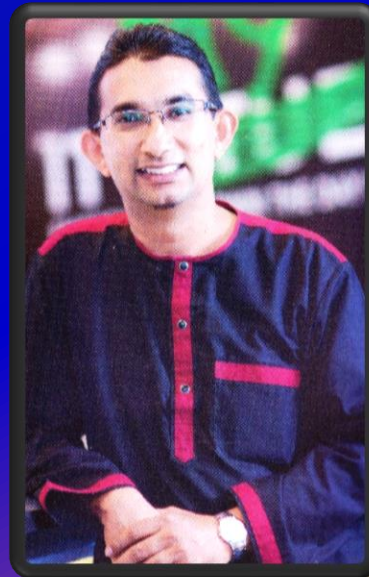
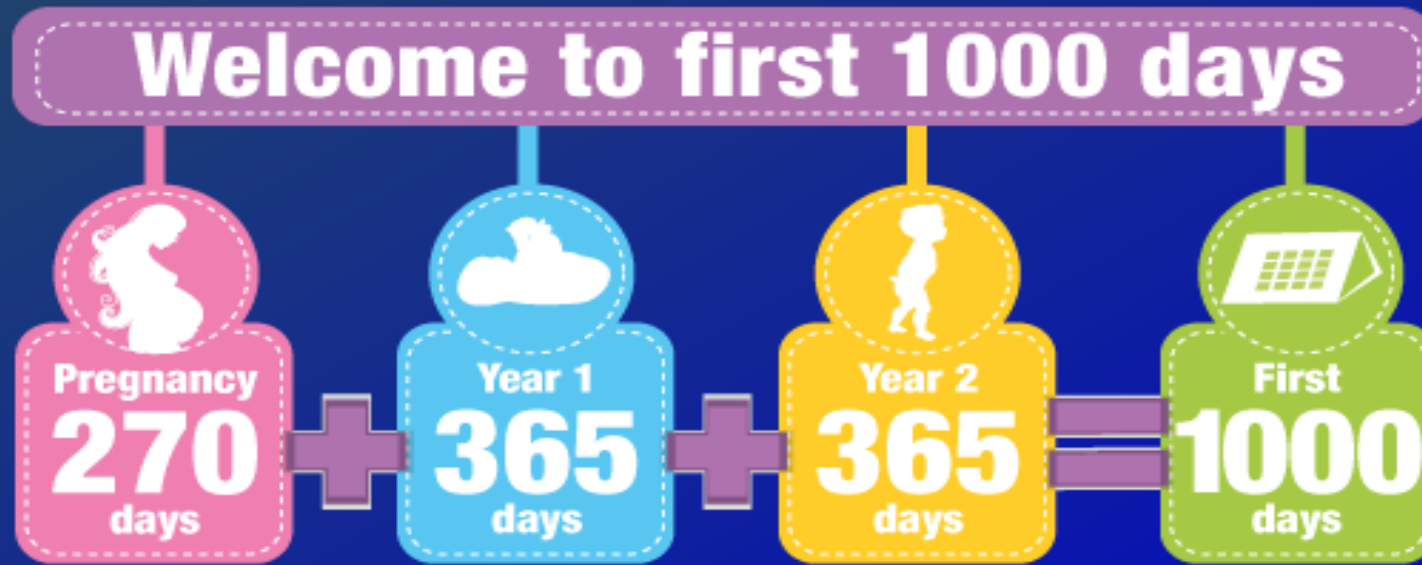


# Maternal and infant nutrition: Risk factors and interventions in Malaysia".

Prof. Dr. Hamid Jan Jan Mohamed

Nutrition Programme,  
School of Health Sciences,  
Universiti Sains Malaysia





- The 1,000 days between a **woman's pregnancy and her child's 2<sup>nd</sup> birthday** offer a unique window of opportunity to shape healthier and more prosperous futures.
- The right nutrition during this 1,000 day window can have a profound impact on a child's ability to grow, learn, and rise out of poverty. It can also shape a society's long-term health, stability and prosperity.

## WEIGHT IN INFANCY AND DEATH FROM ISCHAEMIC HEART DISEASE

D. J. P. Barker, C. Osmond, P. D. Winter, B. Margetts and S. J. Simmonds

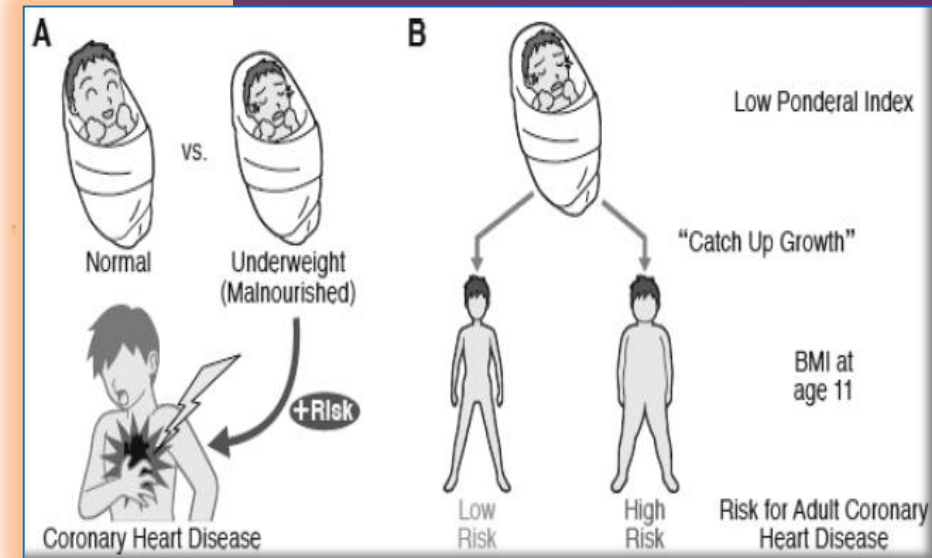
MRC Environmental Epidemiology Unit, University of Southampton, Southampton General Hospital, Southampton SO9 4XY, United Kingdom

Available online 19 September 2003.

### Abstract

Environmental influences that impair growth and development in early life may be risk factors for ischaemic heart disease. To test this hypothesis, 5654 men born during 1911-30 were traced. They were born in six districts of Hertfordshire, England, and their weights in infancy were recorded. 92.4% were breast fed. Men with the lowest weights at birth and at one year had the highest death rates from ischaemic heart disease. The standardised mortality ratios fell from 111 in men who weighed 18 pounds (8.2 kg) or less at one year to 42 in those who weighed 27 pounds (12.3 kg) or more. Measures that promote prenatal and postnatal growth may reduce deaths from ischaemic heart disease. Promotion of postnatal growth may be especially important in boys who weigh below 7.5 pounds (3.4 kg) at birth.

**Dr. Barker's  
hypothesis  
leading to  
DOHAD**



## Experiences...



Loy & Hamid Jan 2014 | Pp50-64  
*Health and the Environment Journal, 2014, Vol 5, No 1*

### **The Universiti Sains Malaysia Pregnancy Cohort Study: Maternal-infant Adiposity Development until the First Year of Life**

Loy SL and Hamid Jan JM\*

*Nutrition Programme, School of Health Sciences, Universiti Sains Malaysia, Health Campus,  
16150 Kubang Kerian, Kelantan, Malaysia.*

\*Corresponding author: [hamidjan@usm.my](mailto:hamidjan@usm.my)



#### ORIGINAL ARTICLE

### **Birth Cohort Consortium of Asia Current and Future Perspectives**

*Reiko Kishi,<sup>a</sup> Jun Jim Zhang,<sup>b</sup> Eun-Hee Ha,<sup>c</sup> Pau-Chung Chen,<sup>d,e</sup> Ying Tian,<sup>b,f</sup> Yankai Xia,<sup>g</sup> Kenji J. Tsuchiya,<sup>h</sup>  
Kunihiko Nakai,<sup>i</sup> Sungkyoon Kim,<sup>j</sup> Soo-Jong Hong,<sup>k</sup> Yun-Chul Hong,<sup>l</sup> Jeong-Rim Lee,<sup>m</sup>  
Hamid Jan B. Jan Mohamed,<sup>n</sup> Rajendra Prasad Parajuli,<sup>o</sup> Linda S. Adair,<sup>p</sup> Yap Seng Chong,<sup>q,r</sup> Yue Leon Guo,<sup>d,e,s</sup>  
Shu-Li Wang,<sup>s</sup> Muneko Nishijo,<sup>t</sup> Teruhiko Kido,<sup>u</sup> Pham The Tai,<sup>v</sup> and Sumal Nandasena<sup>w</sup>*





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## Nutrition and Global Health

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### Predictors and consequences of gestational weight gain in low- and middle-income countries (LMICs) settings (2/20/2019 – 07/31/2022)

The project will examine the impact of gestational weight gain (GWG) as a determinant of pregnancy outcomes in the context of LMICs using pregnancy cohorts in the GHAP datasets and others. Secondary data analyses will be undertaken to (i) identify geographic patterns in the distribution of GWG, (ii) identify risk factors inadequate GWG, (iii) evaluate impact of nutritional interventions on GWG and (iv) examine the risk relationships between GWG and adverse pregnancy outcomes. These outcomes include perinatal mortality, low birth weight, preterm birth and small-for-gestational age.

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Kelsey J. Carthew



January 6, 2021



Maternal and Child Health, Research Projects, Wafaie Fawzi



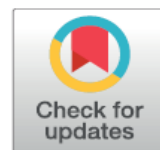
RESEARCH ARTICLE

# The Mother-Infant Study Cohort (MISC): Methodology, challenges, and baseline characteristics

Hadia Radwan<sup>1\*</sup>, Mona Hashim<sup>1</sup>, Reyad Shaker Obaid<sup>1</sup>, Hayder Hasan<sup>1</sup>, Farah Naja<sup>2</sup>, Hessa Al Ghazal<sup>3</sup>, Hamid Jan Jan Mohamed<sup>4</sup>, Rana Rizk<sup>5,6</sup>, Marwa Al Hilali<sup>1</sup>, Rana Rayess<sup>1</sup>, Ghamra Izzaldin<sup>1</sup>

**1** Department of Clinical Nutrition and Dietetics, College of Health Sciences, Research Institute of Medical and Health Sciences (RIMHS), University of Sharjah, Sharjah, United Arab Emirates, **2** Department of Nutrition and Food Sciences, American University of Beirut, Beirut, Lebanon, **3** Family Health Promotion Center, Sharjah, United Arab Emirates, **4** Nutrition and Dietetics Program, Universiti Sains Malaysia, Kelantan, Malaysia, **5** Department of Health Services Research, Maastricht University, Maastricht, The Netherlands, **6** Institut National de Santé Publique, d'Épidémiologie Clinique et de Toxicologie (INSPECT-LB), The Lebanese University, Beirut, Lebanon

\* [hradwan@sharjah.ac.ae](mailto:hradwan@sharjah.ac.ae)



## The Lahore Birth Cohort Study



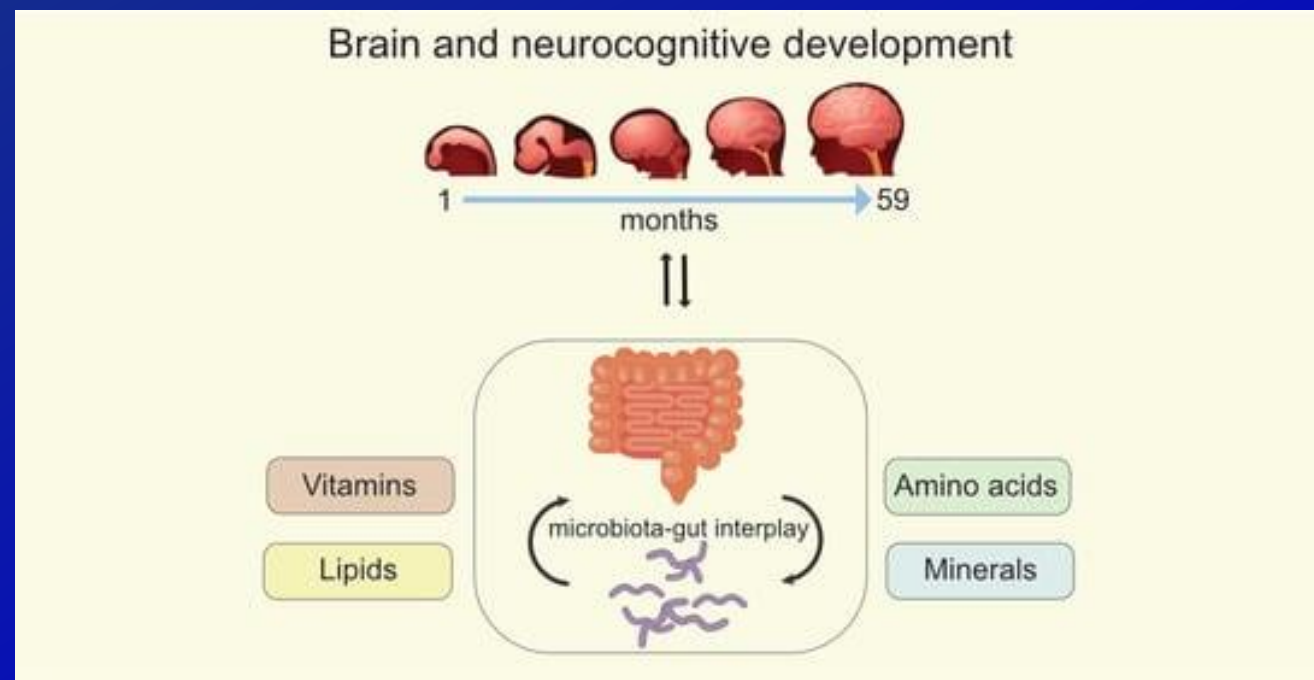
Review

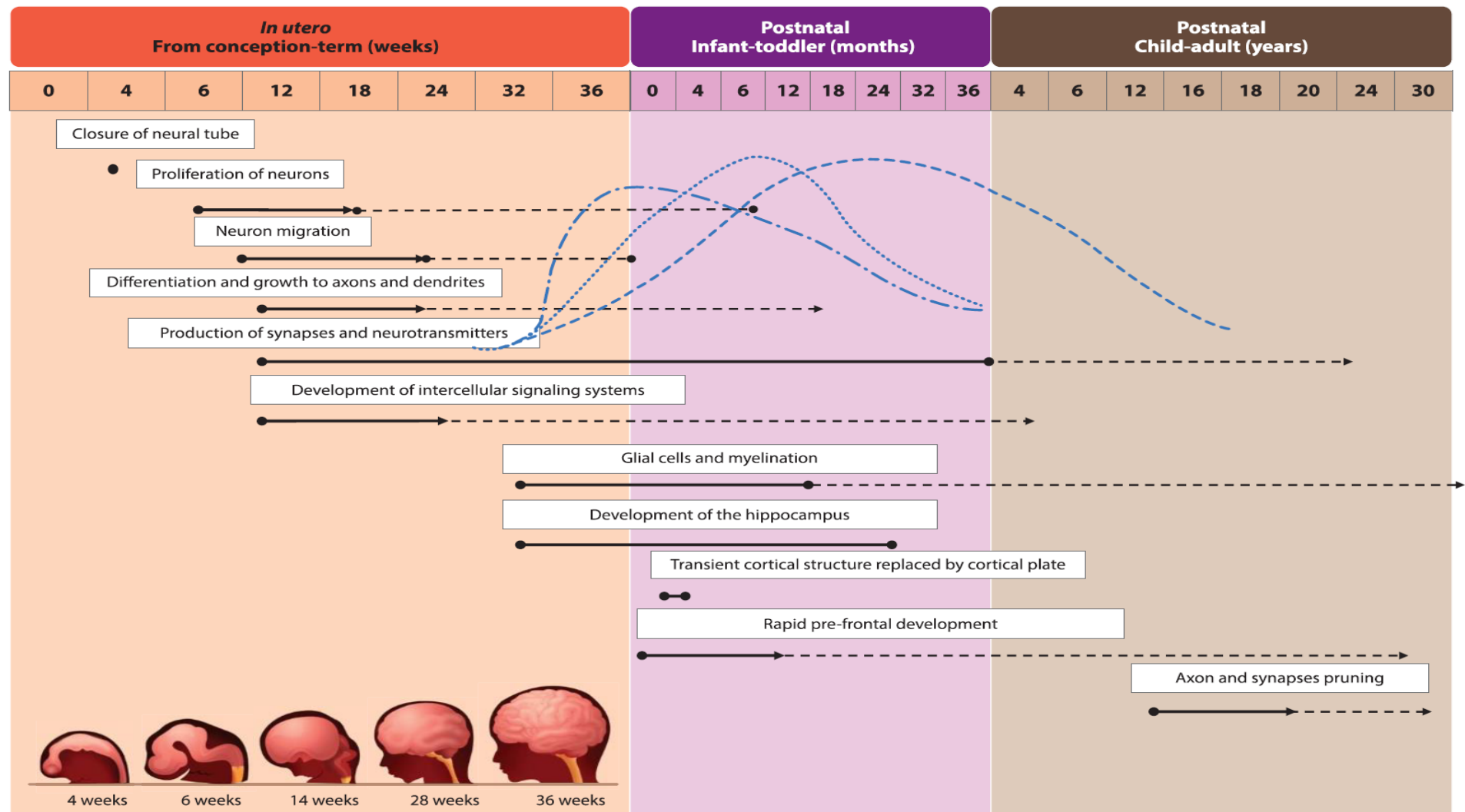
# Nutritional Support of Neurodevelopment and Cognitive Function in Infants and Young Children—An Update and Novel Insights

Kathrin Cohen Kadosh <sup>1</sup>, Leilani Muhandi <sup>2</sup>, Panam Parikh <sup>2</sup> , Melissa Basso <sup>1,3</sup>, Hamid Jan Jan Mohamed <sup>4</sup> , Titis Prawitasari <sup>5,6</sup>, Folake Samuel <sup>7</sup>, Guansheng Ma <sup>8,9</sup>  and Jan M. W. Geurts <sup>10,\*</sup> 

*Nutrients* **2021**, *13*, 199. <https://doi.org/10.3390/nu13010199>

<https://www.mdpi.com/journal/nutrients>





Depicts approximate timelines for experience-dependent synaptic development:

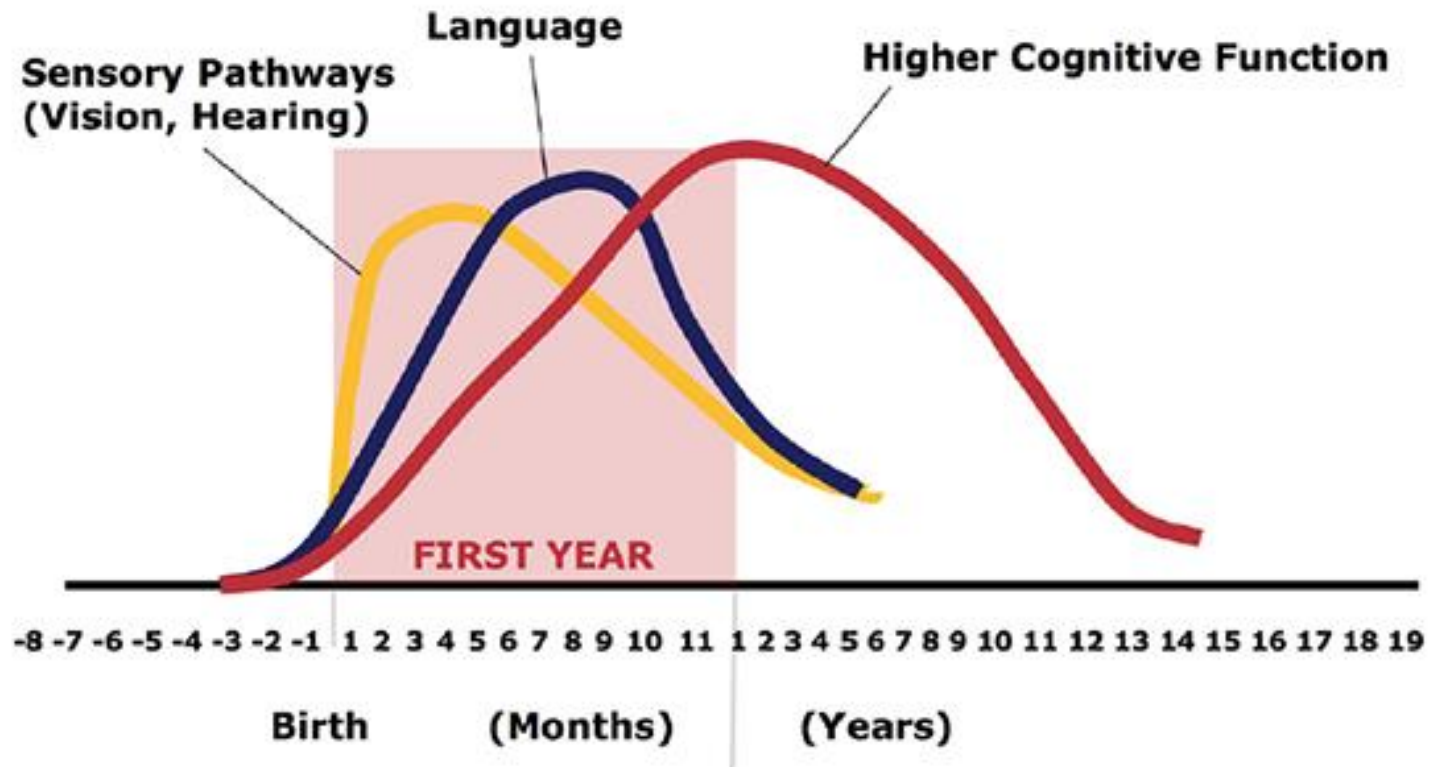
- Visual and auditory cortex (seeing/hearing);
- - - - - Angular gyrus/Broca's area (language and speech);
- - - - - Prefrontal cortex (higher cognitive functions)
- Rapid development    - - - - - → Prolonged development

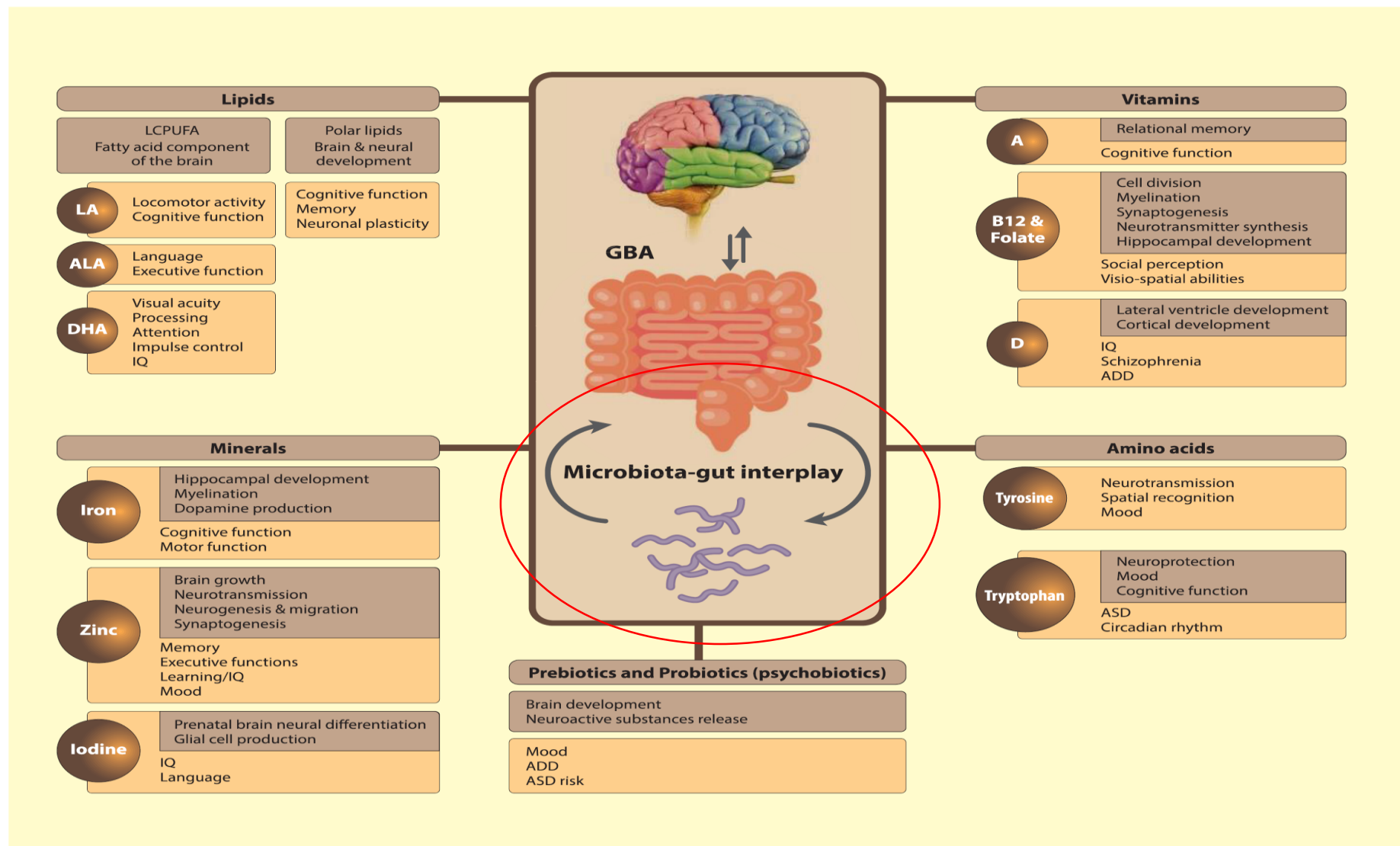
**Figure 1.** Visual representation of brain development timeline in humans from in utero up to adulthood.



# Human Brain Development

Neural Connections for Different Functions Develop Sequentially





Roles in nervous system development	Affected domain if deficient
<p>LCPUFA: long-chain polyunsaturated fatty acid; LA: linoleic acid; ALA: alpha-linolenic acid; DHA: docosahexanoic acid; IQ: intelligence quotient; ASD: autism spectrum disorder; ADD: attention deficit disorder; GBA: Gut-Brain Axis</p>	

**Figure 2.** Functions and effect of some nutrients on brain and neuronal development. It also includes pre-and probiotics and tryptophan-based interactions through the gut brain axis.

Mohamed *et al.*

*BMC Pregnancy and Childbirth* (2022) 22:294

<https://doi.org/10.1186/s12884-022-04616-z>

BMC Pregnancy and Childbirth

RESEARCH

Open Access

# Maternal diet, nutritional status and infant birth weight in Malaysia: a scoping review



Hamid Jan Jan Mohamed<sup>1\*</sup>, See Ling Loy<sup>2,3</sup>, Amal K. Mitra<sup>1,4</sup>, Satvinder Kaur<sup>5</sup>, Ai Ni Teoh<sup>5</sup>,  
Siti Hamizah Abd Rahman<sup>1</sup> and Maria Sofia Amarra<sup>6,7</sup>

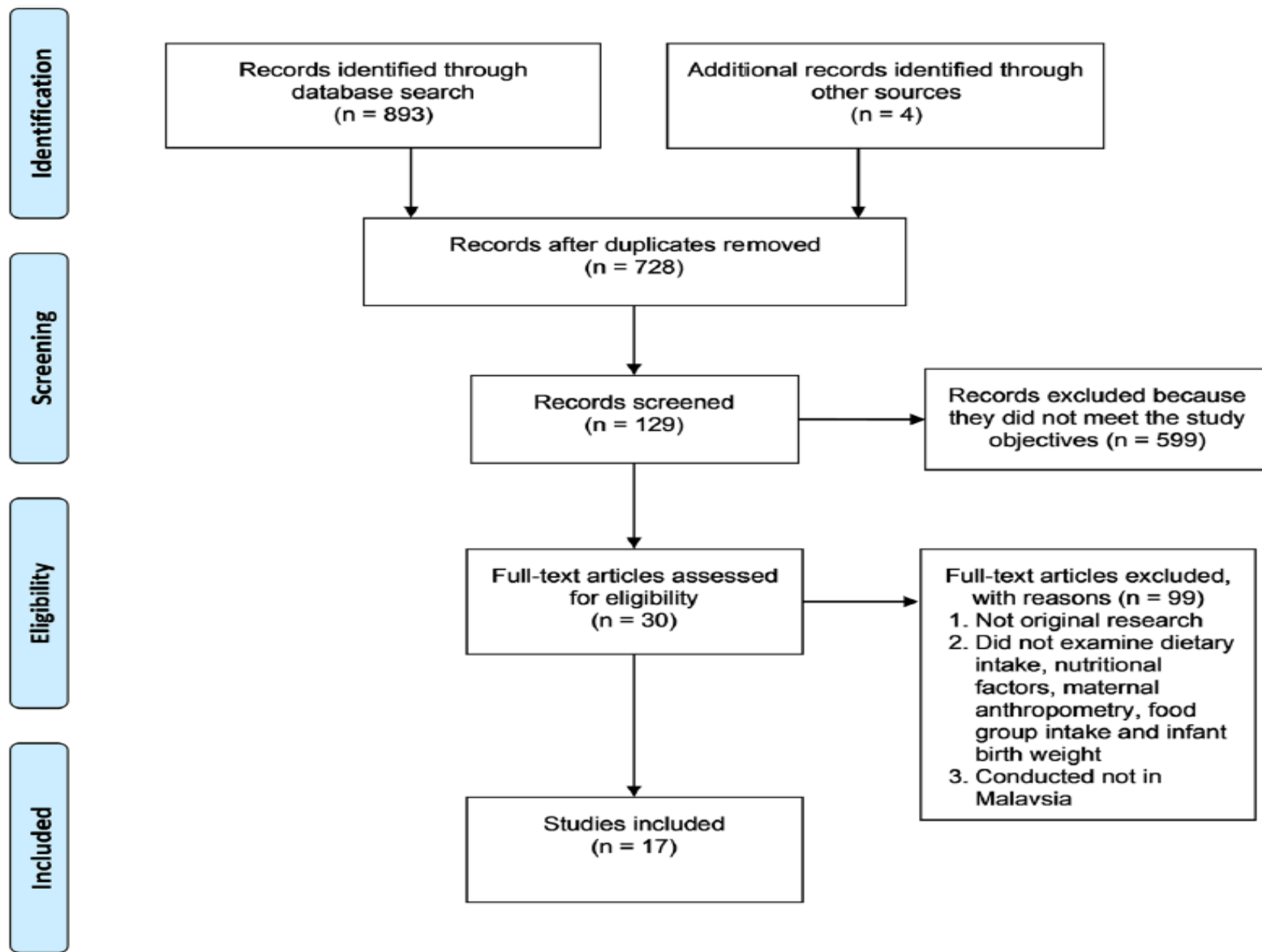
# OBJECTIVES

The objectives are to evaluate: 1) The adequacy of selected dietary micronutrient intake among pregnant women; 2) The association of the following maternal nutritional factors on infant's birth weight defined in terms of macrosomia and LBW: pre-pregnancy body mass index (BMI), and GWG; 3) Maternal food group intake; and 4) Selected co-morbidities during pregnancy with the infant's birth weight, such as maternal high blood glucose and high blood pressure.



**Table 2** Inclusion and exclusion criteria

Inclusion Criteria	Exclusion Criteria
Quantitative studies	Review articles
Human studies	Animal studies
Scholarly paper	Study conducted outside Malaysia
Published between 1972 and 2021	
Native and English language	



**Fig. 1** PRISMA Flowchart showing the results of search strategy and inclusion and exclusion of articles

# Results

## Maternal Micronutrient Intake

- Calcium
- Iron
- Vitamin D
- Folic Acid
- Niacin

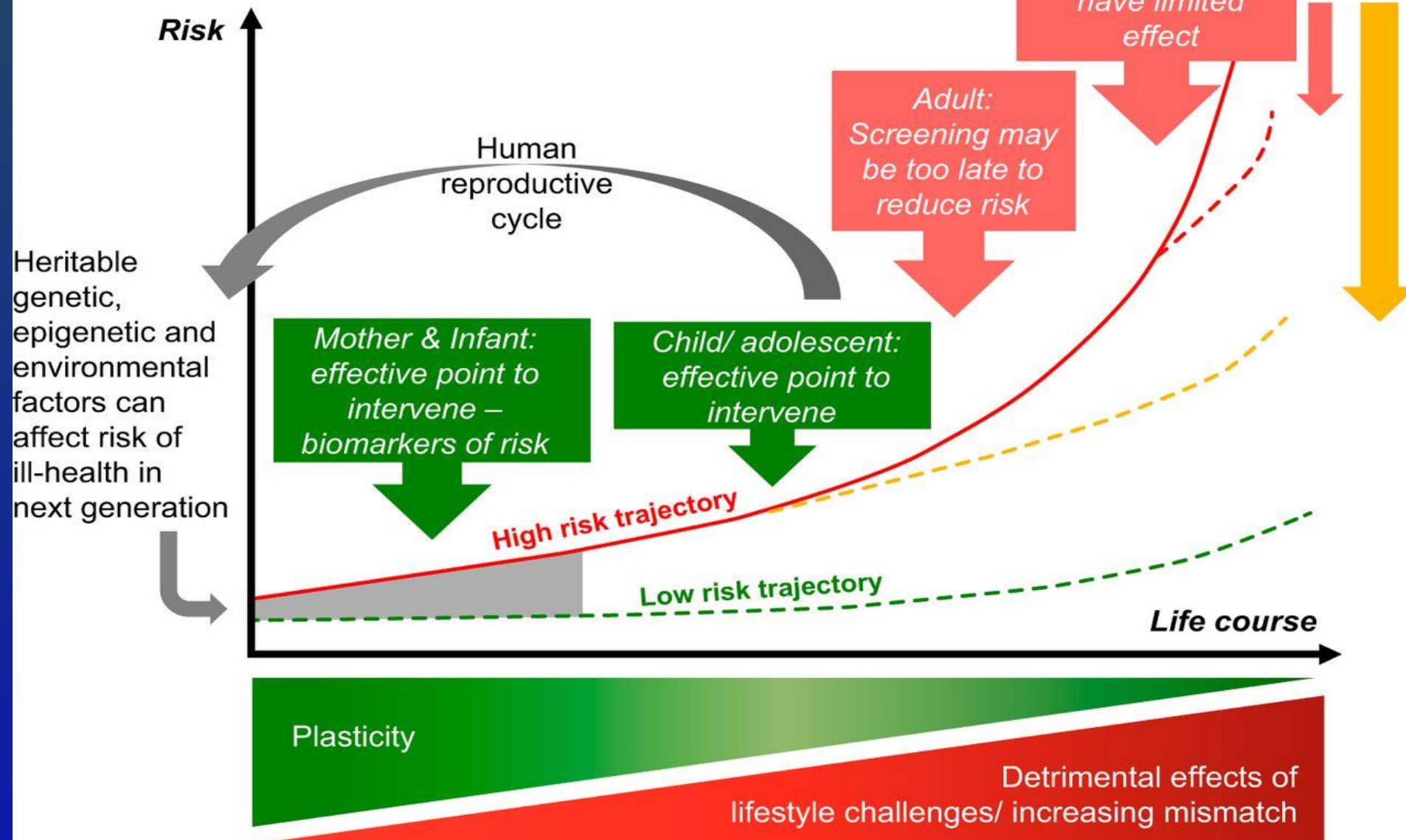
## Fetal Macrosomia

- High Pre-pregnancy BMI
- High Gestational Weight Gain
- High Blood Pressure

## Low Birth Weight

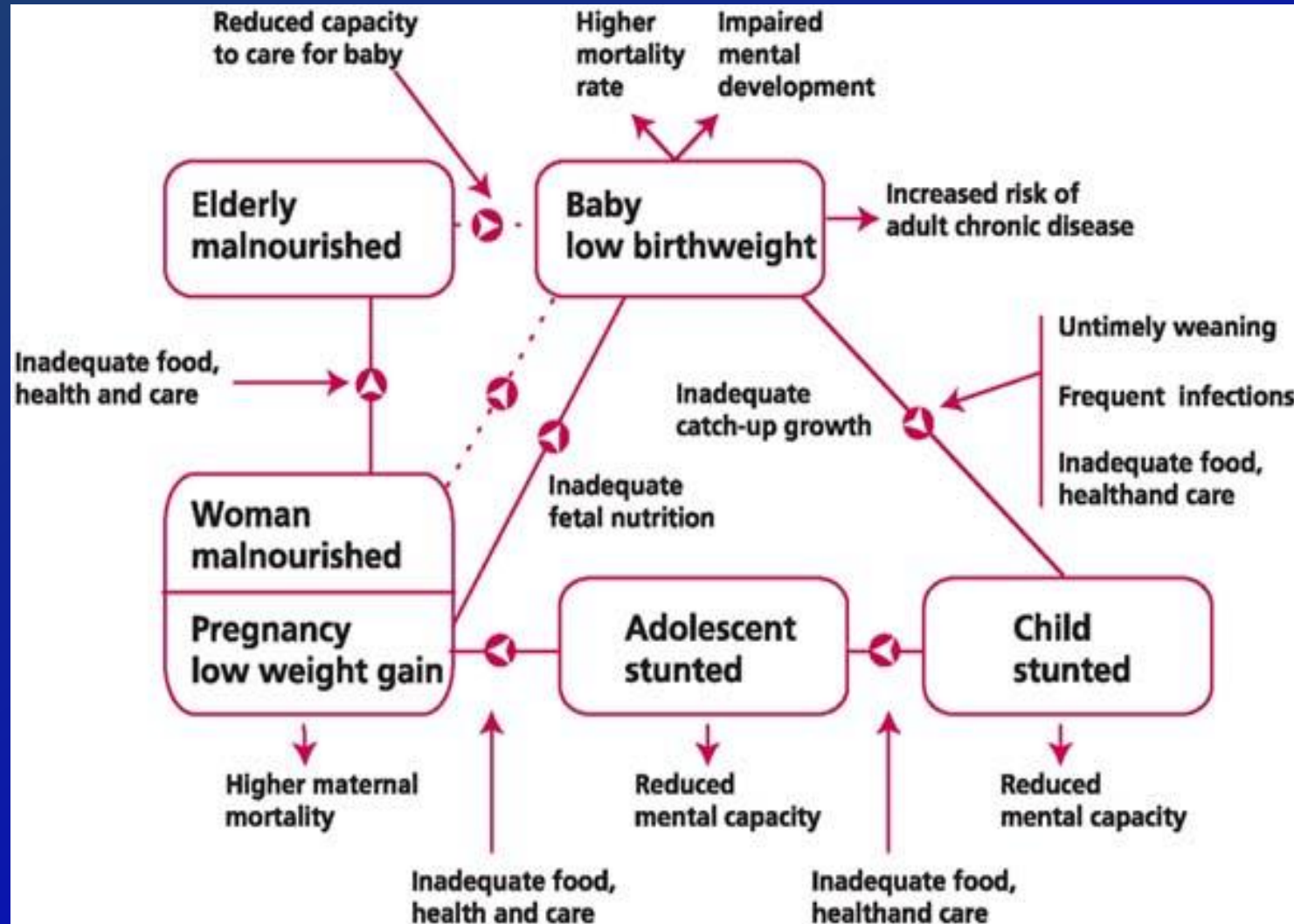
- Low pre-pregnancy BMI
- Inadequate GWG
- Confectionaries and Condiments
- High Blood Pressure

# What is the best time to intervene and prevent disease ?





# Maternal and Child Nutrition (The vicious cycle)



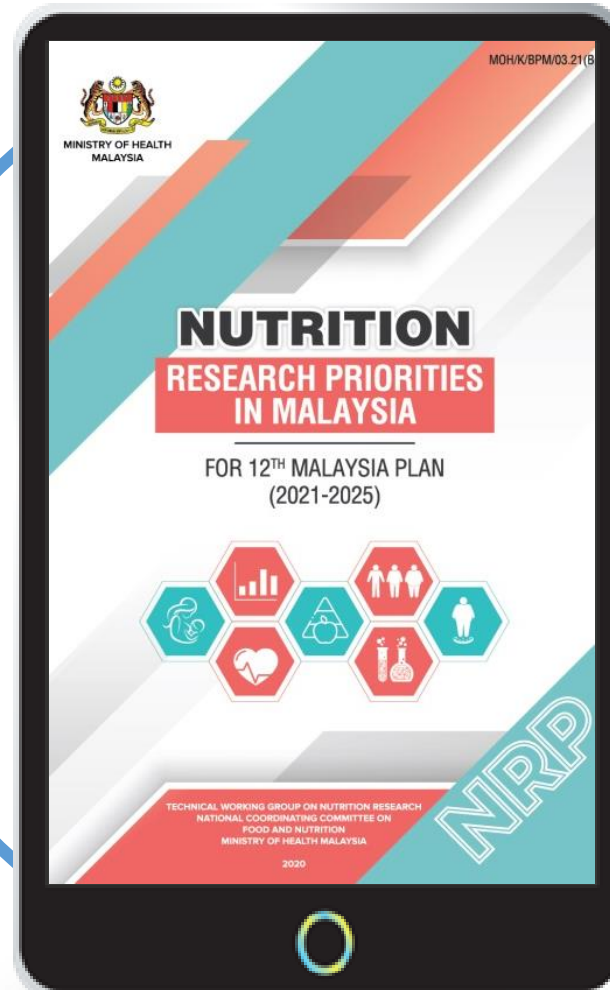
Source: Adapted from the ACC/SCN-appointed Commission on the Nutrition Challenges of the 21st Century. (2000)

# 7 RESEARCH PRIORITY AREAS NRP FOR 12<sup>TH</sup> MP (2021-2025)

**Maternal, Infant and  
Young Child  
Nutrition**

**National Food  
and Nutrition  
Situation**

**Life Course  
Approach to Food  
Intake and Dietary  
Practices**



**Nutritional  
Deficiencies and  
Excesses**

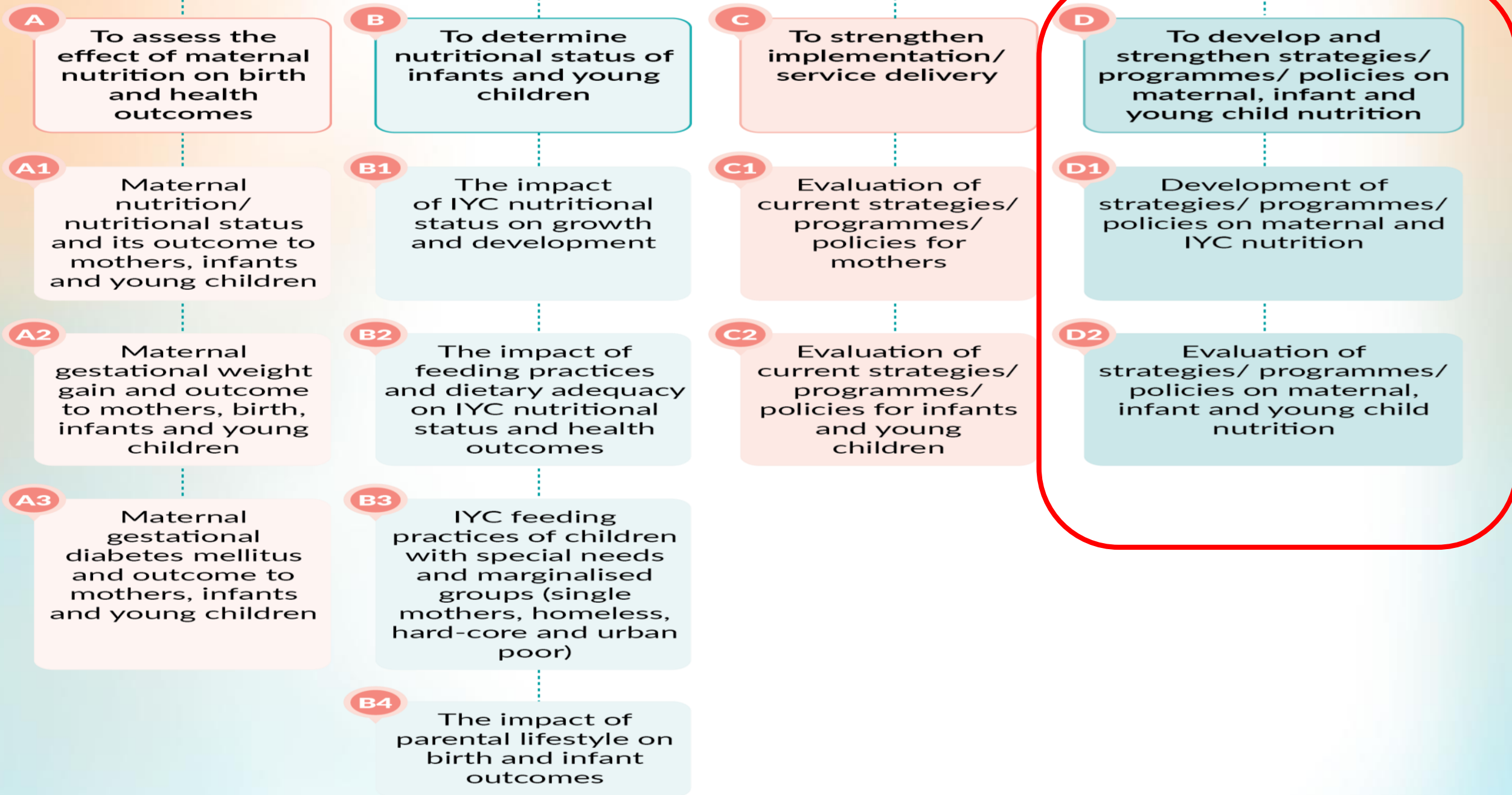
**Overweight and  
Obesity**

**Diet-Related Non-  
Communicable  
Diseases**

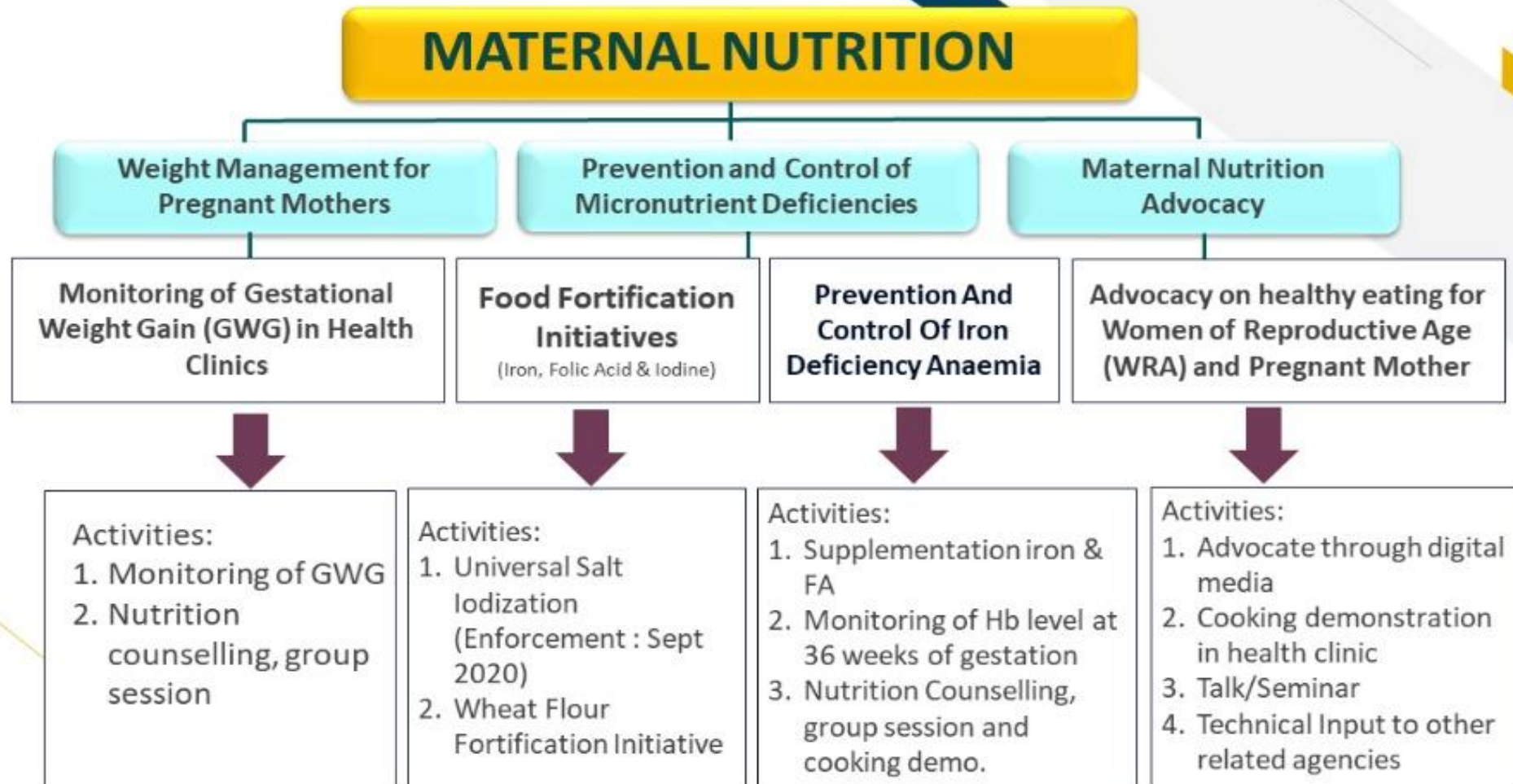
**Nutrient and Non-  
nutrient Composition of  
Foods**

\*All RPAs were considered equally important in meeting the national needs for further information & data/evidence required for improving the health & nutritional well-being of Malaysian.

# RPA 1 : Maternal, Infant & Young Child Nutrition



# Nutrition Division, MoH activities





## Stunting and Internet User- Malaysia



Stunting is the most common type of child malnutrition.

22 % of children under 5 years of age are stunted in Malaysia (NHMS, 2019)



90 % Internet users (Department of Statistics Malaysia, 2020)

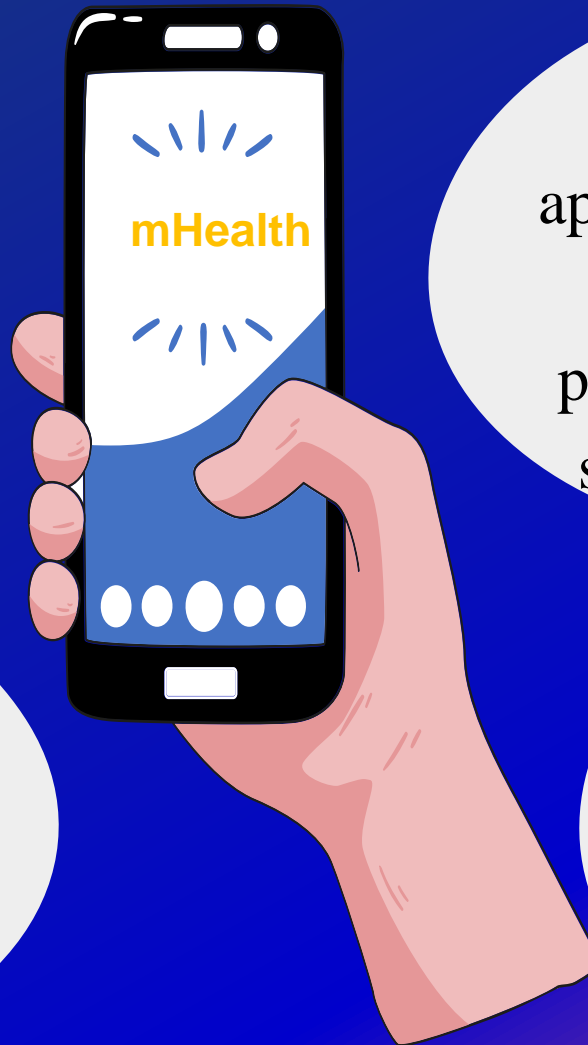


# mHealth

The accessibility of mobile health makes it a convenient and viable platform to overcome challenges in healthcare delivery

(Labrique et.al, 2013)

Have shown potential in changing health behaviors - but much of the evidence has been from developed countries

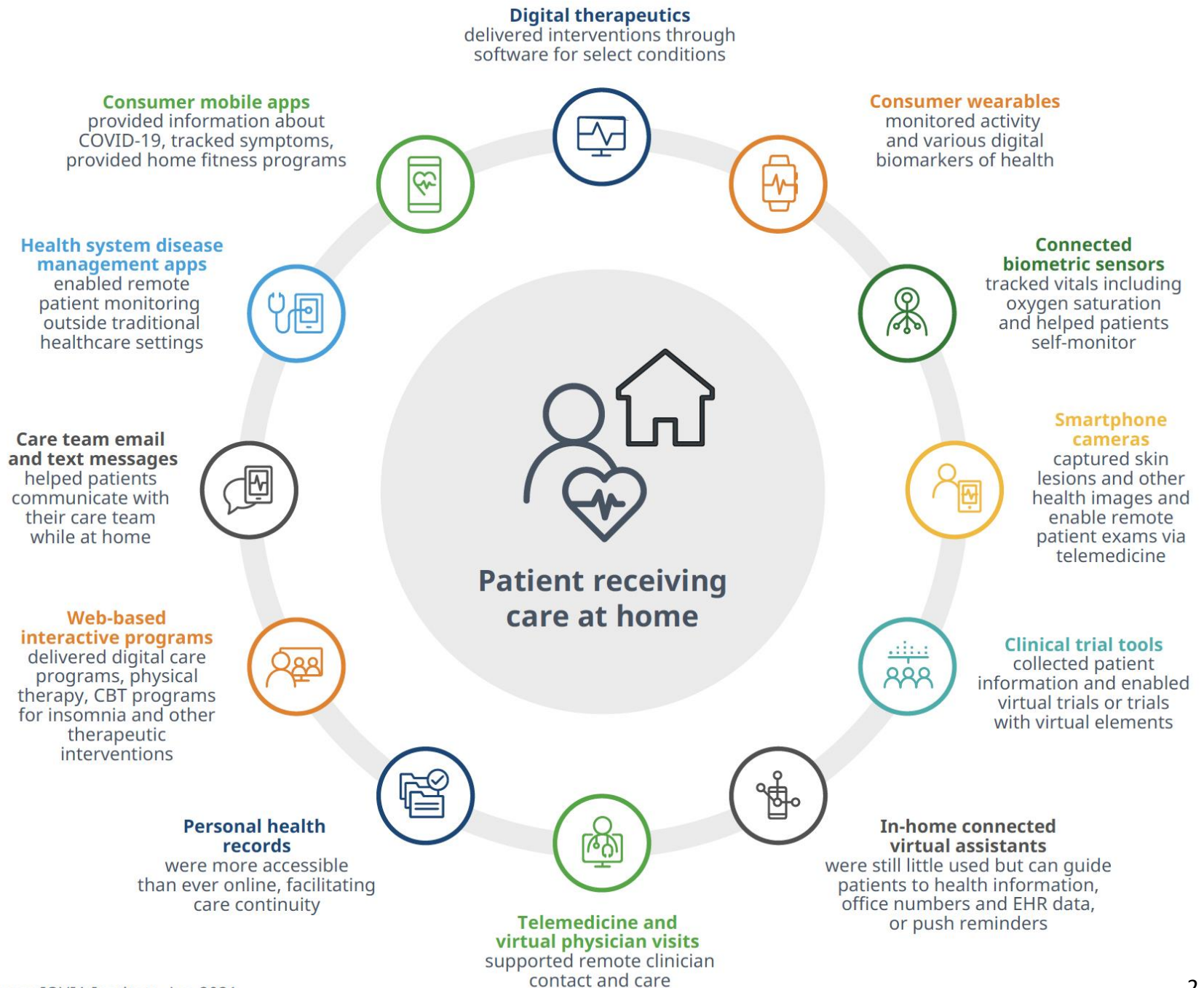


Current conventional approaches were less likely to be successful in preventing the increase of stunting among children

Found to improve health outcomes and/or behavior at a lower cost (Hall, Cole-Lewis & Bernhardt, 2015)

What we talk about when  
we talk about

# Digital health



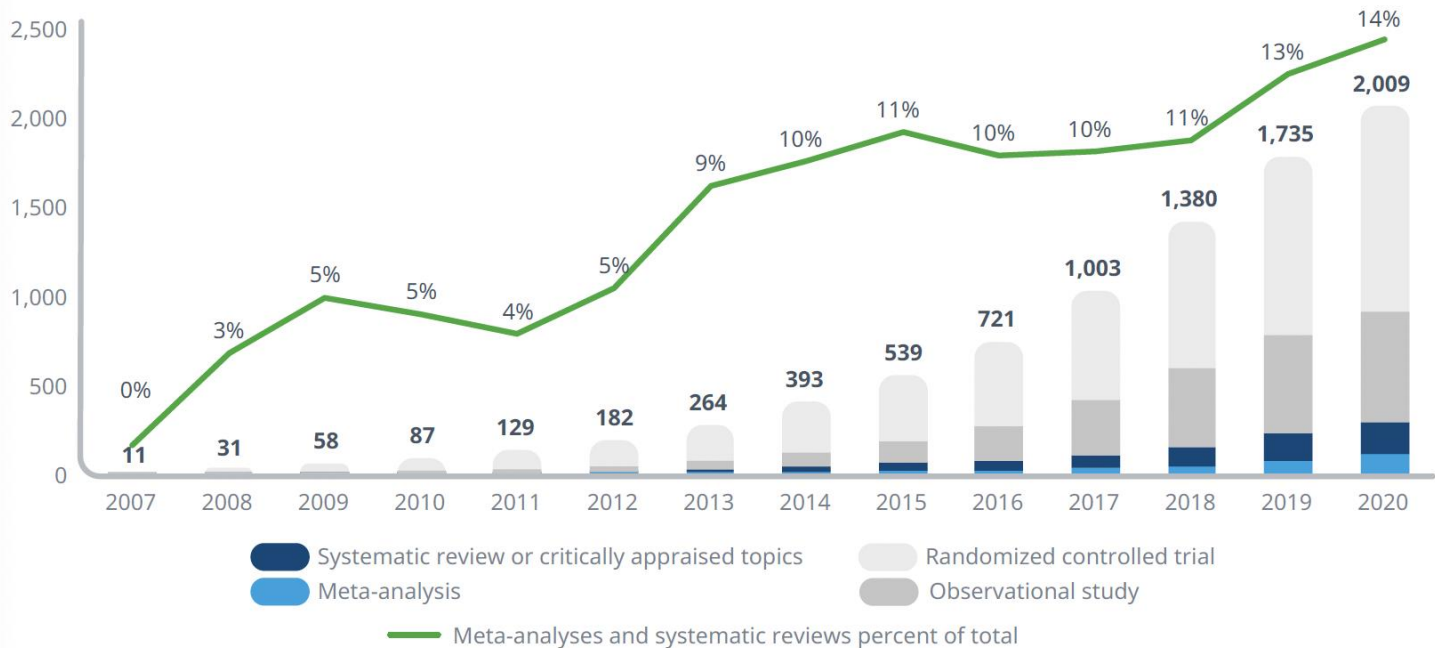


# Evidence on Digital Health

Trends in the past decade

Progression of global digital health trends

Exhibit 26: Cumulative Number of Published Digital Health Efficacy Studies and Percentage of Meta-analyses and Systematic Reviews



Source: AppScript Clinical Evidence Database, Jan 2021  
Notes: Only includes studies that evaluated the interventional value of a digital health solution (mobile or web app, connected device, or other mobile intervention such as texting) on patient outcomes such as activity levels, lab results, or healthcare resource utilization. 'Observational Study' includes all trials examining the interventional value or impact of an app excluded from the other three categories regardless of design.

- 1 Literature is growing
- 2 Evidence now support inclusion of digital health tools in treatment guidelines .
- 3 Independent organizations continue to highlight need for **high-quality** evidence



# Health apps

Cyclical global trends in health apps: where are we now?

1

Progression of global digital health trends

Peak – Contraction - Trough – Expansion

1

These data alone will not reflect the dynamics in 2020 and 2021.

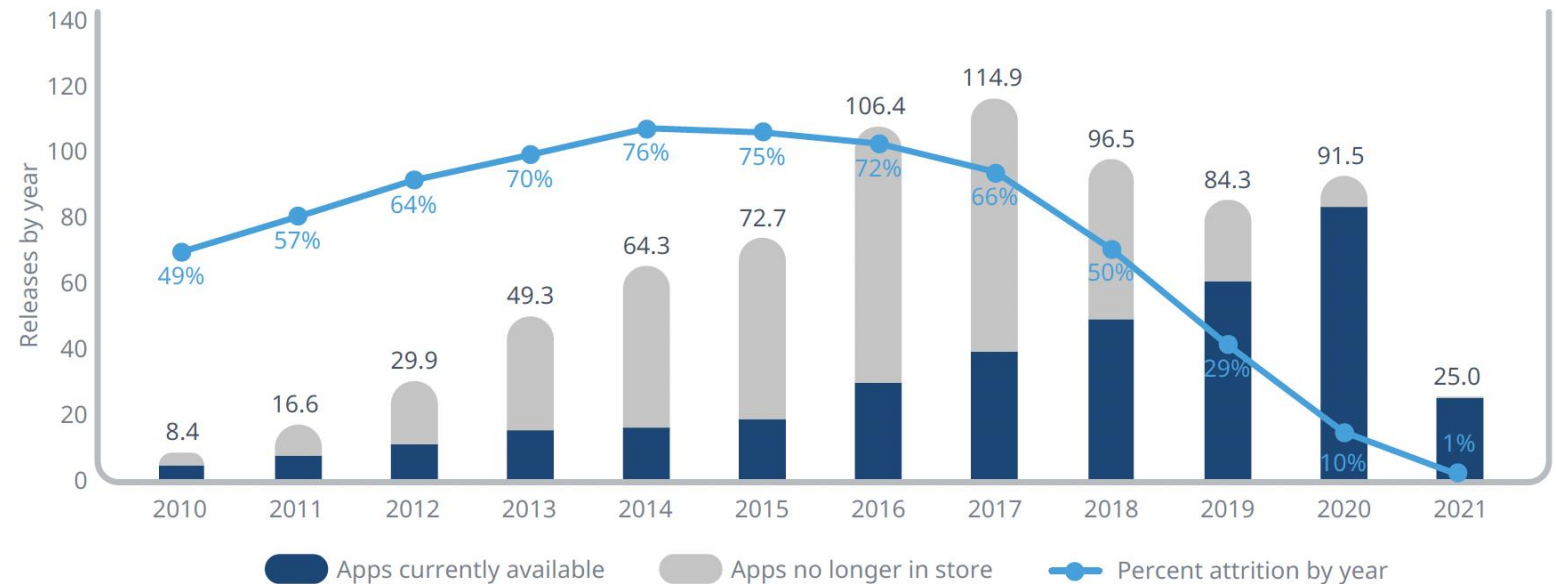
2

Among apps pulled from app stores, 51% had under 100 downloads.

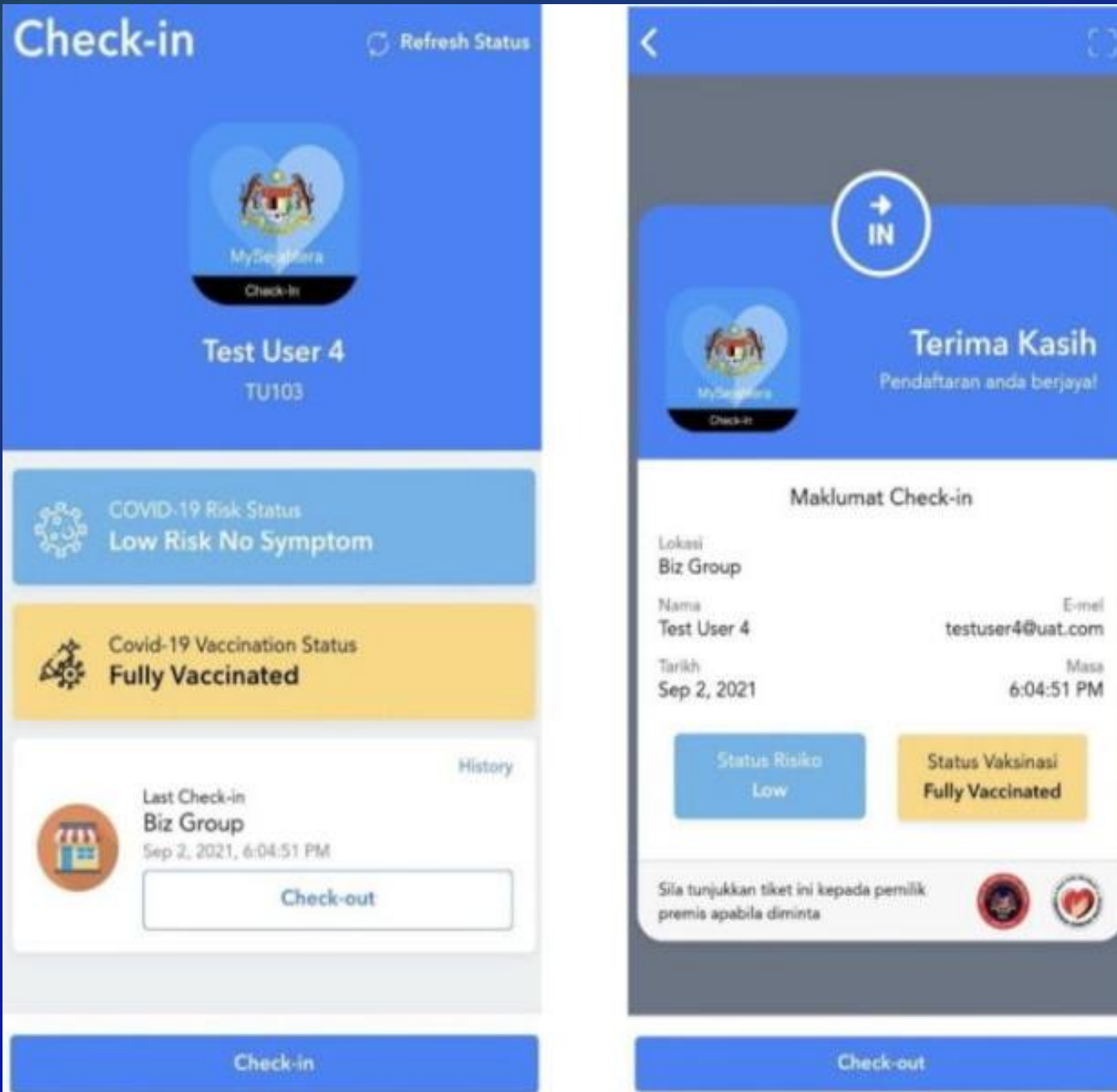
3

Developers not only need to build apps but also create a plan to drive uptake and differentiate from the noise.

Exhibit 4: The Release and Removal of Health Apps from Stores Over Time



Source: 42 Matters, Jun 2021 and Jul 2017; Mevvy, Jun 2015; IQVIA AppScript App Database, Jun 2021; IQVIA Institute, Jun 2021  
Notes: Includes digital health apps that are publicly available to consumers and categorized as Health & Fitness or Medical.



RESEARCH ARTICLE

Open Access

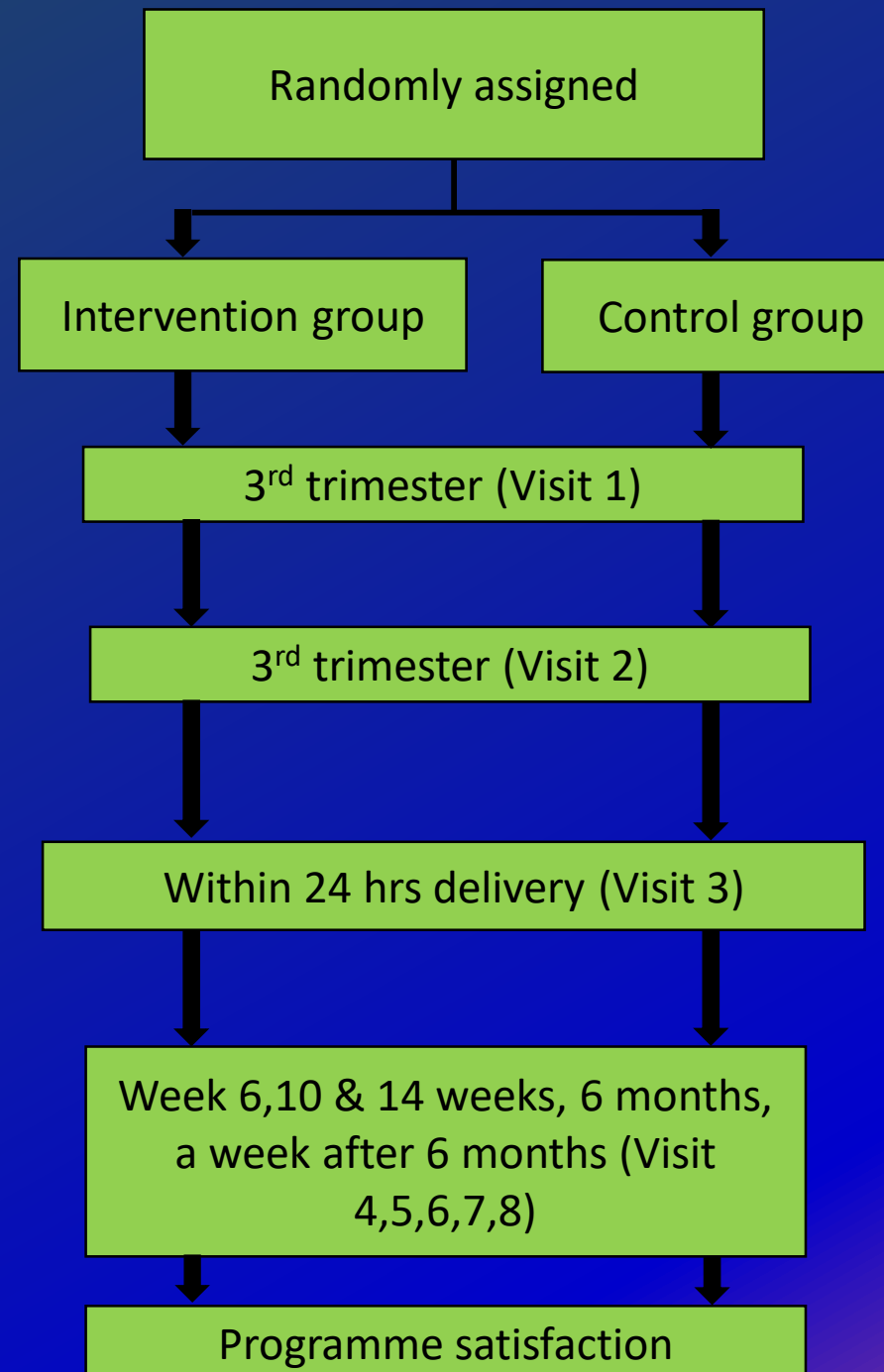


# Effectiveness of weekly cell phone counselling calls and daily text messages to improve breastfeeding indicators

Archana Patel<sup>1,2</sup>, Priyanka Kuhite<sup>2</sup>, Amrita Puranik<sup>2\*</sup> , Samreen Sadaf Khan<sup>2</sup>, Jitesh Borkar<sup>2</sup> and Leena Dhande<sup>1</sup>

# Methodology

- A two arm, hospital-based pilot study in Nagpur, India
- Women in their third trimester (32-36 weeks), n= 1037 mother-infant dyads
- **Intervention group:** 1x/week of phone counselling call & daily text messages + Routine healthcare services
- **Control group:** Routine healthcare services



Assessment of:

Sociodemographic & health status

Maternal illness, routine of breastfeeding advice & breast examination

Information of birth, infants' anthropometry, breastfeeding initiation, pre-lacteal feeding rate, maternal/infant illnesses

Infants' anthropometry, breastfeeding practices, infant immunization and initiation of complementary feeding

# Authors's conclusion

- Lactation counselling using cell phones proved to be a very useful tool for frequent and sustained support to pregnant and lactating mothers.
- This intervention can be successfully implemented in low resource settings by training nurse midwives who can potentially communicate with large number of beneficiaries.
- It needs further evaluation prior to scale up and incorporation into the public as well as private health systems.



# DEVELOPMENT AND EFFECTIVENESS OF A MOBILE HEALTH BASED EDUCATION INTERVENTION ON MATERNAL, INFANT AND YOUNG CHILD NUTRITION TO PREVENT STUNTING IN KELANTAN



Ministry of Health Malaysia

Nutrition Division



*Mobile Health Nutrition Education*



# METHODOLOGY

6 months of quasi-experimental design of intervention



## Phase 1

Development of a  
MiNd package



## Phase 2

Evaluation of the  
effectiveness of mobile  
health intervention  
programme



## Phase 3

Qualitative study  
through in-depth  
interview



# Take Home Messages

Healthy maternal nutrition is important to ensure a healthy infant growth and development.

Sufficient information are available to highlight nutritional area that needs attention

It is timely for researchers and stakeholders to develop innovative and effective intervention for mental and infant nutrition improvement



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MALAYSIA

# Thank You Very Much...

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