VIRTUAL EVENT

D4N 20 22

November 9-10, 2022

Delivering for Nutrition in South Asia

Transforming Diets

THE AGA KHAN UNIVERSITY
INSTITUTE FOR GLOBAL HEALTH AND DEVELOPMENT

ANH Academy
Agriculture, Nutrition and Health Academy

HELEN KELLER INTL

INTERNATIONAL FOOD POLICY RESEARCH INSTITUTE
IFPRI

IPS
INSTITUTE OF POLICY STUDIES OF SRI LANKA

MSSRF

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NATIONAL INSTITUTE OF NUTRITION

PUBLIC HEALTH FOUNDATION of INDIA

POSHAN
Led by IFPRI

Transforming Agrifood Systems in South Asia
CGIAR

unicef
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WFP
World Food Programme

#D4N2022

AGENDA BOOKLET

About the Conference

Background

Food systems are complex and dynamic, consisting of the food production value chain, food environments, and consumer behaviors. These components shape people's dietary choices and, in turn, nutrition outcomes.

FPRI's Partnerships and Opportunities to Strengthen and Harmonize Actions for Nutrition in India (POSHAN), together with the One CGIAR South Asia regionally integrated initiative Transforming Agri-Food Systems in South Asia and a range of regional co-hosts, are pleased to announce the virtual conference, '**Delivering for Nutrition in South Asia: Transforming Diets.'** The conference took place *November 9-10, 2022*.

With this overarching purpose, the key objectives were to:

- Examine evidence on current dietary patterns at the local, country-, and regional-levels, and the determinants of these patterns
- Identify strategies for shaping healthy dietary behaviors, including what has worked, has not worked, why, and in what contexts
- Identify potential program and policy levers for transforming diets

Process

Through an open call, abstracts were invited on research studies and implementation experiences focused on transforming diets. Selection of abstracts for oral presentation and posters was made through a double-blind review process.

List of co-hosts (in alphabetical order)

- Aga Khan University (AKU) (*Pakistan*)
- Agriculture, Nutrition, and Health (ANH) Academy (*Global*)
- CGIAR Initiative on Transforming Agri-Food Systems in South Asia (TAFSSA) (*South Asia*)
- Helen Keller International (HKI) (*Nepal*)
- Institute of Policy Studies (IPS) (*Sri Lanka*)
- International Food Policy Research Institute (IFPRI) (*South Asia*)
- M S Swaminathan Research Foundation (MSSRF) (*India*)
- National Institute for Nutrition (NIN) (*India*)
- Public Health Foundation of India (PHFI) (*India*)
- UNICEF Regional Office for South Asia (ROSA) (*South Asia*)
- University of Dhaka (*Bangladesh*)
- World Food Programme Regional Bureau for Asia & the Pacific (*South Asia*)

[Hear from our co-hosts!](#)

About the agenda booklet

This booklet curates the agenda, abstracts of research studies and implementation experiences submitted in response to the open call that were selected for oral and poster programming, and the speaker biographies programmed into the two-day conference agenda. These are presented verbatim, as they were received, without any edits or modification. Abstracts were programmed as oral and poster presentations under carefully chosen themes. In this booklet, they are presented under their relevant themes.

All oral and poster presentations are available on the [Delivering for Nutrition Conference 2022 website](#).

Agenda Overview

Day 1: Wednesday, November 9

Time (24-hour format)						Day 1: Sessions
EST (East Standard)	GMT (UK)	PKT (Pakistan)	IST/SLST (India/Sri Lanka)	NPT (Nepal)	BST (Bangladesh)	
01:00-02:30	05:00-06:30	10:00-11:30	10:30-12:00	10:45-12:15	11:00-12:30	**Opening Session**
02:30-04:00	06:30-08:00	11:30-13:00	12:00-13:30	12:15-13:45	12:30-14:00	**Thematic Session 1: Maternal diets, determinants, and interventions in South Asia**
04:00-06:00	08:00-10:00	13:00-15:00	13:30-15:30	13:45-15:45	14:00-16:00	**Break & Poster Viewing**
06:00-07:30	10:00-11:30	15:00-16:30	15:30-17:00	15:45-17:15	16:00-17:30	**Thematic Session 2: Adolescent diets and determinants in South Asia**
07:30-08:00	11:30-12:00	16:30-17:00	17:00-17:30	17:15-17:45	17:30-18:00	**Break & Poster Viewing**
08:00-09:30	12:00-13:30	17:00-18:30	17:30-19:00	17:45-19:15	18:00-19:30	**Keynote Lecture: Making food choices for healthy diets: the push and pull factors**

Day 2: Thursday, November 10

Time (24-hour format)						Day 2: Sessions
EST (East Standard)	GMT (UK)	PKT (Pakistan)	IST/SLST (India/Sri Lanka)	NPT (Nepal)	BST (Bangladesh)	
00:30-02:00	04:00-05:30	09:30-11:00	10:00-11:30	10:15-11:45	10:30-12:00	**Thematic Session 3: Diets, determinants, and interventions in South Asia**
02:00-02:30	05:30-06:00	11:00-11:30	11:30-12:00	11:45-12:15	12:00-12:30	**Break & Poster Viewing**
02:30-04:00	06:00-07:30	11:30-13:00	12:00-13:30	12:15-13:45	12:30- 14:00	**Thematic Session 4: Children's diets, determinants, and interventions in South Asia**
04:00-06:00	07:30-10:00	13:00-15:00	13:30-15:30	13:45-15:45	14:00-16:00	**Break & Poster Viewing**
06:00-07:30	10:00-11:30	15:00-16:30	15:30-17:00	15:45-17:15	16:00-17:30	**Thematic Session 5: Policies, programs, and solutions for improving diets in South Asia**
07:30-09:00	11:30-13:00	16:30-18:00	17:00-18:30	17:15-18:45	17:30-19:00	**Closing Plenary: Looking forward: Actions to inform policies, programs and research to transform diets in South Asia**

Day 1: Wednesday, November 9, 2022

Time (GMT)	Sessions
05:00-06:30	**OPENING SESSION** **Welcome address** Purnima Menon, International Food Policy Research Institute (IFPRI) **Opening remarks by co-chairs** Shahidur Rashid, IFPRI G. N. Hariharan, MS Swaminathan Research Foundation **Presentation, "What is South Asia eating?"** Anna Herforth, Harvard T.H. Chan School of Public Health (video recording) **Reflections on the following for healthy diets** - Agricultural production: Timothy J. Krupnik, International Maize and Wheat Improvement Center (CIMMYT) - Markets and prices: Sudha Narayanan, International Food Policy Research Institute - Consumers and information: Subbarao Gavaravarapu, National Institute of Nutrition **Q&A** **Conference overview** Esha Sarswat, International Food Policy Research Institute
06:30-08:00	**THEMATIC SESSION 1: MATERNAL DIETS, DETERMINANTS, AND INTERVENTIONS IN SOUTH ASIA** **Co-chairs: Avula Laxmaiah, National Institute of Nutrition; Kaosar Afsana, BRAC University** 1. *Assessment of dietary intake of overweight/obese pregnant women belonging to upper SES residing in north-west Delhi: A longitudinal observational study*, Priyanka Arora, Institute of Home Economics, Delhi University 2. *Influence of gendered social norms on intra household food access and consumption: evidence from Uttar Pradesh, India*, Aradhana Srivastava, UN World Food Programme 3. *Social environment, mental health, and dietary diversity: a multicomponent pathway analysis among married women of reproductive age in Bihar,* Shuchi Sree Akhouri, Knowledge Management and Learning Centre, Care India Solutions for Sustainable Development 4. *An intersectionality evaluation of the reach and benefit of nutrition-sensitive agricultural programmes and their impact on intersecting inequalities in maternal diets in rural Odisha, India,* Emily Fivian, London School of Hygiene and Tropical Medicine 5. *Engaging men for better nutritional and family health outcomes,* Anurudra Bhanot, Project Concern International

	6. Nobo Jatra: A new beginning for improved maternal & child health and nutrition in southwest Bangladesh through multi-layered interventions, Alex Bekunda, World Vision International 7. Improving dietary diversity through an integrated food security resilience and SBCC approach, Satish Kumar Srivastava, Catholic Relief Services Q&A
08:00-10:00	**Break & Poster Viewing**
10:00-11:30	*THEMATIC SESSION 2: ADOLESCENT DIETS AND DETERMINANTS IN SOUTH ASIA* **Co-chairs: Shweta Khandelwal, Public Health Foundation of India; Gopinath Radhakrishnan, MSSRF** 1. *Food consumption practices and their determinants among school-age children and adolescents in Bhutan*, Kunzang Deki, School Health and Nutrition Division, Ministry of Education, Bhutan 2. *Dietary diversity among young adolescents living in urban informal settlements in Mumbai: a cross-sectional study*, Sheetal Rajan, Society for Nutrition Education and Health Action 3. *Adolescents' Dietary behavior and its linkages with Nutritional Status: A Study of Dual-earner's*, Ajay Gupta, International Institute for Population Sciences 4. *Ultra-processed food consumption trends and its impact on nutritional status among school going adolescent girls from rural areas of Jorhat district of Assam*, Mandeep Digra, Farm2food Foundation 5. *Consumption of ultra-processed foods among rural adolescents-Evidence from a community based cross-sectional study*, Purnoor Kaur, King George's Medical University Q&A
11:30-12:00	**Break & Poster Viewing**
12:00-01:30	*KEYNOTE LECTURE: MAKING FOOD CHOICES FOR HEALTHY DIETS: THE PUSH AND PULL FACTORS* **Chair: Purnima Menon, IFPRI** "Countering commercial influences on diets – the experience of Mexico," Simon Barquera, National Institute of Public Health **Discussants:** • Stuart Gillespie, IFPRI and Institute of Development Studies, University of Sussex • Nazma Shaheen, University of Dhaka • Avula Laxmaiah, National Institute of Nutrition, India Q&A

Day 2: Thursday, November 10, 2022

Time (GMT)	Sessions
04:00-05:30	***THEMATIC SESSION 3: DIETS, DETERMINANTS, AND INTERVENTIONS IN SOUTH ASIA*** **Co-chairs: Meredith Jackson-deGraffenried, Helen Keller International; Ananya Awasthi, Anuvaad Solutions** 1. *Trends and inequities in food, energy, protein, fat, and carbohydrate Intakes in rural Bangladesh, Md. Masum Ali, IFPRI, Bangladesh* 2. *Nutrition status and gaps in the diets of Sri Lankans*, Renuka Jayatissa, Medical Research Institute, Colombo, Sri Lanka 3. *Spatial Differences in Diet Quality and Economic Vulnerability to Food Insecurity in Bangladesh: Results from the 2016 Household Income and Expenditure Survey*, Maxim Parvin, Institute of Nutrition and Food Science, Dhaka University 4. Cost of Recommended Diet (CoRD) and its Affordability in Bangladesh, *Abira Nowar, Institute of Nutrition and Food Science, University of Dhaka* 5. *New methods for measuring food environments in Nepal*, Esther Choo, University of Washington 6. COVID-19 impact on women and children's diet in India, Anjali Pant, International Food Policy Research Institute, India 7. *COVID-19 and Dietary Diversity in India*, Aashi Gupta, Delhi School of Economics **Q&A**
05:30-06:00	**Break & Poster Viewing**

06:00-07:30	**_THEMATIC SESSION 4: CHILDREN'S DIETS, DETERMINANTS, AND INTERVENTIONS IN SOUTH ASIA_** **Co-chairs: Sabrina Rasheed, icddr,b; Romaina Iqbal, Aga Khan University** 1. _Nutritional Status and Diet Patterns of Children under 5 in select districts of Assam_, Jith J.R., Indian Institute of Technology Guwahati 2. _Identifying enabling factors and barriers for good child nutrition in a rural Bangladesh population_, Stacy Saha, LAMB Integrated Health and Development Project 3. _Long term impact of integrated agriculture and health-based intervention program on dietary behaviours of under five children in southern part of Bangladesh_, Farzana Bari, Institute of Nutrition and Food Science, Dhaka University 4. _Association between listening to a radio program with tailored content and maternal and child feeding practices during COVID-19 pandemic in Nepal_, Indra Kshetri, Helen Keller International 5. _Leveraging the Private Sector Resources in Nutrition to shape the dietary practices amongst children under 2 years of age_, Atul Upadhyay, Baliyo Nepal Nutrition Initiative 6. _Evaluation of overall diet quality indexes of the children at the age of 6-24months and its impact on health in Matiari, Sindh, Pakistan_, Sanam Soomro, Aga Khan University 7. _Evidence on Dietary Diversity and Food and Nutrition Security of Women and Young Children from Madhya Pradesh and Maharashtra, India_, Avani Verma, GIZ 8. _Implications of the revised definition of minimum dietary diversity for assessing dietary patterns of children aged 6-23 months in informal settlements of Mumbai_, Karishma Navalkar, Society for Nutrition, Education and Health Action **Q&A**
07:30-10:00	**Break & Poster Viewing**
10:00-11:30	**_THEMATIC SESSION 5: POLICIES, PROGRAMS, AND SOLUTIONS FOR IMPROVING DIETS IN SOUTH ASIA_** **Co-chairs: Lalita Bhattacharjee, Food and Agriculture Organization of the United Nations; Timothy J. Krupnik, International Maize and Wheat Improvement Center (CIMMYT)**

	1. *A rapid landscape review of market-based interventions and policies for nutrient-dense foods in India,* Gregory Cooper, University of Sheffield 2. *Addressing dietary imbalances through food-based approach in Odisha,* Gopinath Radhakrishnan, M S Swaminathan Research Foundation 3. *Do diverse farming system types influence potential nutrient availability and deficiencies the diets of smallholder households? Evidence from Bangladesh,* Timothy J. Krupnik, CIMMYT 4. *Scaling biofortified zinc wheat seeds, grains and foods to meet 1.4 million farmers and 7 million consumers in Pakistan,* Munawar Hussain, HarvestPlus 5. *Qualitative Analysis of a Nutrition-Sensitive Agricultural Intervention in India,* Madison Bearden, Emory University 6. *Toward nutrition-specific social protection: Addressing micronutrient malnutrition though wheat flour fortification in Himachal Pradesh,* Ruchi Sareen, Global Alliance for Improved Nutrition **Q&A**
11:30-13:00	***CLOSING PLENARY: LOOKING FORWARD: ACTIONS TO INFORM POLICIES, PROGRAMS AND RESEARCH TO TRANSFORM DIETS IN SOUTH ASIA*** **Chair: Temina Lalani-Shariff, CGIAR, South Asia** **Conference summary**, *Rasmi Avula, International Food Policy Research Institute & Jai Das, Aga Khan University* • *Implications for maternal and child nutrition,* Zivai Murira, UNICEF • *Implications for national research institutes to support policy and research,* Priyanka Jayawardena Institute of Policy Studies • *Equitable community interventions,* Helen Harris-Fry, London School of Health & Tropical Medicine • *Research priorities on drivers of food choice,* Christine Blake, University of South Carolina **Q&A** **Conference closing & final remarks**

Speaker Biographies

(*in order of session on agenda*)

Opening Plenary

Shahidur Rashid: Shahidur Rashid is IFPRI's Director for South Asia. Dr. Rashid has worked on agriculture and food policy issues in Asia and Africa for more than a decade. Dr. Rashid's is also currently managing the Research for Ethiopia's Agriculture Policy (REAP), a Gates-funded project to provide analytical support to the Ethiopia's Agricultural Transformation Agency (ATA), a study on the value chains of high value Bangladesh, and strategic grain reserves in selected African countries, including the newest nation, the Republic of South Sudan.

G. N. Hariharan: Dr G N Hariharan has been working with MSSRF for over 29 years. He began his career as a Scientist and his group's scientific contributions on the lichens have opened up new avenues to explore the potentialities of the much neglected lichens of our country and also to link the ecological security of lichen rich locations (as it is developing alternative protocols for sustainable lichen collection coupled with lichen compound synthesis in vitro – so that the naturally occurring lichens are saved) with the livelihood security of the rural communities, who depend on lichen collections as Non Timber Forest Produce. The biotech group focuses on developing rice varieties for abiotic stress tolerance and nutritional enhancement using plant breeding pathways and transgenic approaches. He has collected a large number of traditional saline tolerant rice germplasm and is actively involved in varietal selection trials and participatory on-farm trials in collaboration with state agricultural universities.

Anna Herforth: Anna Herforth leads initiatives to improve global food measurement toward food systems for healthy diets. She is the Principal Investigator of the Global Diet Quality Project, building survey tools and indicators for diet quality monitoring; and Co-Director of the Food Prices for Nutrition project, which has generated globally used indicators on Cost and Affordability of a Healthy Diet. Dr. Herforth is a Senior Research Associate in the Department of Global Health and Population at the Harvard T.H. Chan School of Public Health, and a Visiting Senior Researcher at Wageningen University & Research. She co-founded the Agriculture-Nutrition Community of Practice (Ag2Nut).

Timothy J. Krupnik: Leading a transdisciplinary, multicultural science team that works to raise farmers' productivity, increase resilience, and improve livelihoods and diets, Timothy Krupnik 20+ years of research experience in the global south. Timothy is the International Maize and Wheat Improvement Center's (CIMMYT's) Innovation Science Lead for Agroecosystems and Food Systems in Asia and Country Representative for Research and Partnerships in Bangladesh. Timothy is also CGIAR Country Convener for Bangladesh and leads the CGIAR Regional Integrated Initiative Transforming Agrifood Systems in South Asia (TAFSSA). He has authored 125 papers, books, and policy briefs, and has developed a range of agricultural decision support tools.

Sudha Narayanan: Sudha Naryanan is a Research Fellow, International Food Policy Research Institute (IFPRI), New Delhi. She was previously an Associate Professor at the Indira Gandhi Institute of Development Research (IGIDR), Mumbai. Sudha's research interests straddle agriculture, food and nutrition policy, and human development in India. She is particularly interested in survey-based research, using microeconometric approaches to understand broader questions of agrarian change and state delivery systems for food and nutrition security. Her current projects focus agricultural value chains in India and

Bangladesh, agritech interventions and farmer producer organizations in India, women's empowerment in nutrition and affordable diets. Narayanan holds a PhD in agricultural economics from Cornell University and MPhil and M.A. degrees in economics from the Delhi School of Economics, India. In the past, she has worked with the Institute of Economic Growth in India, Cornell University and the Right to Food Campaign in India, where she provided research support to the Commissioners appointed by the Supreme Court of India to monitor the implementation of orders issued in connection with the Right to Food case.

SubbaRao M Gavaravarapu: Dr SubbaRao M Gavaravarapu is Scientist F - Sr Deputy Director and Heads the Nutrition Information, Communication & Health Education (NICHE) Division at ICMR-National Institute of Nutrition. He has widely researched and published in the areas of health, nutrition and food safety communication. His current research studies explore the contextual, cultural, behavioural aspects in communicative processes, food environment, food labelling, vendor education, workplace wellness, infodemic in pandemic. He has over 75 research papers, 13 book chapters and 3 edited books to his credit. He serves on the editorial boards of the Journal of Nutrition Education and Behaviour, Frontiers in Communication and he served as Asian Editor for American Journal of Health Behavior. He coordinated the activities of the Secretariat of WHO Southeast Nutrition Research-cum-Action Network of 11 member countries from 2011-2016. He chairs the Health Communication Working Group of International Association of Media and Communication Research (IAMCR), serves on expert committees and scientific panels of FSSAI, Codex, UNICEF and some Universities. He is a fellow of the National Academy of Agriculture Sciences (FNAAS) and Royal Society for Public Health (FRSPH), UK. He has several awards to his credit some of them are the VN Patwardhan Prize from ICMR, Mid-career Award from American Society of Nutrition, Runner-up in NASI-Scopus Young Scientist Award, Young scientist Award from Nutrition Society of India, JN Bose Award from Indian Dietetic Association to name a few. He has a PhD in Communication from University of Hyderabad; was ICMR International fellow at the Johns Hopkins Bloomberg School of Public Health, Baltimore USA in 2013.

Thematic Session 1: Maternal diets, determinants, and interventions in South Asia

Kaosar Afsana (co-chair): Dr. Kaosar Afsana is a Professor of Public Health at BRAC James P Grant School of Public Health, BRAC University. She had served BRAC in Bangladesh for over 26 years in research, management and implementation, and policy-making. Her research focuses on public health and nutrition, early child development, health system and humanitarian crisis. Professor Afsana has authored books and widely published journal papers and book chapters. She plays a critical role in policy and planning in public health and nutrition at local and global levels.

Avula Laxmaiah (co-chair): Dr. Laxmaiah is the senior deputy director of National Institute of Nutrition. He is trained in Medicine and Public Health and has been researching extensively in the areas of Public Health Nutrition. He has vast experience in carrying out epidemiological, operational and intervention trials in health and nutrition in areas such as undernutrition and overnutrition. He published more than 50 papers in national and international journals, three book chapters and several papers in proceedings of national and international conferences. He serves as an advisory committee member in health and nutrition for reputed Government bodies including the Department of Science and Technology, Mid-day Meal Programme and National Disaster Management Authority.

Priyanka Arora: Ms. Priyanka Arora is pursuing Ph.D. under the department of Nutrition at Institute of Home Economics, University of Delhi. She was awarded with Junior Research Fellowship under the University Grant Commission in 2015. Her research interest includes public health nutrition and clinical

nutrition. She is currently working on publications and conference presentations addressing feto-maternal health.

Aradhana Srivastava: Dr. Aradhana Srivastava is the Gender and Inclusion Officer at the UN World Food Programme, India Country Office. A PhD in Regional Development from the Jawaharlal Nehru University, she has more than 20 years of experience in social science and public health research and programme implementation with a multi-disciplinary approach, specializing in gender and vulnerability analysis, women's health and nutrition, food security and livelihoods. Her core responsibilities at WFP include gender and inclusion research and analyses, technical assistance to Government on gender and women empowerment programmes, capacity strengthening, and advocacy for more inclusive food security and nutrition strategies.

Shuchi Sree Akhouri: Started my career in public health as a dental surgeon during 2015 and eventually shifted to public health research in 2017 with keen interest in epidemiology, Maternal and Child health and nutrition, and gender studies. At present I am working at Knowledge Management Centre (KMC), Care India as a technical associate. I have nearly 5 years of experience in public health, working broadly in implementation or action research including study conceptualization, study design, analysis of research data and its dissemination.

Emily Fivian: Emily Fivian is a Research Assistant and doctoral student at the London School of Hygiene and Tropical Medicine with a background in Public Health and Human Nutrition. Emily's has worked in nutrition-sensitive intervention research aiming to improve agriculture and nutrition in India since 2019, where she began working on the UPAVAN trial. Her research currently focuses on using the intersectionality framework for better understanding issues of equity in women's nutrition in rural India and evaluating coverage and benefits of nutrition programmes.

Anurudra Bhanot: Andy is a social and behavior change communication strategist with more than three decades of experience in the development and private sectors. Over the last15 years he has provided strategic guidance and leadership for development, implementation and evaluation of award-winning SBCC campaigns at BBC Media Action, Westat, Johns Ho, Johns Hopkins Centre for Communication Programs, tes and Project Concern International (PCI). Prior to that, he worked for two decades, in Africa and Southeast Asia, with the advertising and consumer research industry–directing brand, consumer and business research for a range of clients that included leading multinational and corporate organizations.

Alex Bekunda: Andy is a social and behaviour change communication strategist with more than three decades of experience in the development and private sectors. Over the last15 years he has provided strategic guidance and leadership for development, implementation and evaluation of award winning SBCC campaigns at BBC MediaAction, Westat, Johns Hopkins Centre for Communication Programs, Abt Associates and Project Concern International (PCI). Prior to that he worked fortwo decades,in Africa and Southeast Asia,with the advertising and consumer research industry–directing brand, consumer and business research for a range of clients that included leading multinational and corporate organizations.

Satish Kumar Srivastava: Satish Srivastava, a Public Health Nutritionist has extensive experience of more than two decades on planning, executing, and monitoring Nutrition and Health strategies to address the needs of the vulnerable communities. He has successfully navigated and managed diverse partners to provide technical support for system strengthening to improve health and nutrition services. Currently he is associated with Catholic Relief Services (CRS) India as Manager-Health and Nutrition. His interest lies in deploying ICT solutions to strengthen service delivery and demand generation. National Health Mission

Uttar Pradesh has recently scaled up an innovative ICT based pilot statewide to improve supportive supervision, of which Mr. Srivastava has been a part.

Thematic Session 2: Adolescent diets and determinants in South Asia

Shweta Khandelwal (co-chair): Dr Shweta Khandelwal is Head, Nutrition Research at the Public Health Foundation of India (PHFI), Delhi. She is a trained and experienced public health nutrition researcher working in the maternal child health and nutrition space in India for the last 17 years. Shweta teaches nutrition epidemiology especially in relation to the rising overweight-obesity, diet related non-communicable diseases and their risk factors among the Indian population. She has served on expert government panels on topics like Women's health, oils and fats, sustainable healthy diets and combating high fat, sugar and salt in Indian population etc. As a Women Lift Health fellowship awardee, Shweta is a sincere advocate for gender equity and women empowerment especially in nutrition. She is also the Lead for capacity building initiatives in Public Health Nutrition at PHFI and CCDC. In addition to more than 85 peer reviewed articles in scholarly journals, she has contributed to more than 160 media pieces including 50 op-eds in leading international and national print and online platforms. Shweta has also won several prestigious awards, fellowships and grants in the area of nutrition and chronic diseases.

Gopinath Radhakrishnan (co-chair): R Gopinath is a Development Economist, working with MSSRF as Principal Scientist. He has more than 15 years of experience in research and development. His core areas of interest are food security, agrarian transformation and Monitoring and Evaluation of developmental projects. Currently, Dr Gopinath engages in rural transformation programmes focusing on food and nutrition security at both practice and policy interfaces.

Kunzang Deki: Kunzang Deki has 2 years of work experience as a nutritionist in the hospital setting in Bhutan. After her 2 years in hospital, she joined Ministry of Education (MoE), Bhutan as the sole nutritionist and it has been nearly 6 years that she has been working in MoE. She is responsible for any health and nutrition programs and activities across all school in the country. She is the go-to person for any health and nutrition related issues or activities for school children. Along with it she is responsible for the National School Feeding Programme in Bhutan to function efficiently. She has a PG diploma in Public Health Nutrition from Public Health Foundation, Delhi, India and a Bachelor's of science in Nutrition & Dietetics, Chemistry and Zoology from Mount Carme College, Bangalore, Karnataka, India.

Susan Shulman: Susan Shulman has nearly 25 years of experience working on international health and nutrition programs with emphasis on behavioural research and developing, implementing, and monitoring and evaluation of social and behaviour change (SBC) programs in over fifteen countries. She has an MA in International Health and Development from George Washington University and a BA in Asian History from S.U.N.Y. Albany. She is currently the Social Behaviour Change Specialist for WFP/Bhutan.

Sheetal Rajan: Sheetal is a Monitoring, Evaluation and Learning (MEAL) specialist with experience in both quantitative and qualitative research methods. She has done her Masters in Public Health from JIPMER International School of Public Health, Puducherry. She is currently working in the Research domain at Society for Nutrition Education and Health Action (SNEHA), Mumbai. Sheetal is passionate about adolescent health, behavioural sciences research and health communication.

Ajay Gupta: Ajay Gupta is a part-time doctoral student in Population Studies at the International Institute for Population Sciences (IIPS), Mumbai, studying under Prof. Sayeed Unisa. The topic of his PhD research is "Lifestyle, Psychological Wellbeing and Nutrition of Adolescent in Delhi and Mumbai Colleges with special

reference to dual earner families". Before Joining as Junior Research fellow, he completed M.Phil. in Population Studies(2014-15) and M.Sc. in Population Studies(2012-14) at IIPS. He has worked as the Research Officer in Follow-up of CNSM (Comprehensive-Nutrition-Survey-in-Maharashtra) at IIPS, during May-October 2015, a UNICEF funded project. He can be contacted at: ajaygiips@gmail.com.

Mandeep Digra: Ajay have passed B.Sc. (Food Science and Nutrition) (87%) and M.sc. (Food Science and Nutrition) (86%) in 2022 from College of Community Science, Assam Agricultural University, Jorhat-13, Assam [Research topic- Development and quality evaluation of hydrothermally treated rice from Kaoi Jamfri, a red kernel rice of Assam]. He has also cleared UGC NET in June 2020. I have a keen interest in research and now working as Program Coordinator -Research wing for the last few months in Farm2Food Foundation, a non-profit organization.

Purnoor Kaur: At 27, Dr. Purnoor Kaur is a third-year junior resident in Department of Community Medicine and Public Health, KGMU UP. She has completed her graduation from Government Medical College, Amritsar (Batch 2014). She is passionate for public health and policy research. Her main area of interest within the branch is public health nutrition, and she has worked on the same utilizing MAMTA-HIMC scholarship and thesis research opportunities. She quickly imbibes new ideas and keeps upgrading her competency through diverse nutrition research-oriented workshops. She is currently learning about systems thinking for nutrition and plans to actualize it.

Keynote Session: Making Food Choices for Healthy Diets – The Push and Pull Factors

Purnima Menon: Purnima Menon is a Senior Research Fellow at the International Food Policy Research Institute, and is based in New Delhi, India. She is the theme leader for South Asia Nutrition Programs in IFPRI's Poverty, Health, and Nutrition Division and directs POSHAN (Partnerships and Opportunities to Strengthen and Harmonize Actions for Nutrition in India), an initiative to support more use of evidence for nutrition in India. Dr. Menon has research experience in India, Bangladesh, Ethiopia, Haiti, Viet Nam and Nepal, has published extensively, and invests deeply in research translation in her engagements with policy communities.

Simon Barquera: Simon Barquera is a MD with a PhD from Tufts University in Boston, USA. He is a member of the National Academy of Medicine, author of more than 364 scientific publications. He has participated in the development of policies for its prevention and control, for which he has been recognized with the 18 Martinson Lectureship (University of Minnesota, 2018), the Soper award for excellence in health (Pan American Health Organization, 2003), the Tufts University Nutrition Impact Award (2016) and the "Dr. Gerardo Varela" public Health Merit Award (Government of Mexico, 2020). He currently serves as Director of the Center for Research in Nutrition and Health of the National Institute of Public Health. Currently he is the president elect of the World Obesity Federation.

Stuart Gillespie: Dr Stuart Gillespie is a Non-Resident Senior Fellow with the International Food Policy Research Institute (IFPRI) and Honorary Associate with the Institute of Development Studies (IDS), based in the UK. Currently freelance, he is interested in the commercial determinants of malnutrition. Stuart has 38 years of experience in nutrition, food systems and international development. Prior to joining IFPRI in 1999, he worked with UNICEF, WHO, FAO, WFP, UNSCN along with several bilateral agencies and NGOs. He has a PhD in Human Nutrition from the London School of Hygiene and Tropical Medicine (1988) and 180 publications including nine books and an unpublished novel.

Nazma Shaheen: Nazma Shaheen, Professor and former Director of the Institute of Nutrition and Food Science, University of Dhaka, Bangladesh. After completing of undergraduate and graduating from the Department of Biochemistry and Molecular Biology, University of Dhaka, she did a post-graduate degree in Biochemistry from the Medical faculty of Kagoshima University, Japan. She received further higher professional training in epidemiology, biostatistics, and international nutrition and did post-doctoral research as a UNU fellow from National Food Research Institute, Tsukuba, Japan. She has 35 years' experience in teaching and research in the field of nutrition particularly Food Composition and its application to the assessment of the nutritional status of the population and performed an important role in evidence-based policy formulation to eradicate all forms of malnutrition. It is notable that she has been leading the production, management, and use of food composition data in south Asian countries as the Focal Person of Bangladesh for INFOODS‟ "SAARCFOODS" – forum for Food Composition Database (FCDB) for SAARC countries, convenor of SUN Academia and Research Platform for Bangladesh, National Coordinator of IGN, Bangladesh.

Thematic Session 3: Diets, determinants, and interventions in South Asia

Meredith Jackson-deGraffenried: Meredith Jackson-deGraffenried is a Global Technical Advisor for Helen Keller currently living in Malawi. With over 20 years of practical and academic experience in civil society, government, private sector, and academia in Latin America, Asia-Pacific, Africa, and the United States, she works primarily with food and nutrition security and resilience programs, focusing on MNCAHN, GYSI, and social norms at the nexus of food and health systems. As a biocultural medical anthropologist, Meredith's approach to understanding human health and behavior is grounded in understanding the cultural, social, political, and economic influences on health, decision-making, and psychosocial and other well-being outcomes.

Ananya Awasthi (co-chair): Ananya Awathi is the Founder & Director for Anuvaad Solutions which works as an accelerator for Knowledge Translation to promote evidence-based policy making for India's health & nutrition agenda. She is experienced in impact assessment, management consulting, and policy analysis for public-led initiatives in low- and middle-income countries. For the past five years, Dr. Awasthi has served as an assistant director to the India Research Center for the Harvard School of Public Health, where she oversaw the implementation of global health research projects, training programs, and knowledge translation activities with a range of stakeholders in India, including ministries, NGOs, and private hospitals. Some of her work has involved key projects related to data-mapping for agri-food systems to build India's "Poshan Atlas," and identifying social- and behavioral-change communication strategies for the promotion of "Jan Andolan" and the National Nutrition Mission. She also serves on the advisory board of the National Commission for Protection of Child Rights, Government of India; Harvard Business School – India Research Center; and the Poshan Atlas Committee, Ministry of Women and Child Development. Dr. Awasthi holds a Master's degree in Public Health from the Harvard School of Public Health, Harvard University.

Md. Masum Ali: Md Masum Ali is a Research Analyst in the Poverty, Health, and Nutrition Division. He joined IFPRI in August 2021 under the Bangladesh Agricultural Policy Activity Project. His research focuses on dietary intake and nutritional assessment of mothers and children, and nutrition and food security situations in Bangladesh. He has published several articles in the peer-reviewed journal, emphasizing dietary patterns and determinates of Bangladesh from 1985 to 2010 and the factors related to maternal and child malnutrition. Prior joining to IFPRI, he worked for 5 years as a program and research analyst with Helen Keller International (HKI), Bangladesh. Also, he worked for Charite, Germany as a consultant. He

completed his graduation in Nutrition and Food Science from the University of Dhaka and received post-graduation in Food Security Policy and Management from the University College Cork, Ireland.

Renuka Jayatissa: Dr. Renuka Jayatissa MBBS, M.Sc, MD, FPGIM, FCCP is a Consultant Community Physician, and Head of the Department of Nutrition, Medical Research Institute, Sri Lanka. She obtained her nutrition training in UK and has worked as a Nutrition Specialist for the Ministry of health and UNICEF. She is the current President of Sri Lanka Medical Nutrition Association, Regional coordinator of Iodine global network and Past President of Nutrition society. She pioneered in establishing the MD clinical nutrition degree in Sri Lanka. Her research interests are child and adult malnutrition, micronutrients, food security and clinical nutrition. She has published widely and is an editor and reviewer for numerous journals.

Maxim Parvin: Dr.. Maxim is a medical officer at Dhaka Civil Surgeon Office, Dhaka. She is also studying an MPhil course (thesis part) at the Institute of Nutrition and Food Science at the University of Dhaka. My research interest is in the field of nutrition and food science. She had completed my undergraduate in medical science (MBBS) from ZH Sikder Medical College under the University of Dhaka. So far, she has one international research article on nutrition and food science.

Abira Nowar: Abira, a faculty of the Institute of Nutrition and Food Science at the University of Dhaka. He has completed my Master's and Bachelor in Nutrition and Food Science. Her research interest is the management of non-communicable diseases through implementing community and individual-level interventions. She has skilled herself in qualitative and quantitative research methodologies, development and validation of tools, and software such as SPSS, STATA, and REDCap. She envision herself as a prominent researcher in my field and pursuing her dream of higher studies.

Esther Choo: Esther Choo is a PhD candidate in the Global Health Implementation Science program at the University of Washington. She is interested in assessing and operationalizing interventions to address the double burden of malnutrition globally. Her research focuses on economic evaluations of food system strategies in resource-constrained settings, understanding food environments and drivers of unhealthy consumption. She has fourteen years of international development experience specialized in agriculture and nutrition. She has lived and worked in Uganda and DRC where she managed food security, nutrition, and financial inclusion programs. She holds an MPH in Global Health/Public Nutrition from Emory University.

Anjali Pant: Anjali Pant is a Senior Research Analyst at the International Food Policy Research Institute. She works in the Poverty Health and Nutrition Division, where she contributes to evidence-based research activities using large scale public health and socioeconomic datasets. Her research interests include investigating context-specific drivers of undernutrition, its impact on human development, and identifying policy measures that can help improve maternal and child health. Anjali has a Master's degree in Economics from the Madras School of Economics in Chennai, India, and has worked in the development sector for over 6 years.

Aashi Gupta: Aashi Gupta is an experienced Research Assistant who is skilled in Stata, Data Analysis, R, and Statistics. She has a Master's degree focused in Economics from Boston University, and is currently pursuing PhD in Economics from Delhi School of Economics.

Thematic Session 4: Children's diets, determinants, and interventions in South Asia

Sabrina Rasheed (co-chair): Sabrina Rasheed is a Scientist at the International Centre for Diarrheal Disease Research, Bangladesh (icddrb), and is based in Dhaka, Bangladesh. She works within the Urban health theme of Health Systems and population Studies Division of icddrb. In terms of the focus of her research in Bangladesh, Dr. Rasheed extensive experience in working on maternal and child nutrition, health systems, urban health, ICT for health and climate change. She has conducted policy analysis, implementation research and evaluation of large-scale health and nutrition programs. Dr. Rasheed has a PhD in International Nutrition from Cornell University.

Romaina Iqbal (co-chair): Dr. Romaina Iqbal is a Nutrition Epidemiologist by training. She is the Section Head for NCDs and Mental Health in the Department of Community Health Sciences at the Aga Khan University, Pakistan. Her research interests include measuring diet in different population groups in South Asia, Food Environment in LMICs, and the Association of diet with CVD and diabetes.

Jith J.R.: Jith J R is a PhD Research Scholar at the Department of Humanities and Social Sciences, Indian Institute of Technology Guwahati. His current research focuses on maternal and child nutrition interventions and contextual factors that influence the implementation. Prior to this, he was associated with Health Governance Hub at PHFI, working on a project focusing on local governments and public health and various other independent research projects.

Stacy Saha: Stacy Saha is a nurse, midwife, epidemiologist (MSc from LSHTM) who has worked at LAMB (Lutheran Aid to Medicine in Bangladesh) rural integrated health and development project since 1993. From 2006 to September 2022, she led the management information systems and research department (MIS-R) at LAMB. Research interests include diet and nutrition during pregnancy and early childhood, adolescent mental health, adolescent sexual and reproductive health including gender-based violence, and poverty assessment and improving health access for poor and marginalized groups.

Farzana Bari: Farzana Sultana Bari, (MS and BS in Nutrition and Food Science, Dhaka University) a Public Health Nutrition enthusiast, who has concentrated her career on community nutrition and nutrition education to reduce nutrition-related health disparities to attain the full potential of the population's health and well-being. She has over ten years of teaching experience. She also served as a research coordinator at the Institute of Allergy and Clinical Immunology of Bangladesh (IACIB). In her academic career, she has completed 13 research projects, eleven of which were published in peer-reviewed journals.

Indra Kshetri: Mr. Indra Dhoj Kshetri, is the Senior Manager – Outreach and Knowledge Management for USAID funded Suaahara II Good Nutrition Program in Nepal. Led by Helen Keller International, Suaahara II is dedicated to improving the health and nutrition of women and children. Indra's main interests focus on using digital and social media technologies for behavior change, SBCC design and implementation, Risk Communication, program outreach and advocacy. He has an MA in Journalism, Media and Communication from the University of Dhaka and has been working in Nepal for more than ten years in mainstream media, development communication and social and behavior change communication.

Atul Upadhyay: Mr. Atul Upadhyay holds a Ph.D. in Food Science & Nutrition and has over 20 years of work experience with governmental, non-governmental and private organizations. As a researcher, he has developed several nutrition supplements and has authored more than 30 articles and several book chapters. As the Chief Executive Officer of Baliyo Nepal Nutrition Initiative, he oversees programs that rally

different stakeholders in improving food safety and nutritional situation in Nepal. He is member of several high-level national and international committees on food and nutrition, including the WHO/FAO Codex Committee on nutrition. He also leads the Country Sun Business Network and is the president of the Nepal Food Scientists Association.

Sanam Soomro: Sanam Iram Soomro is a resident of Hyderabad Sindh Pakistan and received her Ph.D. in 2022 in the field of Analytical Chemistry, under the thesis title, "Revision and Development of Food Composition Table for Pakistan." Currently, she is a nutrition analyst and food analytical chemist at Aga Khan University. She has completed 3 different projects as a nutrition analyst and two projects as a food analytical chemist, which aimed to develop new methodologies for extraction of nutrients from plant food and production of new fortified food.

Avani Verma: Ms. Avani Verma holds a MSc. in Food and Nutrition and has been working as a Junior Technical expert in the GIZ "Securing Nutrition, Enhancing Resilience" (SENU) project since the last 6 months. She focuses on the project's Monitoring and Evaluation, Knowledge management, Communication and Gender component. She had experience in public health and nutrition research work with special focus on gender equality and women empowerment. She has worked in both urban and rural communities of India, and is passionate to engage in community based interventions and behaviour change approaches

Karishma Navalkar: Karishma Navalkar is a native of Mumbai and completed her graduation in Pharmacy from HK College of Pharmacy, Mumbai in 2012. She received her Masters in Public Health Administration from Tata Institute of Social Sciences. During post–graduation, she interned with rural and urban health NGOs and public health systems and got placed in NRHM – Gujarat. She worked there for 9 months before moving back to Mumbai and secured a job in CSR firm. She joined SNEHA (Society for Nutrition, Education and Health Action) in 2016 as Monitoring Evaluation and Research Coordinator for one of their public health projects based out of Dharavi, Mumbai.

Thematic Session 5: Policies, programs, and solutions for improving diets in south Asia

Lalita Bhattacharjee (co-chair): Lalita Bhattacharjee, PhD, is a senior nutrition and public health expert with a professional career spanning 45 years. Her work encompasses research, teaching, and policy, and she has worked in academia in India and in Thailand for over 20 years, and for 19 years as a Senior Nutritionist with the Food and Agriculture Organization (FAO) of the United Nations guiding food-based nutrition and healthy diets through agriculture and public health linked strategies in Bangladesh, India (selected states) Laos, Rome, Sri Lanka, and Thailand. She serves as a senior Nutrition Advisor to FAO, IFAD and GAIN on an ongoing basis. Dr Bhattacharjee has been the recipient of FAO's biennial B.R. Sen Award for 2014 in recognition of outstanding contribution towards improvements in food-based nutrition in Bangladesh.

Timothy J. Krupnik (co-chair): Leading a transdisciplinary, multicultural science team that works to raise farmers' productivity, increase resilience, and improve livelihoods and diets, Timothy Krupnik 20+ years of research experience in the global south. Timothy is the International Maize and Wheat Improvement Center's (CIMMYT's) Innovation Science Lead for Agroecosystems and Food Systems in Asia and Country Representative for Research and Partnerships in Bangladesh. Timothy is also CGIAR Country Convener for Bangladesh and leads the CGIAR Regional Integrated Initiative Transforming Agrifood Systems in South Asia (TAFSSA). He has authored 125 papers, books, and policy briefs, and has developed a range of agricultural decision support tools.

Gregory Cooper: Greg's research cuts across the major themes of developing agri-food systems, environmental sustainability and social-ecological resilience. He joined the Department of Geography and Institute for Sustainable Food as a postdoctoral research fellow on the UKRI funded Action Against Stunting Hub in March 2021. Prior to joining the University of Sheffield, Greg spent three years at the School of Oriental and African Studies (SOAS) as the Postdoctoral Research Fellow on the Market Intervention for Nutritional Improvement (MINI) project (funded by the Bill & Melinda Gates Foundation and the UK Government's Foreign, Commonwealth and Development Office). Greg completed his PhD in Geography at the University of Southampton, where he used system dynamics modelling to explore the social-ecological sustainability of the Chilika lagoon fishery system in Odisha, India. Greg also holds a BSc in physical geography from the University of Southampton.

Gopinath Radhakrishnan: R Gopinath is a Development Economist, working with MSSRF as Principal Scientist. He has more than 15 years of experience in research and development. His core areas of interest are food security, agrarian transformation and Monitoring and Evaluation of developmental projects. Currently, Dr Gopinath engages in rural transformation programmes focusing on food and nutrition security at both practice and policy interfaces.

Munawar Hussain: Munawar is a program design, research and policy expert with more than 20 years of professional experience in agriculture, food security and nutrition programs. He worked closely with national and subnational governments for design and development of public health, agriculture and nutrition policies, programs and action plans. He has significant knowledge of agriculture value chain and key challenges faced by the value chain actors in Pakistan. He led number of projects and served at key management positions with national and international organizations. He also undertook consultancy assignments with public and private sector including INGOs and UN agencies.

Madison Bearden: Madison Bearden serves as a graduate research assistant at Emory University within the Rollins School of Public Health. Her research focuses on social and behavioral change within nutrition-sensitive agriculture programs as well as malnutrition and epidemiologic interventions within South Sudan. Bearden is a qualitative analytics and epidemiology assistant at The Carter Center in the Trachoma Control Program in Atlanta, Georgia. She received her bachelor's in anthropology from Augusta University and Master of Public Health from Emory University, expected in May 2023.

Ruchi Sareen: Ms. Sareen is a nutrition professional working in the field of Public Health Nutrition for the past 10 years. She serves as Program Manager for the Large-Scale Food Fortification Project at the GAIN India office. Her core interests and areas of expertise include nutrition interventions for food fortification, Maternal and Child Health, and child feeding practices. She obtained her Master's in Food and Nutrition with a specialization in Public Health Nutrition at Delhi University.

Closing Plenary: Looking forward: actions to inform policies, programs and research to transform diets in South Asia

Temina Lalani-Shariff : Temina Lalani-Shariff is Regional Director, South Asia, CGIAR, and a trusted leader who brings over 20 years of diverse management and business development experience in the research and innovation industry, energy, tech, telecommunications, non-profit and government sectors. She is an adaptable leader and team-builder, deeply committed to fostering an environment of creativity, inclusion, and innovation where people can do their best work.

After having established and grown a boutique public relations firm, she joined the International Rice Research Institute (IRRI) where she served as Director of Global Advocacy and Brand for the past five years. Here, she has led the development of an institution-wide advocacy strategy to increase and diversify IRRI's profile and supporters as well as intensify support for broader global issues of climate change adaptation and mitigation, nutrition security and equitable access to technology. In each role, she has generated support for the organization's mission from governments, private funders and stakeholders.

Zivai Murira: Zivai Murira is the Regional Advisor, Nutrition at UNICEF's Regional Office for South Asia and is based in Kathmandu, Nepal. In this role, Zivai is leading broad regional efforts to improve nutrition of women and children in the South Asia region: technical advice and support, advocacy, networking, and partnership building; capacity development and knowledge management.

Priyanka Jayawardena: Priyanka Jayawardena is a Research Economist at the Institute of Policy Studies of Sri Lanka (IPS). She has around 20 years of research experience at IPS. She has conducted numerous research studies on the economics of health and nutrition, education, fiscal policy, and equity analysis. Priyanka has worked as a consultant to many development partners including the World Bank, ADB and UNICEF and various government ministries. Many of her research has been published in peer-reviewed national and international journals and book chapters.

Helen Harris-Fry: I am an Assistant Professor at the London School of Hygiene & Tropical Medicine and hold a PhD in Public Health Nutrition from University College London. Over the past 10 years, my research has focused on co-developing and testing equitable and impactful approaches to improve nutrition outcomes, mostly in rural South Asia. This has involved the evaluation of a range of interventions, including agricultural interventions, participatory women's groups, nutrition counselling, and cash transfers. I am on the editorial board of Maternal Child Nutrition journal and co-lead a mentoring scheme for early career professionals working in agriculture, nutrition and health.

Christine Blake: Dr. Christine E. Blake is an expert in food choice and child feeding behaviors with an emphasis on people and organizations that shape these behaviors in families and children. Her mixed-methods research has examined food choice, food parenting, and how the integration of work and family demands impacts food choice decisions in multiple Low-, middle-, and high-income country contexts. Dr. Blake was PI of the Drivers of Food Choice Competitive Grants Program funded by the Bill & Melinda Gates Foundation and UK DFID that facilitated research on the drivers of food choice in Asia and Africa.

Abstracts

Oral Presentations

Thematic session 1: Maternal diets, determinants, and interventions in South Asia

Assessment of Dietary Intake of Overweight/Obese Pregnant Women belonging to upper SES residing in North-West Delhi: A Longitudinal Observational Study; *Priyanka Arora, Institute of Home Economics, Delhi University*

Background: Good maternal nutrition is crucial for optimal feto-maternal health. Since, overweight/obesity is often recognised as "over-nourished," dietary intake of obese women is neglected during their pregnancies. Increase in prevalence of maternal obesity in South-Asian countries in recent years is worrisome, henceforth, the present study was planned to assess dietary intake among affluent overweight/obese pregnant women residing in North-West Delhi. **Approaches/methods of innovation/changes implemented:** A total of 312 women with singleton pregnancy, BMI >18kg/m2, belonging to upper SES were enrolled within 12th week of their pregnancies from private antenatal clinics in North-West Delhi. At enrolment, subjects were categorised into normal weight (NW; BMI:18–22.9 kg/m2), overweight (OW; BMI:23–24.9 kg/m2) and obese (OB; BMI: ≥25 kg/m2) according to Asian-Indian BMI criterion (2009).This was a longitudinal descriptive study wherein data were gathered at <16th week(baseline),18th-20th week(midterm) and >32ndweek-childbirth(term).Data related to socio-demographic and obstetric history were collected from participants using structured questionnaire. Anthropometric measurements and dietary intake were assessed using standardised tools and 24-hour dietary recall respectively. STATA was used for statistical analysis using chi-square and kruskal wallis test. **Key findings:** Overall, suboptimal diet was consumed by OB and OW subjects which was high in carbohydrate(term; OB:260+31.2g/d,OW:215.58+34.63g/d, NW:211+33.92g/d, p=0.000***) and fat (term;OB:48+9.54g/d,OW:48.62+7.59g/d, NW:44.68+7.43g/d, p=0.382) while was inadequate in protein (term;OB:52+11.81g/d,OW:47.52+3.84g/d,NW:46.32+4.37g/d, p=0.333). Adequate intake for calcium (term;OB:100%,OW:100%,NW:100%),folate (term;OB:100%,OW:68.12%,NW:69.86%) and zinc (term;OB:100%,OW:100%,NW:100%) were consumed by most of subjects. For vitamin-A (term;OB:74.76%, OW:84.06%, NW:90.41%), thiamine (term; OB:98.06%, OW:98.55%, NW:100%),riboflavin (term;OB: 100%, OW:100%, NW:100%), niacin (term; OB:98.06%, OW:100%,NW:100%), vitamin-C (term; OB:48.54%, OW:56.52%, NW:69.86%) pyridoxine (term; OB:95.15%, OW:100%, NW:98.63%), cyanocobalamin (term; OB:100%, OW:100%, NW:100%) and magnesium (term; OB:36.89%, OW:34.78%, NW:36.99%), intake was inadequate among most of subjects. Thus, it highlights a dual burden of maternal obesity and multiple micronutrient inadequacy which would have amplified the burden among OW and OB subjects. **Significance and application:** Most maternal nutrition policies in South Asian countries are geared towards reducing under-nutrition. Results of current study underscore to expand antenatal care programmes to address overweight/obesity. Interventional studies are warranted to determine adequate dietary intake for overweight/obese pregnant women which can help to manage excessive weight gain, combat micronutrient deficiencies, and achieve positive pregnancy outcome.

Influence of gendered social norms on intra-household food access and consumption: evidence from Uttar Pradesh, India; *Aradhana Srivastava, UN World Food Programme*

Background: In India, prevailing discriminatory social norms significantly influence intrahousehold food distribution, depriving certain vulnerable members of healthy and complete diets. The UN World Food Programme conducted a study in Uttar Pradesh to understand such norms, and food-related cultural taboos and perceptions that prevent healthy diets for all household members. **Approaches/methods implemented:** The study followed a phased mixed methods approach using focused group discussions, key informant interviews and in-depth interviews with community women and men, community health workers and government staff to explore social norms influencing intrahousehold food distribution and consumption. Informed by the first phase, a quantitative survey of 1049 women from rural and urban poor households was conducted in three districts. Themes included food security, use of government food programmes, intrahousehold food access, and knowledge and practices on food selection and decision making around food. Qualitative analysis was thematic using grounded theory approach. Household data was analysed using descriptive statistics. **Key findings:** Gender norms influenced pattern of food access and consumption within households: Usually men brought food home while women and girls cooked and served it. • In most households, men and boys ate first, while women and adolescent girls ate last. In case of food shortage, women were expected to reduce their consumption over others. • A large percentage of households believed in following potentially unhealthy food taboos like restricting yogurt and fruits among children in winter. • About a third of the surveyed households still followed the norm that pregnant women should eat less for an easy delivery, depriving them of adequate diet. **Significance and application:** Deeply entrenched social norms and cultural food taboos in India imply that emphasis on healthy diets alone will not be adequate to make a change towards healthy eating for all. Such programmes should also include targeted social and behaviour change communication for women and men, as per their household decision-making roles.

Social environment, mental health and dietary diversity: a multicomponent pathway analysis among married women of reproductive age in Bihar; *Shuchi Sree, Knowledge Management and Learning centre, Care India Solutions for Sustainable Development*

Background: Evidence suggest social oppression and poor mental health are interrelated precursors for undernutrition which affects ~20% Indian women. Resource poor patriarchal states like Bihar, where >25% are undernourished, mental health is often silenced among women and emotional roots of under nutrition remain unexplored, calling for a deep dive. **Approaches/methods implemented:** Cross-sectional study conducted in 38 districts of Bihar using multi-staged cluster random sample of 22,800 consenting married women of reproductive age through in-person interviews using a structured, pre-tested tool. The outcome of interest was minimum dietary diversity (MDD; consumption of a minimum ≥7 of 10 food groups during previous 24 hours). Potential predictors within the domains of violence (physical/emotional/sexual) and mental health disorders were used in addition to known sociodemographic determinants. Analysis (using SAS 9.4) involved frequency distributions of various indicators and logistic regression was conducted to establish associations between outcome and probable determinants. **Key findings:** Nearly 24% women had MDD. Cereals and pulses (>75%) remained predominantly consumed food groups as opposed to green leafy vegetables, vitamin A rich foods, animal proteins. Younger, educated, zero parity wealthier women from non-marginalized castes were more likely to have MDD. Similarly, those with exposure to specific counselling and social media were at higher odds (aOR[counselling for MDD]:1.43;aOR[media exposure]:1.50). Some level of empowerment (mobility, decision making capacity and economic independence) was positively associated (aOR[empowered women]:1.22) with MDD. Mental health disorders and any form of violence were strong negative correlates for MDD (e.g. aOR [History of mental disorders]:0.87;aOR[any violence experienced]:0.88). **Significance and application:** Broader nutrition related interventions need to incorporate provisions for considering micro groups vulnerable to violence and mental health disorders. Such realities remain under-acknowledged. Given programmatic feasibility and interests, current evidence may be utilized in re-orienting and converging existing nutrition programs with

the likes of mental health programs.

An intersectionality evaluation of the reach and benefit of nutrition-sensitive agricultural programmes and their impact on intersecting inequalities in maternal diets in rural Odisha, India; *Emily Fivian, London School of Hygiene and Tropical Medicine.*

Background: Evaluations of nutrition-sensitive agricultural (NSA) programmes have focused more on average effectiveness and less on equity. We unpack the relative reach and benefit of NSA programmes tested in the 'UPAVAN' trial, and their impact on intersectional inequalities in maternal diets in Keonjhar district Odisha, India. **Approaches/methods implemented:** NSA programmes comprised women's groups using: a) videos on NSA or nutrition-specific topics (videos only), or b) videos on NSA and nutrition-specific topics, combined with a Participatory Learning and Action approach (videos+PLA). We analysed cross-sectional endline data of 3,294 women from 111 clusters where NSA programmes were delivered. Exposures were caste-by-wealth and caste-by-education social intersections and the outcome was minimum dietary diversity. We first describe associations between social intersections and dietary diversity, and then decompose how much of this association was due to differences in the probability of participating and/or differences in the effectiveness among those who do participate. **Key findings:** Nutritionally best-off intersections were wealthier and most educated non-Scheduled tribe women. Participation was higher among nutritionally better-off intersections, however, contributions to intersectional differences in diets were small, widening gaps by a maximum of 3%. Among those participating, NSA was less effective among best-off relative to nutritionally worst-off caste-by-wealth intersections (videos only: excess relative risk (ERR (95% CI) -0.12, (-0.23, -0.02); videos+PLA: ERR -0.11 (-0.25, 0.03)), but not caste-by-education. Among non-Scheduled tribes, poorest and least educated women benefited more in both programmes. Among Scheduled tribes, wealthier and most educated women benefited more in videos only; benefits were more equitable in videos+PLA. **Significance and application:** NSA programmes from the UPAVAN trial narrowed several intersectional inequalities in maternal diets. PLA is important for achieving equitable dietary benefits for multiply marginalised groups (e.g., poor and Scheduled Tribe women) relative to other intersections; whilst videos only were sufficient for narrowing gaps in diets among singularly marginalised intersections.

Engaging Men for Better Nutritional and Family Health Outcomes; *Anurudra Bhanot, Project Concern International (PCI)*

Background: The intervention was an innovative solution co-designed to engage men in household nutrition decisions. Food preparation and feeding the children are considered women's responsibility, but men control resource allocation towards purchase of food items, and their food choices dictate what gets cooked in the household, often leading to neglect of children and women's nutritional needs. The intervention was implemented by PCI and Dalberg over 2 years in Bihar state in India. Learn more. **Approaches or methods implemented:** Couples with a child aged 6-24 months were enrolled in a financial planning course to help them achieve their economic goals. Exercises after each module included tools to visualize and track the nutrition habits of the child. Parents were motivated to discuss, and make more collaborative decisions on what they purchase, prepare and feed the child. Healthier and well-nourished children were positioned as a route to the family's overall and economic well-being. Project staff gathered and analyzed data on the number of food groups fed to the child, and discussed the findings with the couples every week. **Key Findings:** Awareness about the minimum dietary diversity for children increased by 34% points among those exposed to program interventions compared to those not exposed. Spousal communication about child nutrition increased by 24% points, translating into a net increase of 16% points of children getting a minimum diet diversity in intervention villages. Interestingly, the percent of mothers getting five or more food groups everyday also increased by 14% points in intervention villages.

Parents in intervention villages reported decrease in feeding of packaged snacks to children, and fewer instances of medical expenses on child illness. **Significance and application:** The development sector has anchored on nutrition programs focused largely on women. This has led to a further widening of the gender gap and has left behind an opportunity to accelerate outcomes by engaging men. Findings from the learning pilot underscore the need to engage both men and women in nutrition programs to improve gender equity within the household, and the health outcomes of children and women.

Nobo Jatra: A New Beginning for Improved Maternal & Child Health and Nutrition in Southwest Bangladesh Through Multi-Layered Interventions; *Alex Bekunda, World Vision International*

Background: Nobo Jatra, USAID funded project addressing systemic causes of undernutrition and chronic food insecurity in Southwest Bangladesh through improving gender equitable behavior practices, knowledge and capacities for household nutritious food production, assets and incomes. Implemented since 2015 through a consortium led by World Vision International. **Approaches or methods implemented:** Nobo Jatra's health and nutrition approaches advocate for and address the causes of undernutrition with interventions focused on integrated Social Behavior Change targeting pregnant and lactating women (PLW), caregivers of children and adolescents. SBC tactics include household visits, courtyard sessions and cooking-feeding demonstrations, providing nutrition safety nets (USD 23) for 15 months to 23600 PLW and onetime cash grants (USD 176) to 21000 ultra-poor women, advocating for uptake of sustainable health service delivery models through the government and capacity building of health professionals. Program activities were subject to routine monitoring, learning utilization and participant annual surveys. **Key findings:** Women's minimum dietary diversity and the percentage of children having a Minimum Acceptable Diet (MAD) improved in program areas, with 53.6% of women considered to have minimally diverse diets at endline compared to 49.9% at baseline and 48.1% of children with a MAD at endline versus 38.9% at baseline. Child stunting and wasting rates reduced by 7.8% and 9% from 26.8% and 17.4% respectively and 57.5% of children are exclusively breastfed compared to 29.2% at baseline. Cash transfers along with SBC aided women in purchasing nutritious foods while homestead food production increased availability of vegetables and animal-based protein. Remote areas, COVID-19, natural disasters and ingrained socio-cultural behaviors are notable barriers. **Significance and application:** NJP's results show that positive nutrition outcomes are possible when interventions are delivered as part of a multi-sectoral intervention including WASH, climate resilient food production, disaster risk reduction and women's economic empowerment. NJP's MCHN model could be applicable to other regions of South Asia prone to climate-related natural disasters.

Improving dietary diversity through an integrated food security resilience and SBCC approach; *Satish Kumar Srivastava, Catholic Relief Services (CRS)*

Background: The five-year project aimed to improve dietary diversity among food insecure tribal pregnant, lactating women (PLW) and children of 6-23 months by promoting nutrition sensitive crop diversification, improving food production and SBCC around household level decision making for consumption of diversified foods. Implementing NGO- SWAD, Financial & technical support- CRS & NABARD. **Approaches or methods implemented:** A two-pronged strategy was used consisting of 1) promoting improved practices to sustainably increase access to the nutritious food and 2) SBCC to influence decision making at the household level on diversified diet. Key methods included capacity building to increase farming skills, natural resource management, cooking demonstrations to popularize local foods and home visits/counseling to PLWs, husbands and mothers-in-laws. Indicators of USAID's FANTA project were used for measuring minimum dietary (MDD) scores and HH Food Insecurity Access. The MDD was consumption

of at least 5 out of 10 defined food groups for PLW, 4 of 7 groups for children during past 24hrs. **Key findings:** Comparison of food consumption pattern in baseline and endline evaluations: Food Secure HHs: 7% to 40.8%. Consumption of minimum diversified diet: PLWs: 17% to 73.2%, Children: 31% to 82.2%, Consumption of three prioritized foods:

Pulses: women- 67% to 92.6%, children-58% to 95.2%, Green leafy vegetables (GLVs): PLWs-49% to 71.3%, children- 28% to 64.3% , Egg: PLWs- 4.0% to 43.6%, children- 9.0% to 47.2%,

Integrated approach addressing critical issues like low production, availability and poor buying capacities, created a conducive platform for successful implementation of SBCC. Promotion of kitchen gardens was very helpful in accessing GLVs. However, round the year access to water was a barrier in it. **Significance and application:** SBCC activities targeting husbands & mothers-in-law who play major role in decision making helped in changing the behavior of PLWs. • Interventions grounded with extensive research do have the capacity to overcome social taboos and customs. • Integrated implementation (access, availability and SBCC on diet) was beneficial • PLW's consumption of egg distributed by ICDS increased

Thematic session 2: Adolescent diets and determinants in south Asia

Food consumption practices and their determinants among school-age children and adolescents in Bhutan, *Kunzang Deki, School Health and Nutrition Division, Ministry of Education, Bhutan*

Background: To gain a deeper understanding of dietary practices of Bhutanese school aged children (aged 5-18 years), the determinants of these behavior including food preferences, opportunities and motivation to consume healthy diets. The research also looked at various channels of communication and influencers around school-age children at the personal, social, community and national levels to identify optimum ways to engage with children **Approaches or methods implemented:** A qualitative research design was used in the study, employing six distinct data collection methods including: 1) free-listing, 2) pile sorting, 3) photo journal eliciations, 4) focus group discussions among children and their care givers,5) in-depth interviews of school staff, 6) observations at homes, school kitchens/mess, halls and retailers within 100 meters of schools. Data were collected from 24 schools, purposely selected from three ecological and cultural-linguistic regions, including rural and urban, and boarding and day schools. Data analysis method of each sub-study varied, using Anthropac for free-listing, Optimal Workshop for Pile Sorting, and thematic analysis of other qualitative data. The research protocol was approved by the National Research Ethical Review Board of the Ministry of Health in Bhutan. **Key findings:** The study found a clear difference in ways students conceive "Meal" versus "Snack" foods. "Meals" often refers to whole foods such as rice, eggs and beans, and others, and "Snacks" saliency scores highest for processed convenience foods such as instant noodles, chips, and others. While the pile-sorting activity found that students were aware that snack foods listed are "unhealthy" and that fruits and vegetables are "healthy", data from the photo journal elicitation and focus group discussions revealed that this knowledge does not always translate into practice. Students reported frequent consumption of "Snacks', which are quickly making their way into meal times. Determinants of consumption of unhealthy junks include taste preferences, availability, convenience, affordability, their role in building social bonds with friends and families, and as an expression of an independent psychological identity. **Significance and application:** Through the National School Feeding and Nutrition Programme, the Royal Government Of Bhutan has tried to counter the proliferation of unhealthy snacking by providing nutritious school meals at rural and boarding schools around the country (covering approximately 65 percent of all school-aged children). There is at least partially enforcing strict no-junk policies in all schools. However, additional work and creative solutions are required to counter this trend. Led by the Ministry of Education, a national Social Behaviour Change Strategy will be developed based on the findings of this study with proposed interventions through a 5 year action plan. Operational research to test the relative impact of interventions to curb snacking will be required.

Dietary diversity among young adolescents living in urban informal settlements in Mumbai: A cross-sectional study ; *Sheetal Rajan, Society of Nutrition Education and Health Action.*

Background: Adolescence is a period of phenomenal growth yet not much is known about the nutrition and dietary practices of adolescents, especially young adolescents in the urban context. This study aimed to determine the dietary diversity among adolescent boys and girls residing in urban informal settlements in Mumbai. **Approaches or methods implemented:** Data were collected from 687 randomly selected adolescents, aged 10-14 years, in a cross-sectional survey conducted between December 2020 and February 2021. Because of the COVID-19 pandemic, all data were gathered through telephone interviews. Food and Nutrition Technical Assistance (FANTA) tool was used to measure minimum dietary diversity with a recall period of 24 hours. Those who met the criteria of a cut-off of five food groups were classified as having adequate dietary diversity, a proxy indicator for higher micronutrient adequacy. Additionally, details regarding intake of iron and deworming tablets were also recorded. **Key findings:** Only 31% of the participants were found to have adequate dietary diversity. Proportions of adolescents who consumed from the different food categories over a 24-h period were; cereals/grains (99.6%), legumes (94.5%), other vegetables (65.4%), other fruits (33%), flesh foods (27.8%), green leafy vegetables (25.9%), dairy products (21.4%), nuts/seeds (17.5%), eggs (11.5%) and vitamin A-rich fruits and vegetables (9.6%). 3% of adolescents had received IFA supplement in the preceding month of the survey and 7% had received deworming tablet in the preceding six months of the survey. **Significance and application:** The findings reveal low diversity in adolescent diets, coupled with low coverage in receiving IFA supplement. Given that adolescence offers a nutrition-sensitive window to promote healthy growth, adolescent-responsive nutritional interventions are a pressing need. Further research is needed to address the data gaps related to specific age groups (10-14 years) and specific outcomes like micronutrient deficiencies.

Adolescents' dietary behavior and its linkages with nutritional status: a study of dual earner's; *Ajay Gupta, International Institute for Population Sciences.*

Background: Lack of time prompts working parents to ask their growing child to have food outside. Also changes in lifestyle behavior of adolescent affects dietary pattern that impacts nutritional status and increase risk of chronic diseases. This study is an attempt to understand dietary behavior of adolescents of dual-earners and nutritional status. **Approaches or methods implemented:** A self-administered questionnaire was developed to explore the lifestyle, psychological wellbeing and nutrition of the adolescents aged 15-19 years whose both parents are working and those studying in the colleges of Delhi and Mumbai University. 447 adolescents selected through criteria, completed the interview. Data was analyzed using the statistical techniques in Stata 14. The Adolescent were probed about the number, place, and skip pattern of meal as well as the consumption of various food items they had in the week preceding the survey. The Anthropometric measurement were taken to understand the nutritional status. **Key Findings:** Half of respondents had breakfast and one-third had lunch on previous day. Less than one-third of adolescent reported consumption of vegetables except potatoes in preceding week but 95% reported eating at least one serving of energy-dense snack. Less than half of respondent consumed a particular fruit/juice while 80% reported drinking one servings of energy-dense beverages. Overall, adolescents reported poor dietary intakes. It is found that time spent(more), family affluence(rich) and parental education(higher) impacts the consumption. Also, consumption of energy-dense food/beverages is found to be related with obesity. **Significance and application:** The dual-earner nuclear families don't have much time to discuss the dietary behavior that not only affects their physical health but also impact the psychological wellbeing in the long run. Therefore, there is need to further assess the role of economic burden on the growing child which accompanies them to adulthood if left behind and increase the risk of diseases.

Ultra-processed food consumption trends and its impact on nutritional status among school going adolescent girls from rural areas of Jorhat district of Assam ; *Mandeep Digra, Darm2food Foundation*

Background: Ultra- processed food consumption is increasing day by day and thereby can be categorized as an emerging threat to public health. India is home to 253 million adolescents with the majority living in rural areas. Among adolescent girls, iron deficiency anemia also constitutes a major public health problem. The present study was carried out with objectives to assess ultra-processed food (UPF) consumption trends and its impact on nutritional status among school going adolescent girls. **Approaches or methods implemented:** Simple random sampling was employed for the sample selection of 100 adolescent girls from the age group 16-17 years. A standardized interview schedule was prepared to record background information; anthropometric indices (height and weight; clinical signs and symptom, and biochemical (hemoglobin estimation) procedures were used. For the assessment of UPF consumption, food frequency questionnaire based on modified NOVA classification was used. **Key findings:** Results showed that mean heights and weights of the target group ranged between 152.7 to 152.8 cm and 42.98 kg to 45.09 kg respectively and were lower than ICMR standards (159.7 cm to 160.2 cm and 51.3 kg to 52.8 kg, respectively). Majority of the population samples were found to be normal (81%), followed by thinness (12%), overweight (6%) and severe thinness (1%). The estimation of hemoglobin level indicated high prevalence of iron deficiency anemia (67%) among the target group. Clinical signs and symptoms of adolescent girls depicted deficient of nutrient intake of iron, vitamin C and beta-carotene. The study on the UPF inferred that the consumption of these food items on daily basis was highest for the packaged and branded biscuits, cream biscuits, cookies, cream puffs/rolls and other similar items (86%) followed by packaged and branded chips, nachos, puffs and other similar items (66%). On the other hand, consumption of UPF per week was highest for packaged and branded bread and other similar items (73%) followed by aerated/cold/soft drinks and other similar drinks (67%). A positive correlation between consumption of UPF and nutritional status was found, however there is no significant relation between consumption of UPF and obesity among adolescent girls. **Significance and application:** Therefore, there is a strong need to focus on reducing UPF production and consumption as it will benefit those affected with malnutrition as well as nutrition-related noncommunicable diseases. Policies should be made for industries to develop minimal processed foods that will have no or less adverse effects on health. There is an urgent need for public policies that can change the eating behavior of adolescence from UPF to minimal processed foods or traditional diet. Further studies are needed to better understand the underlying mechanisms of UPF consumption and nutritional status association.

Consumption of ultra-processed foods among rural adolescents -Evidence from a community based cross-sectional study ; *Purnoor Kaur, King George's Medical University.*

Background: 1. To estimate consumption of ultra-processed foods among rural adolescents aged 15 - 19 years 2. To assess the dietary diversity of rural adolescents aged 15-19 years. **Approaches/methods of innovation/changes implemented:** Community based Cross-sectional study design with 400 participants estimated using assumption of at least fifty percent dietary diversity amongst the rural adolescents aged 15-19 years. Simple random enrolment from family details in ASHA registers was done for interview-based community survey using a pretested questionnaire infield practice area of college. For the survey, 20 - food items were identified from NOVA Class 4 food classification and frequency of consumption was recorded over a 7-day period along with a 24-hour FFQ validated for North India was used for assessing dietary diversity. Descriptive and Inferential statistics were used to analyses data. **Key findings:** Out of 20 ultra-processed food items, more than half of the adolescents (58.5%) reported eating instant noodles and soups three or more days a week. "Ice-creams" (81.8%), "Chips" (73%), "Cakes/pastries" (82%) and "Carbonated soft beverages" (72.3%) were consumed less frequently (3 days in a week) but by higher number of

adolescents. "Biscuits" stood out as the ultra-processed food item consumed daily by 37.7% adolescents, followed by "Packaged breads/buns" (23.7%). Out of 400 rural adolescents, 62.7% consumed ≥5 food groups. Lower age and male gender were associated with dietary diversity ≥5 (p value = 0.002 and p value = <0.001 respectively). **Significance and application:** India are facing a high rise in burden of non-communicable diseases as well as burden of triple malnutrition. This study highlights infiltration of ultra-processed foods even in rural adolescents, thus, underscoring a need of integration of nutritional knowledge in curriculums and providing conducive environment for healthy diet within policy framework.

Thematic session 3: Diets, determinants, and interventions in south Asia

Trends and inequalities in food, energy, protein, fat, and carbohydrate Intakes in rural Bangladesh*; Md. Masum Ali, IFPRI, Dhaka, Bangladesh.*

Background: We assessed trends and adequacies in energy and macronutrient intakes and evaluated changes in inequities by age group, sex, and expenditure quintile. **Approaches or methods implemented:** We used panel data from the 2011 and 2018 Bangladesh Integrated Household Survey (n=20,339 and 19,818 household members ≥2 years, respectively). Dietary intakes were collected using 24-hour recall and food weighing methods. Changes in energy and macronutrient intakes were assessed using generalized linear models and adjusted Wald tests. Inequities in outcomes were examined by age group, sex, and expenditure quintile using the Slope Index of Inequality and Concentration Index. **Key findings:** Between 2011 and 2018, dietary diversity improved across sex and age groups (30-46% in children, 60-65% in adolescents, 37-87% in adults), but diets remain imbalanced with around 70% of energy coming from carbohydrates. There were declines in intakes of energy (3-8%), protein (3-9%), and carbohydrate (9-16%) for all age groups (except children 2-5 years), but an increase in fat intake (57-68% in children and 22-40% in adults). Insufficient intake remained high for protein (>50% among adults) and fat (>80%) while excessive carbohydrate intake was >70%. Insufficient energy, protein, and fat intakes, and excessive carbohydrate intakes were more prevalent among poor households across survey years. Inequity gaps reduced for insufficient energy intake in most age groups, remained stable for insufficient protein intake, and increased for insufficient fat and excessive carbohydrate intakes. **Significance and application:** Despite improvements in dietary diversity, diets remain imbalanced and inequities in insufficient energy, protein, and fat intakes persist. Our findings call for coherent sets of policies and investments toward a well-functioning food system and social protection to promote healthier, more equitable diets in rural Bangladesh.

Nutrition status and gaps in diets of Sri Lankans ; *Renuka Jayatissa, Medical Research Institute, Colmbo, Srilanka.*

Background: 1. To assess the current status of food and nutrient intake among different age/ sex/ physiological groups at household level in Sri Lanka and to assess the percentage of children and adults that meet the recommendations on energy and nutrients in Sri Lanka. **Approaches or methods implemented:** 1.A descriptive cross-sectional study 2. This study was carried out in all 25 districts in Sri Lanka. Households (HH) were identified by using a cluster sampling method and 1,776 households were studied. The dietary assessment was completed for 5,785 individuals and 3,275 were assessed for anthropometry. Assessment of the socio-economic data and the 24-hour dietary recalls were conducted virtually by using a computer-directed interview program and the anthropometric assessments were done in the field. 3.Effect of precooking and/or cooking process on nutrient retention or loss was accounted for using coefficient factors. Raw foods were converted to nutrients using Sri Lankan food composition tables

2021. Data was analyzed using SPSS (version 22.0, IBM, Inc) software package. Frequency, percentage, mean (standard deviation) and median (IQR) were used to present the data. Categorical data was analyzed using chi square test. **Key findings:** The median energy intake among all households surveyed was 1984.3kcal (10th and 90th percentile was 1293.0 and 2937.7kcal), which fulfilled 84.8% of Average Energy Requirement. Median intake of carbohydrate was 313.6g and fat was 49.9g, providing 63.7% and 23.6% of total calories respectively. Meanwhile, median intake of protein (61.4 g) exceeded the EAR at 136.5% and provided 12.7% of the total calories. The total fibre intake was 29.0g, which consisted of 6 g from soluble fibre and rest from insoluble fibre. The median intake of micronutrients at household level were below the EAR except vitamin K (140.3%), iron (102.3%), copper (111.5%), sodium (113.4%), manganese (166.4%), phosphorous(167.9%) and selenium(195%). **Significance and   application:** 1. Dietary energy is inadequate, and intakes of calcium and vitamin A was grossly inadequate. Sri Lanka needs interventions on improving food and nutrition security. 2. Need to conduct additional research to assess the micronutrient status of the different age groups in the country and need to assess the factors affecting the food and nutrition security of the individuals and household levels.

Spatial Differences in Diet Quality and Economic Vulnerability to Food Insecurity in Bangladesh: Results from the 2016 Household income and Expenditure Survey; *Maxim Parvin, Institute of Nutrition and Food science, University of Dhaka.*

Background: To explore the spatial differences in diet quality and economic vulnerability to food insecurity with the association of sociodemographic characteristics at the household level in Bangladesh. **Approaches or methods implemented:** This study involved secondary analysis of 46,076 households of Household Income and Expenditure Survey (HIES) data of 2016. A total of 125 food items were considered in the diet quality analysis. Both statistical and spatial analyses were applied while assessing diet qualities in terms of the household dietary diversity score (HDDS), percentage of food energy from staples (PFES), and percentage of expenditure on food (PEF) as an indicator of the economic vulnerability to food insecurity (EVFI). **Key findings:** Diet quality degraded as one moved from urban to rural while EVFI increased in the peripheral region. Nationally, the average HDDS was around 6.3, and the household PFES was around 70.4%. Both the HDDS and PFES showed that rural areas and the north, northwest and southeast regions had mostly low diet diversity. Besides, the average PEF per household per day was about 54%, with the highest in rural and lowest in the city. Age, sex, educational qualification, household head's religion, number of earners, income, place of residence and divisions were significantly associated with HDDS, PFES and EVFI. **Significance and application:** 1. Targeted interventions should be implemented in peripheral areas of South Asian Countries to increase diet quality and minimize economic vulnerability to achieve sustainable food and nutrition security. 2. Further study is required to assess the individual diet quality inequality as well as seasonal variation in diet quality and economic vulnerability to food insecurity.

Cost of Recommended Diet (CoRD) and it's Affordability in Bangladesh ; *Abira Nowar,, Institute of Nutrition and Food science, University of Dhaka.*

Background: The cost of diet has been increasingly recognized as a major determinant of the quality of overall diets and nutrition outcomes. The objective of the study is to estimate the minimum cost and affordability of the recommended diet based on the updated food-based dietary guideline (FBDG) in Bangladesh. **Approaches or methods implemented:** The cost of recommended diet (CoRD) was computed by using the food prices and updated FBDG of Bangladesh. A list of the most consumed foods was prepared, and their prices were collected in 48 locations through a market survey. For affordability, the household size and daily food expenditure data were taken from the recent Household Income and Expenditure survey of 2016. As CoRDs were calculated for an adult individual, the reported household size was adjusted with adult male equivalent (AME) values. CoRDs were then adjusted by a deflation factor and

divided by the household's daily food expenditure to estimate affordability. **Key findings:** The CoRD was found to be $0.87 per person at the national level. It was the highest ($0.93) in the Sylhet division and the lowest ($0.74) in the Barisal division. About 43% of households could not afford CoRD nationally, and the burden of unaffordability was higher in rural areas. The households spend more than one-third of their expenditure (38%) on starchy staples while they underspend on nutrient-dense foods such as protein-rich animal foods, fruits, leafy vegetables, and dairy. The study also found that across all regions, the prices of protein-rich animal foods and dairy drove up the cost of CoRD. **Significance and application:** South Asian governments should focus on agricultural and public food procurement policies to increase the production and diversity of nutritious foods in the markets. Future research may collect food prices on a large scale at different times of the year to address the seasonal variation of CoRD and its affordability.

New methods for measuring food environments in Nepal ; *Esther Choo, University of Washington.*

Background: Significant shifts in food systems and environments in the last two decades have resulted in a nutrition transition marked by increased consumption of unhealthy foods resulting in the rise of diet-related disease in Nepal and most low- and middle-income countries (LMICs). In LMICs, food environments are complex as individuals access food from a wide variety of sources including informal markets, food stalls, agricultural activities, bartering, in addition to formal markets. New methods to measure the effect of food environments on healthy and unhealthy food consumption are needed. **Approaches or methods implemented:** We pilot a newly developed food environment tool designed to capture perceived external domains of availability, stability, product properties, marketing, and personal domains of accessibility, convenience, affordability, social forces, and desirability of processed foods and dark green leafy vegetables. We initially tested the tool with 146 women 15-49 years of age in Dolkha district, Nepal. Following pilot testing, we embedded the questionnaire within a cross-sectional household survey in Nepal (n=3648 households). Using the household survey data, we will develop a food environment index using a three-step approach: 1) run redundancy tests to identify independent constructs, 2) identify 2-5 candidate index measures, 3) conduct robustness checks for correlation and concordance to identify the best performing index. **Key findings:** The piloting of the tool resulted in a parsimonious set of questions that can easily be incorporated into existing household surveys. We adjusted the tool to include questions for both rural and urban consumers, and response options to reflect the local context for improved comprehension. **Significance and application:** Currently, no standardized tool has been used to identify perceived food environment dimensions: desirability, accessibility, availability, stability, product properties, and convenience of unhealthy foods. A perceived food environment index can easily be adapted to capture local context that will be useful for measuring the influence of food environments on food consumption patterns.

COVID-19 impact on women and children's diet in India; *Anjali Pant, International Food Policy Research Institute.*

Background: (1) We investigated impact of COVID-19 (C19) on diets of women and children in India at district level (DL). (2) We examined variation in diet pattern because of differences in place of residence, wealth, and women's education status at individual level (IL). **Approaches or methods implemented:** Rounds 4 and 5 of National Family Health Survey (NFHS) for women (N=706,212) and children (N=2,47,456) used at DL; NFHS round 5 used for IL analysis. Data was restricted to 10 states with districts surveyed before and during C19 across levels; only comparable districts considered at DL. C19 exposure constructed using NFHS-5 interview date, with 23 March 2020 as cut-off (national lockdown): DL (pre, during C19), IL (pre, moderate, severe). Key outcome variables: daily and weekly food groups, dietary diversity (dd) score, minimum dd, early initiation of breastfeeding (bf), exclusive bf. Difference in difference analysis, controlling for covariates and survey weights, used at DL; descriptive statistics reported at IL. **Key**

findings: Women daily dd score (1.7 food group-fg) and minimum dd (1.4 percentage point-pp) significantly reduced in districts surveyed during C19 (v/s pre-C19 districts); dairy (9.2pp) and legumes (4.8pp) consumption was worst affected. Women weekly diet indicators significantly affected as well. Child dd score (1.2fg) and minimum dd (5.7pp) significantly reduced in districts surveyed during C19 (v/s pre-C19 districts); Vitamin A fruits and vegetables and green vegetables consumption was worst affected (4-4.9pp). At IL, during pre and severe C19, diet indicators more affected in rural areas and among those with poor wealth and education. **Significance and application:** The diets of women and children in India have been negatively affected by COVID-19. The diets of the vulnerable and marginalized groups have further worsened. There is a need to strengthen relief measures, and more research is needed on their impact on diets.

Covid-19 and Dietary Diversity in India ; *Aashi Gupta, Delhi School of Economics.*

Background: The objective of the study is to examine the composition of diets and the determinants of dietary diversity in India prior to and during the Covid-19 pandemic in India. The pandemic-induced lockdowns adversely affected the food supply chains and led to income and unemployment shocks, challenging households' abilities to access enough food for nutrition. **Approaches or methods implemented:** The study is based on Consumer Pyramids Household Survey (CPHS) conducted by CMIE. We use multiple regression model examining covariates of dietary diversity. The explanatory variables include a vector of household characteristics, state specific variables signifying the intensity of the pandemic and time dummies. Given that the Covid-19 cases may be endogenous, we instrument using a 2SLS estimation. We also employ Quasi-experimental difference-in-differences (DID) technique that compares changes in dietary diversity prior to and during the Covid-19 pandemic in India for households that did not face an unemployment shock (the control group) and the affected households or those who faced an unemployment shock (the treated group). **Key findings**: The rural areas have a more concentrated diet as compared to urban ones. In addition, the shifting to a more concentrated diet during the lockdown was more pronounced in the rural households, as compared to the urban households. We observe a higher dietary diversity, and lower fluctuation in the same during the pandemic, in the female-headed households. The dietary diversity is negatively associated with the age of the household head; lower castes exhibit a higher dietary diversity, while minorities (except Muslims) show lower. Households that faced an unemployment shock during the first nationwide lockdown showed a steeper reduction in their dietary diversity, throwing light on the importance of generating stable employment for all. **Significance and application:** A reduction in dietary diversity during situations of macro-shocks unravels a story of limited access and instability of food security among lower segments of the society. Checking for regional imbalances, better integration of food supply chains, provision of public goods and building infrastructure to support it, nutritional education are some major areas of policy direction.

Thematic session 4: Children's diets, determinants, and interventions in south Asia

Nutritional Status and Diet Patterns of Children under 5 in select districts of Assam; *Jith J R, Indian Institute of Technology Guwahati.*

Background: To understand the nutritional status of children under 5, breastfeeding and complementary feeding practices, and diet patterns in districts of lower Assam, a region with a high incidence of malnutrition and maternal and child mortality. **Approaches or methods implemented:** The survey was conducted between September 2019 and February 2022. Primary data was collected through a survey of 987 households with children under five from seven districts: Barpeta, Bongaigaon, Darrang, Dhubri, Goalpara, Kokrajhar, and Udalguri of Assam. Mothers of the children or other primary caregivers were the respondents. The survey schedule comprised socio-economic details of the household, mother and child anthropometric measures, prenatal and antenatal care details, 24-hour recall of the child's dietary intake, and information on household food consumption for the month predating the survey. Various indicators commonly used to track progress toward nutrition are estimated for all seven districts. **Key findings:** For the surveyed districts Stunting (41.2%), Wasting (12.9%), Underweight (28.2%), and total prevalence of anthropometric failure using a composite index of anthropometric failure (49.8%) are estimated. Children receiving minimum diet diversity (28.8%), minimum meal frequency (64.6%), and minimum acceptable diet (25.8%) are also estimated. Grains, roots and tubers (55.6%) are mainly used to feed the children and legumes and nuts (15.2%) are the least. The highest per capita expenditure is on edible oils, and the lowest is on eggs. The highest quantity consumed is roots and tubers (18.56% of total food consumption), and the least is eggs (1.6%). District-wise calculations show a wide gap in indicators and differences in diet patterns between districts falling under Bodoland Territorial Region and others. **Significance and application:** Study results show high inter-district variation in nutritional status outcomes, coverage of nutrition interventions, and immediate and underlying determinants of nutrition, pointing to the marginalisation of certain social groups and inefficacies of one-size-fits-all policies to address the challenges. Further research is needed to explore the reasons behind the low consumption of certain affordable healthy food groups.

Identifying enabling factors and barriers for good child nutrition in a rural Bangladesh population; *Stacy Saha, , LAMB Integrated Health and Development Project.*

Background: The purpose of this three-year action research was to inform implementation of an ongoing rural nutrition project through assessment of current nutritional status of children 6 to 24 months and identification of local positive and negative deviant behaviors related to feeding, caring, hygiene and health care. **Approaches or methods implemented:** A cohort of 558 children in three unions of Bangladesh were followed from six months to two years with six-monthly data collected on 24-hour dietary recall, height & weight, and care practices. A 10% sample of well-nourished children from the poorest 40%, and a 5% sample of poorly nourished children from the wealthiest 40% of families had home interviews. Focus groups were held with parents and grandparents of children under two to identify common breastfeeding and complementary feeding attitudes and practices. Stunting, wasting, minimum dietary diversity (MDD) and minimum meals were calculated at each age. Qualitative data was coded and analyzed by topic. **Key findings:** MDD and minimum meals both increased with age (5.4- 20.2% and 64.4 – 80.6% respectively) in the cohort. Positive deviance families were found to feed mixed family foods to their children from 6 months of age, give young children preference for limited nutritious foods (liver, egg), and decrease breast feeding as complementary feeding increased in their second year. Care related positive practices included forming good hygiene habits early, having routines for eating and sleep and regular de-worming. Feeding of commercial snacks increased with age among children in the cohort and was attributed to convenience, child preference and cultural habits. **Significance and application:** Knowledge of local food and cultural

practices are key to improving children's diets. Further research is needed to explore the fathers' and grandparents' role in childcare and nutrition, social and commercial factors contributing to consumption of low nutrition purchased snacks and lost grandma's recipes for traditional healthy snacks.

Long term impact of integrated agriculture and health based intervention program on dietary behaviours of under five children in southern part of Bangladesh; Farzana Bari, *Institute of Nutrition and Food science, University of Dhaka.*

Background: To capture the evidence of long-term impact of "Integrated Agriculture and Health Interventions for Improved Food and Nutrition Security in Selected Districts of Southern Bangladesh (IAHBI)" project on dietary behaviors of the children participating in the program, undertaken by the Government of Bangladesh with technical supports from FAO and UNICEF. **Approaches or methods implemented:** This is a comparison study to capture the changes over three points of time. The report findings of Endline (2015), Follow-up I (2016) were compared with Follow-up II (2021) to investigate the sustainable changes in dietery behaviour after the project completion. Purposive sampling guided the qualitative study design and selection of project stakeholders. A total of 8 KIIs among implementers, 11 FGDs (n = 95) and 6 IDI among beneficiaries were conducted. Thematic analysis considering two indicators: (A) food-based nutrition education and (B) cooking-demonstration were selected for long-term sustainability of the intervention program. **Key findings:** (A) Food based nutrition-education: Participants perceived knowledge on balanced-diet, dietary-diversity, child health care service, health and hygiene, IYCF-practices, home food safety and food preparation

Association between listening to a radio program with tailored content and maternal and child feeding practices during COVID-19 pandemic in Nepal; *Indra Kshetri, Helen Keller International.*

Background: Mass media, including radio programs, plays an important role to deliver health and nutrition messages. The objective of this study is to explore the association between mothers' exposure to a popular radio program with tailored nutrition content and maternal and young child feeding practices in Nepal during the COVID-19 pandemic. **Approaches or methods implemented:** We used data from a cross-sectional rapid assessment survey on maternal and child nutrition collected in January 2022. Respondents included 23,471 randomly selected mothers with children less than 24 months from 389 of Nepal's 753 municipalities. The outcome variables were minimum acceptable diet, and minimum dietary diversity among children 6-24 months; child fed more during illness, and minimum dietary diversity of mothers of children less than 24 months. The exposure variable was mothers who listened to the Bhanchhin Aama radio program at least once a month. We applied a logistic regression model adjusted for socio-economic confounders to test the association. **Key findings:** Among surveyed mothers, approximately 42% listened to the Bhanchhin Aama radio program at least once a month. In the adjusted model, we found that mothers reporting listening to the radio program at least once a month was positively associated with children 6-24 months meeting the minimum acceptable diet (OR=1.50, CI: 1.41 to 1.60), children 6-24 months meeting the minimum dietary diversity (OR=1.57, CI: 1.47 to 1.68), sick child fed more during illness (OR=1.55, CI: 1.39 to 1.74), and mother meeting the minimum dietary diversity (OR=1.62, CI: 1.54 to 1.71) compared with mothers who had not listened to the radio program. **Significance and application:** Findings suggest that listening to the Bhanchhin Aama program at least once a month was significantly associated with good maternal and child feeding practices. During emergencies where vulnerable population may be cut off from in-person sources of information, exposure to tailored media content is effective to promote good nutrition practices.

Leveraging the Private Sector Resources in Nutrition to shape the dietary practices amongst children under 2 years of age; *Atul Upadhyay, Baliyo Nepal Nutrition Initiative.*

Background: Engaging private sector, particularly leveraging their resources, for nutrition has always been a challenge. Baliyo Nepal Nutrition Initiative (BNNI) partnered with several food and non-food private sectors to promote consumption of processed complementary fortified foods (CFP) for children. A two-month intervention during COVID-19 pandemic in Lumbini Province, Nepal was done. **Approaches or methods implemented:** BNNI piloted an intervention model by first partnering with the two largest private food companies of Nepal to manufacture CFP. The CFPs, 25 g sachet providing 30% required nutrient intake to the children 6-23 months, were sold in the markets of Lumbini Province at 10 cents per sachet. BNNI leveraged the resources of private companies' CSR and conducted several awareness programmes in the communities: trained female community health volunteers, oriented school children, conducted radio programmes at local level and oriented the retail shopkeepers on the nutritional advantage of fortified food products. A third party conducted the assessment of the outcomes. **Key findings:** The collective awareness campaign led to 76% sales in CFP and 32% increased sales of other porridges. Almost 9 out of 10 consumer reported to buy because of its affordability and convenience and shopkeepers encouragement. Almost 80% of the respondents said that they were encouraged by the shopkeepers, and the assessment further showed that 86% of repeat buyers said they would buy it again. Local governments support and non-food private sector resources facilitated the campaign. However, low profit margins, lack of awareness on processed fortified foods, and change in consumer food priority due to pandemic were found to be barriers. **Significance and application:** The pilot study exhibited that availability, affordability and convenience of healthier options can increase the consumption of safe and nutritious foods. Furthermore, with certain regulatory financial incentives to encourage the private sectors, their resources can be leveraged to support and contribute to the nutrition programmes while doing their business sustainably.

Evaluation of overall diet quality indexes of the children at the age of 6-24 months and its impact on health in Matiari, Sindh, Pakistan; *Sanam Soomro, Aga Khan University.*

Background: The objective of this study is to evaluate the general indices of the diets. The standard used to measure overall diet quality includes those based on examination of nutrient intake, food groups, dietary diversity, or a combination of both, and some indicators such as breast milk feeding and non-breastfeeding patterns, etc. compared to standard recommended diets. **Approaches or methods implemented:** The newly developed index was used in a Pakistan Malnutrition Survey (SEEM) in rural Matiari District in Sindh in which we collected quantitative estimates of non-breast foods and breast milk consumed by children through a food recall form. 24 hours from 6 months onwards to 24 months every 2 months (n=4813). Index components included all nutrients and antinutrients, food diversity groups such as added sugar, total fat, polyunsaturated fatty acids, total fat and whole grains, fruits, vegetables, excess fruit juice, dairy, iron, and a term of interaction of total daily energy consumption. Points were assigned to reflect poor or excessive intakes. Indicators of dietary assessment means and standard errors were used to describe food intake and Dietary Quality Index scores. The ability to differentiate the diets was determined using the mean intake of food/nutrient groups and total energy intake. The highest and lowest quartile component scores of the quality index were compared with standard. **Key findings:** The results show that the dietary pattern varies according to the age of the baby as recommended by the WHO/FAO, the intake of breast milk is reduced and complementary foods are increased from 6 months. The quality of the diets shows that 60% of the total energy intake comes from breast milk and 40% from other complementary foods, since as we progress to 6 months of age, the intake of nutrients from complementary food increases compared to breast milk. We have found that, depending on age, the dietary diversity of complementary foods is not as great, which may be the main cause of malnutrition. Only 3 different types of food were consumed under 12 month age group, including wheat-based snacks, wheat bread, cooked rice, cereal-based weaning foods, and potatoes. Therefore, it is necessary to add meat and other foods in their diets to meet the standard requirements. **Significance and application:** Study provides the comprehensive diet quality indexes of 6-24 months children, in which all standard quality indicators of WHO/FAO indicators were used to define the quality of

food consumed in Sindh Pakistan under 6-24 months age group.This study survey helps to make policies for infants children to reduce the malnutrition to secure the future with good health for all ages. There is need to be assess the nutrition status clinically and the groups of children with good quality of food, water and better enviroment as well for comparision.Only the quality of food is not the main cause of malnutrition but there is also need to be check the quality of water and eating hygencity parameter for further understanding.

Evidence on Dietary Diversity and Food and Nutrition Security of Women and Young Children from Madhya Pradesh and Maharashtra, India; *Avani Verma, GIZ.*

Background: To determine the food and nutrition security of women of reproductive age (15-49 years) and children (6-23 months). To ascertain information on household's access to nutritious food. **Approaches or methods implemented:** The survey was conducted in Maharashtra (districts Washim and Nandurbar), and Madhya Pradesh (districts Barwani and Khandwa), India. Two stage Probability Cluster sampling methodology was used with the selection criteria for households as one woman in reproductive age (15-49 years) and at least one child in the age group 6-23 months of age. Data collection (Quantitative) was done through (standardized) questionnaire, (N=800, 200 women per district) and through (Qualitative) Focus Group Discussions (FGDs). Topics of inquiry were Child feeding practices, Minimum Acceptable diet (MAD), Minimum Dietary Diversity-women (MDD-W) and Household food insecurity (HFIES) and questions on Social Behaviour Change. The data was analyzed using descriptive statistics. **Key findings:** Data on dietary diversity of women shows that the number of food groups consumed by women is around 4 food groups on average. The only exception is Barwani where women consumed more than half a food group less than other district (3.5 ± 0.9 food groups). Child nutrition is slightly better for the districts in Maharashtra than for Madhya Pradesh with the lowest value in Barwani (2.3 ± 1.2 food groups), against 2.9 ± 1.1 food groups in Khandwa and 2.8 ± 1.3 in Maharashtra. The analysis of consumption by food groups is also very consistent with the food groups consumed by mothers as staple food and pulses are very largely consumed followed by dairy products. Other fruits and vegetables are consumed by about 36 percent of the children. Vitamin A rich fruits and vegetables and flesh food are consumed by less than five percent of children overall. Breastfeeding is practiced almost universally (99%). However, only 37% of families initiated timely complementary feeding with the mean age for introduction of solid food is being around 6.9 months. There is a sizeable share of children that are introduced to complementary feeding only after 8 months, and quite a few before 6 months. Regarding information on food security, over 90 percent of respondents were either food secure or mildly food insecure in almost all districts. With respect to access to nutritious food, relatively small number (13%) of all households declare having access to nutrition garden. While Barwani has the largest share of households with access to a nutrition garden (22.5%) and washim has the lowest (5.5%). **Significance and application:** Diversified agriculture especially homestead nutrition gardens should be promoted for sustainable improvement of dietary intake and nutritional situation of the population focusing on the obstacles and barriers hindering diversification of diet for both women and children. Further studies on positive deviance, quantitative impact assessment and qualitative studies on social and behavioural change determining beliefs and practices of the communities are required to learn more on this topic.

Implications of the revised definition of minimum dietary diversity for assessing dietary patterns of children aged 6-23 months in informal settlements of Mumbai; *Karishma Navalkar, Society for Nutrition , Education and Health Action.*

Background: The definition and threshold for minimum dietary diversity was updated in 2021 by WHO and UNICEF as part of the revised IYCF questionnaire. This study investigates the effects of the revision in measuring child feeding practices among children aged 6-23 months in urban vulnerable settlements of Mumbai. **Approaches or methods implemented:** A cross-sectional survey was conducted with 688 mothers of children aged 6-23 months that were part of community- based intervention to improve maternal

and child health and nutrition. Data was collected using the revised IYCF questionnaire. The threshold for minimum dietary diversity was modified from ≥ 4/7 (MDD-7, 2008) to ≥ 5/8 (MDD-8, 2021) food groups with the inclusion of "breastmilk" as the eighth food group. Diet information was collected using 24-hour recall. Information was further disaggregated by breastfed and non-breastfed children. **Key findings:** The minimum dietary diversity among 6–23-month children was 30% (MDD-7), which drops to 25% as per the revised definition. When disaggregated by the breastfeeding status, the MDD prevalence remains almost same at 26% for breastfed children while for non-breastfed children it drops from 46% to 18% highlighting the lack of a diverse diet for non-breastfed children. MDD being part of Minimal Acceptable Diet (MAD), prevalence of overall MAD shifts from 18% to 17%, with significant decline in non-breastfed children where the difference is of 6 percent points (MAD of non-breastfed: 2008- 7 %, 2021- 1%). **Significance and application:** The revised definition of MDD-8 emphasizes breast-milk as an essential part of children's adequate diet. As the nutrition interventions prepare to implement the revised indicators, it is critical to disseminate the new knowledge among stakeholders and to redesign the existing nutrition programs with renewed focus on achieving optimal feeding practices.

Thematic Session 5: Policies, programs, and solutions for improving diets in south Asia

A rapid landscape review of market-based interventions and policies for nutrient-dense foods in India; *Gregory Cooper, University of Sheffield.*

Background: Food markets are increasingly seen as potentially powerful leverage points to scale-up access to nutrient-dense foods (e.g., to landless communities). To synthesise the current landscape, we conducted a rapid review of market-based interventions and policies with the potential to improve the availability, affordability and safety of nutrient-dense foods to low-income populations in India. **Approaches or methods implemented:** Acknowledging that the latest innovations may not yet be published in academic papers, we also reviewed media reports, NGO publications and policy documents. The search was conducted over two weeks in December 2021, utilising Google, Google Scholar and institutional repositories (e.g., NITI Aayog, POSHAN Abhiyaan, Department of Agriculture & Farmers' Welfare, etc.,). Searches included combinations of food groups (e.g., fruits, vegetables, eggs etc.,), locations (e.g., India, Andhra Pradesh, Odisha, Bihar or Uttar Pradesh), interventions (e.g., storage, market information etc.,), and additional dimensions (e.g., ownership, scale, cost). Relevant information for each example was screened and synthesised. **Key findings:** We identified a diverse landscape of interventions, governance models, and geographies. Of the 166 in total, 86 (51.8%) were established by private organisations, 53 (32.1%) were government schemes or policies (central or state), whilst the remaining 27 (16.1%) were associated with NGOs or academic institutions. Major intervention categories that have gained policy traction include the digitisation of value chains and markets (e.g., transport booking systems and e-commerce), the creation of new markets (e.g., farmers' markets), and government schemes that promote investment in market infrastructure (e.g., transport and food processing), clean-energy cold storage and the promotion of healthy food consumption. **Significance and application:** The landscape of market-based interventions for nutrient-dense foods is evolving rapidly, driven by innovative value chain solutions and technologies. However, pressing research priorities include how to stimulate interministerial convergence on agri-nutrition issues, the design of market interventions that are inclusive of marginalised and low-income communities, and strategies to strengthen the climate-resilience of markets*.

Addressing dietary imbalances through food based approach in Odisha; *Gopinath Radhakrishnan, M S Swaminathan Research Foundation.*

Background: The objective of the study was to understand the underlying causes of malnutrition, agricultural conditions (agro-ecological, water availability etc), production systems and practices in Rengali irrigation project areas in Odisha, with a view to develop strategies to mainstream nutrition goals and promote nutrition sensitive agriculture. **Approaches or methods implemented:** The study adopted mixed methods to assess the ground realties and the on-going practices among rural households in the interface of agriculture-nutrition linkages in two districts of Odisha Dhenkanal and Jajpur. Four villages in each district were selected based on the list of indicators pointing to nutritional vulnerabilities. Systematic stratified random sampling method was used to identify the study households in each village. A detailed household survey with 328 households, 61 key informant interviews (village, block / district) and 40 focus grouped discussions were conducted in the selected areas. Prevailing agricultural production systems, nutritional assessments were examined and analysed using appropriate indices. **Key findings:** The agrarian community dominated by small and marginal farmers had very minimal crop diversification. There were no ongoing post-harvest or value addition activities in the agriculture sector; that reduced income spread due to increased risk in production. Vegetable cultivation at the household level was not translated into dietary pattern. This along with high junk food consumption and poor nutritional literacy led to malnutrition among all age groups. Malnourishment was very highly prevalent among women (18-59 years);while obesity was extensively observed among both males and females. In addition micro nutrient deficiencies tripled the burden of malnutrition in the study area. **Significance and application:** Ground-level convergence between agriculture and health at the village level for healthy diets with local produce is crucial to reduce the burden of malnutrition. Imparting nutrition literacy in the adult age group and promoting nutrition sensitive agricultural production systems are critical for improving community dietary pattern and overall nutrition.

Do diverse farming system types influence potential nutrient availability and deficiencies the diets of smallholder households? Evidence from Bangladesh; *Timothy J Krupnik, International Maize and Wheat Improvement Center (CIMMYT*).

Background: Macro- (e.g. carbohydrate, protein) and micro-nutrient deficiencies (e.g. iron, Vitamin A, folate) persist among rural farm households in Bangladesh. Once subsistence- and primarily rice-oriented, smallholders are now increasingly cultivating a diversity of foods including aquaculture and livestock for both consumption and the market. We explore how diverse farming systems, when interacting with markets, create inward (self-consumption or market purchase) and outward (market sale) nutritional flows and lead to patterns of household macro- and micro-nutritional adequacy or deficit. **Approaches or methods implemented:** The study uses a unique production, marketing and consumption dataset from >3,000 households cultivating crops, livestock, and fish and with varying levels of market integration in Southern Bangladesh, collected through face to face interviews with male and female household heads. Farm types were defined from structural and functional variables identified in surveys and using principal components analysis followed by hierarchical clustering. Macro- and micro-nutrients flows and balance sheets considering farm production and market sales, food purchase and diets were subsequently analyzed in relation to predominant farm types. **Key findings:** Our results reveal previously unexplored relations between rural farm types and their level of market integration to nutrient deficiencies (calcium, iron, folate, riboflavin, Vitamin A). Nutrient balances measured by farm types also suggest that market linkages drive a large proportion of nutrients produced, many of which are sold. Farmers are increasingly producing nutrients in the form of foods, selling them, but later repurchasing them from markets. **Significance and application:** These result highlights the need for targeted agriculture-, market- and nutrition interventions that are fine-tuned by farm typology and level of market integration, to address the nutritional needs for the large diversity of rural household types found in Southern Bangladesh. More research is required to understand how impact of agricultural technologies on nutritional outcomes is differentiated with farm types.

Scaling biofortified zinc wheat seeds, grains and foods to meet 1.4 million farmers and 7 million consumers in Pakistan; *Munawar Hussain, HarvestPlus.*

Background: The introduction of biofortified zinc wheat.
The intervention was needed to delivering biofortified zinc wheat and product to Pakistani Population. HarvestPlus was the lead implementing agency. The main actors include the entire wheat value chain R&D institution, extension workers, seed companies, farmers, aggregators, food processors and retailers. Nearly 10 years. **Approaches or methods implemented:** The creation of a delivery model: Sequence of activities to produce seed, grains, and foods available and accessible to beneficiaries through existing and new market channels and a scaling model: Expanding reach through increased investment in key delivery activities in seed, grains, and foods. The monitoring is done through regularly collecting the program data, and annual farmers and value chain actors surveys. The impact assessment on human health is also monitored through measuring the change in the population's zinc intake through National Nutrition Survey 2018. Additional studies are in progress to monitor household and market level use of zinc wheat. **Key findings:** 3.5 million metric tons of wheat grain harvested in the cropping season of 2021-22. More than 1.4 million farming households are growing zinc wheat. Nearly 7 million people consuming biofortified zinc wheat and products. More than 65000 metric tons certified seed produced for cropping season of 2022-23. The catalyst to scale was the support from the Government in early generation seed production and a high quality, competitive product developed through the CGIAR with subsequent new products added. Use and adoption of digital technologies and a full value chain approach from seed R&D to consumer food marketing remain the key facilitators. **Significance and application:** Adopt and take calculated risks with digital technologies like digital extension, farmer platforms and digital marketing. Ensure activities are promoted and easily accessed by women farmers and minority groups. Constant dialogue with Government, inclusion of multidisciplinary support organizations for specific steps of value chain. Ensure liaison with other nutrition interventions.

Qualitative Analysis of a Nutrition-Sensitive Agricultural Intervention in India; *Madison Bearden, Emory University.*

Background: Nutrition-sensitive agriculture (NSA) interventions endeavor to improve nutrition by increasing consumers' production of and/or access to nutritious foods. This research study's objective was to conduct a landscape analysis of social behavior change strategies in 13 NSA interventions focused on improving dietary quality and quantity, including an intervention in India. **Approaches or methods implemented:** Data from the NSA project in India were collected in two phases: (1) a desk review, including review of program documents (N = 16); and (2) in-person site visit to conduct staff and stakeholder interviews (N = 3 IDIs), observe key activities (N = 5 observation periods), and conduct focus group discussions with community members (N = 7 focus groups). Participants were purposively sampled for relevant knowledge, enabling thematic saturation with a smaller sample size. Qualitative data were coded and analyzed in MaxQDA using the thematic analysis approach. **Key findings:** Partnerships between local government officials, local producers (fishermen), and local consumers facilitated increased availability of locally sourced and hygienically prepared dried fish and their consumption by vulnerable groups. Coastal fishermen were equipped with skills to catch and dry their fish hygienically while the local government's Anganwadi program provided a market for their procurement. Dried fish were then provided to pregnant and lactating mothers as well as children and adolescent girls through the program. This intervention demonstrates the utility of working closely with government partners to develop markets for agriculture and fishery products to achieve sustainable improvements in livelihoods and nutrition. **Significance and application:** Few research studies have assessed the impact of NSeA interventions on consumption or sale of dried fish in India, even though fish are vital in local food systems. Policies and programs in South

Asia can learn from this intervention's successful, trilateral engagement of producers, consumers and local government.

Toward nutrition-specific social protection: Addressing micronutrient malnutrition though wheat flour fortification in Himachal Pradesh; *Ruchi Sareen, Global Alliance for Improved Nutrition.*

Background: The Government of Himachal Pradesh recognised anemia as a foremost concern. At the time of intervention, 53% of women and 55% of children in the State were anemic (NFHS-4). To address this challenge, key stakeholders and Global Alliance for Improved Nutrition (GAIN) sought to mainstream wheat flour fortification in the public distribution system (PDS). **Approaches or methods implemented:** In partnership with the Government and millers, GAIN supported fortification of wheat flour with iron, folic acid and vitamin B12 through PDS in 2019-2020. Technical consultations were conducted with millers to understand their perspectives and raise awareness. Onsite training and support on fortification and quality assurance was administered to 80 millers supplying wheat flour to PDS. Linkages were built between millers and premix suppliers to enable sourcing of quality-assured premixes for fortification. Policy advocacy was conducted to position wheat flour fortification as an efficient, scalable and sustainable approach to reduce micronutrient malnutrition. The rate of PDS shops adopting fortified wheat flour was monitored to ensure availability at the population level and Food District Controllers were also capacitated in process monitoring. **Key findings:** This initiative enabled the State to provide quality assured fortified wheat flour to 1,800,000 families through the PDS since January 2020. Previously, only a subset of PDS beneficiaries were eligible to receive wheat flour, while the remaining beneficiaries were provided with wheat grains. To resolve this barrier, GAIN advocated with the Government to expand eligibility to all PDS beneficiaries. The intervention bolstered the political will to address the challenge of anemia, resulting in built capacity, intersectoral cooperation, and a scalable model for nutrition-specific social protection. The success of this intervention was facilitated by industry willingness to initiate wheat flour fortification. **Significance and application:** This intervention has elucidated a model for alleviating micronutrient malnutrition through social protection, which could be adapted in other contexts. Valuable lessons learnt on quality assurance can inform subsequent efforts. The integrative emphasis on partnerships, capacitation, and advocacy constitutes a holistic approach that can result in long-term nutrition impacts.

Poster Presentations

Focal Area 1: Evidence on dietary practices of South Asian populations, focusing both on healthy dietary behaviors and consumption of unhealthy foods

Improvement of child nutrition status through home-based targeted counselling by Anganwadi Workers on complementary food and feeding practices: findings from a behavioural change intervention by Anganwadi Workers in Kamrup and Darrang district, Assam ; *Atanu Achrya, Dr. Kaliprasad Pappu, Mochumee Bora and Loboni Jana, YouthInvest Foundation.*

Background: In Kamrup and Darrang district, Assam, while determinants of child malnutrition like water, sanitation, and preventive health services have shown improvement, exclusive breastfeeding and adequate complementary feeding continue as the proximate causes of malnutrition in under two children. The AWWs were found to give generic counselling to caregivers which were not effective. **Approaches/methods of innovation/changes implemented:** The intervention, building an effective behaviour change strategy, specifically targeting food and feeding practices of the caregivers for under two children was developed. Capacities were built in 40 Anganwadi Workers and Supervisors along with building- confidence and commitment in the district ICDS system to deliver the targeted behaviour change counselling services. The system adopted the approach of what was called "swavavik ojanar shishuko swavavik ojan rokhato gurutbapurna" (A normal weight child must be kept normal weight). The project developed tools and aids including SBCC digital tool and Counselling Guide for AWW to help counsel caregivers, and help arrest growth faltering between 0-2 years, at the home level. **Key findings:** The home visits and weighing efficiency of under two children increased remarkably compared to the control area resulting in 97.5% of underweight children showing weight gain, 41% of children graduating to normal weight (of 14% in the control area) and at the determinants level 91% of caregivers changing complementary feeding habits by maintaining the adequacy of the food. The AWW's counselling on feeding to maintain the adequacy of the child's food using locally available low-cost food followed by fortnightly weighing in front of the mother and involving her to understand the changes motivated the mother as well as AWWs. **Significance and application:** The home-based targeted counselling strategy used by Anganwadi Workers improved food and feeding practices with a positive effect on under two child nutrition. This is backed by resource tools and training assistance from the technical partner, the district administration is scaling up the intervention in the entire districts of Darrang and Kamrup.

Improved nutritional outcome through increase in uptake of local superfoods ; *Rajeev Ranjan Pandey, Pallavi Upadhyaya and Sharmil Dubey, Society of Human & Organizational Development in Harmony (SHODH)*

Background: To change behaviour of mothers residing in urban slums towards improved nutritional choices to improve the nutritional status and reduce malnutrition amongst mothers and children of 0-6 years. Many indicators of child health are worse in slums than in neighboring or rural areas. This project is conceived and implemented by SHODH with fund support from Adobe-Employee Contribution Fund. The project has completed three years and is in its fourth year. **Approaches/methods of innovation/changes implemented:** The project involved innovative participatory approaches like cooking workshops, co-creating recipes, creating healthy snacks at home for children, amalgamation of good cooking ingredients like millets, moringa, flaxseeds etc with the mothers from communities. The projects also focussed on other components like WASH, food safety practices etc. The project is well accepted by the mothers of the community beyond the target population. The outcomes are measured

by regular body measurements of children in the target population and a brief information collected by Poshan Sakhis during their regular interactions during field visits. It is also measured by the upward growth in demand in healthy ingredients like millets, moringa, flaxseeds and other locally grown food. **Key findings:** Outcome: There is a significant Increase in the nutritional knowledge, attitude and practices of households specially mothers. Visible improvement found in dietary intakes of households reflected through a diverse and nutritious diet intake. There is a significant improvement in increased uptake of good ingredients like millets, moringa leaves, flaxseeds, and other locally grown food. There is a reduction in morbidity among children (0-6). There is an overall change in the nutritional security of the entire family participating in the intervention and there is a growth in demand from other families as well. Facilitators: Collaboration with like-minded agencies like "Millets for Health" facilitated easy connections with the chefs, nutritionists etc. Barriers: Inhibition and reluctance of the community to make peace with millets again. COVID-19 as the biggest barrier for the entire programme, but we adapted to online interactions, like workshops meetings, recipe sharing, sharing of cooked meal pictures etc. and at last budgetary constraints. **Significance and application:** Key lesson from project is to work on learning about nutrition through tasty and acceptable food choices, child friendly recipes and making contemporary foods out of nutritious ingredients. We need to incorporate this approach in nutrition interventions to make them sustainable. An unintended consequence is the increased demand for millets to be made available which are now being sold locally in community through a peer educator/salesperson model.

Use of technology and convergence with Agriculture department and Krishi Vigyan Kendra to assess and improve dietary diversity and dietary pattern among ICDS beneficiaries in two aspirational districts of Rajasthan; *Dr. Mukta Agarwal, Shilpa Sharma , Himanshu Sharma, Minakshi Singh, Vanita Dutta and Madhusudan Singh Tomar; Department of Home Science, University of Rajasthan.*

Background: The ongoing intervention was initiated by SCoE for Nutrition, Department of Home Science, University of Rajasthan, Jaipur, by involving Agriculture Department and KVKs the 4th A, in convergence with ICDS in development of nutri-gardens at AWCs and homes of beneficiaries and use of nutri-dense foods in daily diet of the vulnerable groups to improve the dietary diversity. Due to covid Pandemic use of tele-phonic survey cum counselling was adopted. NFHS 4, CNNS report indicated poor dietary adequacy and high prevalence of malnutrition in Aspirational districts. **Approaches/methods of innovation/changes implemented**: Promotion of nutri garden development, awareness generation on use of nutri dense foods in daily diets of beneficiaries, Capacity building of district, block and grassroot level functionaries of Agriculture and ICDS Departments was done. Development of IEC material, counselling of target groups by functionaries in offline mode before Covid and online mode during and post covid pandemic. Data was collected by trained tele-counsellors, on ODK forms, on food consumption patter, dietary diversity, availability of nutri-gardens at home and utilization of services of the program, which was then followed by counselling on identified gaps in dietary habits. **Key findings:** Nutri-gardens were developed at more than 100 AWCs and at one third homes of ICDS beneficiaries. The dietary diversity scores in children were found much better than as reported by CNNS,2018, and NFHS 5. Three meal pattern is followed. 50% children received 4 or more food groups in a day. More than two third pregnant and lactating women were consuming 6 food groups or more in daily diet which included cereals (100%), milk and milk products (72%), fats and oils (90%), sugar and jaggery (95%), other vegetables and roots and tubers (80%). Special diet is given to lactating women which included extra fats, some herbs, and dry fruits. The food groups consumed less frequently were pulses, green leafy vegetables, fruits, eggs, fish and meat Covid pandemic was the barrier in implementation of the program. **Significance and application:** Involving 4th A, the Agriculture department proved successful in development of nutrigardens. Tele- counselling is effective and can be used alone or along with offline mode counselling. Male-participation and interest in dietary patterns also increased, as in most of the tele-counselling's husbands used to take part as well.

Location Specific Farming System for Nutrition (FSN) Models to Address Malnutrition in Koraput Region of Odisha, India; *Akshaya Kumar, Mr. S. Raju and Dr. M.M. Hossain; M.S.S. Swaminathan Research Foundation.*

Background: The intervention was Farming System for Nutrition (FSN) which envisages the introduction of location-specific agricultural remedies for nutritional maladies by mainstreaming nutritional criteria in the selection of farming system components involving crops, animals, and wherever feasible fish. Farming is the primary source of livelihood for majority of the population of this region but reported to be the home for to a large, undernourished population. MSSRF led the intervention, in collaboration with Directorate of Agriculture and Food Production, Govt. of Odisha implemented the intervention for 4 years since 2018. **Approaches/methods of innovation/changes implemented:** A combination of sustainable measures including advanced crop production practices, promotion of nutri-gardens with fruits and vegetables, livestock, and poultry, and setting up of small-scale fisheries combined with nutrition awareness were promoted for consistent higher income and better nutrition. A detailed baseline survey was conducted on existing agriculture and aquaculture practices, home gardens, household food consumption patterns, dietary diversity, and nutrition knowledge. Based on this, the FSN interventions were designed in discussion with the community. Besides regular monitoring, an end line survey was conducted to assess project impact in the final year. The questionnaire format employed during baseline survey was used in the end line survey. Qualitative information was collected through focus group discussions. Interviews with third party stakeholders (like Panchayat leader, village leader, AWW, ASHA, ANM, local line department etc) is under way. **Key findings:** Key Survey findings: (i) increased adoption by farmers (ii) increased area and yield of nutrient dense crops (finger millet, maize, pigeon pea, orange flesh sweet potato, horse gram, green gram, and black gram), (iii) increased consumption from different food groups relative to baseline, (iv) enhanced knowledge on health, sanitation and hygiene, general nutrition, etc. through community hunger fighter interventions. Overall (i) 90 % of targeted households have better understanding of nutrition sensitive agriculture at community level and (ii) 70 % of target households adopted nutrition sensitive agriculture practices at community level, (iii) change in farmer attitude and active participation in the programme; (iv) co-operation and coordination with local administration and government-line departments were crucial for positive impacts of the programme. Uneven and erratic rainfall affected both demonstration and farmer fields, while lockdowns due to the covid-19 pandemic (2020-21) negatively impacted execution of the activities. **Significance and application:** FSN interventions significantly increased dietary diversity of smallholder farmers, (a majority in the study area), a step towards achieving zero huger (Sustainable Development Goal-2). The Covid-19 lockdown led to a breakdown of supply chains globally, further reinforcing the need for decentralized approaches and local value chains to strengthen community resilience.

India dietary-profile understanding dietary patterns and associated NCD risks; Bhuvaneswari Balasubarmanian, Ty Beal and Ruchi Screen; Global Alliance for Improved Nutrition.

Background: Diet quality is related to malnutrition in all its forms, and diet-related non-communicable diseases (NCDs). Poor diets are estimated to be among the top risk factors driving the global burden of disease. Understanding dietary patterns in populations is the first step to inform actions to improve diet quality and track progress. **Approaches/methods of innovation/changes implemented:** The Global Diet Quality Project has implemented a country-adapted Diet Quality Questionnaire (DQQ) in India, aiming to provide locally appropriate and standardized indicators of diet quality. Data were collected on consumption of 29 food groups from a nationally representative sample of women and men aged 15 and above as part of the Gallup World Poll in 2021. The DQQ food groups are used to construct indicators of nutrient adequacy and dietary risk factors for NCDs, including Minimum Dietary Diversity (MDD) for women score and the global dietary recommendations (GDR) score, among others. **key findings:** Diet quality in India is largely characterized by consumption foods made from grains (94%), pulses (64%), and vegetables (65%), but overall inadequately diverse diets with only 28% consuming

at least 5 WHO recommended food groups. Consumption of micronutrient-rich foods are generally poor [vitamin A-rich vegetables (23%), fruits (20%), nuts/seeds (18%)], indicating an increased risk for micronutrient inadequacy and NCDs. Only 41% of women (33% rural women and 50% urban women) consume diets that meet MDD indicating a higher probability of micronutrient inadequacy in their diet. Milk is the most consumed animal-source food (63%), while consumption of eggs (25%) and poultry (14%) is poor. The most common dietary patterns associated with NCD risk are consumption of ultra-processed sweet foods (38%), and salty snacks and instant noodles (33%). **Significance and application:** Actions to reinforce current positive dietary patterns, and to curb those associated with increased risk of malnutrition/NCDs, are needed. Overall dietary diversity needs improvement, focusing on micronutrient rich foods. Consumption of processed foods high in salt and sugar, especially in urban population, require public health strategies to mitigate NCD risks. The survey findings can be a starting point for needed actions and to track progress.

Effectiveness of layering women's nutrition interventions on a large scale poverty alleviation program (Swabhimaan): Evidence from three eastern Indian states ; Abhishek Kumar, Vani Sethi, William Joe, Monica Shrivastava, Mahendra Prajapati, Rabi Narayan Parhi, Sourav Bhattacharjee, Sandip Ghosh, Sayeed Unisa and Abhishek Saraswat; Institute of Economic Growth.

Background: Swabhimaan, a community-led programme to improve adolescent girls' and women's nutrition was rolled out in the designated poverty pockets of rural areas of three Indian states—Bihar, Chhattisgarh, and Odisha. The programme was implemented over a five-year period (2016-2021). The programme delivered five essential nutrition interventions via promoted village organizations. It was anchored by Livelihoods Missions along with Departments of Health, Women and Child Development, Civil Supplies, Social Welfare, Agriculture and Public Health Engineering, with technical and financial support from UNICEF. **Approaches/methods of innovation/changes implemented:** The programme interventions engaged Women SHG federations to implement community action activities using additional grant, supported by trained community cadres. Women SHGs developed and implemented integrated nutrition micro-plans, conducted Participatory Learning and Action (PAL) meetings, and strengthened local government services in order to improve the nutrition outcomes of women and adolescent girls. Systems strengthening efforts were undertaken to strengthen delivery and ensuring access to services of VHSND, ICDS and other departments. The evaluation followed a prospective, non-randomised controlled study design with baseline and endline cross-sectional survey carried out in 2016-17 and 2020-21 respectively. It was hypothesized that the programme would lead to a 15% reduction in proportion of adolescent girls and mothers of children with low BMI and 0.4 cm improvement in mean MUAC of pregnant women. Further the programme envisaged an improvement between 5% to 20% in the coverage of 18 key nutrition-specific and nutrition-sensitive interventions. **Key findings:** We examined about 21 indicators related to pregnant women, lactating mothers and adolescents. We found that pregnant woman who participated in both VHSND and PAL meetings were twice more likely to receive antenatal care visit in first trimester (Odds ratio: 2.55). While mothers who participated in both were 60% more likely to receive 4 ANC visits (Odds ratio: 1.61). Also, we note a significant increase in intake of diversified diet among both pregnant women and mother of children under 2 years of age. Although the programme activities were disrupted due to COVID-19 pandemic, but services were ensured by conducting home visits, door-step delivery of services and using tele-methods. Community resource person played vital roles in reaching out the target groups even during the COVID-19 pandemic. Home visits by CRPs ensured that the households received counselling as well as timely ration through the AWCs. **Significance and application:** Findings indicate that participation in community meetings in itself is an outcome. It was assumed to be of instrumental relevance to influence other outcomes but this indicator itself has an intrinsic relevance as only greater participation provides the platform for dissemination of information on health and nutrition. In addition, although the participatory learning approach could augment the knowledge base but the translation of knowledge into higher utilization of services and better outcomes is governed to a large extent by socio-economic

characteristics and related behaviour patterns which can remain stagnant for a longer period of time. However, further research attention is required to understand the sustainability of such interventions.

Garden of nutria-rich plants: A pathway for nutrition security and awareness to eradicate malnutrition; *Hariharan G N; M.S. Swaminathan Research Foundation.*

Background: Food-based approach to eradicate malnutrition by increasing the availability and consumption of micronutrient-rich food. This approach needed for developing and demonstrating location specific nutrition garden to enrich farming system and to enhance human nutrition. MSSRF initiated this intervention in 2018 in collaboration with Krishi Vigyan Kendras and State Agricultural Universities. **Approaches/methods of innovation/changes implemented:** Food-based strategies, focus on the necessity of improving diets (including availability of nutri-rich food, dietary diversification) in both quantity and quality in order to overcome and prevent malnutrition. This approach is expected to bridge the disconnect between agriculture and nutrition, bringing nutritionally important crops to the farms, awareness on nutrition related issues to the consumers and consumption of nutritive and balanced diet by the people and leading towards a healthy society. The nutrition survey will be conducted at the end of this project to assess the perceived increments in nutri-rich food production and consumption by establishing nutrition gardens. **Key findings:** The outcome of the intervention is (i) Each nutrigarden will aim to conserve a minimum 150 species level diversity with maximum varietal diversity within species occurring in the agro-ecological zone and (ii) Increased Awareness among local community on the nutri-rich plants for using it in food-based approach for addressing the nutritional security. Partnering with Krishi Vigyan Kendras and State Agricultural Universities are the key facilitators to reach out the communities in remote locations. Increased drought, excess rainfall and Covid-19 and subsequent lockdowns are the barriers to implement this program. **Significance and application:** Lessons Learnt: The levels of anemia in women and micronutrient deficiencies in children below 5 years are very high. Gaps in addressing issues of malnutrition necessitated the program. Food-based approaches by promoting nutrigarden is a sustainable pathway to spread nutri-literacy and key plants to eradicate malnutrition at the household level.

Theory-driven mixed-methods impact evaluation of KIRAN intervention in Ahmedabad, Gujarat; *Ankita Shah, Late Prof. Dr. Malavika Subramanyam and Dr. Smriti Pahwa, State Health Systems Resource Centre.*

*Background: KIRAN was a c*ommunity-based health literacy intervention set in socio-economically disadvantaged areas of Ahmedabad, Gujarat, India- designed and implemented by a non-governmental organization during 2015-16. It was one among the few interventions that targeted urban population through contextually relevant, group-based participatory learning approach as opposed to interpersonal counseling. **Approaches/methods of innovation/changes implemented:** KIRAN aimed at engaging mothers through a series of ten skills-focused, participatory group activities for improving nutritional and health status of young children. Impact evaluation of KIRAN was carried out by an academic institute using quasi-experimental, theory-driven mixed-methods design. At the baseline, 850 mothers of children below two years were enrolled in the intervention and 383 mothers of children in similar age comprised the comparison group. The participants in both the groups were followed-up over a maximum period of one year and nine months, collecting data at four separate time-points, two of which were at 6- and 12-months post-intervention. Our final sample size was 125 and 290 participants in the intervention and comparison groups respectively. **Key findings:** We observed an increase in mothers' knowledge and complementary feeding practices in the intervention group versus the comparison group at the endline. However, the nutritional status of the children remained similar in both the study-groups. We unpacked a complex interplay of multiple factors related to social context of the participants, vis-à-vis intervention design and delivery, which facilitated or hampered the mothers' engagement with the intervention. While the mother was the principal agent involved with child-care responsibilities, they had limited agency and power in a hierarchical familial structure to be able to navigate barriers in exercising

their choices that were imposed by the socio-cultural context. Aspirations of the mothers helped them leverage support for participation from their families. Intervention design features - visibility of meeting venue, group-based learning, and flexibility - minimized the limiting effects of socio-cultural contextual factors. **Significance and application:** We bring to the center the role of the family in facilitating a mother 's participation as well as in adoption, initiation and sustainability of recommended behavior change. Further, we identified several socio-cultural contextual barriers that limited the sustainability of behavior change efforts, which are required to be adequately addressed by similar interventions.

Add (Role of) Community Hunger Fighters to Address Malnutrition; *Prashant Kumar Parida, Dr. Kartik Charan Lenka and Dr. M. M. Hossain; M. S. Swaminathan Research Foundation.*

Background: Koraput district of Odisha has high prevalane of malnutrition among women and children. The Community Hunger Fighters Programme supported by Ford foundation was initiated in Koraput in 2010. Based on the encouraging results, this programm was launched with support from Friends-of-Swaminathan-Australia, Global Alliance for Improved Nutrition (GAIN), Rastriya-Krishi-Vikash-Yojana and BIRAC. **Approaches/methods of innovation/changes implemented:** MSSRF under the leadership of Prof. MS Swaminathan, conceptualized the "Community Hunger Fighters (CHFs; representatives from villages were trained as rural-academicians to address issues of poverty, hidden-hunger, malnutrition, dietary needs of pregnant-women and children, methods to assess nutritional-deficiency, create awareness on sanitation and clean drinking-water and the importance of nutrition for the first-thousand days in a childs life-cycle. They were oriented to access various state-and-national schemes for the benefit of the community. Currently ~300 CHFs capacitated as rural nutrition-academicians were instrumental in establishing ~2500 backyard nutri-gardens, as a dietary source of vitamins-and-minerals, creating nutrition-awareness along with Anganwadi-workers, ANM, ASHAs etc. **Key findings:** The selfless work of the CHFs resulted in increased awareness on nutrition and health, dietary-diversity in food plates, access to food and nutrition entitlements etc., among the tribal communiites. This led to substantial reduction in under-nutrition i.e. anaemia among women and children. Most importantly the cultural barriers of non-consumption of milk and milk products and other social taboos were the major challenges faced. The acute poverty forced the rural-communities to sell majority of the nutri-rich products they produced and thus less quantities went to their food plates. Bringing atitudinal change among tribal communities on consumption nutritious food was a great challenge. **Significance and application:** The CHFs are change-makers of malnutrition-and-hidden-hunger, hence creating a cadre of CHFs in regions of South-Asia with prevalence of rural poverty and malnutrition and recognizing them as rural nutrition-academicians will increase the self-esteem and social-prestige of the rural-communities. This initiative will advocate people's processes and policy-initiatives to bring foreseen change.

Food intake experience of Bangladeshi postpartum depressive mother during Covid-19 lockdown; *Samia Amin; Macquarie University.*

Background: Postpartum depression (PPD) is an eminent public health concern. The right diet combined with regular exercise and appropriate psychological support can help cope with postpartum depression. The aim of this study was to describe the food intake barriers among the postpartum depressive mother during covid-19 pandemic lockdown. **Approaches/methods of innovation/changes implemented:** This was a qualitative study comprising a semi-structured interview with a postpartum depressive mother in Bangladesh. The average length of the Interviews was 15 minutes and conducted via a virtual video-conferencing platform (Zoom©) during the teleconsultation process. The interview discussions were transcribed verbatim and imported into NVivo V.10 for analysis. A total of 12 interviews were analyzed using inductive thematic analysis. The analysis aimed to capture emergent concepts and thus took an inductive approach. Transcripts were read and re-read, and open line-by-line coding was conducted with a focus on understanding and capturing participants' food intake barriers due to covid-19 lockdown. **Key findings:** Three types of barriers were

found: Food retailing-related, patient-related, and peer-related. Trading hours, scarcity of supply, and upsurge prices were the emerging subtheme for food retailing. Depression level, uncertainty, and fear of getting infected by covid limited the food intake of the participants. Partners working hours, cooking styles and limited access to homemakers were mentionable peer-related factors that act as an impediment factor for participants' food intake habits. **Significance and application:** This study is a baseline platform for future policymakers to ensure food accessibility in the market and public health researchers to design intervention programs to educate both mother and peer members to support appropriate food intake during the postpartum depression as well as any public health crises like covid.

Predictors for weight retention and barriers for weight management in postpartum women: *A cross-sectional study; Divjyot Kaur, Piyush Ranjan, Archana Kumari, Anita Malhotra, Gaurishankar Kaloiya and Ashish Datt Upadhyay, University of Delhi.*

Background: To study the association of postpartum weight retention with socio-demographic, obstetrics, and lifestyle-related factors. To investigate barriers/myths associated with postpartum weight management. **Approaches/methods of innovation/changes implemented:** A hospital-based telephonic cross-sectional survey was carried out using a pre-developed and validated questionnaire to assess the risk factors of weight retention and barriers associated with weight management. Convenience sampling technique was employed to recruit women from different phases of the postpartum period i.e. women in the first three months post-delivery, four to six months post-delivery and beyond six months post-delivery. Chi-square test and regression analysis were applied to assess the association of various factors with weight retention/weight gain in different postpartum phases. **Key findings:** The final sample comprised 505 postpartum women with a mean age of 29±4 years. Socio-economic status was associated with weight retention during the first three months post-delivery ($p<0.05$) whereas type of family and education qualification were associated with weight retention during four to six months post-delivery ($p<0.05$). Gestational weight gain was associated with weight retention in all three phases of the postpartum period ($p<0.05$). Among lifestyle-related factors, 50.7% of women did not consume regular meals and around 70% women had lower consumption of fruits and vegetables with a higher intake of HFSS foods. Only 5% indulged in low to moderate intensity physical activity whereas 95% had more than 4-hour exposure to screen time and sedentariness. Barriers such as lack of knowledge about diet and physical activity, lack of time, foundation to abide by family's advice and myths such as eating for two, consumption of high-calorie diet and energy-dense galactagogues restricted participants from adopting healthy lifestyle practices. **Significance and application:** The study findings will assist in formulating and implementing weight management strategies. Future longitudinal studies must be carried out for further understanding of predictors of postpartum weight retention.

The Effect of COVID-19 on Food and Nutrition Security of selected Garment Workers , *Md. Mahbub, Prof. Dr. Nazma Shaheen, Prof. Dr. ruhul Amin, Sneha Sarwar, University of Dhaka.*

Background: The lockdown induced by the COVID pandemic hampered many export industries and pushed many RMG workers into unemployment, and income instability making them vulnerable to food insecurity. Our study aims to find out the effect of COVID-19 on the food security, nutrient intake, and dietary diversity of garment workers. **Approaches/methods of innovation/changes implemented:** A cross-sectional survey was conducted from September to October 2020 on the workers of 'Square Fashion Ltd.'s garments industry located at Bhaluka, Mymensingh. A total of 400 workers were enlisted in the study. Data on food security, consumption, and dietary diversity were collected by direct interviewing the workers with a validated and pretested questionnaire. Descriptive, inferential, and regression analyses were performed in SPSS. **Key findings:** Among 400 workers, 45% were female and 28% were migrated, workers. Their average monthly income was 13,397.00 takas, and 43% of it was spent on food. Among the workers, only 14.6% were food insecure (0.4% severe food insecure). Only 29% of women workers consumed less diversified diets during the study period. The average daily

energy intake was 2058 kcal where cereals were the dominant food group for energy (62%) and carbohydrates (83%). Plant protein was the primary protein source (57%), and vegetables are the main source of micronutrients. Micronutrient intake was adequate except for calcium, riboflavin, and vitamin A. **Significance and application:** RMG workers had faced low food insecurity with a high dietary diversity during the pandemic period. This may be facilitated by mandatory mid-day meal provision by the industry and the inclusion of more local workers. Further studies should be done to realize the effect more clearly and use the knowledge in managing future unprecedented situations.

Assessment of infant and young child feeding practices among mothers of Paniya tribal children aged 0-23 months in Gudalur block, Nilgiris district; *Rithu S and dr. Navaya Vyas; Prasanna School of Public Health, Manipal Academy of Higher Education.*

Background: To assess the infant and young child feeding practices among mothers of Paniya tribal children aged 0-23 months in Gudalur block, Nilgiris district and to determine their association with factors affecting it among mothers of Paniya tribal children aged 0-23 months in Gudalur block, Nilgiris district. **Approaches/methods of innovation/changes implemented:** A cross-sectional quantitative study was conducted. 293 participants were interviewed face-to-face by administering a self-structured and validated questionnaire including domains like sociodemographic details, obstetric history, breastfeeding practices, complementary feeding practices, dietary diversity, food handling practices and food security. Data was entered in Microsoft Excel and analysed using Jamovi 2.3.2 version. Descriptive data was presented as frequency and percentage. Associations were determined using bivariate and multivariate logistic regression. **Key findings:** The prevalence of timely initiation of breastfeeding was 89.1%. 77.9% of the infants below 6 months were exclusively breastfed. Mixed milk feeding was absent in infants under 6 months. 90.3% of infants aged 12-23 months were breastfed. Bottle feeding was seen in 23.5% of the infants aged 0 to 23 months. 25% of infants aged 6 to 8 months were introduced with solid, semi-solid or soft foods. Among those infants aged 6 to 23 months, 77.3%. were fed adequately often and 27.8% of them were given a diverse diet. Egg and/or flesh food was given to 91.7% of them and 63% of them were not fed any vegetable or fruit. 55% of them were fed unhealthy food. Mothers who delivered vaginally and those who were illiterate followed optimal feeding practices. The adherence to these practices was found to decrease gradually with increase in infant's age. **Significance and application:** While SDG 2 aim to tackle malnutrition and national programmes in India like Poshan Abhiyaan and Integrated Child Development Scheme continue to work against malnutrition, there is existing burden of malnutrition and also feeding practices are not optimal. Programs must focus on reinforcement of IYCF practices. The family members along with the mothers should be considered as main stakeholders during Village Health Sanitation Nutrition Days. In-depth interviews should be conducted to understand the mother's perception on nutrition.

Alcohol consumption response to pandemic induced income shocks in India; *Nidhi Kaicker; Dr. Br. Ambedkar University, Delhi.*

Background: Our objective in this study is to assess the impact of Covid-19 induced economic crisis (income and unemployment shocks) on household alcohol consumption, across various socioeconomic subgroups in the context of a developing country (i.e. India) where supply shocks played an offsetting role. **Approaches/methods of innovation/changes implemented:** The study is based on Consumer Pyramids Household Survey (CPHS) conducted by CMIE. We use a multiple regression model examining covariates of alcohol consumption expenditure (as a share of total household expenditure). The explanatory variables include a vector of household characteristics, state specific variables signifying the intensity of the pandemic and time dummies. Given that the Covid-19 cases may be endogenous, we instrument using a 2SLS estimation. We also employ a difference-in-differences (DID) technique that compares changes in alcohol consumption prior to and during the Covid-19 pandemic in India for households that did not face a severe income shock (the control group) and the affected households or those who faced a severe income shock (the treated group). **Key findings:** Our results

suggest higher alcohol consumption among the illiterates compared to households with a majority of graduates; higher consumption among the more deprived socio-economic groups compared to the unreserved category; and among Christian households compared to Hindus. We also find lower consumption of alcohol among female headed households compared to male headed households; among those with an elderly head compared to those with a younger head; and among households with greater proportion of children compared to those with a greater proportion of grown-ups. Muslim households have lower consumption of alcohol compared to Hindu households. Households that faced an income shock had higher liquor expenditure shares than the unaffected households after March 2020, i.e., the onset of the pandemic. Thus, our analysis reveals a positive impact of the pandemic induced income shock on alcohol consumption in India. **Significance and application:** The pandemic showed that complete restrictions were counterproductive – an increase in alcohol expenditure shares across rural and urban India, and more so among the vulnerable and disadvantaged groups is corroborated by our results. While complete prohibition has been shown to be a failure, the current permissiveness without the enforcement of regulations also represents a lack of responsibility from a public health perspective.

Determinants and prevalence of dual burden of malnutrition in India ; *Saurabh Singh; International Institute for Population Sciences*

Background: One of the most challenging public health issues facing the low- and middle-income countries is the problem of maternal and child malnutrition (Mamun & Mascie-Taylor, 2019). Thus, the aim of the present study is to describe the prevalence of Double Burden of Malnutrition in India and to assess the wealth-based inequalities in its prevalence. **Approaches/methods of innovation/changes implemented:** This study utilizes data from the NFHS-5 and Children under the age of 3 years and their mothers were considered eligible for this study. Bivariate analysis and logistic regression were used to understand the prevalence of double burden of malnutrition. Wagstaff decomposition analysis was done to quantify the contribution of each of the inequalities in the social determinants on the observed income related inequality in the dual burden of malnutrition. **Key findings:** The prevalence of double burden of malnutrition was higher among households where child was born through C-section (12% vs. 6%), in southern states (12%), richest wealth quintile households (12%) and having higher educational attainment (10%). Results from logistic regression analysis showed that households where births occurred by C-section, currently breastfeeding women, richer wealth quintile women were more likely to have dual burden of malnutrition. The decomposition analysis indicated that delivery by C-section, rural residence, improved water source and abdominally obese women contributed majorly to the wealth-based inequalities in DBM. This study confirms a coexistence of child and maternal under- and over-nutrition. **Significance and application:** The results of this study need quick, coordinated action to prevent the double malnutrition problem. Adult obesity and its associated health effects, as well as maternal and infant malnutrition, need to be addressed using evidence-based therapies. A multisectoral action, involving both nutrition specific and nutrition sensitive interventions that are context specific can be adopted.

Exploring the consumption pattern of wild edibles among local people in Eastern Uttar Pradesh, North India; *Amit Kumar Bundela and Dr. P. C Abhilash; Institute of Environment & Sustainale Development, Banaras Hindu University,Varanasi,Uttar Pradesh,India*

Background: Bioprospecting of wild edibles are essential for agrobiodiversity management and SDG-2. Hence, my study was primarily aimed to explore nutritionally and agriculturally relevant wild crops and their consumption patterns among local people in Eastern Uttar Pradesh, north India and develop strategies for large-scale utilization for food security and dietary diversification. **Approaches/methods of innovation/changes implemented:** A structured multi-layered methodology comprising of two components (Inventorization and survey) was undertaken. The selected sites were primarily concentrated in Mirzapur district and some parts of Sonebhadra in Eastern Uttar Pradesh, India.

Inventorization involved exploratory field visits for documentation of wild crops. Interaction with local farmers was carried out using the Participatory Research Appraisal Method based on a set questionnaire. Around 148 local residents were interviewed to assess their awareness and consumption patterns of wild crops as well as their medicinal importance. The collected data was analysed through descriptive statistics, and the results were tabulated accordingly. **Key findings:** The exploratory survey could identify 59 wild edibles belongs to diverse use category having agricultural, nutritional and biocultural relevance. Among which 17 species were leafy vegetables, 13 vegetables and legumes, 19 fruit crops, 8 roots & tubers and 2 cereals and pseudocereals. The frequency, occurrence as well the consumption pattern of these species among the local residents were documented and a food calendar (nutri-calendar) was prepared accordingly. Leaves were the most commonly consumed part followed by fruits, roots and tubers and flowers. Apart from the nutritional value, these species were also bestowed with medicinal attributes. **Significance and application:** Our study could identify few highly promising wild edibles for dietary diversification and thereby facilitating the transition towards a planetary healthy diet. Exploring more of such species from different agro-ecological regions and standardizing agronomic practices for most promising ones are essential for agricultural sustainability.

Assessing quality of Indian diets and nutritional inadequacy using diet quality indices ; *Srishti Mediratta and Dr. Pulkit Mathur; University of Delhi.*

Background: The aim of study was to assess dietary practices using diet quality indices among adults. It also explored the predictors of diet quality among adults. **Approaches/methods of innovation/changes implemented:** A cross sectional study design with non-probability purposive sampling followed by snowball sampling was used to collect dietary data from 589 adults (20-40 years) in Delhi, India. Nutrient intake was assessed using 24-hour dietary recall method. Diet quality indices such as Diet Quality Index- International Score (DQI-I) and the Global Diet Quality Score (GDQS) were selected to measure diet quality. The differences were assessed using Mann- Whitney U test with 95% confidence interval (CI). Spearman's correlation between diet quality index scores was analyzed. Multinomial regression was applied to determine the predictors of diet quality among adults. Statistical significance was assumed at 5% level ($p < 0.05$). **Key findings:** The average DQI-I score was 56.4 ± 5.6 among participants (n=589). The average DQI-I component scores for variety, adequacy, moderation and overall balance scores were 13.1±2.6, 27.5±2.2, 15.3±2.9, 0.43±0.9 respectively. Females were more likely (β=2.07, 95% C.I.: 1.26 – 3.401) to have DQI-I scores in the lowest quartile as compared to males (p=0.04). Majority participants (88%) had moderate risk of nutritional inadequacy and 11% were at a high risk of nutritional inadequacy on the basis of GDQS. There was positive association between GDQS and DQI- I score (ρ =0.316, p<0.001). The GDQS is better for assessing nutrient adequacy with healthy and unhealthy food consumption being compared. On the other hand, DQI-I gives a composite score combining the nutrient and food group intake and comments on variety, adequacy, moderation and overall balance. **Significance and application:** Reformulation of unhealthy foods to reduce fat, sugar and salt, nutrition education and behaviour change communication strategies to encourage healthier food selection and promotion of dietary diversity will help improve nutritional adequacy of the diets.

Dietary Behaviors, Nutritional Status, and Menstrual Function among Adolescent Girls: A mixed method approach; *Priyanka Yadav and Prof. Sangeeta Kansal; Banaras Hindu University.*

Background: Adolescence is transitional phase of physical and mental development between childhood and adulthood and is characterized by immense hormonal changes. Majority of girls experience some problems associated with menstruation which mostly related with dietary behaviors. Thus, this study aimed to elicit the dietary behaviors, nutritional status, and menstrual function among adolescent girls. **Approaches/methods of innovation/changes implemented:** Present study was based on randomly selected 202 adolescent girls (10-19) years in rural Varanasi, India. We applied a mixed-method approach, including a cross-sectional community-based survey and qualitative sessions

of in-depth interviews about dietary behaviors and menstrual health. A semi-structured schedule through Epi collect was used to assess dietary behaviors, nutritional status, and menstrual health. Univariate and bivariate analyses were done using SPSS version 23. **Key findings:** The mean age of the study subjects was 14.04±2.78 years (range 10 to 19 years). Mean height, weight, and body mass index were 141.99±9.23 cm, 34.75±9.65 kg, and 17.21±3.14, respectively. Nearly 10% of adolescent girls had no regular eating habits, compared to more than half (56.4%) who only ate twice each day. Only 21.8% of girls reported that their diet contains roti, dal, rice, vegetables, salad, and seasonal fruits, and that this gap was substantially correlated with whether the menstrual cycle was regular or irregular (p value<0.05). The prevalence of fruit intake was 35.1% while 5.0% were the fast-food consumer every day. Only 1.5% of adolescent girls received knowledge about the menstrual cycle, anaemia, and a balanced diet from school. **Significance and application:** Lifestyle modifications like regular physical activity, decreasing the intake of junk food and promoting healthy eating habits should be emphasized in school health education programs to improve menstrual health. Also, still there is need to establish a causal association between menstrual deformities and dietary behaviors thus a randomized clinical trial will be a good choice for further studies.

Assessment of micronutrient intake, nutritional awareness, practices and their risk factors among women of the reproductive age group in the aspirational district, Bahraich, Uttar Pradesh , *Shantanu Sharma, Bhavna Sharma, Afreen Sultana, Priyanshu Rastogi and Meetu Kapur; MAMTA Health Institute for Mother and Child.*

Background: The increasing prevalence of anemia among women and girls, according to the national survey, highlighted the need of understanding its risk factors and implement actions to address them. The objective of the study was to assess the knowledge, attitude, and practices related to anemia, diet, and iron-folic acid supplementation in Bahraich. **Approaches/methods of innovation/changes implemented:** It was cross-sectional quantitative research conducted among 403 adult women (non-pregnant and non-lactating), 414 pregnant and lactating women, and 405 adolescent girls. The study was a part of community-based intervention, Project Samposhan. The data were collected using a validated semi-structured questionnaire on knowledge, attitude, and practices related to anemia, nutrition, and iron-folic acid supplementation, anthropometric measurements, and 3-day 24hr dietary recall. The study was done in 24 villages over 2-months. Logistic regression was performed to assess the association between the risk factors and the nutritional intakes using SPSS. **Key findings:** Less than one-third of all respondents had heard of anemia. Less than 1% of girls or adult women were consuming IFA tablets compared to 27% of pregnant or lactating women. More than two-thirds of women and girls received rations under the public distribution system and 92% of pregnant women received take-home rations from Anganwadi centers. Nearly all the girls and women had intakes of iron, calcium, proteins, vitamin A, and zinc less than the estimated average requirement. Poor socio-economic status, limited knowledge and perceptions, and low education status were associated with poor nutritional intakes. **Significance and application:** The nutritional intakes, status, and awareness were poor among women and girls. Aspirational districts like Bahraich need core nutritional interventions focusing on increased awareness generation, food supplementation, access to services, and extensive monitoring of public health programs. A baseline assessment of key indicators of the intervention is crucial to assess its effectiveness over time.

Development of integrated nutrition messages for schools; *Kaosar Afsana, Saira Parveen Jolly, Fahmida Akhter, Abu Ahmed Shamim, Malay Kanti Mridha, Barnali Chakraborty and Lalit Battaharjje , BRAC James P Grant School of Public Health, BRAC University.*

Background: School textbooks are important tools for disseminating information across the country. It was urgent to develop sets of impactful messages encompassing thematic issues on healthy diets, nutrition and immunity, hygiene and sanitary practices, physical activity and lifestyle, and environment including a COVID-19 context for textbooks of schoolchildren. **Approaches/methods of**

innovation/changes implemented: We conducted a mixed method study in Rangpur and Dinajpur districts of Bangladesh, from August 2020 to March 2021 among stakeholders, 450 students, their mothers and school teachers. Firstly, we did a literature review on national textbooks, curriculums, and national policies and followed by Key Informant Interviews and a knowledge assessment survey. Based on the findings, three sets of pictorial and narrative messages were developed for different grades, and the messages were modified by a comprehension and aesthetic test. Finally, we conducted trials of improved practices among schoolchildren. We performed the content analysis with qualitative data and used One-way ANOVA and chi-square tests by using SPSS-24 for analysing quantitative data. **Key findings:** Textbooks cover more or less all the six thematic areas of healthy diets, nutrition and health. The stakeholders suggested aligning with the contents of textbooks and existing policy. They also suggested maintaining the age and grade of the students and the representation of messages on the cover page or visible pages. We observed the knowledge gap among mothers and students on the environment and climate change issues. The results from the trials of improved practice showed that the newly framed integrated nutrition messages were significant in changing both knowledge and practices of children **Significance and application:** Reinforcing the integrated nutrition messages on the visible pages of the textbooks by the National Curriculum and Textbook Board might prove to be an effective tool to bring changes in knowledge and practices among the students of Bangladesh. These messages can be validated nationally in Bangladesh and similar settings in South Asia.

Quantifying the burden of lipid anomalies among adolescents in India; *Kirti Kirti; International Institute for Population Sciences*

Background: The present study's aim is to quantify the burden of lipid abnormalities (excessive non-high-density lipoprotein (non-HDL) cholesterol and low-density lipoprotein (LDL) cholesterol) among Indian adolescents. Which has emerged as a significant covariate of coronary heart disease (CHD). **Approaches/methods of innovation/changes implemented:** The present study aims to unearth the prevalence of any lipid anomalies, their level, and types of lipid profiles among adolescents in India using the Comprehensive National Nutrition Survey 2016-18 i.e., cross-sectional data. Descriptive and bivariate statistical analyses have been used to check the associations and significant differences between groups of individuals suffering from any type of lipid abnormalities. **Key findings:** A total of 35,830 adolescents aged between 10 and 19 years (mean age:14.36 yrs.; SD=2.81 for males and 14.39 yrs.; SD=2.78 for females) were included. Roughly 77 percent of the adolescents are suffering from any lipid anomalies. Their mean lipid levels are 140.6 (SD=32.9), 84.1 (SD=24.8), 47.3 (SD=10.7), and 95.3 (SD=50.0) for total cholesterol, LDL, HDL, and triglycerides, respectively. A higher proportion of adolescents suffered from lipid anomalies among those who were overweight or obese (89%, 95% CI: 85, 92) and pre-diabetics (81%, 95% CI: 78, 83) compared to each of their counterparts. Furthermore, a considerable proportion of samples with vitamin A (70%, 95% CI: 68, 73), D (81%, 95% CI: 79, 82), and B12 deficits (73%,95% CI: 72, 75), as well as zinc (77%, 95% CI: 76, 77), folate (76%, 95% CI: 74, 77), and iron deficits (75%,95% CI: 73, 77), were suffering from any lipid anomalies. Of individuals who consume an unhealthy diet, 77% (95% CI: 76, 78) of them were suffering from any lipid anomalies than others. **Significance and application:** The study contends that preventing the increasing burden of lipid abnormalities among Indian adolescents is essential. Vitamin and mineral deficiencies and unhealthy dietary habits are significantly associated with high LDL and non-HDL levels. In the longer run, this might cause the early onset of hypertension, diabetes, and CHDs. Hence, appropriate interventions are needed to curtail these early onsets by primarily focusing on adolescents.

Does lifestyle behaviors trigger cardiovascular risk factors among school going adolescents in Pakistan?; *Nilofer Fatimi Safdar, Nida Jawed, Anishta Murad, Salma Halai Badruddin, Kashfi Shafique and Sumera Inam; Dow University of Health Sciences, Karachi, Pakistan*

Background: To conduct a baseline survey of low-income school going adolescents from Karachi in order to investigate multiple aspects of adolescent life including lifestyle behaviors, dietary habits,

micronutrient levels and associated risk factors for cardiovascular diseases among adolescents. **Approaches/methods of innovation/changes implemented:** A cross-sectional study in 1195 adolescents aged 11-17 years from low-income schools in Karachi, using a multistage stratified sampling. A pretested questionnaire (translated into local language) used to gather socio-demographic characteristics of students and their parents/guardian. Participant's diet (80 items food frequency questionnaire), physical activity (adapted from validated Questionnaire) screen time, sleeping pattern and tobacco and betel nut use were assessed. Anthropometric & clinical measurements including weight, height, BMI (kg/m2), body fat %, muscle strength & blood pressure were measured using scales. Descriptive statistics were calculated as mean ± standard deviation and N (%) for continuous and categorical variables. Independent sample t test was done for differences in non-communicable diseases risk factors and a p-value <0.05 was considered significant. **Key findings:** Body mass index (BMI) and fat mass was found to be significantly higher among female adolescents (60.8%) as compared to males. Majority (83.3%) of participants were physically inactive. Students consuming soft drinks were 91.2 % as compared to a smaller number (7.2%) consuming fast food. Consumption of Chaliya, Pan & Gutka was 48.4%, 32.9% & 21.2% respectively. The daily screen time was more than 2 hours among 45.7% participants. Higher rates of diastolic and systolic blood pressure and Hand Grip Strength (HGS) were observed among males as compared to females (p-value <0.05). **Significance and application:** Interventional programs in schools should emphasize on healthy lifestyle behaviours, increased physical activity, good eating habits and smoking cessation for effective health. More research is needed on a larger sample including population from different provinces due to ethnic diversity in Pakistan. Also, adolescents who don't go to school need to be investigated as well for CVD risk.

Healthy Postpartum Dietary practices - Facilitators and Barriers - A cross-sectional survey in Eastern Tamilnadu, India; *Rahul Anand Kanakasabapathy and Nandini Annamalai; Government Kamraj Hospital, Chidambaram, Tamilnadu*

Background: The objectives of the study were to assess the facilitators and barriers to health postpartum dietary practices among women in a rural taluk of Eastern Tamilnadu - India .**Approaches/methods of innovation/changes implemented:** Study design - Cross-sectional study Data collection method - Survey Sample size - 1000 Respondent type - Postpartum women (within 6 weeks of childbirth) Modality of data collection - Self-administered Questionnaire - Using the Tamizh Translated version of the Postpartum weight managament questionnaire by Kumari et al Topics of Inquiry - Perceptions related to body weight, Eating behaviours, inability to follow a healthy eating behaviour and common beliefs associated with postpartum dietary practices . **Key findings:** 36.7% of the women felt that their present weight was significantly more 54.4% maintained a regular meal pattern only for 1-2 days in a week 39.4% did not routinely include protein-rich food in every major meal of their daily diet 92.1% did not routinelt include 4-5 servings of fruits or vegetables in their daily diet. 71.5% consumed food high in fat, salt and Sugar (HFSS) almost daily 83.9% had no knowledge about the healthy dietary practices in the postpartum period 61.7% opined that they were bound to eat high calorie foods as per their family's advice **Significance and application:** Our study indicates that regional socio-cultural factors and economic constraints must be taken into consideration when devising programs to address the problem of postpartum weight retention. Longitudinal studies with a larger sample size is needed to further understand the issues with healthy postpartum dietary practices.

Zinc content in prefered rice types in Bangladesh; *Victor Taleon, Md. Zakiul Hasan, Khairul Bashar and Sonia Gallego; International Food Policy Research Institute*

Background: Parboiled "Minikit" rice is one of the most prefered "slender" rice types in Bangladesh. However, "Minikit" rice is generally produced by excesively milling "bold/medium" rice which could result

in large nutrient losses. The objective was to determine the zinc content of rice types produced by households and commercial mills in Bangladesh. **Approaches/methods of innovation/changes implemented**: Four rice samples were purchased in 3 shops in each of 2 peri-urban and 2 urban markets/villages of 5 districts (Faridpur, Jamalpur, Rangpur, Barisal and Bogura) in Bangladesh (n=240). Rice samples were collected from 4 households in 6 villages within the same 5 districts (n=120). Information about the variety name, rice type, rice shape and milling intensity was obtained. The zinc content was measured by XRF while phytic acid was measured by NIRS. **Key findings***: From the 10 most common rice types, "Minikit" rice had the lowest zinc content (6.3 ug/g), meanwhile, the rice "Ranjit" had the highest zinc content (13.2 µg/g). Minikit rice was reported only once among the 72 samples from rural households who typically produce their own parboiled rice. Highly polished rice (n=149) had 7.1 µg/g of zinc compared to 9.9 in less polished rice (n=211). Although slender rice had lower zinc content (8.1 µg/g) than bold rice (9.1 µg/g), rice zinc content was more affected by milling intensity than rice type. Phytic acid content was 1.7 mg/100g in highly polished rice and 2.1 mg/100g in less polished rice. **Significance and application:** Promotion of parboiling as a treatment to produce "nutritious rice" needs to be urgently reconsidered. Although parboiling can help reduce vitamin B deficiency, this survey showed that highly milled parboiled rice such as "Minikit" produced in commercial mills contains very low levels of zinc which exacerbates the zinc deficiency in Bangladeshi vulnerable populations. A follow up study is needed to identify regions where behavior change interventions may be more effective.

Nutrient Density of Bangladeshi Foods and its Application in Diet Planning for Pregnant Women;

Nazma Shaheen, Prof. Dr. Md. Ruhul Amin, Aiful Islam, Abira Nawar, Fariha Ferdous and Lalit Bhattacharjee; Institute of Nutrition and Food Science, University of Dhaka

Background: This study aimed to identify foods that are rich sources of the seven problem micronutrients of Bangladesh —iron, zinc, calcium, thiamine, riboflavin, vitamin A, and vitamin B12 — and formulated a model diet for the third-trimester pregnant women across three activity levels. **Approaches/methods of innovation/changes implemented:** The study developed a new metric, "naturally nutrient-rich score 7 (NNR7)," considering the seven problem micronutrients of Bangladesh. All foods on the food composition table for Bangladesh (FCTB) were divided into eight food groups according to the national food-based dietary guideline. The study also assessed the nutrient adequacy score (NAS) of the top ten NNR7-scored foods from each food group and made a food exchange list consisting of 80 food items. Adding soya oil and potato to the previous food list, the study formulated a model diet using linear programming for the third-trimester pregnant women of three different activity levels. **Key findings:** According to the NNR7, food groups such as meat, poultry and eggs, pulses and legumes, leafy vegetables, and fish were the richest sources of the problem micronutrients. Dried anchovy (62.1%), soybean (33.1%), and skimmed milk (137%) were the foods that can fulfill the highest percentage of the daily values of iron, zinc, and calcium, respectively. The NAS scores worked as a food exchange list for foods of the same group. **Significance and application:** South Asian governments should increase awareness of micronutrient-rich foods by providing robust nutrition education programs to help people make educated food choices. Further research may examine the role of food prices to determine the nutrient return per unit cost to enable consumers to choose foods wisely at affordable costs.

Assessment of dietary and lifestyle pattern of college students (18-25 years) residing in Delhi and Kathmandu during covid-19 pandemic; *Swati Jain and Samikshya Karki; Lady Irwin College*

Background: This study proposes to assess dietary and lifestyle patterns among college students in the two South Asian countries- India and Nepal. The Covid-19 pandemic has further changed several daily habits such social gathering, outing, physical activity and eating habits due to lockdowns imposed in several parts of the world. It is imaginable that this situation drastically could have changed the dietary

choices of several people because of food availability, accessibility, also people were forced to eat in-house. As the pandemic is not yet over and many countries are still imposing confinement and restrictions in mobility, the accessibility of food may be crippled during situations, which could easily influence the overall diet The objective of the study was to compare the dietary and lifestyle pattern, nutritional and knowledge levels of Indian and Nepalese college students (aged 18-25 years). **Approaches/methods of innovation/changes implemented:** Cross sectional study design. The present study is exploratory research and was expected to conduct on a minimum of 150 participants but due to time constraint it was conducted on 101 participants, approximately 50 from both groups. The information was gathered through an online questionnaire and a survey. The Google forms containing the study's questionnaire were distributed via email and social media platforms such as WhatsApp and Facebook. Any device with an Internet connection could access the form. Participants who agreed to fill out the. questionnaires gave their informed consent. A written information sheet informed the participants about the study. A self-administered questionnaire was used to assess the socio-demographic profile, eating pattern, lifestyle factor, and nutrition-related knowledge of college-aged girls aged 18 to 25 years. In the study sites designated for data collection, pre-testing of tools was done on 20% of the entire study sample. Both quantitative and qualitative data were coded, tabulated, and statistically analyzed in Microsoft Excel (2007). The data collected from college students (aged 18-25 years) was checked, coded, cleaned, consolidated, and transferred to excel sheets for analysis and interpretation using the tools described. Statistical Package for Social Sciences (SPSS) was used for all quantitative data analysis (version 28.0.1.1.). The information gathered was coded and systematically analyzed.• The t-statistic was used to test the statistical significance of a difference in two means between groups, assuming P<.05 for statistical significance The questionnaire was divided into three sections: dietary information, lifestyle information, and knowledge-related information. To enable comparison of different variables between the two groups, a suitable scoring pattern was used. **Key findings:** A total of 101 college students from Delhi and Kathmandu participated in this study. The age group of college students was 18-25 years, with more female (73.3%) than male (26.7%). The mean height and weight based on self reported measurements was almost similar in both groups so there was no significant difference in BMI.In both groups, the majority of individuals were non-vegetarian by dietary choice. However, there were more non-vegetarians in Nepalese population. Cereal consumption pattern among Indian subjects which reveals that the majority of the subjects (80%) were the consumers of cereals regularly while only 37.04% of Nepalese subjects were eating cereals regularly. It is interesting to note that majority of the students in both group; Indian (25 out of 47) and Nepalese (38 out of 54) groups did not report addition of extra salt to their food. In terms of nutritional knowledge, Indians had significantly higher levels than Nepalese students (p>0.001). In order to find out dietary knowledge consciousness, some special questions were asked regarding food, diet and their nutritional contents. Indian participants were significantly better in this category scoring far more indicating they have a better understanding and awareness of healthy diet. However, for physical activity levels Nepalese were ahead of Indians and were spending more time in outdoor activities like playing, swimming, sports etc. in a day. Since both surveyed subjects were subjected to the same geographical coordinates, some individual food surveys were done which was commonly available for both the groups. Dietary consumption as measured through FFQ revealed that cereals, pulses and milk were being consumed significantly higher in Indians (p<0.05) Meat and poultry with special liking for buff sukuti, and energy dense snack like potato chips/fries' consumption was significantly higher in Nepalese. Consumption of fruits and vegetables was lesser than recommendations in both the populations. **Significance and application:** Younger generation of India needs to be more aware of importance of physical activity and consumption of fruits and vegetables for micronutrient adequacy. This will help the nation achieve the SDG's and lead to more progress of the nation in the times to come.

Adolescent girls and their eating behavior in rural Bihar, India: Challenges in improving their dietary practices; *Varsha Pradhan, Putul Thakur, Santosh Akhauri, Irina Sinha and Vikas Kumar ; Project Concern International*

Background: One of the key objectives of the study was to understand dietary practices among 15-19 years old adolescent girls in rural areas and the factors associated with it. Additionally, to understand the efficacy of the life skill module amalgamated with health and nutrition sessions to improve dietary behaviours among adolescents. **Approaches/methods of innovation/changes implemented:** TARA, a pilot project, adopted a cluster randomized controlled trial design. A total of 48 villages were chosen from two blocks of Rohtas district in Bihar using fixed criteria of population size and the presence of a school in villages. 24 villages were assigned to each arm randomly. All adolescent girls aged 15-19 years living in these 48 villages were listed before the intervention. Two rounds of surveys were conducted before and after the intervention. A total of 2327 and 2033 adolescents were interviewed in baseline and endline respectively using a structured schedule. Recall of 24-hour food consumption was asked. **Key findings:** Under the TARA project, adolescent groups (15-20 girls in a group) were formed to roll-out the sessions to improve the knowledge on dietary diversity with other life skill training. The study revealed that a higher percentage of adolescents had knowledge about the consumption of a minimum diverse diet however, a few of them consumed, despite the availability. A net effect of 17.8% in the knowledge [Baseline-(treatment -71%, control-82%) Endline- (treatment- 85%, control- 77%)] and 6.4% [Baseline- (treatment- 25%, control- 23%), Endline- (treatment-32%, control- 23%)] in consumption of the minimum diverse diet was observed among the adolescents exposed to the intervention. **Significance and application:** The study reveals poor dietary consumption among adolescent girls. Poor dietary intake during the critical growth years of adolescence may affect health outcomes and lead to intergenerational affects such as malnourished children, and anemic mothers etc., Moreover, dietary practices of boys should be studied separately.

What happened to child feeding practices and caregiver child interaction when we "unlocked"? Findings from a cross-sectional study in Telangana, India.; *Reetabrata Roy, Gitanjali Lali, K.S. Chandrika, Deepak Jangra, Khyati Tiwari, Narasimha Rao and Gauri Divan ; Sangath*

Background: The COVID-19 pandemic impacted health, nutrition and learning of young children. Community health workers showed resilience, by optimizing child well-being through various initiatives including maintenance of food distribution services. This study was conducted to understand infant and young child feeding (IYCF) practices in the community post easing of COVID-19 pandemic related restrictions. **Approaches/methods of innovation/changes implemented:** We conducted a cross-sectional study with mothers of children aged 6-36 months in the catchment areas of 30 Anganwadi Centers spread across 3 ICDS projects in Hyderabad, Telangana. Telephonic interviews were conducted with 170 randomly selected respondents on caregiver-child interactions, access to feeding
programs and IYCF using the WHO Complementary Feeding Questionnaire. Data collection was done during November-December 2020 when phased unlocking in India was being implemented. Descriptive analysis of data was conducted using STATA. **Key findings:** 51% mothers received family support in feeding children; 18% reported father's participation. 71% mothers received food from AWCs both before and during lockdown. 34-42% caregivers reported playing, reading, singing etc. with their child during the pandemic but not before. 63% children received WHO recommended minimum acceptable diet, 73.5% received >=4 food groups & 92% received recommended number of meals in the 24 hours preceding the survey. 95% children had grains & roots in their diet followed by other fruits/vegetables (84%), dairy products (75%), Vitamin A rich food (72%) & Eggs (61%). Only 26% received legume & nuts and 17% consumed flesh food. **Significance and application:** Despite unprecedented challenges of the pandemic, active community engagement by Anganwadi workers and optimal maintenance of food distribution services ensured continuation of IYCF practices among young children. These efforts would have protected children from the immediate and long-term impacts of undernutrition.

Impact of smartphone usage on the dietary habits of college-going students; *Shivani Phugat and Mrs. Prachi shukla; Lady Irwin College, University of Delhi*

Background: The objectives of the study were--To study the impact of smartphone usage on dietary habits of college-going students (age 18-24 years). -To assess the duration of usage of smartphones among college-going students. - To study the relationship between smartphone usage and dietary habits of college-going students. - To compare the dietary habits of smartphone addicts with non-addicts college-going students **Approaches/methods of innovation/changes implemented :** The study design was cross-sectional. • The research was quantitative in nature. Purposive sampling technique was used for data collection. A questionnaire in the form of a google form consisting of 5 sections was used as a tool for data collection. The 5 sections were as follows- Socio-demographic profile, anthropometric measurements, dietary habits, lifestyle habits, and Smartphone Addiction Scale Shorter Version (SAS-SV). SAS-SV is a validated tool by Kwon et al (2013) which consists of 10 questions that help in screening young adults who are vulnerable to smartphone addiction. A semi-quantitative FFQ was used to collect the dietary habit data of the sample size. **Key findings:** The findings revealed that the overall prevalence of smartphone addiction was 54 (41%). Out of the 41% addicted students, 34% were male and 66% were female, indicating that SAS-SV scores were higher in females in comparison to males. The study showed a significant difference in consumption of junk foods between addicts and non-addicts. In the present study significant associations between the quality of sleep and smartphone use ($p<0.001$); moderate-intensity physical activity and smartphone use ($p=0.042$); BMI status and smartphone use ($p=0.016$); sedentary behavior and smartphone use ($p<0.001$) has been found. Significant associations between smartphone screen time and smartphone addiction ($p<0.001$); levels of stress and smartphone addiction ($p=0.028$) have also been obtained. In the present study the prevalence of smartphone addiction was high (41%) and it was found to be impacting their quality of sleep, physical activity and stress levels. **Significance and application:** There is a need for proper guidelines in order to restrict the time spent on smartphones as a smartphone has become a necessity in recent times. It is important to come up with a program that increases awareness regarding the harmful impact of excessive usage of smartphones. • A case-control study with a larger sample size may be conducted among college-going students to compare the dietary habits of addicted and non-addicted students for better understanding on this topic.

Effects of COVID-19 Lockdown on Lifestyle Behaviours in Children Living in Mysuru, India; *Dr Deepak Anil, Dr Prajwala Hassan Vasudev and Dr Vijaylakshmi Rao Vadaga; JSS Medical College*

Background: To assess the impact of lockdown due to COVID- 19 on diet, physical activity, sleep, and lifestyle changes associated with COVID- 19 lockdown. **Approaches/methods of innovation/changes implemented :** A cross-sectional online survey was shared during the Covid-19 lockdown period from March to May 2021. A convenience sampling method was used for recruiting parents from the general population living in Mysuru. Inclusion criteria were parents aged 21 years or older living in Mysuru and having a child between the ages of 1-5 years. The data collected was entered in Microsoft Excel 2019 spreadsheet followed by analysis using SPSS version 26. The associations between the selected variables and lockdown-related changes were found using the paired t-test, Mc Nemar's test and Wilcoxon signed-rank test. **Key findings:** There was a great increase in the consumption of homemade food (90%), self-feeding (42.9) and an improvement in the hygiene practices of cooking, storing, and feeding (97.1%). 55.7% of the parents were able to engage their children more in physical activities. The time spent by parents with their children increased during the lockdown period. The screen time and sleep duration had also increased during the lockdown which showed statistical significance. **Significance and application:** The results demonstrate that, the child's food habits improved and parents were able to enhance their kids' participation in physical activity. To avoid long-term health concerns during the present and potential future pandemics, initiatives to increase physical activities and limit sedentary time, particularly screen time, in children are needed.

Promotion of Brisk walking can reduce burden of hepatic steatosis; *Aayushi Rastogi, Shiv Kumar Sarin, Manya Prasad and Umesh Kapil; Institute of Liver and Biliary Sciences*

Background: Hepatic steatosis is one of the leading causes of liver-related death around the world. Clinical condition of the hepatic steatosis encompasses a morphological spectrum, from simple fatty liver to complex severe cases of cirrhosis of the liver. Fatty liver has a benign prognosis. However, it is reversible with simple lifestyle interventions. Thus, there is a need to assess the prevalence and predictors of hepatic steatosis in general population to plan interventions accordingly. **Approaches/methods of innovation/changes implemented:** A cross-sectional study was undertaken between September 2021 to May 2022 among COVID-19 vaccine beneficiaries attached to a tertiary care hospital of Delhi, India. Trained research team administered a brief questionnaire assessing their personal and medical history, behavioral risk factors and lifestyle of the participants. In addition, transient elastography (TE), anthropometric measurements and blood sample was collected in enrolled subject. Hepatic steatosis was defined as controlled attenuation parameter (CAP) ≥248 db/m. Univariable and multivariable analysis was performed to determine the factors associated with hepatic steatosis and liver fibrosis. All statistical tests were done in STATA v-14 with statistical significance considered at p value <0.05. **Key findings:** A total of 1014 participants were screened with mean age of 39.1±12.7 years and 65.8% were males. The prevalence of hepatic steatosis was 50.4% (95%CI:47.3%-53.5%). The following factors were found to have a statistically significant association (<0.001) with hepatic steatosis: age, diabetes, hypertension, dyslipidaemia, overweight, obesity, morbid obesity were independent risk factors for hepatic steatosis. Female gender, daily brisk walking and walking after dinner were important factors that had a protective effect on hepatic steatosis. **Significance and application:** Simple lifestyle interventions such as Brisk walking should be promoted to reduce the high burden of hepatic steatosis in the general population.

Dietary Diversity among Indian adolescents and young adults: Evidence from UDAYA study; *Anjali Bansal, Pooja Arora, Radhika Sharma, Archa Misra and P. Shrisha; International Institute for Population Sciences*

Background: We studied minimum dietary diversity (MDD) and explored its linkages with background characteristics like household consumption behavior, presence of grandparents in the household, number of siblings, involvement in paid work, etc. **Approaches/methods of innovation/changes implemented:** For this study, we have data from UDAYA study (Understanding the lives of adolescents and young adults). Data was collected from two majorly populous and backward states of India, namely Bihar and Uttar Pradesh (UP). Follow-up survey of the UDAYA study (2018-19) was conducted among adolescents and young adults aged 12-23 years old. For bivariate analysis and sex differentials, chi-square test was done to study the association between MDD and different covariates. Logistic regression analysis was performed to identify determinants of MDD. **Key findings:** Around half of the adolescents don't have an adequately diverse diet. We found the prevalence of MDD to be 59% among males and 56% among females. Bihar performed better overall with higher MDD and lesser gender inequality. It is observed that the most widely consumed food group among all the respondents is "grains, white root tubers, and plantains". Food groups consumed by more than half of the individual's included dairy, fruits, pulses, and vegetables. Wealth Index and caste were observed to be significantly associated with MDD. Food Consumption Score (FCS) of the household and media exposure were significantly impacted the MDD. **Significance and application:** Improving dietary practices at a younger age eventually results in improved nutritional status and overall development of an individual. It can serve as the key to prevent any nutritional deficiencies and diseases linked with it at later ages. The government should focus more on imparting healthy practices related to diet among both adolescents and their families. Action is required to refine the current schemes present for improvement in household food consumption, more so for the poorer population. Programs are needed that work on reducing gender inequalities, especially in the state of UP.

Assessment Of Age Appropriate IYCN Practises & Weight Gain Pattern of Young Infants In Selected Block Of Kachchh District; *Ankita Agarwal and Dr. Hemangini Gandhi; The Maharaja Sayajirao University of Baroda*

Background: To study region specific IYCN practices. • To determine prevalence of low birth weight children.• To assess periodic weight gain of young infant.• To study the association of low birth weight with maternal socio-economic factors and mother's characteristics, nutrition status and pregnancy outcomes. **Approaches/methods of innovation/changes implemented :** A cross sectional study was conducted. Purposive sampling technique was used for selection of the block namely Gandhidham in Kachchh, Gujarat. All women registered in the anganwadis in the region who had given birth from 01 September 2021 till 28th February 2022 were eligible for inclusion. 104 women were enrolled for the study. Information collection was done via interview using pretested semi structured questionnaire and referring their Mamta Card (MCH card) and/or medical file. Data obtained were analyzed using SPSS 25 and STATA 14. Descriptive statistics and one sample t-test (Group statistics) were used. **Key findings:** Only 18% infants were breastfed within an hour of birth. 63.5% women had discarded first few drops of colostrum. Practice of feeding prelacteals is highly prevalent in the region. 19% infants had low birth weight. 25% infants were undernourished. A significant association was found between low birth weight and anaemic underweight undernourished pregnant women. Significant association of infant nutrition status was found with colostrum feeding, and presently breastfeeding. **Significance and application:** The study highlights the need for focusing on maternal nutrition to reduce the prevalence of LBW in the study region. Sub-optimal IYCN practices needs to be corrected through multi-pronged approach. Regular growth monitoring needs to be strengthened at anganwadi level so as to identify severe cases of malnutrition timely.

Addressing the malnutrition status of children among poor household: Through a positive deviance approach in South Asia; *Ajay Verma, Vani Sethi, Zivai Munira and William Joe; Institute of Economic Growth*

Background: Positive deviants" are "infants and preschool children who grow adequately in low-income families in communities where a large portion of children suffer from growth retardation. The objective of the study is to identify the specific socio-demographic factors that improve the nutritional status of the children even they are living in the poverty. **Approaches/methods of innovation/changes implemented:** We used latest wave of data form DHS for India (2019-21), Pakistan (2017-18) and Bangladesh (2017-18). Sample size of the study was 35303 (India), 551 (Pakistan) and 1393 (Bangladesh) from bottom 40% of wealth quintile respectively. We used bivariate analysis and logistic regression to show the relation and association between positive wasting among children under 2 years and socio-demographics factors for South Asia countries. **Key findings:** Findings of the study shows that the 40% in India, 55% in Pakistan and 60% in Bangladesh children were well nourished in the poor household (40% of wealth quintile). The odds ratios suggested that sex of child (OR = 1.08, 95% CI = 1.04,1.13), maternal 8 or more years of schooling (OR = 1.16, 95% CI = 1.10,1.23) significantly help to improve the children nutritional status in India. However, in India open defecation (OR = 0.91, 95% CI = 0.87,0.96) and unimproved sanitation (OR = 0.70, 95% CI = 0.52,0.94) in Bangladesh increased the risk of poor growth of the children. **Significance and application:** The outcome of the study shows that children from the poor household in India were less well-nourished than Pakistan and Bangladesh. Study suggests in in duration of window opportunity to improve the nutritional status of children policymakers and administrators should be given the attention on the parental education and sanitation facilities. In addition, this study also suggest that we need further deep research to understand the role of positive deviance in nutrition health.

Breakfast consumption pattern of adolescents from select Corporation schools in Chennai.; *Dr. Dimple and Dr. Gowri Ramesh; Women's Christian College, Chennai*

Background: Breakfast is considered the main meal of the day due to its association with improved growth, development, cognitive and academic performance among adolescents. To promote consumption, a few schools offer breakfast to students. Therefore, assessing the breakfast pattern of school children from select state funded Corporation schools was the main objective of this study. **Approaches/methods of innovation/changes implemented :** Stratified random sampling technique was used to select one Corporation school from each of the five zones of Chennai. Students aged 10 to 15 years were selected based on purposive sampling, after parental consent and the student's assent. A cross-sectional quantitative survey was carried out among 492 students in-person using a structured questionnaire. The questionnaire included details of sociodemographic profile, breakfast pattern, and a three day food record. Descriptive statistics, independent t-test and chi-square test were used to analyse data with Microsoft Excel 2007. **Key findings:** Nearly 71% adolescents consumed breakfast daily. Some students did not eat breakfast at all (5%), while the remaining skipped breakfast occasionally. Common reasons for skipping breakfast were lack of time, getting up late and not feeling hungry. Skipping breakfast was significantly (p<0.05) more among girls than boys, and less frequent among students enrolled in the school breakfast programme (p<0.05). A majority of the adolescents (91%) consumed traditional Indian breakfast like idly, dosa and pongal. Fruits and dairy were the least consumed food groups for breakfast. Despite 92% students being non-vegetarians, only 3.4% had a non-vegetarian breakfast. **Significance and application:** Lack of fruits and vegetables at breakfast could be due to less affordability, time constraints in preparation, and non-availability of perishables in public distribution shops. Policies should aim at making these foods more affordable, accessible, and devise strategies to enroll more students in the school breakfast programme. This will provide a vital solution to meet their nutrient requirements, and prevent malnutrition and micronutrient deficiencies.

Nutrition knowledge, attitude, and practice of gym goers (18-35 years) in west delhi; Diksha Agarwat, *Dr. Pooja Raizada and Dr. Neha Bakshi; Lady Irwin College, University of Delhi*

Background: • To assess the nutrition knowledge, attitude, and practices of Gym attendees. • To assess the dietary supplement intake of Gym-Goers of West Delhi. • To assess the nutrition status of Gym attendees. • To analyze the association between nutrition status and nutrition Knowledge, attitude, and practices among Gym Goers. **Approaches/methods of innovation/changes implemented :** The present cross-sectional research was quantitative in nature. Purposive Sampling technique was used. A questionnaire was developed and gym attendees were interviewed to assess the knowledge, attitude and practices. Nutrition status was assessed using BMI as a tool and 24-hour dietary recall was used to assess the dietary intake. • Knowledge, Attitude, and Practice related questions were analyzed using numbers, percentages, frequencies, and mean scores depending on the question. The diet-related data was analyzed by Diet DSS software. • Pearson correlation was used to assess the association between KAP scores and BMI, Wait circumference, Dietary intake and other factors. **Key findings:** The result showed that 40.7% and 19.23% of the males and females were obese respectively, as per WHO, 2017 cut offs for BMI. According waist circumference 51.92% of the women were obese. The data showed and average nutrition knowledge and attitude score among participants (73,6%). The major sources of nutrition knowledge were the Internet, trainers and friends. 46.4% of participants had an average practice score and 37.9% had poor practice scores. A significant positive association was found between nutrition knowledge and attitude (r=0.715). Nutrition Knowledge, Attitude and Practice Scores were found to be positively associated with higher energy (r=0.236, r= 0.212, r=0.356,) and fat intake (r=0.252, r=0.253, r=0.231). A positive association of educational qualification with Nutrition knowledge and attitude score was also observed (r= 0.210, r= 0.273). 53.7% of the male participants of this study were consuming dietary supplements on a regular basis while only 9.62% females were consuming dietary supplements in the form of meal replacement. About 95% of the participants were consuming protein supplements. **Significance and application:** Fitness industry is booming, with such an influx people are aiming to attain perfect body image or overall health. The present study concludes that nutrition knowledge does not promise better nutrition practices. Hence, there is a need for behavior

therapy interventions to promote correct practices among youth choosing to become healthier like gym goers.

Identification of bottlenecks in IYCF practices, especially complementary feeding in rural Bihar – A mixed-method approach; *Sruthi Susan Abraham, Shuchi Sree Akhouri, Kumar Gaurav, Suman Das, Rakesh Giri, Manoj Kumar Singh, G Sai Mala and Tanmay Mahapatra; Knowledge Management and Learning Centre, Care India Solutions for Sustainable Development*

Background: In Bihar while recommended breastfeeding practices remain ~80%; initiation, frequency and diversity of complementary feeding are <60%. Reduced literacy and maternal age at first birth, high prevalence of undernutrition and infant mortality in rural Bihar thus necessitate identification of infant and young child feeding (IYCF) determinants, to promote appropriate practices. **Approaches/methods of innovation/changes implemented:** Annual serial cross-sectional study conducted during 2015-2021 in 38 districts of Bihar recruiting a random sample of 15,687 consenting married women of reproductive age having children aged 0-23 months through in-person interviews. Distribution and determinants of IYCF practices were investigated (descriptive and multivariable logistic regression done in SAS 9.4) across socio-behavioral and programmatic exposures. During 2021, further exploration of child feeding patterns, influencers for existing practices, knowledge on appropriate feeding, quantity, and frequency was conducted through qualitative follow-up (20 mothers of 0-23 months' old babies were interviewed in-depth). In-depth interviews were analyzed using ATLAS.ti applying thematic framework approach. **Key findings:** Most IYCF practices remained better among older infants and improved over time (2015-21); >70% 0-2m old infants had timely initiation and exclusive breastfeeding. Among 6-8m infants, >50% had initiated CF (ICF) and received minimum meal frequency (MMF) but only 7% had minimum dietary diversity (MDD). Recommended IYCF practices were commoner among older, non-marginalized, wealthier, educated mothers. Specific counselling was positively associated with corresponding IYCF practices (e.g. ICF (aOR[ICF advised]: 1.76);MDD (aOR[MDD advised]: 2.69)). Qualitative findings added that impact of FLW visits, services and consequently acquired knowledge get modified during translation into practices by household hierarchies for decision-making, socio-cultural phenomena (norms/beliefs/myths/perceptions). **Significance and application:** IYCF remained far lower than targeted levels despite gradual improvement across years in rural Bihar. Insights thus generated may help targeting specific groups to demystify existing cultural and perceptional myths. Community-based events and rituals may help in building habits supporting recommended IYCF practices, given system readiness & political will.

The Drive For Increased Food and The Paradox Between Quantity vs Quality: Are We Delivering Safe and Healthy Food In South Asia; *Cassia Mahajabeen;*

Background: This paper examines if the common and the poor are getting equitable share of safe and healthy food (either as end consumers or from social programs/safety nets) in South Asia. It also looks at delivery mechanisms and programs that supports, supplies, and brings out solutions to make food healthy, safe and available for the poor. **Approaches/methods of innovation/changes implemented:** The study was analytical in nature to observe if the common and the poor in the South Asian region are having equitable access and availibity of safe and healthy food from existing socio-economic mechanisms. Literature review was conducted on published reports of global and regional organizations, reports from organization that perform checks on food safety and health, journal publications and published working papers on related issue. Quantitative Meta data from UN Organization (i.e FAO) were observed and analyzed. Other related data from global organizations were also observed for cross reference. Local and regional phenomenon were also used for analysis looking at reports (published dailies, price indexes). **Key findings:** -In general, there has been growth observed in food production especially in cereals in South Asia. This has increased consumption of K Cals per person per day and assisted reducing malnourishment. -Parallel to this phenomenon the price of food also has increased, inflation and in some cases spiraling inflation exists for food items. The FAO food

price index shows gradual increase in cereal prices (which are basic staple diet) for the last few decades. - The value chains that are part of market mechanism and supplies food from farm to the table or traded food regionally are not ensuring safety. They are still affected by harmful chemicals, overdosed pesticides, bad processing/ handling and sometimes even banned chemicals.-The poor and the vulnerable in the South Asian region still suffers from under nourishment, unequitable access to healthy food and balanced diet options lacking fruits, vegetables, dairy, legumes and nuts. Regulatory environment is still weak to ensure supply of safe and healthy food for the common, the vulnerable and the poor. **Significance and application:** - Besides the common, the poor and the vulnerable are prone to the threat of not having a safe and healthy diet given the regional condition of accessibility, equity and inflation. Therefore, interventions would need a sharper focus and a stronger vision to support the bottom 40% of the populace.-More findings from the affected groups and information on running interventions are needed to understand the issues affecting equitability, safety and health. So that the resulting interventions from government and nongovernment programs to supply or to deliver safe and healthy food can truly benefit the poor.

To study the various food choice outcomes and drivers of young adult urban women in South Delhi; *Mansi Tejpal; The Public Health Foundation of India (PHFI)*

Background: To understand the dietary choices of 18–35-year-old living in South Delhi and the factors influencing them; both of healthy and unhealthy foods. **Approaches/methods of innovation/changes implemented:** An Exploratory, mixed-methods approach was opted for this study, by using a combination of 25 Semi structured qualitative interviews, conducted in person. The respondents were women aged between 18-35, and they were residents of South Delhi, India for at-least the last 5 years. The interviews were then transcribed, color-coded, and were analyzed through an iterative, comparative process. Each interview began with collecting standard demographic details; like age, weight, income, etc.; and then proceeded to recount dietary recall of the last 24 hours through self-reporting. Questions aimed to discern personal details, like family background, childhood dietary preferences, access to various modalities of obtaining food, diets of family and peer groups, etc. The researcher individually reviewed transcripts to identify emergent codes and patterns. **Key findings:** The mean age of the participants was 25.2 years. Six primary themes emerged: a) Socio-economic status b) Family influence c) Convenience and availability d) Social Media exposure e) Time-constraint f) Cultural and Political beliefs. These themes have been individually discussed in detail in the study. **Significance and application:** This study is pertinent in its relevance to understanding the dietary influences of this generation of young adult urban women– the drivers of their food choices; especially in the context of policies and programs in South Asia who are met with the challenge of best improving the nutritional gap in the diets of young South Asian women belonging to a dynamic social and cultural age. A larger sample size is needed for further understanding of the topic and to establish causations and correlations.

Food Consumption Pattern and the Probability of Nutrient Adequacy in Bangladesh by Lifecycle Stage; *Md. Ruhul Amin, Nazma Shaheen, Masum Ali, Oumma Halima, Lalita Bhattacharjee and Saiful Islam ; Institute of Nutrition and Food Science, University of Dhaka*

Background: The objective of the study was to estimate energy, macro, and micronutrient intakes as well as to compute the probability of adequacy (PA) of 12 selected micronutrient intakes by age, sex, and vulnerabilities. **Approaches/methods of innovation/changes implemented:** The study was a secondary analysis of dietary data from two surveys: Nutrition Survey of Bangladesh (NSB), 2017-18 and Bangladesh Integrated Household Survey (BIHS), 2015 round 2. Dietary data were harmonized using established procedures. Usual intake was calculated by transforming the data following its distribution and adjusting within and between variation with the ANOVA test. The probability of

adequacy (PA) of nutrient intake was computed using the "Probnorm" function in STATA software. Mean probability of adequacy (MPA) for 12 micronutrients (Calcium, magnesium, iron, zinc, thiamine, riboflavin, niacin EQ, vitamin B6, folate, vitamin B12, L-ascorbic acid, vitamin A, RAE) was calculated by averaging the adequacy of the nutrients. **Key findings:** Cereal consumption, specifically rice, dominates the diets of all population sub-groups of Bangladesh, and carbohydrates contributed to about 72%, protein 18%, and fat 10% of the total energy. Only a third of the total protein (37.1 g) was from animal source foods. Nutrient adequacy levels were alarmingly low for calcium, riboflavin, thiamine, vitamin B12 and vitamin A. Nutrient adequacy levels were low in female diets. The mean probability of adequacy (MPA) across the 12 micronutrients was 11% for children under 2 years, 24% for adolescent girls (10-14 years), 34% for women of reproductive age, and 20% for pregnant and lactating women. **Significance and application:** -A robust nutrition education policy or program enhancing dietary diversity should be undertaken through multiple channels to bring about positive changes in rice-based food habits in South Asian countries. -Periodic national level food consumption survey data with precise dietary assessment method is needed to understand the changing dietary pattern and the risk of nutrient adequacy in South Asian Countries.

Effect of dietary patterns on heart disease risk in Bangladesh: Results from the 2016 Household Income and Expenditure Survey; *Rafid Hassan, Masum Ali, Sanjib Saha and Ruhul Amin; Institute of Nutrition and Food Science(INFS), University of Dhaka*

Background: To explore the geospatial heterogeneity and the association between dietary patterns and heart disease among Bangladeshi population. **Approaches/methods of innovation/changes implemented:** This study involved a secondary analysis of the country representative Household Income and Expenditure Survey (HIES) 2016 data including 77207 participants aged ≥30 years. Dietary patterns were derived by principal component analysis (PCA) of 27 food groups. Descriptive and inferential analysis as well as spatial analysis of heart disease and the identified dietary patterns were carried out to ascertain the association and their distribution. **Key findings:** The rate of heart disease was 3.6%, with a range of 0.6% to 10.4% at subnational district levels. Three distinct dietary patterns— the "festival pattern," "pickles and fast foods pattern," and "rice and vegetable pattern"—were identified. Regarding heart disease and dietary adherence, there were regional differences. In the adjusted model, the highest adherence to the "pickles and fast foods pattern" increased the risk of developing heart disease, whereas the "rice and vegetable pattern" decreased it. However, there were regional differences in the relationship between dietary pattern and the prevalence of heart disease. **Significance and application:** -Region specific intervention would be more effective in South Asian countries in addressing risky dietary patterns and lowering heart disease rates due to their spatial heterogenous nature. -Future studies should consider all potential confounders, seasonal variability, and a clinical approach to measure heart disease to ensure this regional dependence.

Transformation of Dietary Practices to Achieve the Nutrition Insecurity of the Non-poor Households: Evidence from India; *Pinaki Das, Sk Md Abul Basar and Mr. Satyanarayan Kumbhaakar; Vidyasagar University*

Background: Despite the high economic growth a significant portion of non-poor households is found to be nutritionally insecure in India. In this context the present study analyses the pattern and trends of dietary practices of the households and examines the effect of dietary reallocation of the non-poor nutritionally insecure households. **Approaches/methods of innovation/changes implemented :** The South-West part of West Bengal, India is purposively chosen and a multistage stratified random sampling technique has been used to select the 600 sample households. We have prepared a micro panel data for these households for the years 2013-14, 2017-18 & 2021-22. The information of the households has been collected both in the form of quantitative and qualitative terms related to occupation and earnings, dietary pattern, food and non-food expenditure and social protection. Heckman selection model (two-step) is used to analyse the

impact of dietary reallocation on the nutrition status of the non-poor households where household's characteristics are control variables. **Key findings:** It is observed that the percentage share of non-poor nutritionally insecure households increased from 19.6 percent in 2013-14 to 25.4 per cent in 2017-18 and further to 26.9 per cent in 2021-22. We found that due to diversification of dietary pattern (in favour of packaged processed food, spices, tobacco and intoxicants) they have experienced nutrition insecurity. It is more prominent in the upper strata of social caste (e.g., general and other backward class). The transformation of dietary practices by the means of budget reallocation (minimum 10 per cent) in favour of nutritious food items significantly overcome the problems of nutrition insecurity of non-poor households. **Significance and application:** The study highlights the transformation of the dietary pattern of nonpoor households can overcome their nutritional insecurity. It recommends awareness programs by the government and other nongovernmental organizations to promote healthy eating habits and curb the consumption of unhealthy foods to overcome the problem of nutritional insecurity among non-poor households.

Cattle ownership, social networks and intrahousehold dietary diversity: The case of dairy farmers in Gujarat; *Sanjana Rajasekar; Center for Development Research (ZEF) Bonn*

Background: The objective of this study is to find out how intrahousehold dietary diversity has changed in dairy-farming households in Gujarat after COVID-19 lockdown in March 2020. The study identifies who within the household have become more food insecure, in what ways dietary diversity has changed as compared to before the pandemic began, and whether participation in dairy-related social networks contributes to better dietary diversity. **Approaches/methods of innovation/changes implemented :** This qualitative study was carried out with cattle-rearing women in Gandhinagar and Ahmedabad. Data was collected through focus group discussions (n=5) and in-depth interviews with local women of the community, community health workers, heads of dairy cooperatives, and ration-shop workers (n=15). Areas of inquiry included ownership of cattle, participation in social networks, decision making, and intra-household dietary diversity. The recordings of the interviews and focus groups were transcribed and coded in English, and common themes were subsequently identified and analyzed. **Key findings:** Dietary diversity has reduced after the lockdown was announced in March 2020. Most women reported eating lesser quantities and varieties of food than their husbands. Most respondents increased their consumption of rice while significantly reducing consumption of fruits, vegetables, and nuts after March 2020. As staples are guaranteed by the Public Distribution System, women are food secure with regard to rice and wheat. However, Covid-19-resultant economic losses have led to lower consumption of market-dependent nutritious food like fruits and leafy vegetables. Ownership of cattle guarantees that women in the household do not go to sleep hungry, as milk is consumed in place of a meal when the household runs out of food. Ownership of cattle also allows women access to a dairy-based social network where financial support and information are shared to promote healthy diets. **Significance and application:** The economic shocks due to the Covid-19 pandemic have facilitated a rapid transition to unhealthy diets comprising of mostly rice. The social networks of women must be strengthened and explored further as they act as a safety-net in times of food crisis.

Trans-Fatty Acids in Edible Oils and Its Estimated Intake in Bangladesh; *Sneha Sarwar, Abu Ahmed Shamim, Nazma Shaheen, Md. Musharraf Ashraf, Fahmida Akter, Malay Kanti Mridha, Ashek Mahfuz, Rudaba Khondker, Mduduzi NN Mbuya and Sk. Shahriar Bin Rasul; Institute of Nutrition and Food Science, University of Dhaka*

Background: The objectives of the study were to determine the trans-fat content in branded and unbranded (bulk) soybean oil (SBO) and palm oil (PO) in nationally representative samples of Bangladesh and to estimate the probable intake of TFA from the usual amount of edible oil intake. **Approaches/methods of innovation/changes implemented:** Total 1521 SBO and PO samples were collected in winter (February-March 2021) and summer (June- August 2021) from 937 shops

in 8 divisions of Bangladesh. A structured questionnaire was used to collect relevant data. Composite samples of branded oils were prepared by mixing equal aliquots from at least 12 samples of the same brand. Bulk oil composites were prepared by pooling samples collected from the same division. A total of 108 composite samples (SBO 67, PO 41) were prepared and analyzed by GC-MS using AOAC Official Method 996.06. Data analysis was done in SPSS version 20.0. **Key findings:** More than 2% TFA (a limit recommended by the World Health Organization and national regulatory bodies) was detected in 66% of branded (n=18) and 25% bulk (n=49) SBO samples; and 15% of branded (n=13) palm oil samples. Mean TFA content was 2.79% and 1.23% for branded SBO and PO, and 1.23% and 0.61% for bulk SBO and PO, respectively. SBO and PO, contributed around 24.1% and 10% of the daily total TFA allowed in a 2000 kcal diet (2.2 g/day). The contribution of branded soybean oil to total TFA would be higher (34.1%) than bulk oil (21%). **Significance and application:** Bangladesh are targeting to limit the TFA content to <2% in all processed foods, including edible fats and oil. This study highlighted the fact and generated evidence that the regulatory authority should strictly limit TFA in edible oils to reduce TFA consumption in the population.

Cash transfer improves maternal diet -Evidence from a phone survey among women with children less than two years in six states of India; *Sumanta Neupane, Phuong Hong Nguyen and Rasmi Avula ; International Food Policy Research Institute*

Background: Quality of maternal diets have implications for their nutrition and for their children's as well. Literatures indicate low diet diversity among women in India, were food/cash transfers target women. Our study objectives were to: 1. Examine dietary patterns of women with children <2 years of age 2. Examine variation in dietary patterns by wealth status 3. Assess the role of food or cash transfers in maternal diet diversity **Approaches/methods of innovation/changes implemented:** We conducted a phone survey of 6,227 women in six states of India between November-December 2021. Dietary intake was assessed using the diet quality questionnaire which was then recategorized to calculate score for food diversity, consumption of healthy and unhealthy foods, and minimum diet diversity for women (MDDW). Inequity in dietary intake was examine by wealth quintiles which was constructed using principal component analysis. Associated between cash or food on maternal diet was examined using multivariate regression analysis controlling for women's, household characteristics and state fixed effects. **Key findings:** On average, women consumed 5 food groups (out of 10) and 57% of the women achieved MDD-W. The scores for healthy and unhealthy food consumption were 4.1 and 1.2 (out of 9) respectively. We found a large wealth gradient in consumption of dairy (42% in Q1 vs. 63% in Q5), fruits (22% vs. 55%), and MDD-W (40% vs. 72%). Food and cash transfer were received by 80% and 19% respectively, by household members in the past three months or by women herself during pregnancy/delivery/lactation. Receiving cash transfer was associated with higher food diversity score (β=0.45, CI=0.33-0.57), healthy (β=0.37, CI: 0.26-0.47) and unhealthy (β=0.30, CI=0.22-0.38) food consumption compared to those who did not receive cash. No association was found between received food transfer and women diet. **Significance and application:** The suboptimal diet and large inequity in food consumption requires concerted actions to improve diet and narrowing of equity gaps. More efforts are required to increase the coverage of already existing cash transfer schemes in India.

Garden of nutri-rich plants: A pathway for nutrition security and awareness to eradicate malnutrition; *Hariharan G N; M S Swaminathan Research Foundation*

Background: Food-based approach to eradicate malnutrition by increasing the availability and consumption of micronutrient-rich food. This approach needed for developing and demonstrating location specific nutrition garden to enrich farming system and to enhance human nutrition. MSSRF initiated this intervention in 2018 in collaboration with Krishi Vigyan Kendras and State Agricultural Universities. **Approaches/methods of innovation/changes implemented:** Food-based strategies,

focus on the necessity of improving diets (including availability of nutri-rich food, dietary diversification) in both quantity and quality in order to overcome and prevent malnutrition. This approach is expected to bridge the disconnect between agriculture and nutrition, bringing nutritionally important crops to the farms, awareness on nutrition related issues to the consumers and consumption of nutritive and balanced diet by the people and leading towards a healthy society. The nutrition survey will be conducted at the end of this project to assess the perceived increments in nutri-rich food production and consumption by establishing nutrition gardens.   **Key findings:** The outcome of the intervention is (i) Each nutrigarden will aim to conserve a minimum 150 species level diversity with maximum varietal diversity within species occurring in the agro-ecological zone and (ii) Increased Awareness among local community on the nutri-rich plants for using it in food-based approach for addressing the nutritional security. Partnering with Krishi Vigyan Kendras and State Agricultural Universities are the key facilitators to reach out the communities in remote locations. Increased drought, excess rainfall and Covid-19 and subsequent lockdowns are the barriers to implement this program. **Significance and application:** Lessons Learnt: The levels of anemia in women and micronutrient deficiencies in children below 5 years are very high. Gaps in addressing issues of malnutrition necessitated the program. Food-based approaches by promoting nutrigarden is a sustainable pathway to spread nutri-literacy and key plants to eradicate malnutrition at the household level.

Predictors for weight retention and barriers for weight management in postpartum women: A cross-sectional study; *Divjyot Kaur, Piyush Ranjan, Archana Kumari, Anita Malhotra, Gaurishankar Kaloiya and ; University of Delhi*

Background: To study the association of postpartum weight retention with socio-demographic, obstetrics, and lifestyle-related factors. To investigate barriers/myths associated with postpartum weight management. **Approaches/methods of innovation/changes implemented:** A hospital-based telephonic cross-sectional survey was carried out using a pre-developed and validated questionnaire to assess the risk factors of weight retention and barriers associated with weight management. Convenience sampling technique was employed to recruit women from different phases of the postpartum period i.e., women in the first three months post-delivery, four to six months post-delivery and beyond six months post-delivery. Chi-square test and regression analysis were applied to assess the association of various factors with weight retention/weight gain in different postpartum phases. **Key findings:** The final sample comprised 505 postpartum women with a mean age of 29±4 years. Socio-economic status was associated with weight retention during the first three months post-delivery (p<0.05) whereas type of family and education qualification were associated with weight retention during four to six months post-delivery (p<0.05). Gestational weight gain was associated with weight retention in all three phases of the postpartum period (p<0.05). Among lifestyle-related factors, 50.7% of women did not consume regular meals and around 70% women had lower consumption of fruits and vegetables with a higher intake of HFSS foods. Only 5% indulged in low to moderate intensity physical activity whereas 95% had more than 4-hour exposure to screen time and sedentariness. Barriers such as lack of knowledge about diet and physical activity, lack of time, boundation to abide by family's advice and myths such as eating for two, consumption of high-calorie diet and energy-dense galactagogues restricted participants from adopting healthy lifestyle practices. **Significance and application:** The study findings will assist in formulating and implementing weight management strategies. Future longitudinal studies must be carried out for further understanding of predictors of postpartum weight retention.

Food Insecurity and Dietary Diversity among University Students: Prevalence and Association with Cumulative Grade Point Average; *Sukaina Shabbir, Dr. Shah Kamal Hashmi and Ms. Sidra Zaheer; Dow University of Health Sciences*

Background: Food insecurity and poor dietary diversity have detrimental effects on physical and intellectual development leading to underweight, wasting, stunting, micro nutrient deficiencies. This

current study aims at assessing food insecurity and dietary diversity and its impact on Cumulative Grade Points Average (CGPA) in university students of Karachi, Pakistan. **Approaches/methods of innovation/changes implemented:** A Non-Probability –Consecutive sampling was conducted in a Public Sector University; Karachi, Pakistan. The study included undergraduate and postgraduate students aged between 18-26 years. The FAO standardized questionnaire "Household Dietary Diversity Score" was used to access dietary diversity and USAID standardized questionnaire "Household Food Insecurity Access Scale" was used to access food security. Chi Square Test determined the association between CGPA and food insecurity while One Way ANOVA determined comparison of mean CGPA & dietary diversity. **Key findings:** 340 students were involved in this study, out of which 1 in 4 students (26.5%) were food insecure but results from Chi Squared analysis showed that food insecurity was not significantly related with CGPA; however, 62.4% food secure students had ≥3.5 CGPA. One way ANOVA results showed that mean differences were not statistically present between dietary diversity and CGPA. Diets of participants showed lack of consumption in healthy foods choices like meat, fish, fruits, vegetables and eggs while their diets were rich in cereals, fats/oils, beverages and sweets. **Significance and application:** The implication of this research concludes that nutrition literacy programs should be organized and interventions should be taken to educate the significance of diversified diets and food security and how it can mitigate malnutrition as well as decrease global burden of diseases and improve health related quality of life in South Asia.

Persistent nutritional challenges among Indian adolescents; *Neelanjana Pandey and Supriya ; Population Council Consulting Pvt. Ltd.*

Background: Evidence on nutritional status and correlated outcomes in adolescence are limited. This paper examines the prevalence of malnutrition among adolescents as they transition from early to late adolescence to young adulthood, and explores the association of malnutrition with the markers of transition to adulthood and its association with cognitive skills. **Approaches/methods of innovation/changes implemented :** Data were drawn from a state-representative longitudinal survey, called UDAYA, conducted during 2015-16 and 2018-19 with adolescents aged 10-19 years from Bihar and Uttar Pradesh, India. The study also collected standard measures for anthropometry-BMI for age and haemoglobin levels, and applied WHO-recommended cut-offs for assessing nutritional status. Descriptive and bivariate analyses were conducted to assess the prevalence of malnutrition. Lagged and fixed-effect models were used to examine the relationship between nutritional status and cognitive skills. Study also examined different dimensions of vulnerability that interact to compromise adolescent girls' and boys' chances of a successful acquisition of adult roles. **Key findings:** Prevalence of thinness declined as boys and girls transitioned from early to late adolescence. However, it showed significant improvement among girls in the late adolescence to young adulthood phase. Moderate to severe anemia increased among boys and girls, who transitioned from early to late adolescence. Dietary intake based on IDDS score suggested slight variation in the food consumption pattern of adolescents by gender. Around 20%-23% boys and 16%-20% girls consumed 6+ food groups. Transitions to adulthood is significantly associated with BMI levels among boys and girls, also malnutrition is significantly associated with poor cognitive skills among younger boys and girls. **Significance and application:** Results highlight the negligence towards adolescent health resulting in an adverse implication on long-term outcomes, towards healthy adulthood. It draws the program's attention towards increasing the reach of nutritional programs for adolescents and focus on out-of-school children and young girls, who are at risk of early marriage and pregnancy.

Focal Area 2: Evidence on interventions targeted to consumers to shape dietary practices

**Effectiveness of Nutrition Education Intervention on Dietary Practices and Knowledge of 5th to 10th Grade Blind Students: A Mixed-method Study*; Rimsha Tehseen and Dr. Ahsan Maqbool Ahmad, Health Services Academy, Islamabad.*

Background: 5th to 10th grade blind students were given lectures for 8 days covering different nutrition education concepts. The rationale behind this intervention was that blind children and adolescents have a higher prevalence of obesity as compared to their sighted counterparts. The researcher, who is a qualified nutritionist, collaborated with blind schools and Ministry of Human Rights (Directorate General of Special Education, Government of Pakistan) for intervention implementation permission and led the implementation. **Approaches/methods of innovation/changes implemented:** Implementation mapping for the intervention is given below: 1) Objectives to be achieved were identified through extensive literature search. 2) Sampling was done in two stages i.e. schools were selected purposefully and an all-inclusive approach was used for participants' selection. 3) Quantitative pre-intervention questionnaire was used which included 3-day dietary recall. In-depth interviews were also conducted to assess the current nutrition knowledge of participants. 4) 8-day nutrition education organised by using Training and Evaluation Material for School Health and Nutrition Supervisors. The intervention was tailored specifically for blind audience, for example, using tactile stimulus, braille, hand-size portion guide. 5) After a gap of one-month, a 3-day dietary recall and in-depth interviews for nutritional knowledge were conducted again to assess the effectiveness of educational intervention. 6) Dietary recall findings were entered into NutriSurvey to obtain nutrient breakdown of food consumption per day. Responses from in-depth interviews were organised in the form of codes and themes. **Key findings:** 1) An overall increase in average in mean micronutrient consumption and decrease in mean fats and sodium consumption was observed. 2) The percentage of children consuming within Recommended Dietary Allowance Ranges for most micronutrients was increased. 3) Paired t-test showed statistically significant results for protein, fats, dietary fiber, PUFA, Vitamin A, carotene, Vitamin E, Vitamin B2, Vitamin B6, folic acid, sodium, phosphorus, vitamin C, calcium, magnesium, potassium, and iron consumption before and after the nutrition education intervention. 4) Informal nutrition knowledge is not enough to bring visible changes in lifestyle despite positive attitude for learning (qualitative analysis) Facilitator: Positive attitude of school staff and parent towards nutrition knowledge being imparted to their children. Barrier: Time constraints affected assessment of intervention effectiveness. **Significance and application:** Nutrition lesson tailored for the respective audience can bring about significant lifestyle changes. Improving the nutritional status of children bearing any type of disability does not only revolve around educational learning but also skill and concept development. Students with visual impairment need concrete experiences to be able to differentiate between healthy and unhealthy foods.

Use of technology for improved coverage in promoting IYCF practices among children discharged with low birth weight and breastfeeding and other medical complications in emergency; *Dr. R. L. Suman, Krishna Gautam, Himanshu Sharma, Shahid Noorani, Madhusudan, Vanita Dutta and Minakshi Singh, Regional Center of Excellence (RCOE), Dept. of Pediatrics, RNT Medical College, Udaipur.*

Background: To provide an alternate source of counselling, as home-visits were disrupted in pandemic and post-pandemic period, regular tele-counselling of selected beneficiaries was done on infant and young child feeding practices. It was done by trained Resource Pool of Tele-counsellors of Regional Center of Excellence of Health and ICDS. Time period of intervention was ten months, from July 2021 to April 2022. **Approaches/methods of innovation/changes implemented:** Mothers/ caregivers of children who were discharged from the PNC, SNCU, & NICU with either low birth weight, breastfeeding related or other medical complications, from 12 districts were contacted in this intervention by as many

counsellors to give relevant and precise information and counselling to promote and support recommended breastfeeding, age specific complementary feeding and WASH practices in context of pandemic. 2 dedicated State Resource Persons constantly mentored and provided hand holding support to these counsellors. Coordinators of Regional Centre of Excellence provided guidance on technical issues and finer aspects, as and when required. Regular analysis were carried out and shared for corrective measures. **Key findings:** Total 9648 mother/caregivers were contacted at least once (taken as reference) and in subsequent round of follow-ups, 220 beneficiaries were contacted more than once. This involved 14,400 counselling sessions and 1250 validation sessions during the intervention period. Exclusive breast-feeding, breastfeeding as and when child wants, identifying early hunger cues, consumption of IFA supplements and consumption of balanced diets improved by 12%, 16%, 59%, 9.7% and 28.7% respectively. Beneficiaries' queries regarding service delivery by government and burn-out were two recurring barriers in implementation. **Significance and application:** Tele-counselling is quick, effective and high-coverage method of reaching out to the target audiences especially in unprecedented times like pandemic and for hard-to-reach areas in general. Specialized training of counsellors to cope burn-out, a verified telephone directory is crucial for an intervention like this. Regular, random Quality checks of counselling is important to ensure consistent quality. In many cases, the mothers/caregivers reached out to the tele-counsellors by themselves whenever they needed any additional counselling support.

Improving dietary practices of children with acute malnutrition admitted in Nutrition Rehabilitation Centres from tribal Communities of Southern Rajasthan; *Dr. R. L. Suman, Sushma Dangi, Kumaril Agrawal, Sheela Rameshwar, Bhagwan Sahai Yadav, Madhusudan Singh, Vanita Dutta and Minakshi Singh, Regional Center of Excellence (RCOE), Dept. of Pediatrics, RNT Medical College, Udaipur.*

Background: Diets of SAM children admitted in the Nutrition Rehabilitation Center at RNT Medical College of Udaipur were assessed and mothers/caregivers of each patient were counselled daily for appropriate diet and care of SAM children during the treatment and post discharge. The intervention (6 months duration) lead by Regional Centre of Excellence & supported by Dept. of Pediatrics-RNT medical college Udaipur and NHM Rajasthan, aimed to increase cure rate of SAM children during stay and overall behaviour change regarding dietary practices. **Approaches/methods of innovation/changes implemented:** Diet demonstrations by Nurses (twice a week), Daily individual counselling during treatment in NRC on topics like age-appropriate diet, frequency of feeds, dietary diversity, energy dense locally available food, avoiding junk food, hygiene practices, etc and continuing counselling post discharge during follow-up. In- person interviews of mothers/caregivers of admitted SAM children from tribal communities and in-person and virtual interviews of mothers/caregivers of children discharged during the last six months (n=80) were done. For data collection and monitoring, Kobo-forms were used. Along with regular review by RCOE Coordinator, for monitoring and validation of data, a dedicated coordinator was assigned to supervise interviews conducted by data collectors in NRCs and also verify 10% of interviews conducted telephonically. **Key findings:** All findings at the time of admission and during follow up post discharge were compared. Children receiving adequate diet, dietary diversity (at least 5 food groups), preparing food separately for children, consumption of energy dense food and consumption of junk food (>3 times in a week) improved from 52.6%, 15.8%, 15.8%, 21.1% and 72.7% to 73.7%, 36.8%, 62.5%, 73.6% and 47.3% respectively. As the counsellor and caregiver all were at the same facility it was one of the biggest factors in implementation. **Significance and application:** The pre-admission to post-discharge change in dietary pattern ranged from 20 to 40 percent and it was more apparent in preparing food separately for children and consumption of energy dense food. Junk food consumption in under-five children is a present challenge because of easy availability and affordability at retail shops in villages and children like the taste, therefore no steep changes were observed. It can be recommended that longitudinal study will be more helpful to observe the behaviour change and dietary practices in the long term.

Nourishing Schools: Promoting healthy dietary practice to adolescents class 4th to 9th in Rajasthan, Maharashtra and Tamil Nadu; *Archana Sinha and Sana Elahi Ansari, Nourishing Schools Foundation*

Background: Only 1 out of 5 adolescents consume pulses and green leafy vegetables and 6 out of 10 adolescents reported zero consumption of fruits even once a week. Nourishing Schools Foundation engage children from 4th to 9th grade with a toolkit i.e. a box of games and activities along with partner organizations to help them adopt healthier behaviours over a two-year cycle. **Approaches/methods of innovation/changes implemented:** We leverage a network of partners for the toolkit rollout, who are already present in our region of work, rather than creating a parallel structure. We train them and they rollout the toolkit as well as our impact assessment process in schools, along with teachers. We have developed a standardized 10-step process that ensures consistent implementation across geographies. For robust program monitoring, we use a custom-built Android survey app to monitor and collect responses from children through baseline, midline and endline surveys. custom-built Android survey app to monitor and collect responses from children through baseline, midline and endline surveys. **Key findings:** Based on our findings from Rajasthan, Maharashtra and Tamil Nadu in 74 schools and over 4200 children, we have seen a decrease in the consumption of unhealthy foods like sweets, potato chips, bakery items fast food and sweet beverages. By providing the data to partners, schools and government officials, we have been able to help them to understand the issues to focus on. Instead of telling them what to do, we show them the data and guide the process of taking action e.g. setting up a school garden, building a handwashing station, setting up a canteen to serve healthy snacks etc. **Significance and application:** Leveraging existing partner networks and the use of technology has helped us scale to over 230 schools cost-effectively and rapidly. Taking feedback from partners and schools on toolkit content and implementation has helped us to bring context-related and need-based innovations. Using gamification has helped us engage children and achieve behaviour change.

An intervention program conduct on moringa oleifera (drumstic leave) nutrition education,health assessment & transformation diet among adolescent girl's of chhindwara district madhya pradesh india; *Aakanksha Mishra and Dr.Abhaya R.Joglekar, Govt.D.B.P.G.Girl's college raipur india.*

Background: The purpose of this study was to determine the effect of moringa oleifera leaf powder, nutrition education, health assessment,tranformation diet, prevent to fluorosis disease ,prevent to anemia disease in school going and drop -out adolescent girl's age 10-19 years at rural area of Chhindwara district, Madhya Pradesh, India. **Approaches/methods of innovation/changes implemented:** this study conduct on school based and drop - out adolescent girl's it was mixed methods study design, where quantitative(survey of school going girl's, and drop school going girl's and qualitatives.(key informant interviews of teacher and parents, health assistants and fluorosis screening doctors)method were used. A predefined questionnaire was used to assess the condition of adolescent girls and they were given nutrition education by way of power point presentation, brochure and pamphlet the subject followed up with 24-hour dietary recall method and food frequency method. **Key findings:** the study finds that consumption of moringa leave & powder has the potential to improving hemoglobin and serum rational level, calcium, serum rational level and also prevent fluorosis disease should be encouraged as regular diet adherence to moringa oleifera leaves, and flowers less due to absenteeism and this can be improved with continued health education session using different methods including the parents.it is proven in numerous cases that the moringa oieifera tree possesses a wide range of medicinal and therapeutic properties. **Significance and application:** studying the culturally and historically diverse areas of Asia provides opportunities for students to discover new global perspective. Economic transformations in Asia have reshaped our global economic and political environment. The proposed study will be conduct in Chhindwara district situated in the southern part of Madhya Pradesh the study area approximately located between latitude 21.52 N to 22.17 N and longitude 78.45 to 79.20 E is traversed by pench and kulbehra rivers. Study reported there is more than one factor that has

played critical role in success of the program. Major were benefits such as an improved sense of well - being, motivational by teachers & friends parents also should be educated about the importance of moringa leaf powder.

Promoting frutis in the daily food intake; *Rajkumar Nagarajah, Global Green Growth Institute and IFPRI*

Background: The project intervention is to promote families in the Northern and Eastern part of Sri Lanka to consume more fruits as part of fulfilling their healty dietary needs. Even though the climatic conditions are favourable to growing variety of tropical fruits people are not interested in growing them and also lack of interest to consume fruits for their daily requirements. Thre are multiple agencies including government departments, International Non Governmental Agencies and community organizations involved in this project interventions The interventions started in 2015 and still continuing with the support of various stakeholders. **Approaches/methods of innovation/changes implemented:** First of all, the project work with the village leaders and department agriculture and schools around the area. There were number of educational and awareness campaign on the importance of balanced diet and the importance to consume fruits in the daily diet. The project closely work with the department of agriculture and private sector organizations in the Agri Business sector to establish fruit nurseries across the provinces and it has become an income generating activities for many individual farmers as well. The communities were trained on compost making, land preparation, water management and other good agricultural practices. The fruit seedlings were distributed to communities and families that can bear fruits in the short term and also long term fruit crops such as banana, mango, avocado, strawberries, Papaw, Guawa, Water melon, Pomegranate, Rambutan, Mangustine, pineapple, Dragan Fruits, Red grapes, custard apple and other fruit varieties as a home gardening and commercial farming concept depending on the land availability and interest of the beneficiaries. **Key findings:** The families continue to access or have variety of fruits year around, make income from the excess harvesting of fruits and able to consume more fruits and some what help them to cope with during periods of temporary food insecurity. The fruit crops also created a micro climatic conditions around the household and also in the farms, in addition to providing shade and aesthetic environment. The communities also share their produces with the neighbours and friends and consume more of it during the seasons. For many families, it has now become an income generating activity and more variety in the daily intake food. It has now become a practice to consume more fruits in their daily intake without even realising it that they are taking a lots of fruits in their diet. **Significance and application:** We need to work with multi sectoral partners to achieve food security and behavior change. Active community involvement is important in the entire stages of the project. Targeting schools and school children can make a huge difference especially when it comes to food habits and dietary patterns.

Use of a quality improvement approach in workplace meal improvement programmes; *Rudaba Khondker, Moniruzzaman Bipul, G.M. Reza Sumon, Md. Mayhadi Hasan, Abida Sultana Sukta, Annewies Hilberink, Christina Nyhus Dhillon and Marijke Hummel, Global Alliance for Improved Nutrition (GAIN).*

Background: Most female garment workers consume an inadequate variety of foods in diets. A quality improvement (QI) approach (plan, do, study, act (PDSA)) was applied to improve the nutritional quality and acceptance of factory-provided mid-day meals. Two factories led implementation, while GAIN and the government provided technical support. The programme was implemented over 4 years. **Approaches/methods of innovation/changes implemented:** Through the QI process we tested a proposed meal option with a small number (10-20) of workers and collected feedback. A nutrition improvement committee (composed of factory management, the caterer, the factory doctor and a worker representative) interpreted feedback and suggested meal modifications, which were tested again on a small scale. The testing cycles were completed after satisfactory feedback and dietary

compliance was met. This QI approach which considered workers' desires gave confidence to RMG factory's management to adopt an improved menu. **Key findings:** Implementing improved menus at the factory level has increased workers' consumption of nutritious diets at the workplace. Factory management and workers are optimistic about the process of QI to diversify their lunch menu nutritionally, which did not require an increased budget. Workers are used to a fixed menu, and it takes time for workers to accept the changes and select an acceptable menu. QI is a long-term process that needs widespread factory management involvement, which can be challenging. **Significance and application:** The QI process is an useful approach to monitor the meal improvement interventions. It empowered the workers and gave confidence to factory management. Proper mobilization can increase the awareness of nutrition and safe food consumption among factory workers. QI is cost-effective and straightforward to implement, fitting well with existing business structures and resulting in acceptable and nutritionally improved mid day meals.

Social Behavior Change Interventions to improve family dietary diversity in Rural Bihar: Leveraging JEEViKA's platform; *Santosh Akhauri, Dr. Narottam Pradhan, Putul Thakur, Rakesh Kumar Jha, Swati and Varsha Pradhan, Project Concern International.*

Background: With the funding support from Bill and Melinda Gates foundation PCI leverage, the JEEViKA- led self-help group platform targeting young mothers to improve their dietary practices along with their children. Women and their family members are exposed to multiple touch points with repeted messages to improve their behaviour. **Approaches/methods of innovation/changes implemented:** PCI has been providing technical support to JEEViKA since 2015 to improve dietary practices of pregnant, lactating women and young children under two years of age. A 360- degree social behaviour change approach was adopted. All pregnant women and lactating mothers from the SHG households were listed to increase the reach of the program. Beneficiaries were exposed to five touchpoints i.e, SHG meetings, home visits, village organisation meetings along with the family members, community video show viewing and felicitation events. The same messages were repetitively discussed and shown to the beneficiaries to improve the dietary diversity among the beneficiaries. **Key findings:** Two rounds of surveys were conducted to understand the impact of the intervention. Round 1 was conducted in Jan 2021 (with only home visits) and round 2 was conducted in June 2022 (home visits along with community events). It was found that community events had a higher impact on improving dietary practices among all the categories. Almost 600 pregnant and 600 lactating women were sampled in both rounds of surveys. Dietary diversity improved from 10% to 20% among 6-11 months children, 27% to 37% among pregnant women and 18% to 24% among lactating women between both rounds of the survey. **Significance and application:** Community events to create awareness have a higher impact on improving dietary diversity among vulnerable categories such as pregnant women, young children and lactating mothers. These events create enabling environment, and sensitize gatekeepers and family members to support target women to practicing desired behaviour. Additionally, rewards help to sustain the behaviour.

Nutrition International's support to expanding the coverage of fortified rice under social safety net programs in Bangladesh; *Md. Guljer Ahmmed, Preeti Kamboj and Suvabrata Dey, Nutrition International*

Background: Nutrition International (NI) and the World Food Program (WFP) have been working with the Government of Bangladesh since 2017 on distribution of fortified rice (FR) through the two largest social safety net programs (SSNPs), viz. the Vulnerable Women Benefit (VWB) program by the Ministry of Women and Children Affairs and the Food Friendly Program (FFP) by the Ministry of Food. **Approaches/methods of innovation/changes implemented:** NI supported strengthening of enabling environment for rice fortification, and production and distribution of FR through SSNPs. Technical assistance (TA) was provided in terms of on-the-job training, monitoring, supervision and quality control (QC) support to fortified rice kernel (FRK) producers and rice blending units personnel to produce and

deliver FR containing vitamins A, B1, B9, B12 and minerals zinc & iron in the required ratio of 1:100 as per national standards. Government officials from Directorate General of Food and Department of Women Affairs were also supported with TA. Government laboratory personnel were also trained in FRK testing to ensure quality of the FR distributed through SSNPs. **Key findings:** Joint technical support by NI and WFP resulted in production of 144,314 MT FR by 129 rice blending mills in 2022 . Seventy blending units were established in 2022, increasing the total number to 175. FR was distributed to 425,643 households in 189 upazillas (sub-districts) under VWB program and 2,250,430 households in 251 upazillas under FFP. Around 2.9 million additional women of reproductive age consumed adequately FR. Training was provided to 102 rice blenders, 18 FRK industry personnel and 449 government officials on QC, inspection and monitoring of production and distribution of FR. **Significance and application:** With NI's support, 2.6 million households covering 10.4 million people were collectively reached with FR under VWB program and FFP in 2022. This is expected to contribute to reducing micronutrient deficiencies burden among ultra-poor families receiving FR through SSNPs.

Effect of nurturing care interventions on child feeding practices: learnings from " AARAMBH" implementation program from rural India; *Dr Pranali Kothekar, Megha Lakhe, Dr Abhishek Raut, Dr Aparna Deshpande, Rajlakshmi Nair, Gayatri Singh, Rubal Agarwal and Dr Subodh Gupta, Mahatma Gandhi Institute of Medical Sciences, Sevagram*

Background: To study the effect of nurturing care interventions on child feeding practices from an implementation research program in rural India. Nutrition is an essential component of the nurturing care framework and is critical for the overall development of children if we want every child to achieve their development potential. Aarambh initiative was implemented in 2018 in Maharashtra, India with the Integrated Child Development Service Scheme (ICDS) sector. The intervention was implemented for 1 year. **Approaches/methods of innovation/changes implemented:** Aarambh adopted an Incremental Learning Approach (ILA) based cascade model for capacity building of Frontline functionaries (FLFs). FLFs, in turn, worked to empower the caregivers and community on components of nurturing care framework through home visits for customized messaging, parents' meetings for peer learning, and Parents' fair for community norm building. Baseline (Dec 2018) and end-line survey (Dec 2019) were conducted on 1500 children, with 250 children each in the age group of 0-6 years. **Key findings:** The results showed an enhancement in the child feeding practices by the caregivers over a period of time in the following aspects; The proportion of children 0-5 months who received exclusive breastfeeding increased from 84%t to 96%. The proportion of children 6-8 months who received complementary feeding in the last 24 hours also increased from 92% to 98%. The proportion of children 6 to 71 months who received four or more food groups has increased marginally from 31% to 36%. The frequency of complementary feeding for children 6-23 months four or more times in the last 24 hours increased 1.5 times from 38% to 60% during the survey period. **Significance and application:** 'Aarambh' demonstrated a feasible implementation model of nurturing care interventions for improving child feeding indicators in a real-life programmatic context using existing human resources and settings.

Scaling up of Improving IYCF good practices with special focus on Complementary Feeding in Odisha; *Biduyllata Patra, Mamata Mohanty, Swapan Bikash Saha, Snehalata Padhy, Sukanta Kumar Patra, Prajna Choudhury and Sourav Bhattacharjee, Women and Child Development*

Background: The study conducted in Odisha during 2018 revealed that more than 68% of 6-24 months old children did not get 70% of RDA of essential nutrients. IYCF project designed to complement "MAA" initiatives. The good practices of pilot project scaled up. The project implemented by UNICEF, CINI and Government for five years. **Approaches/methods of innovation/changes implemented:** Building blocks of district-wide approach adapted to facilitate project operations. The project team provided technical support to facilitate the operational approached. • Centre based feeding demonstration and counselling using IEC materials. • Counselling at different service delivery contact points. • Joint visits of frontline workers to reach last mile for counselling families face feeding problems, or with growth

faltering. • PRI members engaged to monitor the IYCF practices during VHSNC • The good practices scaled up through cascade training and mass awareness (TV chat show, Community radio, SMS, IVR, and WhatsApp.) in coordination with the government. • Expected outcomes monitored using Google form and whatsapp based analysis tools. **Key findings:** During the project period, infant and young child feedings practices showed a major improvement. Infant and young child feeding behaviours NFHS -4 Baseline End-line Initiation of complementary feeding 41.1 51.3 86.6 ,Food Diversity (> 4) 18.3 20.6 30.2 , Meal Frequency 37 62.6 80.5. It was observed that food diversity and age-appropriate quantity, consistency and frequency gradually improved across the project areas. With all good feeding behaviours the prevalence of wasting and severe wasting decreased by 12.3% and 5. 48% respectively. Implementation through government system has been a facilitator to ensure sustainability and poor monitoring by middle level ICDS functionaries has been a barrier. **Significance and application:** The project is in line with fundamentals of POSHAN Abhiyaan. Centre based feeding demonstration, counselling and peer group learning promote complementary feeding behaviours with support of trained FLWs. The use of multi-channel communication helps to reach the last mile. The scale-up is only feasible through government.

360-degree approach of social behavior change communication (SBCC) for improved dietary practices amongst tribal women of Rajasthan; *Priyanka Sharma and Rohit Agarwal, IPE Global Limited*

Background: Since October 2022, RajPusht aims to reduce prevalent low birth weight and wasting among children by supporting the Rajasthan Government's cash transfer scheme for pregnant or lactating women (PLW) in five tribal districts. Rajpusht's Social Behaviour Change Communication (SBCC) strategy focuses on increasing spending on dietary diversity among PLWs as a collective action. **Approaches/methods of innovation/changes implemented:** SBCC intervention touch-points for nudging positive dietary behaviors include home-based interpersonal communication of PLWs and family members; nutrition counselling on Maternal & Child Health & Nutrition Days at Anganwadi Centres; leveraging village-level government platforms based on Participatory Learning & Action technique for prioritising nutrition and community sensitisation; wall paintings/posters and digital media campaigns for enhanced recall of key messages. Cash transfers bolstered with holistic SBCC motivate mothers to eat an adequate & diverse diet for maximal weight gain during pregnancy, thereby reducing the instances of low birth weight. RajPusht monitors exposure to SBCC touch-points, pregnancy weight gain, and nutrition indicators through periodic comprehensive surveys (Concurrent Monitoring) on a significant sample of beneficiaries. **Key findings:** PLWs eating diverse diets (four+ food groups) increased from 56.5% to 63.5% during the intervention period. SBCC Touchpoint Composite Index informs that PLW can have exposure to BCC interventions upto 16 times. Women with SBCC exposure above 7 times were 4.3 times more likely to have a diverse diet than women exposed to SBCC upto 4 times. Women who used cash, received under the govt. scheme, to purchase food had 1.4 times higher likelihood of eating a diverse diet. Women with a diverse diet have been found to be 1.4 times more likely to have appropriate weight gain (8+ kg) during pregnancy. Widespread myths and malpractices were the barriers and success stories from early adopters were the facilitators to the implementation of SBCC interventions. **Significance and application:** There is a positive and significant association between exposure to SBCC and improved dietary diversity. Moreover, cash transfers to purchase food for dietary diversity are positively associated with weight gain during pregnancy. Greater dietary diversity due to cash transfer and holistic SBCC leads to desired programming results of reduced low birth weight and wasting among children.

Development ,validation and dissemination of comprehensive healthy eating and living index (CHELI) for adolescents; *Radhika Hedaoo and Dr. SubbaRao M Gavaravarapu, Symbiosis Institute of Health Sciences*

Background: Unlike healthy eating indices in other countries which assess the adherence to dietary guidelines, this study aimed to develop an easy-to-use scoring matrix called'Comprehensive Healthy Eating and Living Index (CHELI)'for adolescents,by rationalizing the dietary and lifestyle determinants and developing a nutrition education tool based on the implementation of the same. **Approaches/methods of innovation/changes implemented:** This cross-sectional study was conducted on 12-15-year-old school-going urban adolescents, selected by random sampling (n=571).The mixed methods approach was used to identify determinants of healthy eating and living based on the literature review and participatory learning action approach. Following, an item pool was generated by combining several validated indices for each of the determinants-Diet; Sleep; Physical Activity; Screen time & Stress. The index was developed after checking for content validity, test-retest reliability, internal consistency, and construct validity. The CHELI thus developed was implemented among adolescents and nutrition education intervention was developed to address the key factors identified through the index. **Key findings:** The five key determinants affecting healthy eating and living were diet, physical activity, sleep, stress, and screen time. The index showed a good content validity, internal consistency, and test-retest reliability of 0.80, 0.81, and 0.93 respectively. It was observed that only 28% had good CHELI scores while 67.1% had moderate and 4.8% had low scores. The adolescents who met the various recommendations for diet, sleep screen time, physical activity, and sleep were 24%, 19%, 70%, 30%, and 53% respectively. The nutrition education intervention assisted as an inventive method for teaching nutrition and improving the nutrition knowledge of adolescents. **Significance and application:** CHELI is a multidimensional, ready reckoner tool for coming up with tailored recommendations and lifestyle education interventions in the five key areas identified compared to the standards. It can be used readily to determine the specific determinant(s) that need to be addressed for promoting healthy eating and living among adolescents.

Lessons from a virtual counselling intervention to prevent anaemia in pregnancy in rural plains Nepal;

Sanju Bhattari (Herd International), Bibhu Thapaliya, Samata Kumari Yadav, Abriti Arjyal, Santosh Giri, Sara Hillman, Helen Harris-Fry, Naomi Saville, Sushil Baral and Joanna Morrison, Herd International and UCL

Background: We implemented a virtual antenatal counselling intervention to prevent anaemia in pregnancy through increased iron folic acid compliance and dietary changes. We present the results of our process evaluation to understand how context affected the intervention implementation and its' effectiveness in order to inform future interventions. **Approaches/methods of innovation/changes implemented:** We used semi-structured interviews with 20 purposively sampled pregnant women, 4 husbands and 4 mothers-in-law who had attended the virtual antenatal counselling (VAC) and 4 husbands and 3 mothers-in-law who had not attended to explore their opinions of the intervention. We conducted structured observations of 39 (15%) purposively sampled VAC sessions. We sampled a diversity of primi and multigravida women. We did 4 focus group discussions with those who implemented VACs to explore the factors affecting implementation. We conducted structured interviews with 52 Female Community Health Volunteers, and semi-structured interviews with 12 health workers to describe the intervention context. **Key findings:** Implementation challenges involved a lack of familiarity with mobile devices amongst pregnant women, as well as logistical challenges of network and scheduling difficulties. Engaging family members to address barriers to adequate and diverse diets was a key objective of the intervention but the extent of family engagement in the VACs varied. It was difficult to schedule times when other family members were available, and it was challenging to engage them in discussions through a small screen. Counsellors sometimes found it difficult to take a dialogical approach and often VACs were a transfer of information instead of a problem-solving exercise. **Significance and application:** It is important to understand the readiness of communities for a VAC before implementing this type of intervention. Engage families is important to address barriers to addressing anaemia, particularly in context where women occupy a low status in the household, and VAC may not be an effective means for this.

Costing the Suaahara II scaled up integrated nutrition intervention in Nepal; *Esther Choo, Sagun KC, Christopher Kemp, Uttam Paudel, Jolene Wun, Kenda Cunningham, Pooja Pandey and Carol Levin, University of Washington.*

Background: Helen Keller International leads a consortium to implement the USAID Suaahara II (SII) integrated nutrition program covering 42 districts in Nepal in support of the government's national nutrition policy. To understand resources needed to implement an integrated nutrition program at scale, we conducted a costing study of the SII program. **Approaches/methods of innovation/changes implemented:** We applied the SEEMS-Nutrition standardized costing approach to estimate total and unit costs of SII over a 3.5-year period. We interviewed 231 staff, volunteers, participant mothers, and government partners involved in the program from four districts. Districts were sampled based on agro-ecological zone and length of involvement with SII. We used mixed methods to estimate opportunity or economic costs of volunteer and participant time and any other expenses not directly covered by the program. We combine economic costs with financial expenditure data to estimate total cost per district, cost per participant mother and cost per household reached by SII. **Key findings:** The total average annual cost per district was US$1,060,633, with economic costs accounting for half of the costs. The average annual unit cost was US$170 per participant mother, with US$193 for Hill and US$129 for Terai zones. Personnel costs (65%) were the largest cost input driver followed by travel (7%). Community events (30%), household home visits for counseling (22%), overhead (14%), and training (7%) were the largest activity cost drivers. In terms of time spent on SII activities, female community health volunteers spent on average 31 hours a month, while mothers spent 4.8 hours per month on participation and travel. **Significance and application:** Costs of integrated nutrition programs can be significant, especially when taking into consideration the opportunity costs of program participants. Unit costs per participant are comparable to similar multisectoral nutrition interventions. A standardized approach is feasible and can increase transparency and comparability of results of scaled up integrated nutrition programs.

Assessing the residual effect of Early Childhood Development interventions on nutritional status of children in age group of 3-6 years old: A three year follow up study from a rural medical college in central India; *Amey Dhatrak, Dr. Abhishek Raut and Dr. Subodh Gupta, Mahtma Gandhi Institute of Medical Sciences, Sebagram.*

Background: To assess the effect of community-based Early Childhood Development interventions aimed at improving parenting skills for children 0-3 years on nutritional status of children when they grow 3-6 years old. **Approaches/methods of innovation/changes implemented:** Cohort study design with total sample size of 278 in each group for detecting a difference of 12% in prevalence of underweight in the age-group 3-6 years, with 95% confidence level and power of 80% using open epi software. All 720 children (360 each in the intervention and control arm) included in the previous study(ECD intervention were given three years back) were targeted for inclusion in the current study. Primary care taker of child were the respondent in the study. With the help of structured questionnaire data was collected. Anthropometry measurements(Weight and height) were used for nutritional assessment. The data was analyzed using R software with appropriate statistical tests. WHO ANTHRO and WHO ANTHRO PLUS was used for calculating anthropometric indicators for children. Also, nutritional status of the children was tabulated as per age group to find out difference in intervention as per age group. **Key findings:** The proportion of children who had stunting and underweight were less in intervention area as compared to control area and this difference was statistically significant (p<0.001). The mean Z score for weight for age & height for age was -1.2±0.8 & -1.2±1.1in intervention arm and -1.7±0.9 & 1.8±1.2 in control arm(p<0.001).The proportion of children with severe stunting and moderate stunting were 8.1% & 14.1 respectively in intervention area as compared to 19.1% & 28.6% respectively in control area. Proportion of children with severe underweight was 3.2% in intervention area as compared to 8.5% in control area. **Significance and application:** Early Childhood Development activities through community workers had positive impact on child's growth after a period

of 3 years, especially stunting & undernutrition. In India, Under ICDS program, if ECD package is included , this will help in improving the nutritional staus of children even after the stoping of intervention. This study is conducted in small area with limited resources, for genralizing the finding large scale studies with more sample size is needed to find out the effect of ECD interventions on Child growth.

Intervention of ICDS to overcome undernourishment of Under-Five children in India: An Evaluation; Satyanarayan, *Prof. Pinaki Das and Mr. SK MD Abul Basar, Vidyasagar University.*

Background: In India, childhood undernourishment is a serious health issue. The objectives of the present study are: to analyses the status of undernourished children for the poor and non-poor households in India and to examine the interventions of ICDS through supplementary nutrition benefits (SNB) to overcome the undernourishment of children. **Approaches/methods of innovation/changes implemented:** This study is based on the unit level data (child records) of latest two rounds National Family Health Survey (NFHS). We have assessed the households by multidimensional poverty framework and then analysed the status of undernourishment of under-five children separately for poor and non-poor households. We have also analysed the multiple deprivations of child in respect of their status of undernourishment. The multinomial logit model is used to analyse the impact of SNB on the status of undernourishment. In this analysis we have also consider some controls factors like region, caste, religion, sex, and wealth class of the children belonging in the household. **Key findings:** Child undernourishment has considerably decreased over time, yet India still has a very high rate of undernourished children. The status of children undernourishment is significantly higher for poor households compared to non-poor. The children who received SNB on a regular basis is able to overcome the undernourishment in the form of underweight and wasting. But it is not able to reduce the multiple forms of undernourishment. The dietary pattern under SNB only ensures 500- 800 Kcal caloric value and 20-25gm protein per child. It is deficient to overcome the multiple form of child deprivations of poor households. **Significance and application:** The study is innovative as it analyses the role of ICDS on the status of child undernourishment for poor and non-poor households separately. It is also pointed out the severity of child undernourishment. The study strongly recommends to increase the SNB as well as other forms of benefits to the poor households.

Focal Area 3: Measuring rural and urban food environments and innovations in measuring food consumption

A cross-sectional study on utiliisation of Millet based diet among school children in Western part of Rajasthan; *Megha Mohanan, Dr. Nitin Joshi, Dr. Rashmi Rathore, Dr. Pankaj Bhardwaj and Prof. Kuldeep Singh, School of Public Health, AIIMS Jodhpur*

Background: To assess the level of awareness and utilisation of millet-based diet for feeding children among parents of school going children under 12yrs of age in Western Rajasthan. **Approaches/methods of innovation/changes implemented:** A school based cross sectional study was conducted among parents of children (age group 5-12yrs). Data was collected from two rural and two urban schools of Jodhpur, Rajasthan. Information from parents on their level of awareness ,willingness to feed children millet-based diet, frequency and pattern of feeding and barriers to feeding was obtained using a pre-tested structured questionnaire. The data collected was analysed using SPSS software version 23. **Key findings:** Out of 180 participants (81 females) 40.56% were from rural and 59.44% from urban school. Almost all participants had heard about millets. Among both rural and urban population, the maximum consumption was of Pearl Millet (100%, 95.33%) followed by Sorghum (65.75%, 50.47%) whereas consumption of Foxtail Millet and Proso millet was low. Around 25% rural population and 10% urban population was unaware of the benefits of millets. Routine dietary pattern and more cooking time were major barriers for not consuming millets. Mostly millet was consumed in

winter seasons and only 16.44% rural, 21.50% urban population consumed millets daily. The most common millet dishes consumed were Sogra, Khichdi, Raab. **Significance and application:** This study provided guidance on utilisation of millet diet in desert region. Further paving the path for advocating the use of millet based food strategy among children in the state of Rajasthan which is one of the highest producers of millets in India.

A study on the nutritional status of adolescent girls aged 15-18 years in the Guntur district;
Silparasetty S V Lakshni Haritha and P. Radha Kumari, Guntur Medical college, Gunter

Background: Adolescence is the transition period between childhood and adulthood where rapid physical, mental, emotional and social development takes place. Adolescent girls are at greatest risk for nutrient deficiency and it badly affects their overall development. Health and nutrition of the girls affect the health and survival of future generation. With this background this study was conducted to study some aspects of the socio-demographic profile and to assess the nutritional status of adolescent girls by anthropometry in the Guntur district. **Approaches/methods of innovation/changes implemented:** It was a community based cross sectional study conducted during June 2022 to August 2022 in two senior colleges and households of Guntur district. 100 adolescent girls were interviewed using pre designed, pretested questionnaire and anthropometric examination was done by standardized methods. Socio-demographic variables- age, sex, religion, residential background, family type & socio-economic status were considered. Results were analysed with the help of Microsoft Excel and SPSS statistical software. **Key findings:** In this study majority (84%) were Hindu and belonged to nuclear family (62%). 45.63% were educated up to high school level. Most of the girls belonged to socio economic class - IV (45.46%). The prevalence of underweight and stunting in this study was 36.54% and 48.37% respectively. Results will be discussed in the conference in detail. **Significance and application:** Since the prevalence of under nutrition was high among adolescent girls in our study, appropriate health education and nutrition intervention should be directed towards them to improve their nutritional status.

Nutrient Density of Homemade Recipes for Complementary Feedings of Infants; *Abu Torab M A Rahim and Mst. Sarmin Hossain, Institute of Nutrition and Food Science, University of Dhaka*

Background: The study focuses on the compositional analysis of homemade recipes for infants (HMRI), an area of food compositional data production program that is very often not given proper attention.A HMRI survey was conducted among mid-income households from two geographical areas of the World to find out the nutritional gaps through analysis of recipe nutrient composition and comparing with recommended nutritional needed for them. **Approaches/methods of innovation/changes implemented:** The recipe data were collected mainly from Mirpur Area of Dhaka, Bangladesh and from metropolitan Juba, capital of South Sudan. Upon standardization of the collected HMRIs with a cut-off point of minimum citations of an ingredient, 27 recipes were identified that were daily or frequently prepared by the respondent families from both the geographical regions. A total of 9 commonly cited HMRIs were selected for proximate nutrient analysis (8 recipes from Dhaka and 1 recipe from Juba). Mineral and vitamin content and composition were estimated by a web-based recipe calculation program developed by using the 'Food Composition Table for Bangladesh'. **Key findings:** About 70% of the studied households were found to prepare these HMRIs for their babies regularly. The finding showed that Bean soup among the nine HMRI shows highest nutrient density (ND) score while Maggi soup showed the lowest ND score. Comparing the nutrient density of the studied recipes with RDA for the infants showed that among all HMRIs analyzed, Sobji khichuri fulfills up to 90% energy, 93% fat, 100% protein needs quantitatively per servings of the recipe eaten. However, the protein and fat quality in Sobji khichuri cannot be revealed. Rest of the HMRI showed different percentile gaps in ND. **Significance and application:** The findings provided data for complementary homemade recipes for infants thereby will reduce the dependency on commercial infant formulas. This will make policy planers to adopt and advocate complementary feeding using locally available foodstuffs. Further studies are needed to analyse homemade complementary recipes for urban-rural comparision, agewise suitability, costing, etc.

Khichuri Index: How affordability of daily wage earners are changing over time? *Nazia Islam, Abu Said Md. Juel Miah and K.A.M. Morshed, BRAC James P Grant School of Public Health, BRAC University*

Background: The "Khichuri Index", a simple affordability measure, indicates the number of the "Khichuri", a popular Bangladeshi food platter one individual can afford with their daily income. It aims to capture and present the periodic change in the affordability of daily wage earners in the simplest way. **Approaches/methods of innovation/changes implemented:** This is a periodic survey where BRAC staffs collect data on the asking price of the selected twenty-one basic food items and self-reported daily wages of five categories of wage earners, i.e., male and female agricultural labours, male and female construction workers and rickshaw pullers from Sadar and another rural Upazila of all 64 districts of Bangladesh monthly. The Index considered five types of Khichuri platter and each platter roughly represents one meal for a household of four persons. The data collected from July 2021 to May 2022, was considered for this paper. A descriptive analysis was done using SPSS 21 and compared to observe the change in affordability. **Key findings:** The price of all Khichuri platters gradually increased over time. From July'21 to May'22, plain Khichuri price increased from BDT 64.6 to 75.4 and vegetable Khichuri with chicken curry increased from BDT 129.4 to 152.9, indicating 16.7%. and 22.9% price hike respectively. However, the Khichuri index didn't decrease linearly as assumed. Male agriculture labours had the highest affordability of having plain khichuri (7.7) whereas the females of the same profession had the lowest (5.4). The index of "vegetable khichuri with chicken curry" for the female agriculture labour and construction workers was less than three, meaning they could not afford three chicken khichuri platters with their daily wages. **Significance and application:** This simple tool can be utilised to monitor the affordability of different daily wage earners and design social protection programmes based on it. A similar highly contextualised index can be tested out in other South Asian countries.

Nutritional Evaluation of Meals Served Through an Online Food Delivery Application: Making Healthy Food Choices in an Unhealthy Food Environment Difficult, *Pankti Raithatha, Dr.Shonima Venugopal and Prof. Uma Iyer, The Maharaja Sayajirao University of Baroda, Vadodara.*

Background: Alterations to the food environment in which we live have made it easier to consume foods rich in fat, salt and sugar which are known to be associated with chronic disease outcomes. The study evaluated restaurant meals served through a leading online food delivery application in Vadodara city, Gujarat state, India. **Approaches/methods of innovation/changes implemented:** Fifty areas from four zones of Vadodara city were selected. Top 10 unique restaurants/food outlets from each area based on popularity on the food delivery application were selected. Complete menus of 500 unique restaurants/food outlets were evaluated based on the composition of dishes (major and minor ingredients), ratings and reviews. Menu items were classified into three categories 'Green', 'Amber', and 'Red' based on their nutritional value. **Key findings:** A total of 38854 dishes from the 500 restaurants were classified. Majority of the dishes from each zone were classified as red. About 79.8% of the restaurants served only vegetarian food with majority of the dishes being served classified as red. Around 53.4% of restaurants had a delivery rating of more than 4. Around 64.7%, 57.1% and 61.0% of the dishes served in restaurants rated between 3-3.5, 3.5-4.0, and >4 respectively were classified as red. Only South Indian and Gujarati cuisine had maximum dishes in the green category. Dishes from all other cuisines were mostly in the red category. **Significance and application:** There is a need to mandate compliance of laws making the display of nutritional content of food served in restaurants compulsory. Awareness about reducing the intake of high fat, salt, sugar foods and using online food delivery platforms in a more responsible manner needs to be created. Supportive healthy food environments need to be developed.

A modified index for assessing burden of Child Undernutrition in India; *Pooja Arora and Dr. Laxmi Kant Dwivedi, IIPS, Mumbai*

Background: WHO defines 4 broad sub-forms of child undernutrition: wasting (W), stunting (S), underweight (U), and deficiencies in vitamins and minerals, but their interactions and co-existencies with each other have not been explored yet. The same is tried to assess here to understand the real burden of Child Undernutrition in India. **Approaches/methods of innovation/changes implemented:** Secondary data from nationally representative surveys was used, namely NFHS and CNNS. For data analysis, Interactions among Stunting, Wasting, Underweight and Anemia were analysed using correlations and plots. CIAF index was modified with inclusion of Anemia as one more Child Undernutrition outcome. Multiple burdens were found and their trend and pattern were studied, Spatial maps were created to understand variation at state and district level. Chi square test of association, and regression was used to understand its relations with various background, Child's and mother's characteristics. **Key findings:** Fourteen types of burdens are discovered. It is found that 21% of children have no burden, 32% have single burden, 23% have dual burden, 20% have triple burden, whereas 5% have quadruple burden of undernutrition. The most prevalent burden of child undernutrition is of triple burden of Stunting, Underweight and Anemia "SUA", followed by single burden of "only anemia". Quadruple burden "SWUA" varies among Indian States from 0% in Manipur to 9% in Jharkhand. It is inferred from bi-variate and regression analysis that the burden SUA is more associated with undernourished mothers, whereas, "only anemia" is associated with overweight mothers. **Significance and application:** Using a modified index and assessing such burdens might help understand situation of Child Undernutrition better in South Asian and developing countries. More research is needed to see whether these burdens should be given special attention from the policy and planning perspectives.

Geospatial Analysis of Food and Nutrition Security among Mothers and their Children (7-36 Months) in the Low-Income Group Households of Urban Vadodara, Gujarat, India; *Surabhi Pareek, Regina Sherin John and Dr. Suneeta Chandorkar, The Maharaja Sayajirao University of Baroda.*

Background: Use of geospatial mapping techniques help create layered maps to understand the complexities around food and nutrition security and the associated factors. The maps thus generated will serve as an effective tool for advocacy and planning. Therefore, the cross sectional study was undertaken to create geospatial maps of mother child (7-36 months) dyad from LIG settlements of Vadodara. **Approaches/methods of innovation/changes implemented:** It was a cross-sectional study conducted using a proportionate sampling method. Of the five geographic zones of Vadodara city, two North and South were selected at random. Twenty-three LIG settlements (comprising 10% of the total settlements) were selected from the North and South zones of Vadodara. Using 77.2% as the prevalence of food insecurity in urban LIG settings of India, CI of 95%, 5% error, and 10% attrition, the sample size of 297 households arrived (Chinnakali et al., 2014). All the households from the selected regions with mother and children (7-36 months) were included till the desired sample size was reached. The indicators used were socioeconomic status, dietary diversity, anthropometric measurements, and food safety net programs. The analysis was done using Arc GIS 10.5 using interpolation ,inverse distance weighting (IDW), weighted overlay sum, and geographically weighted regression. **Key findings:** The mean age of the mothers interviewed was 26 ± 4 years, and the mean age of the children was 22 ± 10 months.The composite index score for the four food and nutrition security dimensions was 0.451 for households from 23 LIG settlements, indicating moderate food and nutrition security. The interpolated map of child undernutrition showed that clusters of high undernutrition were present in areas that experienced high cases of diarrhea among children and low maternal weight. We predict the local model using geographically weighted regression (with R square value 0.86) for underweight children using breastfeeding and early initiation of breastfeeding. The high values of the R square indicated that these two variables accounted for 86% of child weight variance. **Significance and application:** This data can be used for targeted interventions that will prove to be high impact and cost effective. Further, the use of smartphones which have been introduced in ICDS, the largest nutrition programme across the country, will ease the upscaling and replicability of the spatial mapping technique. Data on location of Anganwadi centre, fair price shops further helps us to map the impact on food and nutrition security.

Focal Area 4: Evidence on policies to support healthy dietary practices

Nutrition International's technical assistance and advocacy to scale up large-scale wheat flour fortification in Pakistan*; Irfan Ullah, Dr. Shabina Raza, Suvabrata Dey and Preeti Kamboj, Nutrition International*

Background: Nutrition International (NI) has been supporting large-scale wheat flour fortification (WFF) through National Food Fortification Program (NFFP) in Pakistan since 2016. When NFFP started, there was no proper institutional mechanism to support the enforcement of WFF activities in the country which highlighted the need for mandatory WFF legislation. **Approaches/methods of innovation/changes implemented:** NI provided technical assistance in drafting mandatory food fortification bills for fortification of wheat flour (WF) (with iron, folic acid, zinc, and vitamin B12) and strongly advocated with the relevant stakeholders at National & Provincial levels. Along with National and Provincial Fortification Alliance, Food Department (FD), Food Authorities (FA), Law departments, etc., NI ensured Provincial standards for fortification are in accordance with National standards. Training, quality assurance (QA) and quality control (QC) manuals were developed. Uninterrupted supply of high-quality premix was ensured. Cutting-edge quantitative testing equipment were provided. **Key findings:** Food Fortification Act was approved in Sindh, Balochistan and Khyber Pakhtunkhwa; and is ready for submission to the Cabinet in Punjab. Approximately 1200 WF millers and >800 officials from FD & FA and QA/ QC staff from FD & FA laboratories were trained. Around 2,333 microfeeders were installed in 992 WF mills in the country. Spectrophotometers were provided to ten public and private laboratories for detection of added Iron in fortified WF; Rapid Testing Kits & I-Check equipment were provided to millers for internal

QC; and 22 I-check Iron cluster laboratories were established. Fortification Information System was developed, and 80 FA & FD staff were trained to regularly update data on WF production and QA/QC. **Significance and application:** NI's advocacy and legal assistance, creation of enabling environment and support in developing required production-level and QAQC infrastructure helped in approval of Food Fortification Act in 3 provinces, production of ~1.5 million MT fortified wheat flour since 2016; and reaching 14 million beneficiaries.

To access the knowledge, attitude and perception on the design of front of packaged food by professional consumers- a cross sectional study from urban Bengaluru; *Raksha Nayak, Dr. Jyothi Jadhav, Dr. Ranganath s, Bangalore Medical College and Research Institute*

Background: Nutrition has been identified as one of the important modifiable risk factors for the increasing burden of Non-Communicable Diseases (NCDs), which contribute to 71% of deaths worldwide. The packaged foods are high in salt, sugar, fat to enhance the taste, are addictive and linked to obesity, NCD s and cancers. The right to know what we eat is a right that must be protected so that can make healthy choices. **Approaches/methods of innovation/changes implemented:** To assess the knowledge and attitude regarding food labels on packaged foods and beverages by professional consumers of Urban Bengaluru. To evaluate their perception on different types of Front Of Package label (FoPL) practiced across the world and their preference. Method: An online survey with digital consent was conducted among 1000 people out of whom 581 responded. The data was collected by a pre-tested, semi-structured, validated questionnaire and entered in MS Excel and analyzed using SPSS 21.0. **Key findings:** Packaged food and beverages were consumed by 96.3% of the participants. Awareness about the food package labeling was known by 70% of the participants and 62.4%of them considered this information helpful. Over half (56.4%) of the respondents considered packaged foods as healthy. Health star rating (HSR)were the most preferred food labels (89%), followed by Multiple Traffic Lights (MTL). **Significance and application:** One of the ways to reduce growing risk of NCDs is FoPL. If consumers can identify unhealthy food by simple images, it will bring about a slow change in dietary routine which in turn will have a long-term positive effect. Taking examples from other countries, more evidence-based research is recommended regarding the knowledge and perception of people on feasibility of FoPL design which will lay a foundation to formulate laws and policies regarding the FoPL in India.

Identification and Quantification of Allergens in Different Varieties of Lens culinaris in Bangladesh, *Syeda Farhana Najnin, Prof. Dr. Nazma Shaheen and Oumma Halima, University of Dhaka*

Background: The present research has been has undertaken to assess the cultivars BARI MASUR 1, BARI MASUR 5, and BARI MASUR 7 developed by the Bangladesh Agricultural Research Institute (BARI) to identify the proteins of these lentil cultivars as well as to identify the total allergen proteins. **Approaches/methods of innovation/changes implemented:** Samples were collected from BARI and then proteins were extracted with the phenol method. Following that, an in-solution proteomics technique was used to examine the entire protein pellet. Proteins were identified and detected using MS systems. To annotate peptides found in hypothetical or unknown proteins, an NCBI BLAST search was used. The total allergen level was calculated using EXCEL by adding the abundance values of the detected proteins and allergen proteins. EXCEL was also used to make graphs and pie diagrams. MEGA X program was used to generate phylogenetic trees. **Key findings:** BARI MASUR 1, 5, and 7 identified 687, 595, and 740 proteins respectively and among them, 367 proteins were common. 31 proteins were identified as allergen proteins and 23 of them were common in the studied cultivars. Allergen proteins Len c 1.0101, Len c 1.0102, Convicilin, vicilin, vicilin type C, legumin, and lectin were detected, although Convicilin and vicilin were the main emphases due to their abundances. BARI MASUR 1 and 5 showed almost the same percentage of allergenic abundance (39%) but BARI MASUR 7 showed a reduced percentage (38%). The phylogenetic tree revealed that Convicilin and vicilin shared the same origin. **Significance and application:** To address Bangladesh's large demand for lentils in the nutritional system and the ability to produce high and environmentally sustainable cultivars by minimizing the hypersensitivity problems of lentil allergens. Further analysis is needed to establish the whole protein profile of all the BARI MASUR varieties and evaluate the epitope region.

Uptake of Take Home Ration Findings from an Urban informal settlement: *Sushma Shende, Sheetal Rajan, Anuja Jayaraman, Sonali Patil, Rijuta Sawant and Sushmita Das, Society for Nutrition Education Health Action*

Background: Supplementary nutrition is one of the core components of the Integrated Child Development Services (ICDS) program designed to improve the nutritional status of children and mothers; however its uptake remains a concern. This study was conducted to estimate the proportion of women utilising supplementary nutrition services at two points (by mothers during pregnancy and by mothers while breastfeeding). **Approaches/methods of innovation/changes implemented:** 572 randomly selected mothers of 0-2 years old children living in urban informal settlements in Mumbai's M-East Ward were interviewed in a cross-sectional survey conducted in February-March 2022. A predesigned, pre-tested structured questionnaire was used to capture uptake of take home ration (THR) from ICDS. Data were analysed in Stata v.14 and results presented in proportions. Chi-square test was applied to find the association between sociodemographic factors and utilisation of THR. **Key findings:** The study showed that utilisation of supplementary nutrition by women during their pregnancy was 53% while it was 49% for lactating mothers. Living in a joint family, duration of residence in the slum and ante-natal registration were found to be important determinants of uptake of take home ration by pregnant women. For lactating mothers, their duration of residence in the slum and antenatal registration were significantly associated with uptake of THR. **Significance and application:** The association of THR uptake with the duration of residence stresses the need on identifying the newly migrated beneficiaries at frequent intervals. Strategies like awareness generation, mobilization, referral of newly migrant families and involvement of local community members and influencers needs to be undertaken to improve the uptake of THR.

Nutritional Status of Under-Five Children in India: A Multilevel Modelling; *Rahul Kumar and Priyanka Kumari, International Institute for Population Sciences,Mumbai*

Background: Despite recent achievement in economic progress in India, the outcome of development has failed to secure a better nutritional status of children in the country. The first objective is to determine the prevenance of malnutrition among U5 children across the states of India. The second objective is to measure the extent of socio-economic inequality in childhood malnutrition across the major states of India. **Approaches/methods of innovation/changes implemented:** NFHS-5 (2019-21) Data and Handbook of statistics on Indian Economy 2020-21 has been used to fulfills the Objectives. Using NFHS 5 Data, an attempt is made to estimate the socio-economic inequality in Childhood stunting at the State level Through Concentration Index (CI). The CI has been universally used by the economists to measure the degree of inequality in various health system indicators and it ranges between -1 to +1. Due to the stratified nature of data in NFHS, keeping in view hierarchically clustered nature, we use multi-level regression model to estimate parameter for nutritional status among children to avoid the likely under-estimation of parameters from a single level model. **Key findings:** Across the states disproportionate burden of stunting is observed among the children from the poor socioeconomic status. The highest stunting is observed in Meghalaya (47%) and Bihar 43%. On the other hand, Andaman & Niccobar Island (22. %) and Sikkim (22.3 %) observed the lowest rate of stunting. The states having the lower prevalence of Childhood malnutrition shows much higher burden among the poor. Though the negative correlation (r=-0.702, p<0.005 is established between Net State Domestic Product and CI Value for Stunting. Result from the multilevel model however shows children from highest Socioeconomic status quintiles possess 60 Percent better nutritional status than those from poorest quintile. **Significance and application:** The POSHAN Abhiyan launched in 2017 strives to achieve SDG-2 of eliminating all forms of malnutrition 2030 in children. The Current data shows disturbing trends of malnutrition which pushes the back the progress achieve so far. India needs to enhance the program effectiveness and reach. It calls for proactive measure and scaling up of innovation required to address malnutrition.

Public health nutrition in Afghanistan-policies, strategies and capacity-building: current scenario and initiatives; *Muhammad Karim and Homayoun Ludin, AADA*

Background: A narrative review was conducted with the aim of mapping current nutrition policies and capacity development initiatives to assess policy and the institutional environment and identify gaps and opportunities along with indian team and Afghan colleagues of MoPH to evaluate the nutritonal policies of the country in the context of Afghanistan. **Approaches/methods of innovation/changes implemented:** The study design was literature or documents review by Indian and Afghan team members. The literature review search was conducted for nutrition-related policies, programmes, training and capacity-building activities published from Afghanistan and in peer reviewed research papers. The literature search was performed using Google, Google Scholar and PubMed. The policy and programme documents and reports were searched using a combination of search terms and phrases, including: health and nutrition status, health systems in Afghanistan, nutrition in Afghanistan. Examples of search terms for PubMed include: (nutrition) AND (child nutrition) OR (maternal nutrition) OR (maternal undernutrition) OR (stunting [MeSH Terms]) or (wasting [MeSH Terms]) or (undernutrition [MeSH Terms]) or (anemia [MeSH Terms]) or (infant and child feeding) or (breastfeeding[MeSH Terms]) or (complimentary feeding[MeSH Terms]) and (Afghanistan [MeSH Terms]). **Key findings:** The key findings of the National Nutrition Survey 2013 highlighted the rising burden of overweight and obesity in Afghanistan, with 5.4% of children under 5 years, 11.6% of adolescent girls and about one fifth (20.7%) of women of reproductive age (15–49 years) overweight. Widespread micronutrient deficiencies continued to remain a public health challenge, with more than 95% women of reproductive age deficient in vitamin D and 40% affected by anaemia. Equity is a central issue associated with nutrition: disparities in nutritional status in Afghanistan exist across geographic locations and socioeconomic groups. Although undernutrition status is influenced poverty, other determinants such as hygiene and sanitation, suboptimal feeding practices, gender norms and availability of health services also contribute significantly. **Significance and application:** Initial nutrition policies focused on health interventions within the facilities through safe motherhood initiatives to improve antenatal care,

counselling, providing micronutrient supplementation and offering nutrition education at facility and community levels. The child nutrition initiatives focused on care of severe acute malnourished children at the facilities and household intake of fortified foods. Subsequently, several nutrition-related policies and strategies were developed, including the strategy on prevention and control of vitamin and mineral deficiencies (2009) and the infant and young child feeding strategy (2009) as well research for policies & programs for South Asian countries. So in present scenario of Afghanistan, further research like public nutrition and preventive medicine will be an interesting topic to be discussed.

Content Analysis of Food related Television Advertisements Aimed and Children and Women: A Pilot Study in Delhi; *Barkha Sachdeva, Dr.Seema Puri and Dr.Renu Arora, Institute of Home Economics, University of Delhi*

Background: 1) To identify most commonly watched TV food advertisements among children and their mothers, 2) To observe and analyze content of food advertisements and corresponding food labels vis-a-vis advertising appeals and health/ nutrition claims in accordance with Food Safety and Standards (Advertising and Claims) Regulations, 2018 and Advertising Council of India (ASCI) guidelines **Approaches/methods of innovation/changes implemented:** Cross-sectional, mix method study. It was a triphasic study. In phase one survey was conducted using questionnaire cum interview schedule. (n=60, 30 children and 30 mothers). Socio-demographic profile and television viewing habits of participants (food channels, food ads they watched) were our topic of enquiry. Phase 2 involved observation of food advertisements on most watched TV channels. In last phase, content analysis of food advertisements and corresponding food labels was carried out. This was done using a checklist prepared after literature review, based on FSSAI and ASCI guidelines. Data analysis was done using MS Excel. Frequencies and percentages were calculated for number and frequency of food advertisements. Mean and SD was calculated for number and duration of advertisements. Content analysis of shortlisted advertisements was carried out qualitatively. **Key findings:** Television viewing was identified as a regular habit among children and mothers with preferred time slot of 8 to 11 p.m. Most watched advertised food category among children was chocolate/candies/lollipops (80%) and among mothers were grocery products (96.6%).On observation, as compared to mainstream, proportion of food commercials was almost double on kids' channels however, most advertised food category (chocolate / candies / lollipops) was found to be common on both channels. Use of advertising appeals along with health / nutrition claims (56%) was prevalent. As per Food Safety and Standards (Advertising and Claims) Regulations, 2018 and Advertising Council of India (ASCI) guidelines, no gross violation of claims was found; however, few conditional and health claims were depicted in a misleading manner. **Significance and application:** Many developed countries e.g United Kingdom banned advertisements of HFSS products in television programs for children in 2006. However, in South Asian countries like India, enforcement of stringent measures against misleading food advertisements is lacking. The present study concludes that misleading food advertisements and labeling is prevalent and policies implemented in same direction would be a major step for the good health of the people. Further, National level research is required on a larger sample size and associations between food ads/labels, eating habits and health parameters must be assessed.

Food security in the economic crisis of Sri Lanka: Role of trade policy; *Aanka Wijesinghe and Chathurrdhika Yogarajah, Institute of Policy Studies*

Background: Forced by the FOREX crisis, Sri Lanka introduced strict import controls to minimise foreign exchange leakage. Investigating the impact of these trade restrictions on food imports is essential, as studies show that imported food is a crucial source of calories for an average Sri Lankan household. We analysed the behaviour of the policymaker in deciding the coverage of import control and the relative place of food imports. **Approaches/methods of innovation/changes implemented:** Using Gazette notifications, we constructed a novel dataset at Harmonized Codes (HS) eight digits level. In addition, we built a data set using the Gazette notifications to delete the imposed import

controls. We merged the created data set with product attributes, including the end-use category and an indicator for food. We use industry fixed effects to control for the unobserved industry heterogeneities, which may affect the policy maker's decision to bring a product under import controls. We use Linear Probability Model (LPM) to estimate our limited dependent variable models. We also used Firth's penalised likelihood method as a robustness test. **Key findings:** We found that Sri Lanka disproportionately imposed quantitative and price controls on food imports. After eight waves of import controls since April 2020, around 88 per cent of food imports by 2017 values were under import controls at the end of August 2022. However, the Sri Lankan government facilitated rice imports by the beginning of 2022 due to the input-induced output slump. When the government of Sri Lanka deleted the import controls from regulations, non-food, intermediate, and capital goods were prioritised. We believe that policymaker is under the assumption that imported food is "non-essential" and can be replaced by domestic sources. **Significance and application:** Our study shows that under weakened macroeconomic conditions, consumers are cut off from imported food items as a result of the trade policy. Moreover, policymakers are concerned about caloric needs yet consider important micronutrient sources-like dairy and fruits- as "non-essential" or "substitutable". Further studies are required to find the impact of trade restrictions on the nutritional security of households.

Determinants of Diet Diversity: A case study on tribal women from Adilabad and Kumaram Bheem, Telangana; *Ravneet Kaur, Dr. Sony Pellissery and Dr. Padmaja Ravula, National Law School of India University*

Background: *What are the determinants of diet diversity which impact the nutritional outcomes in tribal communities? Nutrition is a multidimensional concept which has an elaborate casual loop so what are the factors (such as time-use, education, sanitation, income, drinking water sources, cultures, policies* etc) that contribute to diet diversity? **Approaches/methods of innovation/changes implemented:** The conceptual framework was borrowed from 'Multidimensional Nature of Nutrition' by Pingali and Ricketts (2014). A mixed methods study used data from survey (collected by ICRISAT under 'Nutri-Food Basket' initiative 2018) to empirically identify determinants of diet diversity through diet diversity scores (DDS). There were 1755 respondents in the survey. DDS were build using FAO's food group classification. DDS was regressed with independent variables (caste, education, income, religion, source of income, livestock, toilet type, time-use) using ordered logit regression. For qualitative aspect (cultural and policy factors), FGD was done with 7 tribal women and 3 field experts of the region. **Key findings:** The regression revealed that only variables like caste, religion, source of income, owning livestock and type of toilet were significant and influenced diet diversity revealed that Adilabad being a cotton market was the major driver for farmers to shift their cropping pattern which did affect the consumption pattern. Furthermore, the enactment of forests act, 2006 consumption of animal protein has reduced drastically. Respondents wanted their traditional crops under PDS. Under Mid-day meals, children are fed non-traditional diets Cultural practices influenced diet diversity as well, such as month long fasting by pregnant women during "Shravan mass". Significance **and application:** Build case for state-specific policies with this case study. Policy shifts are required especially focusing on nutrition security. Policies should have tailored approach towards region and vulnerable communities. Similar studies focusing on different states or communities should be conducted to build more evidence on factors impacting their diet diversity.