Consequences of maternal malnutrition

Shane Norris
University of the Witwatersrand, Johannesburg, South Africa
A country’s wealth goes hand in hand with its Gross Domestic Product = market value of goods and services over a defined time.

Several types of capital available to a country = manufactured, natural, financial, social and human capital.

Human capital = people’s health, education, skills, motivation & inclusion.

Social capital = institutions and organisations that help develop human capital (families, communities, businesses, and the like).

World Bank concluded that 2/3 of the wealth difference between countries can be attributed to variations in human capital. It found that human capital accounts for 70% of wealth in high-income countries, whereas natural capital remains the biggest asset in low-income countries.

Human capital starts early in life.
MATERNAL UNDERNUTRITION

Consequences:
• Poorer physical growth
• Poorer health (including obesity)
• Less learning & schooling
• Lower prospects of work
• Poorer wages
• Increased social risks

Long-term studies (COHORTS):
• maternal undernutrition translates into an average loss of adult income of 26% in the her children

Children born into these conditions start with lead on their feet
Richter et al. Lancet 2017
Consequences:
• Black et al. (Lancet 2013) demonstrated a causal link between maternal iron deficiency and adverse outcomes
• Maternal anaemia is associated with poorer development & educational attainment in adulthood
• Less clear effects of deficiencies of zinc, copper, magnesium and selenium have been reported

Maternal micronutrient deficiencies during pregnancy?
MATERNAL MALNUTRITION

- Impaired fetal development
- Stunted undernourished mother
- Low birthweight
- Undernourished Infant and child
- Transition
- Excess adiposity
- Childhood, Adolescent, Adult
- Weight gain
- Macrosomia
- Hyperglyceamia
- Increased insulin resistance
- In pregnancy
- Altered fuels to the fetus
MATERNAL OBESITY

Consequences:
- Hyperglycaemia exposure
- Higher blood pressure and insulin resistance in childhood
  - Mediated by childhood BMI
- Cardiovascular disease & type-II diabetes
  - Helsinki birth cohort at 60+
MATERNAL OBESITY

Maternal hyperglycaemia:
The Hyperglycaemia and Adverse Pregnancy Outcome Study (HAPO) Follow-up
- 19.1% of children born to GDM mothers were obese compared to 9.9% of children born to non-GDM mothers
- Greater adiposity in girls
- Higher rates of abnormal glucose tolerance (4.7% vs 1.7%)

Hung Tam et al. Diabetes Care 2017
2018 edition of the South African Child Gauge

• More than 60% of children live in poverty.
• This means most children in South Africa live in households where the income is less than R1,138 per person per month ($88)
• 12% of children live in households where they go hungry
• Approx. 20% of children younger than 5 years old show stunted physical growth.
• Fewer than half of young people end up obtaining a school-leaving certificate
Complex maternal malnutrition burden
- Legacy of severe undernutrition and stunted adults
- Low-rate of underweight during pregnancy
- 67% of pregnant women are overweight or obese
- 30% of pregnant women are anaemic
- 10% gestational diabetes (screening study; no universal screening)
- Other micronutrient deficiencies?
  - Some evidence of vitamin D

Women exhibit multi-malnutrition markers
WHAT CAN BE DONE?

Governments must recognise that it cannot develop human potential on its own.

- Families must be provided with quality services that match their investment in their children.

Families must recognise that the state cannot develop their children’s potential on its own.

- Even the best schools and health services will not make or keep their children healthy, educated and well-adjusted without their families’ deep commitment and engagement.
CONCLUSION

**Maternal malnutrition** impacts multiple pathways of children’s development, health, and human capital.

“**Families and the state are equal partners** in ensuring that the most critical element of our wealth and our future - human capital – is nurtured and fostered from young, and throughout life. In this way, human wealth can be shared by us all and handed on ....... with interest”

Linda Richter
THANK YOU!