
Understanding the impact of micronutrient deficiencies on birth outcomes in Vanuatu and in the wider Western Pacific

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Sunshine Coast
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VANUATU 3RD HEALTH RESEARCH SYMPOSIUM

VNPF Conference Center, Luganville, Santo

26-28 October 2022



Hidden Hunger – A form of malnutrition



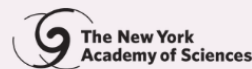
Hidden Hunger



1 in 3 of the world's population suffers from hidden hunger and its related conditions because of insufficient micronutrient status.

Learn more:

nyas.org/ebriefings/2018/hidden-hunger



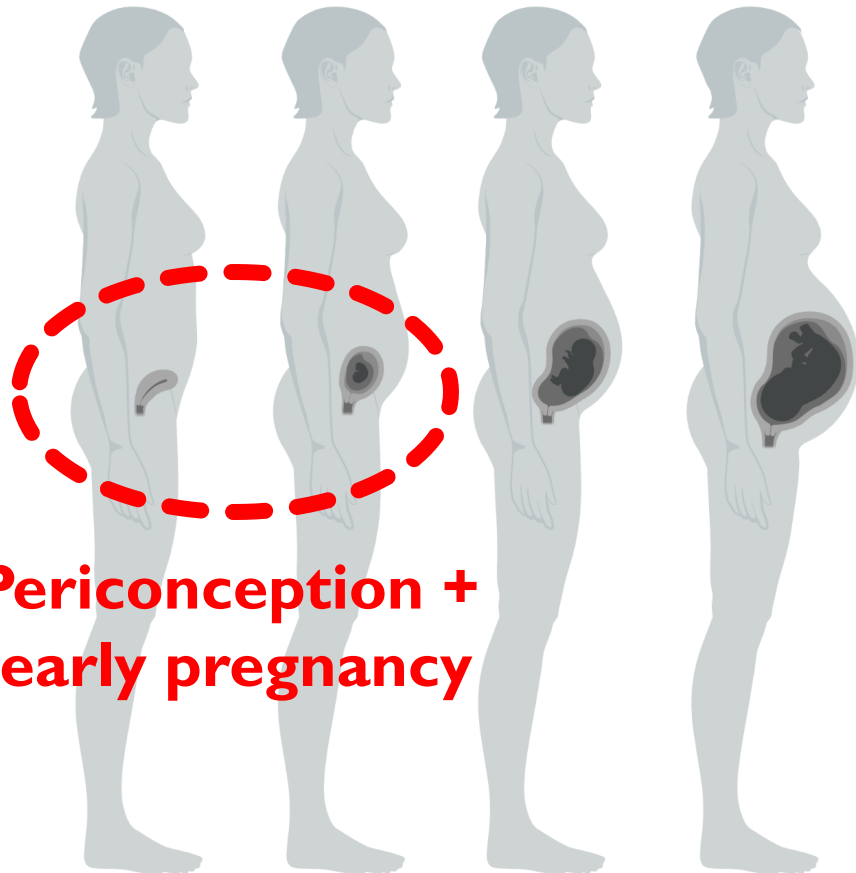
Malnutrition is a critical area of public health concern in Vanuatu and the wider Western Pacific.

Malnutrition comes in many forms including:

- Under-nutrition > low caloric intake > underweight
- Over-nutrition due to high caloric intake > overweight
- **Hidden hunger – a deficiency in micronutrients**



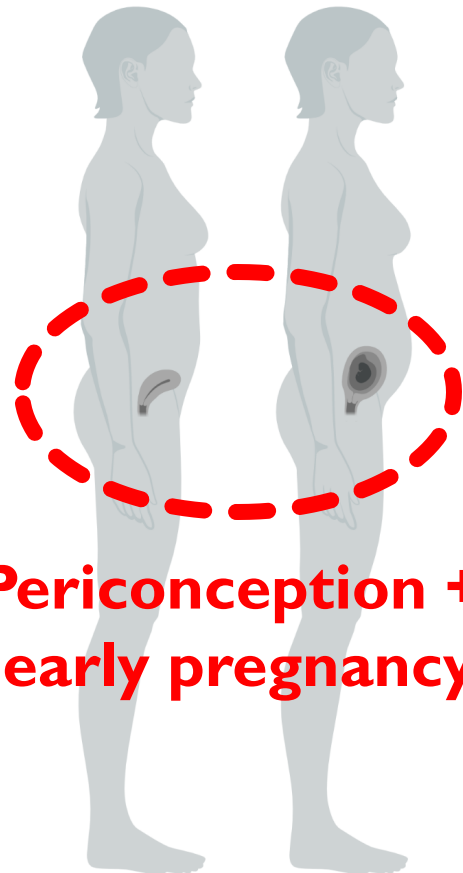
Micronutrient deficiencies



**Periconception +
early pregnancy**

- Micronutrient deficiencies (MDs)** refer to suboptimal dietary intake of micronutrients such as:
- Minerals (iodine, iron, zinc, calcium and selenium)
 - Vitamins (folate, A, B, C, D, E vitamins).

Folate and iodine are important for healthy fetal development



**Periconception +
early pregnancy**

Maternal
intake is
critical for
preventing



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suboptimal dietary intake of micronutrients such as:

- Minerals (iodine, iron, zinc, calcium and selenium)
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Birth defects / congenital anomalies	Preterm birth
Miscarriage	Poor neurodevelopment and cognition
Stillbirth	Altered growth and development
Low / Very low birth weight	Reduced cardiometabolic function

Gernard et al. Nature Reviews. 2016 <https://www.nature.com/articles/nrendo.2016.37>

Maternal MDs and birth outcomes in Vanuatu



Country	HDI rank (/191)	Neonatal mortality rate (/1000 live births)		% change over 20 years
		1999	2019	
Australia	8	3.5	2.3	- 34 %
New Zealand	14	3.5	2.6	- 26 %
Vanuatu	140	12.7	11.4	- 10 %
Solomon Islands	151	13	8.2	- 37 %
Papua New Guinea	155	31.3	21.9	- 30 %
PICTs (average)		15	10	- 33 %
World		37	17	- 54 %

Malnutrition associated non-communicable diseases are escalating in Vanuatu.

Of all Western Pacific nations, Vanuatu infant and neonatal and mortality rates have seen little improvement over the last 20 years.

Hypothesis:

Increasing MDs from malnutrition is undermining efforts to improve birth outcomes in ni-Vanuatu communities.

Research Questions – Scoping reviews



Research questions (1):

*For published research on **micronutrient deficiencies** in the Western Pacific:*

- How many studies have been completed?
- Which Pacific regions are represented?
- What micronutrients have been researched?
- What drove the research?
- What subjects were represented?

Research questions (2):

*For published research on **congenital anomalies (birth defects)** in the Western Pacific:*

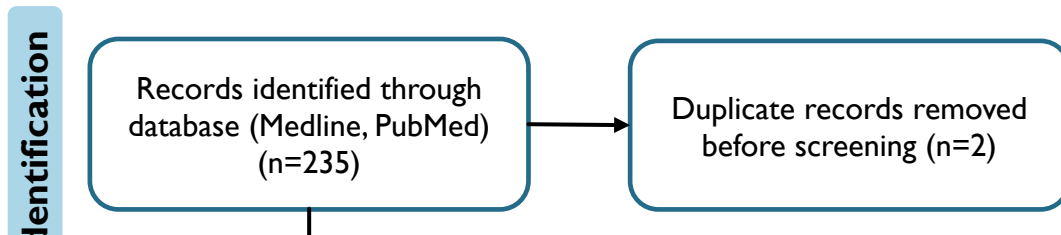
Scoping reviews allow researchers to systematically map the all published research on a topic to identify key concepts, theories and sources of evidence to inform practice in the field.



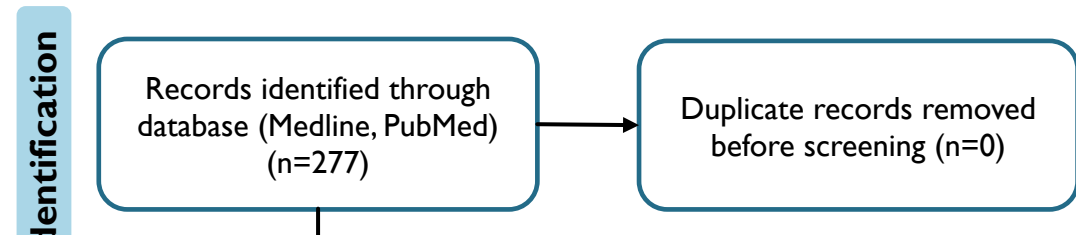
Research Methodology



Research questions (1):



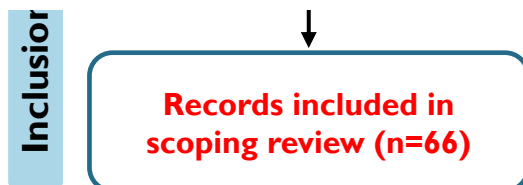
Research questions (2):



We identified 95 peer-reviewed studies published across the last 52 years focusing on micronutrient deficiencies or birth defects in the Western Pacific.

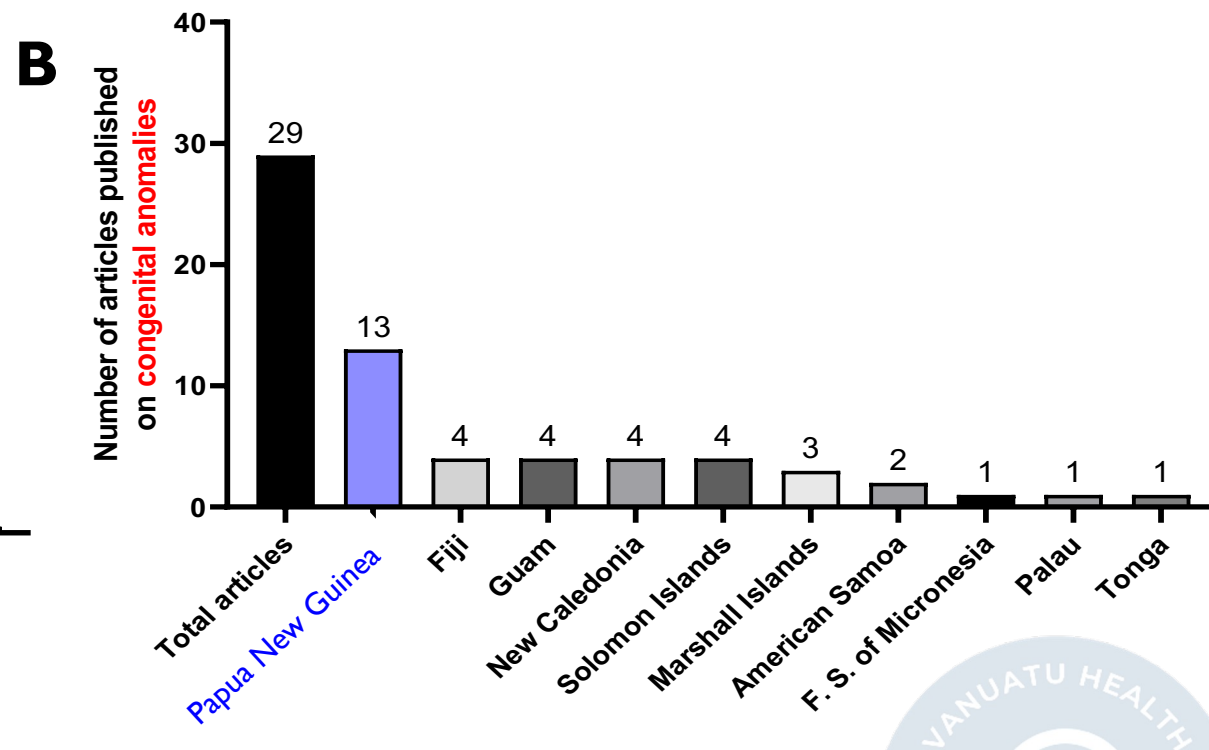
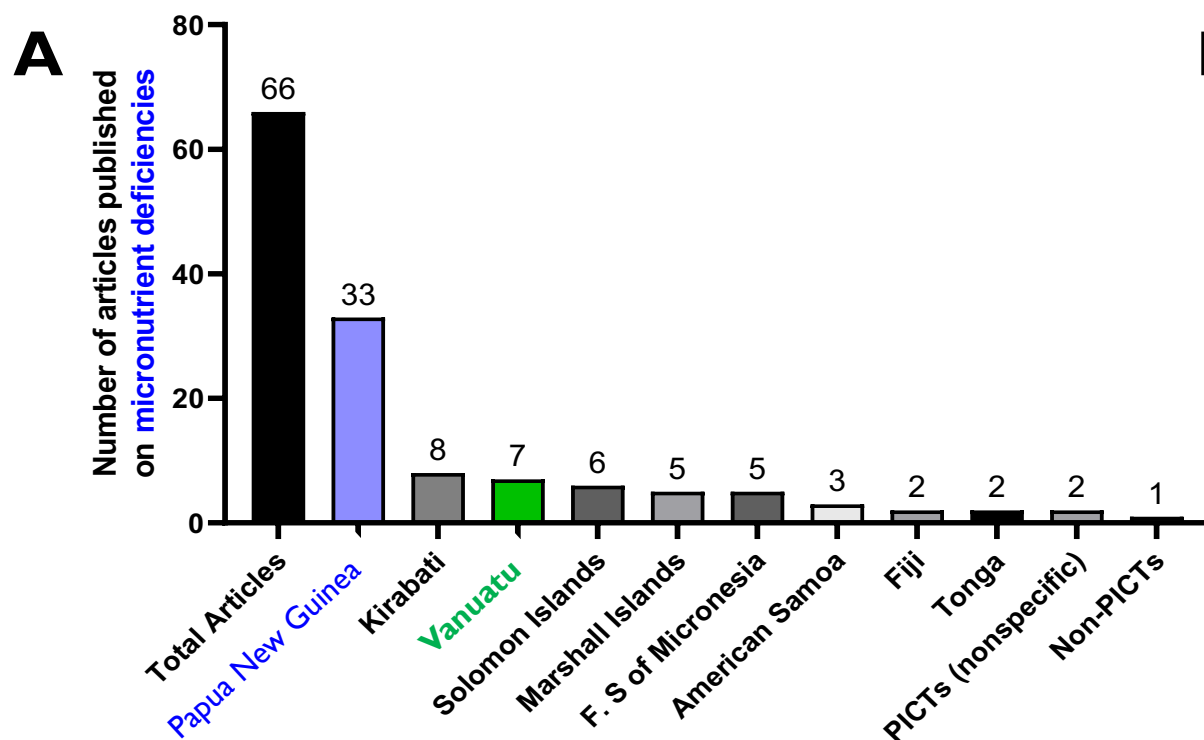


Thematic analysis



Results (I)

Vanuatu is underrepresented in micronutrient deficiency research

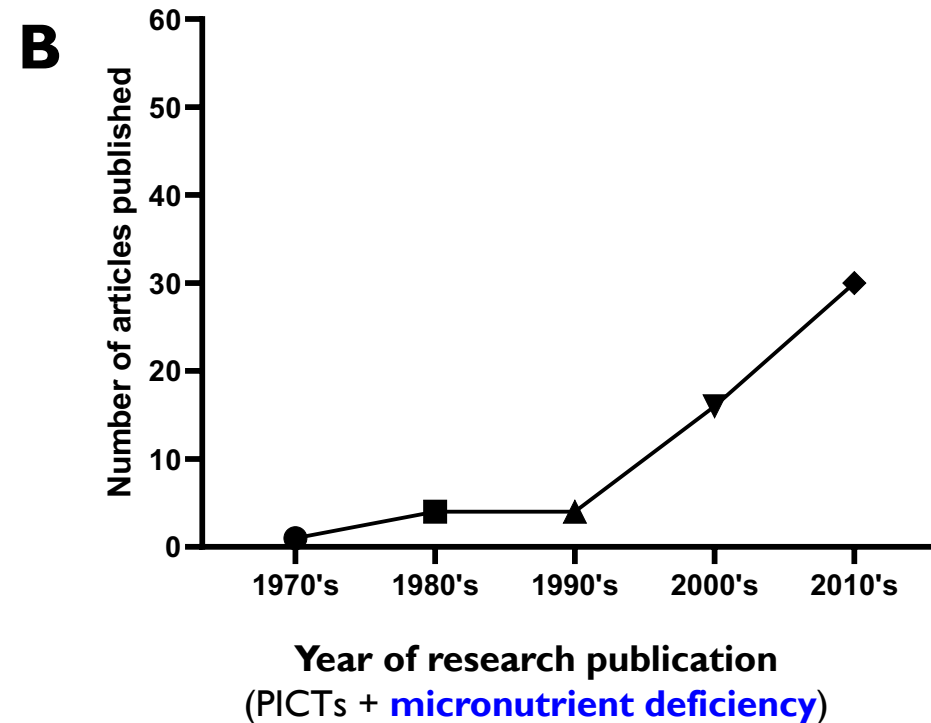
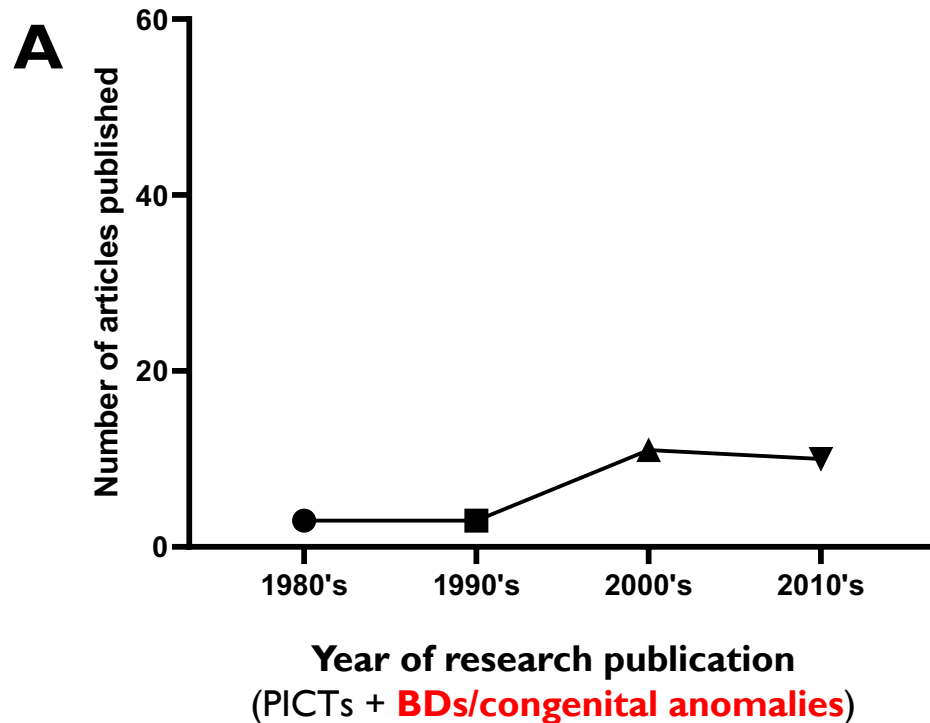


- Most research studies focused on Papua New Guinea (48 %)
- **Vanuatu was included in 7 % of research studies**
- There is currently no Vanuatu-focused published research on congenital anomalies / birth defects



Results (2)

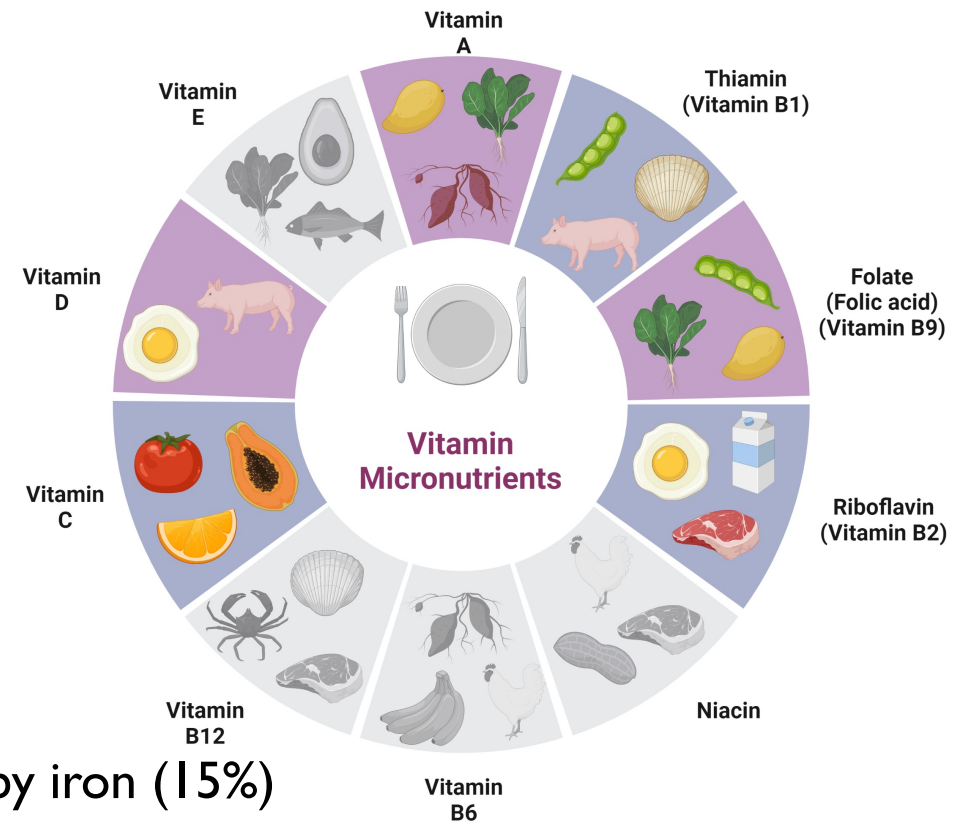
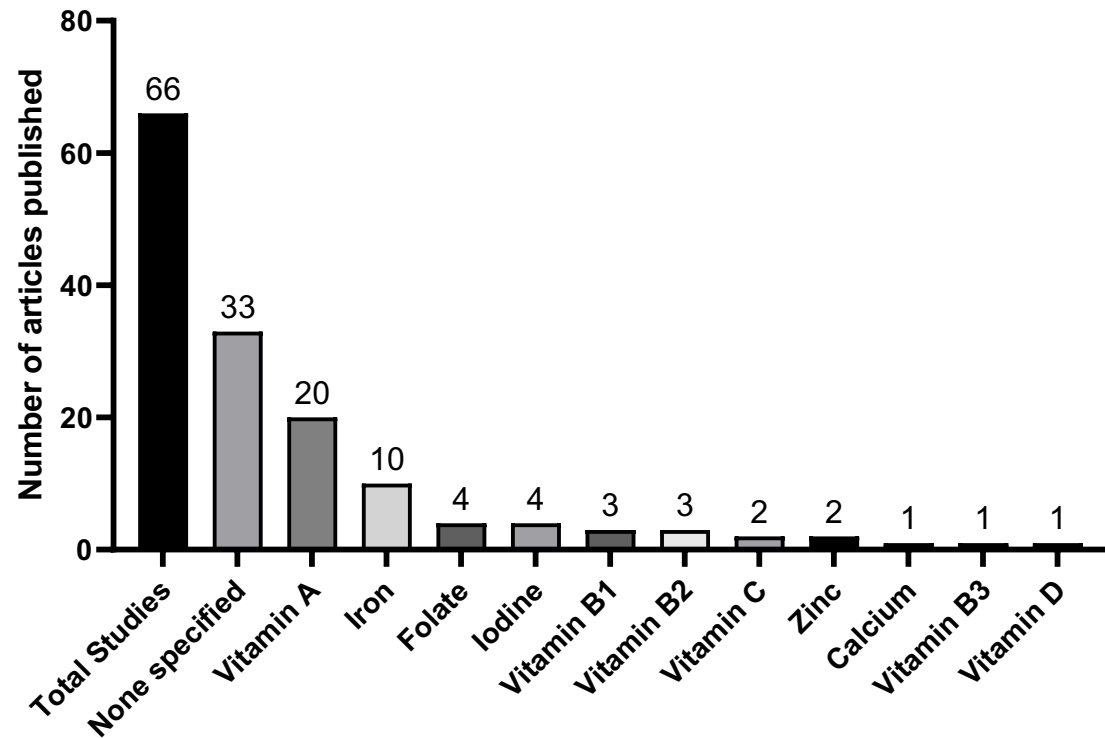
Research into birth defects has plateaued in the Western Pacific



- Research into birth defects in the Western Pacific has not increased in the last decade
- Fewer research studies focus on birth defects relative to micronutrient deficiencies

Results (3a)

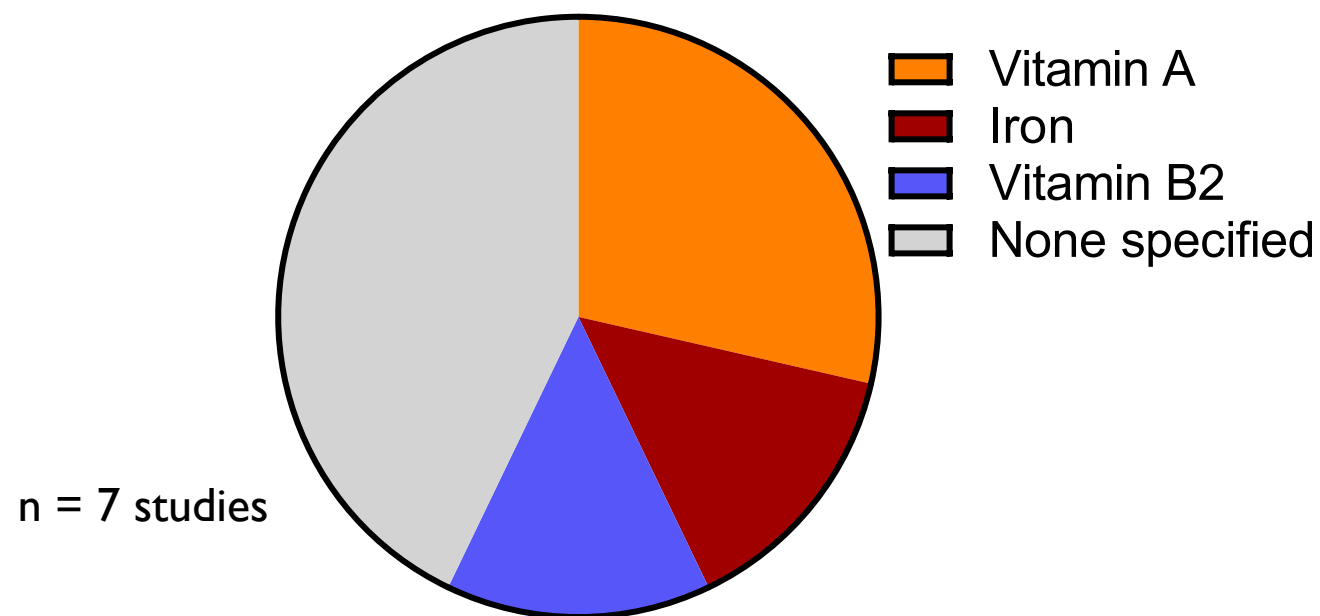
Micronutrients are not researched equally in the Western Pacific



- Vitamin A is the focus of most research (30%), followed by iron (15%)
- Currently, folate and iodine research accounts for only 6% of total micronutrient studies
- Several micronutrients have never been researched in the Western Pacific

Results (3b)

Only 3 (of 15) micronutrients have been investigated in Vanuatu



- Only 3 of the 15 micronutrients have been investigated in Vanuatu
- **No published research on iodine or folate intake**



Discussion and Conclusions



We need **more evidence to determine the **impact** of micronutrient deficiencies on birth outcomes in Vanuatu and in the wider Western Pacific.**



Implications, recommendations and future directions



Comprehensive dietary data can inform on micronutrient intake and be used to design strategies to improve birth outcomes in Vanuatu

“The MaMi Project” *(Ma)ternal (Mi)cronutrients*

Investigating maternal micronutrient availability and impacts in Vanuatu



Dr. Barnaby Dixson
UniSC



Dr. Rachael Thurecht
UniSC



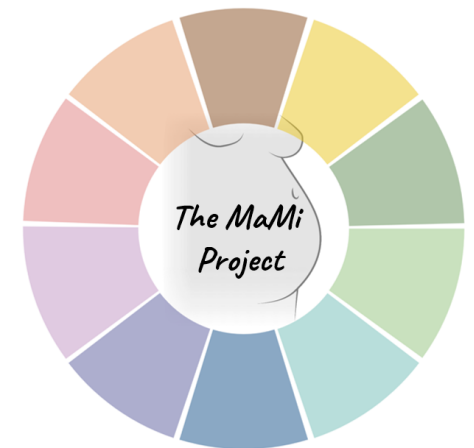
Ms. Eliza Kitchener
UniSC PhD student

GOVERNMENT
OF THE
REPUBLIC OF VANUATU
MINISTRY OF HEALTH



GOVERNEMENT
DE LA
REPUBLIQUE DE VANUATU
MINISTERE DE LA SANTE

Director Dr. Jenny Stephen
Ms. Nerida Hinge
Dr. Matt Cornish



Implications, recommendations and future directions



Comprehensive dietary data can inform on micronutrient intake and be used to design strategies to improve birth outcomes in Vanuatu

Over the next 12 months our *MaMi project* aims to use UniSC research funding to:

- 1) Develop a strong partnerships with local health professionals and work together to enhance local research capacity
- 2) Assist ni-Vanuatu researchers in accessing research funding and training opportunities
- 3) Conduct field work to determine dietary profiles and micronutrient intakes by ni-Vanuatu women across urban, semi-rural and remote areas
- 4) Record ni-Vanuatu experiences of birth defects and complications in urban, semi-rural and remote areas.

Acknowledgements



Caelan Kilham
Research student

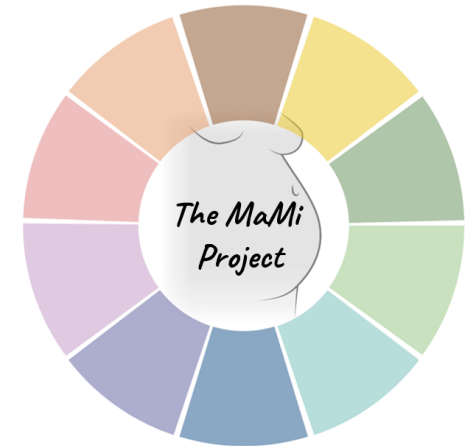


Mr. Rex Turi (RN)
Shefa Health Team



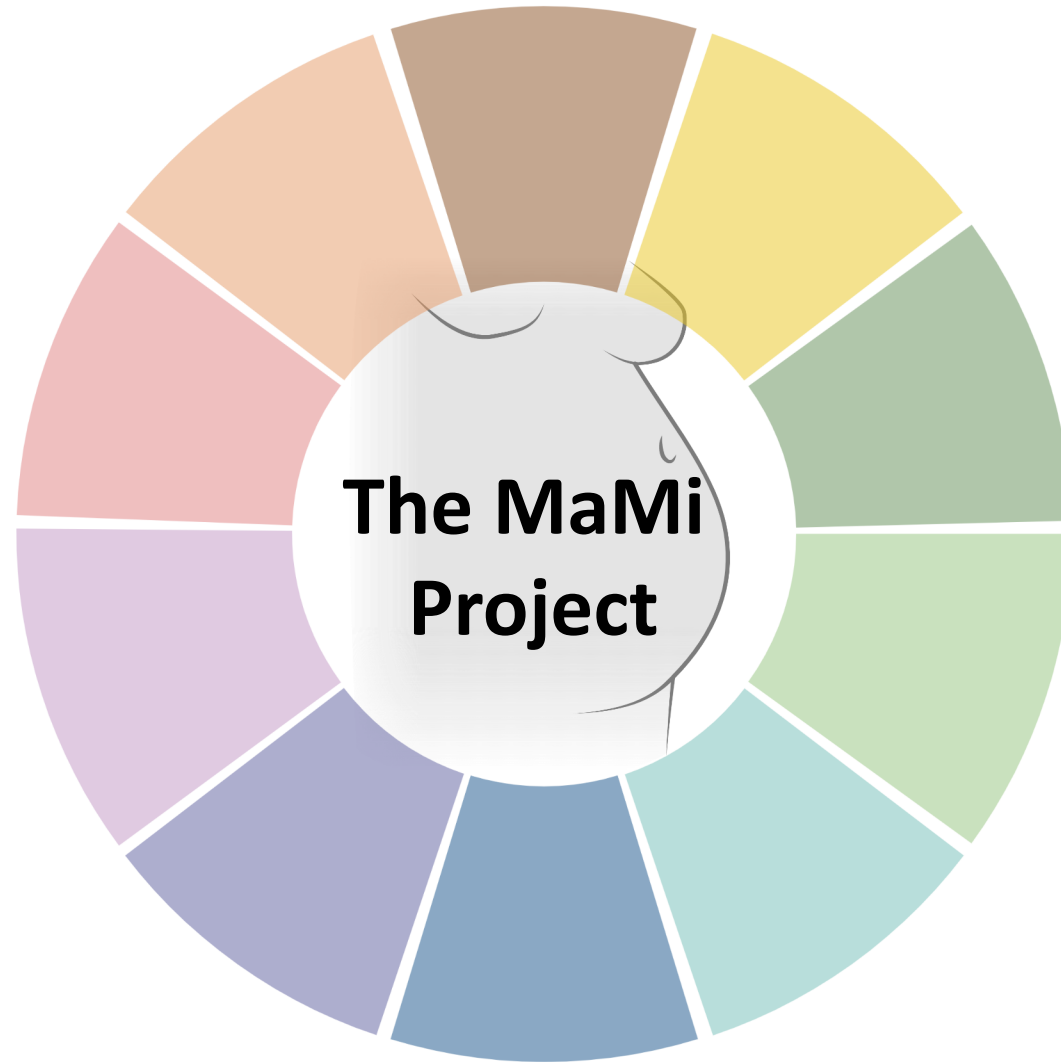
Mrs. Jo-Ann Kafer
*Ekiye Community
Liaison*

DVCR-I Research Grant



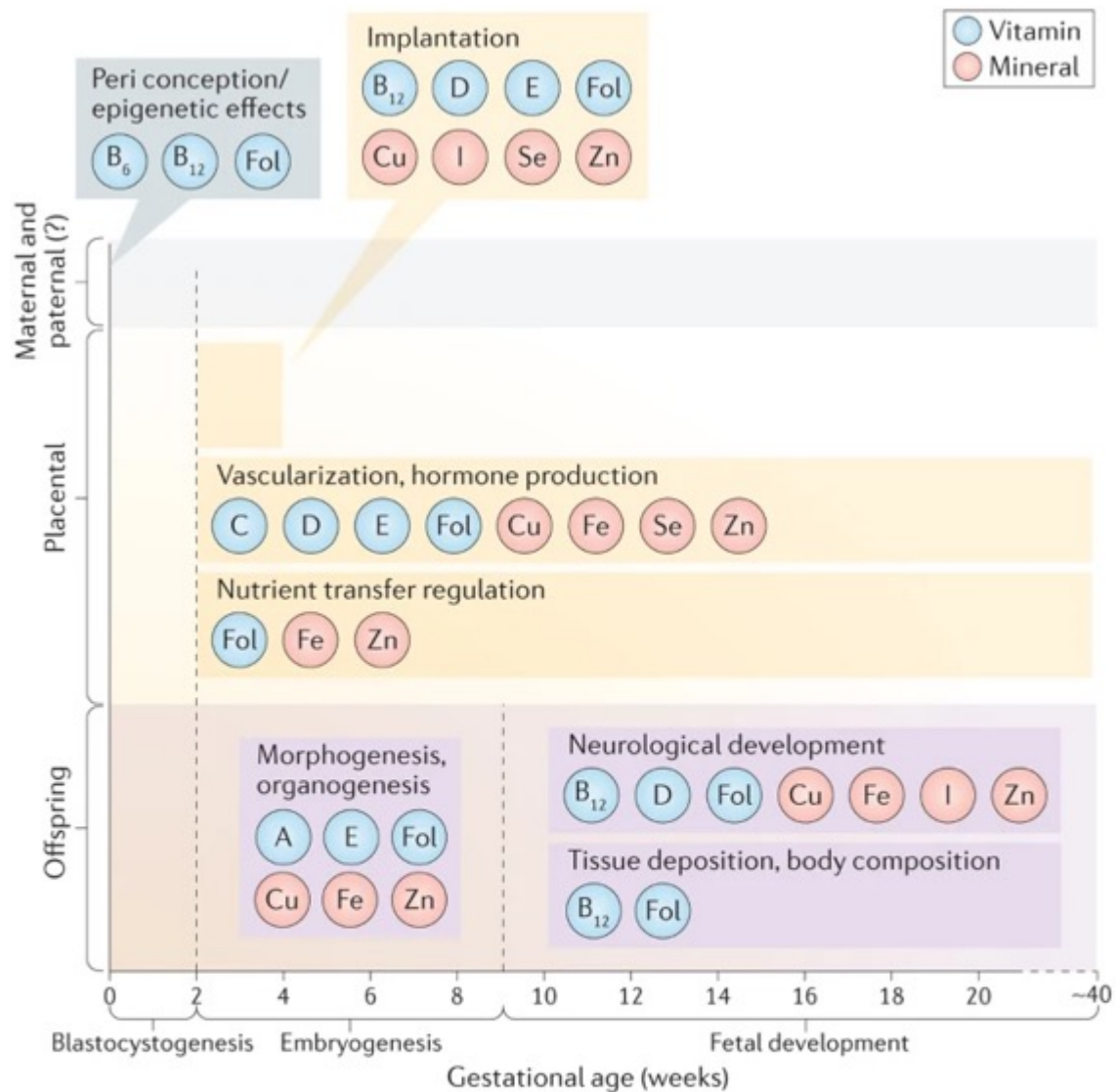
- Scoping reviews were funded by the University of the Sunshine Coast through SRP student work and research support to CI Kafer
- No conflicts of interest
- Tank yu tumas to the Vanuatu Health Research Symposium for the opportunity





Additional slides





Adverse health outcomes of gestational micronutrient deficiency

Short-term

- Miscarriage
- Stillbirth
- Birth defects
- Small size for gestational age
- Preterm birth

Long-term

- Death
- Altered growth, body composition
- Compromised cardiometabolic, pulmonary and immune function
- Poor neurodevelopment and cognition

Nature Reviews | Endocrinology

Gernard et al. Nature Reviews. 2016
<https://www.nature.com/articles/nrendo.2016.37>



Why focus on Vanuatu?



Vanuatu-WHO Country Cooperation Strategy 2018-2022

“2.6: Strengthen nutrition governance and coordination across sectors... prevent and control iron deficiency anaemia, iodine deficiencies and other micronutrient deficiencies among vulnerable populations...”

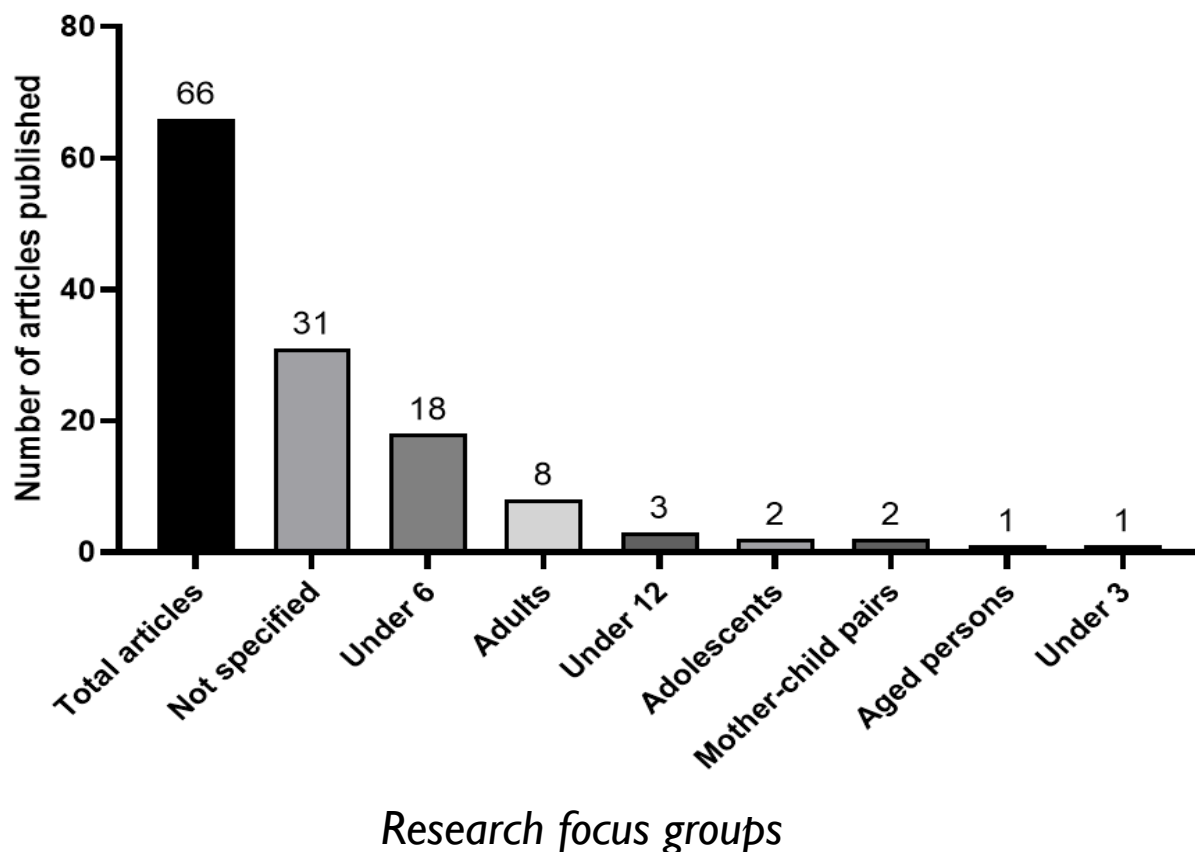
“3.1: Eliminate preventable deaths of mothers and newborns, and preventable deaths and illness of children...”

<https://www.who.int/vanuatu/our-work>



Results (4)

Peri-conception MD research is lacking in Vanuatu and all PICTs



There is currently no published research on periconception /maternal MDs in Vanuatu or any other PICT.

