impacting cognitive health and mitigating age-related decline in healthy ageing. Marital status, engagement in household activities, spiritual practices, and living arrangements impacts the scores of different aspects of healthy ageing. Gender disparities in healthy aging are noticeable in the 60–74 age group, with women generally having lower scores. Safety of the living environment is a crucial determinant of the mental health of the elderly across all age groups. These findings highlight the complex interplay of factors in healthy ageing outcomes.
Conclusion: Our study emphasizes the pivotal role of education in fostering healthy ageing in India. Factors such as environmental safety and social participation also influence well-being. Targeted interventions addressing education, gender equality, safety, and healthcare access are vital for enhancing the ageing experience and overall well-being of older adults.

**Keywords**: Healthy ageing, Multivariate regression trees, Machine learning, older adults

## Gender Differences in Mental Health Outcomes Among Elderly Widowed Individuals in India Using Large-Scale Data

Hirangi Madhavan

This study investigates gender differences in mental health outcomes among elderly widowed individuals residing India by utilizing data from the Longitudinal Aging Study in India (LASI). Widowhood, particularly in later life, is a critical period marked by significant psychological and emotional challenges. Additionally, the socio-economic conditions of low-income communities further complicate these challenges, potentially leading to distinct gender disparities in mental health outcomes. Therefore, by leveraging the data from LASI, this research focuses on key mental health indicators such as depression, anxiety, and overall psychological well-being. The study employs a comparative analysis to explore how these mental health outcomes differ between elderly widowed men and women. The analysis is contextualized within various socio-demographic factors, including age, income level, social support networks, and or health conditions, to discern patterns of mental health disparities. Preliminary findings suggest that elderly widowed women in low-income communities are more likely to experience higher levels of depression and anxiety compared to their male

counterparts. This trend may be attributed to several factors, including greater economic vulnerability, reduced access to social and financial resources, and the cumulative effects of lifelong gendered expectations that place a higher caregiving burden on women. These factors can worsen feelings of isolation and hopelessness among elderly widowed women, particularly in environments where formal support systems are limited. On the other hand, elderly widowed men, while less likely to report symptoms of depression and anxiety, may struggle more acutely with loneliness and a lack of social integration. These men often rely heavily on their spouses for emotional support, and the loss of this support can lead to significant psychological distress, which may manifest in less visible but equally concerning ways, such as substance abuse or deteriorating physical health. The findings help understand the need for gender-sensitive public health interventions that address the unique mental health needs of elderly widowed individuals in low-income communities. By tailoring mental health services to these specific challenges, we can improve access to care and enhance the psychological well-being of this vulnerable population.

**Keywords:** Widowhood, Gender Differences, Mental Health, Elderly, Low-income Communities, LASI, Depression, Anxiety

## SMART FALL DETECTION JACKET FOR ELDERLY

Khadejaa M J

The aging population faces significant risks from falls, which are a leading cause of injury, disability, or death among the elderly. To address this growing concern, we propose a smart jacket equipped with a comprehensive fall detection and airbag protection system. The system utilizes advanced algorithms to detect falls and immediately deploys a protective airbag to minimize the risk of injury. In addition, it ensures prompt assistance by automatically notifying caregivers or emergency services and providing real-time location tracking. The system integrates several key components, including the NodeMCU ESP8266 microcontroller, MPU6050 motion sensor, GPS module, airbag module, and buzzer. The MPU6050 sensor, which combines a three-axis accelerometer and gyroscope, accurately detects falls by capturing rapid changes in both motion and orientation. Upon detecting a fall, the NodeMCU ESP8266 processes the sensor data and activates the GPS module to pinpoint the user's exact location. Simultaneously, a buzzer sounds to alert nearby individuals, while a notification is sent to designated caregivers via the Pushsafer application, ensuring immediate action regardless of distance or location. A unique feature of this system is the deployment of an airbag by an inflator pump, which cushions the body and reduces the risk of severe injuries. The airbag inflates within 0.6 seconds, providing critical protection to vulnerable areas, such as the head and torso, during a fall. After the fall is managed, the system is designed to automatically deflate the airbag to ensure comfort and prevent prolonged pressure on the user's body. This smart jacket is lightweight, comfortable, and suitable for daily use by elderly

individuals. By combining advanced fall detection, automatic alert notifications, real-time tracking, and airbag protection, it offers a practical and effective solution to a critical problem in elder care.

**Keywords**: NodeMCU ESP8266, MPU6050 sensor, Fall Detection

## Onset of Chronic Diseases Across Varying Birth Cohorts: Unraveling the Health and Longevity of Indian Adults

Author: Rashmi

Despite global advancements in longevity, the increasing prevalence of chronic diseases, particularly among middle-aged adults, is shortening healthy years and raising concerns about the "double expansion" of morbidity—living with chronic conditions from early life until death. While some developed nations show a trend of morbidity compression, where illnesses are confined to a shorter period later in life, many developing countries, including India, are experiencing an expansion of morbidity. For instance, the continuous increase in chronic disease prevalence in every age group challenges the best-fit morbidity theory, especially in developing countries. In India, the early onset of chronic diseases is a growing concern due to its profound impact on health and economic stability. The present study examines the timing of onset for seven chronic conditions—hypertension, diabetes, lung disease, heart disease/stroke, arthritis, neurological disease, and cancer—among Indian adults and the elderly, and explores the factors contributing to their early development. Using data from Wave 1 of the Longitudinal Ageing Study in India (LASI), we analyzed the age of disease onset with advanced statistical models, including Loglogistic and Weibull accelerated failure time models and the Fine-Gray competing risk model to account for competing health risks. The findings indicate that chronic diseases are emerging earlier than anticipated, particularly in individuals aged 45-64, placing a significant portion of the working-age population at risk. The onset of neurological diseases in the 45-54 age group highlights the critical need for balancing physical and mental health in middle-aged adults. The early onset of these conditions not only brings immediate health consequences but also leads to long-term economic losses as people age with these diseases. The study highlights the urgent need for targeted, disease-specific interventions aimed at working-age adults to mitigate the rising burden of chronic diseases. Without such efforts, these conditions will continue to strain healthcare systems and pose serious socio-economic challenges.

**Keywords:** Onset; Longevity; Chronic diseases; Adults; India

# Wealth Disparities and Cognitive Impairment Among the Elderly in India: Analysing the Contributing Factors

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## Introduction

Cognitive impairment (CoI) is a significant risk factor among the elderly and a major burden on public health. CoI is a condition in which a person struggles to recall, learn new things, focus, or make decisions that have an impact on his or her daily activities.

## Objective

This study unearths the degree of socioeconomic inequalities and assesses the determinants of CoI among the elderly in India.

## Methodology

Elderly aged 60+ years (n=31,646) data gathered in a nationally representative LASI (2017-18) was analysed through STATA 16.1. Binary logistic regression, concentration index and curve, and Wagstaff Decomposition analysis were performed to assess the socioeconomic inequalities and the determinants of CoI.

## Critical findings

Sixteen percent of the elderly had CoI. Females (OR=1.88, 95% CI= 1.70-2.09), those aged 80 plus years (OR= 3.98, 95%CI = 3.56-4.44), from ST (OR=2.65, 95%CI=2.32-3.02), with perceived poor health (OR=1.61,95%CI=1.45-1.79), with depression (OR=1.32, 95%CI=1.21-1.43), with no schooling (OR=16.46, 95%CI= 11.31-23.97) with 1+ADL (OR=1.43, 95%CI=1.31-1.57) and 1+IADL (OR=1.30, 95%CI=1.19-1.41) had higher odds of CoI than their respective counterparts. Elderly from urban areas, higher income groups (OR=0.61, 95%CI= 0.53- 0.70) and higher education level with sources of financial support less likely to experience CoI. Economic inequalities exist in the distribution of CoI-the poorest being the most disadvantaged (concentration index value= -0.118).

## Conclusion

The findings advise raising awareness and developing more customized policies/programs to reduce socioeconomic inequalities in CoI among India's elderly. The improved mental health of the elderly will contribute to achieving Sustainable Development Goals, including Goal 3 on guaranteeing good health and well-being for all.

**Keywords:** Elderly, Cognitive impairment, Concentration index, Decomposition analysis, India.

## Regional Variations and Determinants of Quality of Life Among Older Adults in India: Insights from LASI-Wave I

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As 'ageing' transpires into a global phenomenon, fulfilling the needs of the elderly population becomes important. The first step in understanding the elderly needs is to have an idea about their overall condition. An important metric of judging the condition of elderly is 'Quality of Life (QoL)'. This study attempts to fill the research gaps by investigating the regional variations in QoL and its various domains and study the factors associated with QoL. This study uses data from LASI-Wave I (2017-18). The study population is older adults aged 60 years and above. The main outcome variable is QoL, comprising four major domains – physical, psychological, social, environmental and an additional domain having two items namely general health and life satisfaction. The covariates ranged from individual level factors to community level factors. The overall Quality of Life (QoL) for older adults in India averages 69.4, with notable regional variations. North-East and West India report the highest QoL scores, while Eastern India has the lowest. South India leads in physical well-being, West India in psychological well-being, and North-East India leads in social well-being. The environmental domain scores are above average in most regions except Central and Eastern India. Significant factors affecting QoL include gender, education, marital status, employment, and community-level characteristics. QoL declines with age, but increases with better decision-making involvement and social participation. This study can shed light on the requirements of the older adults of India and allow the policy makers to effectively address those needs.
**Keywords:** Quality of life, India, older adults, LASI

## Do Social Networks in Later Life Improve the Mental Well Being of Left Behind Older Parents? Evidence from India.

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Social networks, such as ties with spouses and close friends, and participation in social activities benefit older adults' mental well-being globally. India has a rapidly growing ageing population and adult child out-migrants. Prior empirical studies show that mental well-being is significantly associated with this population. However, the exact association between social networks and left-behind elderly parents' mental well-being remains unexposed mainly. To address the need, study aims to assess the relationship between social networks and psychological health among elderly parents with migrant sons using LASI data. Descriptive statistics were used to describe the background of older parents. Bivariate analyses were used to check the difference in mental health aspects by social networks. Furthermore, Multi-level binary logistic

regression was used to assess the relationship between social networks and psychological health. Study indicates that those who have close relationship with their spouse, friends and participate in any social activities are less likely to report poor SRH, depression, lower Life satisfaction, and low cognitive abilities. Those older parents who were very close to their spouse/partner had 0.65 times less likely to have major depression than their counterparts. When they were very close to their friends, had 0.39 times less likely to have poor cognitive abilities. After adjusting for confounding factors, those who participated in social activities were 66% less likely to report poor SRH, 43% less likely to report major depression, 68% less likely to report poor life satisfaction, and 80% less likely to report poor cognitive abilities. These findings suggest the need for initiatives that strengthen social networks through social support and create network hubs in older adults. These initiatives will make it beneficial for older parents to connect with friends and the community. This will allow them to undertake social activities and help exchange knowledge about health practices and better health.

**Keywords:** Social networks, Psychological Well-being, left-behind older parent, LASI.

### Quality of Life of the Elderly Population in Urban areas of Haveri District: A Geographical Study

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The quality of life (QOL) of elderly people refers to their overall well-being, satisfaction, and happiness in their later years. It encompasses various dimensions that impact their overall quality of life which includes their physical and mental health and their socio-economic status. QOL is a critical concern in the face of rapid population ageing. The World Health Organization (WHO) defines QOL in older age as "the perceived quality of life, which is influenced by the person's physical health, psychological state, level of independence, social relationships, environment, and spirituality / religion / personal beliefs."

Haveri district in Karnataka state is considered a backward district and offers a unique context for studying the quality of life of elderly people due to socio-economic challenges such as poverty, limited access to healthcare, education, and infrastructure, making it an ideal location to study the impact of these factors on elderly people's quality of life. The study's findings are grounded in primary data gathered through direct field observations and structured interviews, employing questionnaires to solicit detailed information from participants. For present study, composite index has been used for finding the levels in the quality of life of elderly people.

The findings of the study highlight the need for targeted interventions and policy responses to address the geographical inequalities and improve the quality of life of

the elderly population in Haveri District. The research contributes to the understanding of population ageing from a geographical perspective, emphasizing the importance of place-based approaches to addressing the challenges of ageing.

**Key Words:** QOL, Elderly, Ageing, Physical health, Economic Status

## Assessing quality of life among older people and its association with food insecurity in India

Papai Barman

Quality of Life (QoL) is increasingly recognised as a crucial factor influencing overall well-being of older population. Existing research on QoL has explored aspects such as physical health, mental health, and social life. However, a relatively under-explored area is the direct relationship between food insecurity and QoL among older population. Food insecurity, being a prime and one of the three basics necessities, can substantially influence QoL, affecting not just nutritional status but also physical, mental, and functional health, and social life. Therefore, present study attempted to examine the association between food insecurity and QoL among older people in India using a secondary data from the Longitudinal Ageing Study in India (2017-18). Elder QoL (EQoL) was measured using physical, mental, and functional health, social life, living environment, and spirituality-religiosity aspect. Food insecurity defined by meal size reduction, limited food choices, experiences of hunger, and perceived weight loss. Descriptive statistics and linear regression were employed for the purpose of analyses. Result indicated that older population in India had the highest score in environmental domain (0.92) and the lowest in social domain (0.21), indicated that while majority of older people enjoyed a good environmental life, a substantial portion experienced very poor social quality of life. The overall EQoL score in India was found to be 0.64. The mean score of EQoL was 0.64 among the older people with food security, while it gradually deceased to 0.53 among those experiencing higher levels of food insecurity. Regression results further exhibited that, on average, one unit increase in food insecurity was associated with a 0.12 unit decrease in EQoL among the older population. In conclusion, there is a need to re-look into the existing policy and programme to improve the EQoL, especially social and physical quality of life among the older people. Importantly, food security could be an indicator to comprehensively understand the EQoL in India.

**Keywords:** Quality of Life, Food Insecurity, LASI, India

## Examining the Determinants and Clustering of Old-age Mortality in India

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As per the United Nations report, the aged population would increase from 0.7 billion (9% of the global population) in 2019 to 1.5 billion (16%) in 2050 Given the significant socio-economic disparities in mortality among older adults in India, there is an ongoing concern about the clustering of deaths within high-risk families and communities. This study leverages data from the India Human Development Survey (IHDS) to explore the socio-economic, demographic, and health factors contributing to the clustering of old-age mortality. Using data from 16,964 older adults across 12,981 households from the first round of IHDS (2005) and tracking their outcomes in the second round (2012), the study investigates the bivariate relationships between mortality determinants through the log-rank test. A multilevel analysis was conducted using a random-intercept Weibull proportional hazard model across three levels—individual (level 1), family (level 2), and community (level 3). To ensure the robustness of the findings, the study employed the e-value method to assess the sensitivity of the multivariate results against unmeasured confounding and selection bias. The analysis reveals substantial heterogeneity in mortality risk among different families, with the health status of older adults and early-life socio-economic conditions emerging as key predictors of longevity. The study also found that widowhood was a prominent predictor of mortality among older adults. Additionally, extended or joint families experience higher mortality risks among older adults. Despite a higher proportion of older adults in southern regions of India, mortality risks were higher in central, northern and eastern areas of India. The study emphasizes that interventions in early life are crucial, as efforts initiated later in life may have limited impact on sustaining the health and survival of older adults.

**Keywords:** Elderly mortality; Aged population; Social and Health factors; Household context; Multilevel survival regression; Sensitivity analysis; India.

## Does Female Older Adults Live Longer and Happier than Male in India: An Analysis of Gender Disparities in Happy Life Expectancy

Sadanand Karun[1], Abhishek Singh[2]

**Background**: India made significant improvements in total life expectancy (TLE) for males and females, and females are in an advantageous position. Female survival benefits raise the question of whether additional years of life due to mortality advantages translate into happiness or unhappiness. In this context, we aim to assess the gender disparities in total life expectancy (TLE60) and happy life expectancy at age 60 (HapLE60) in India and its states.

**Methods**: We utilized data on age-specific mortality rates obtained from the Sample Registration System and data on age-specific happiness prevalence from the Longitudinal Ageing Survey in India. The life satisfaction scores were taken as an indicator of happiness. The life table, starting from age 60 up to age 85+, was constructed using Greville's method. The happy life expectancy (HapLE) was derived by combining happiness prevalence with the life table using Sullivan's method. We decomposed the gender gap in HapLE in mortality and happiness effects using the stepwise replacement decomposition method.

**Findings**: At the national level, male $TLE_{60}$ was 17.4 years, while for females 19.2 years, indicating a gender gap of 1.8 years. The subnational variations in $TLE_{60}$ indicate a gender gap of as high as 5.1 years in Jammu and Kashmir to as low as -1.1 years in Jharkhand. Only in six states (i.e., Kerala, Karnataka, and Haryana) out of twenty-two included in the analysis did the gender gap in happiness favour females, where females are happier than males. Contrastingly, happiness disfavours females in sixteen states (i.e., West Bengal, Assam, Jharkhand, and Bihar) where males are happier than females.

Nationally, the $HapLE_{60}$ was 12.2 years for males and 12.7 years for females. At the state level, in absolute terms, $HapLE_{60}$ for both genders was highest in Gujarat (M=16.1; F=18.9) and lowest in Delhi (M=8.2; F=8.8). The gender gap in $HapLE_{60}$ was highest in Kerala (3.9 years) and lowest in Jharkhand (-1.8 years).

The decomposition results reveal that only 27.7% of additional years of females due to mortality advantage are spent in happiness at the national level. Furthermore, the happiness disadvantage of females was highest in Punjab, where only 6.2% of additional years were spent in happiness, and it was lowest in Kerala, where 97% of additional years were spent in happiness. The age-groups-wise decomposition of the gender gap in $HapLE_{60}$ showed a mixed pattern. In India and most of its states, the contribution of mortality and happiness decreases as age increases.

**Conclusion**: In India, though females live longer than males, their additional years of life are spent in unhappy states. A state-specific focus is required to increase happiness among older adults so that both genders spend the mortality advantage more happily.

**Keywords:** Happy Life Expectancy, Life Expectancy, Life Satisfaction, Ageing, Disability Free Life Expectancy.

## SOCIO-ECONOMIC DETERMINANTS AND PREVALENCE OF CHRONIC MORBIDITY AND MULTIMORBIDITY AMONG ELDERLY POPULATION IN KOLKATA

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The onset of Chronic morbidities and Multimorbidity are rising with increase in age, are influenced by various socio-economic background characteristics among the elderly population in Kolkata. The main aim of this study is to assess the prevalence of chronic morbidity and multimorbidity among the elderly population in Kolkata. A cross-sectional survey has been done using a random sampling method conducted among the elderly population (60+ age group) in Kolkata city of West Bengal State in India from April to June, 2022. The survey was conducted among 300 respondents including 152 males and 148 females. The selected chronic diseases included in this study are Heart Disease, Diabetes, Hypertension or High Blood Pressure, Arthritis, Cholesterol and Thyroid. Multivariate Analysis and Binary Logistic Regression have been conducted. Around 82 percent and 51 percent of the elderly population are suffering from 'Chronic Morbidities' and 'Multimorbidity' in Kolkata. Single disease is prevalent among 32.33 percent of the elderly and 16.33 percent of older persons have reported 'No disease'. About 56 percent of the elderly population are suffering from Hypertension or High Blood Pressure followed by Diabetes (36 percent) and Arthritis (31 percent) in Kolkata. Female elderly persons, not currently married having higher educational background, with Poor Self-Rated Health are more likely to suffer from chronic morbidities. On the other hand, female older population, from highest monthly household expenditure, also financially dependent with Poor Self-Rated Health are suffering from Multimorbidity.

**Keywords:** Chronic morbidity, Multi-morbidity, Prevalence, Elderly, Older persons, Self-Rated Health, Kolkata

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