

Future Perspectives of Early Nutrition Programming to Tackle Obesity

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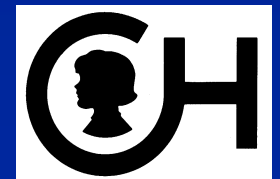
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The Diogenes project

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Outline

- **Potential points of interventions**
- **Evidence levels for interventions**
- **Other considerations for interventions**
- **A matrix approach to examine potentials, evidences and research gaps**
- **Research priorities and summary**

Potential points of intervention

- **Pre-pregnancy women weight status**
- **Pregnancy weight gain**
- **Gestational diabetes**
- **(Pregnancy smoking)**
- **Fetal growth**
- **Fetal and infant taste programming**
- **Breastfeeding**
- **Infancy weight gain**

Evidence levels for intervention

- **Observational studies:**
 - secular trends, cross-sectional, longitudinal, meta-analyses, genetically-informative designs
- **Mechanism studies / animal models:**
 - causality, physiology
- **Efficacy randomized trials:**
 - feasibility, causality, risk-benefit
- **Effectiveness / public health interventions:**
 - feasibility, risk-benefit, cost-effectiveness, guidelines development

Other considerations for intervention

- **International Obesity Task Force framework for translating evidence into action:**
 - Effectiveness analysis: efficacy + effect size + uptake
 - Economic analyses
 - Feasibility
 - Sustainability
 - Effects on equity
 - Potential side-effects
 - Acceptability to stakeholders

Other considerations for intervention

Table 3 'Promise table' for categorizing potential interventions

Certainty of effectiveness*	Potential population impact†		
	Low	Moderate	High
Quite high	Promising	Very promising	Most promising
Medium	Less promising	Promising	Very promising
Quite low	Least promising	Less promising	Promising

*The certainty of effectiveness is judged by the quality of the evidence, the strength of the programme logic, and the sensitivity and uncertainty parameters in the modelling of the population impact.

†Potential population impact takes into account efficacy (impact under ideal conditions), reach, and uptake and it can be measured in a number of ways such as effectiveness, cost-effectiveness, or cost-utility.

Swinburn B, Obesity Rev, 2005

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	Observation studies	Mechanism studies	Efficacy studies	Effectiveness studies	Promising
Pre-pregnancy women weight status					
Pregnancy weight gain					
Gestational diabetes					
Fetal growth					
Fetal and infant taste programming					
Breastfeeding					
Infancy weight gain					

Pre-pregnancy women weight status

- **Observational studies:**
 - Strong evidences, but causality? (Parsons TJ, Int J Obes 1999)
- **Mechanism studies:**
 - Evidences from animal models (Shankar K, Am J Physiol 2008)
- **Efficacy, effectiveness studies:**
 - Unknown
- **Promising:**
 - Yes: side effects
 - No: efficacy, effect size, uptake

	Observation studies	Mechanism studies	Efficacy studies	Effectiveness studies	Promising
Pre-pregnancy women weight status					++
Pregnancy weight gain					
Gestational diabetes					
Fetal growth					
Fetal and infant taste programming					
Breastfeeding					
Infancy weight gain					

Pregnancy weight gain

- **Observational studies:**
 - Some evidences, but causality? (Mamun AA, Circulation 2009)
- **Mechanism studies:**
 - Evidences from animal models (Heinsbroek AC, Int J Obes 2009)
- **Efficacy, effectiveness studies:**
 - Unknown: retrospective, prospective
- **Promising:**
 - Yes: uptake, feasibly, side effects, acceptability
 - No: efficacy, effect size

	Observation studies	Mechanism studies	Efficacy studies	Effectiveness studies	Promising
Pre-pregnancy women weight status					++
Pregnancy weight gain					++
Gestational diabetes					
Fetal growth					
Fetal and infant taste programming					
Breastfeeding					
Infancy weight gain					

Gestational diabetes

- **Observational studies:**
 - **Some evidences** (Dabelea D, Diabetes 2000)
- **Mechanism studies:**
 - **Evidences from animal models** (Boloker J, Diabetes 2002)
- **Efficacy, effectiveness studies:**
 - **Unknown: retrospective, prospective**
- **Promising:**
 - **Yes: economic, side effects, acceptability**
 - **No: effect size**

	Observation studies	Mechanism studies	Efficacy studies	Effectiveness studies	Promising
Pre-pregnancy women weight status					++
Pregnancy weight gain					++
Gestational diabetes					+++
Fetal growth					
Fetal and infant taste programming					
Breastfeeding					
Infancy weight gain					

Fetal growth

- **Observational studies:**
 - Strong evidences, but causality? (Parsons TJ, Int J Obes 1999)
- **Mechanism studies:**
 - Evidences from animal models (Boloker J, Diabetes 2002)
- **Efficacy, effectiveness studies:**
 - Unknown: retrospective, prospective
- **Promising:**
 - Yes: side effects
 - No: efficacy, effect size , feasibility

	Observation studies	Mechanism studies	Efficacy studies	Effectiveness studies	Promising
Pre-pregnancy women weight status					++
Pregnancy weight gain					++
Gestational diabetes					+++
Fetal growth					+
Fetal and infant taste programming					
Breastfeeding					
Infancy weight gain					

Fetal and infant taste programming

- **Observational studies:**
 - N.A.
- **Mechanism studies:**
 - Unknown
- **Efficacy studies:**
 - **Some evidence on preference** (Mennella JA, Pediatrics 2001)
 - Unknown impact on obesity

Fetal and infant taste programming

- **Effectiveness studies:**
 - Unknown
- **Promising:**
 - Yes: feasibility, sustainability, side effects, acceptability
 - No: efficacy, effect size

	Observation studies	Mechanism studies	Efficacy studies	Effectiveness studies	Promising
Pre-pregnancy women weight status					++
Pregnancy weight gain					++
Gestational diabetes					+++
Fetal growth					+
Fetal and infant taste programming					++
Breastfeeding					
Infancy weight gain					

Breastfeeding

- **Observational studies:**
 - **Conflicting, but positive meta-analyses** (Owen CG, Am J Clin Nutr 2005)
- **Mechanism studies:**
 - **Some evidences** (Taveras EM, Pediatrics 2006)

Breastfeeding

- **Efficacy, effectiveness studies:**
 - **No evidence in one study** (Kramer MS, Am J Clin Nutr 2007)
- **Promising:**
 - **Yes: feasibility, side effects, acceptability**
 - **No: efficacy, effect size**

	Observation studies	Mechanism studies	Efficacy studies	Effectiveness studies	Promising
Pre-pregnancy women weight status					++
Pregnancy weight gain					++
Gestational diabetes					+++
Fetal growth					+
Fetal and infant taste programming					++
Breastfeeding					++
Infancy weight gain					

Infancy weight gain

- **Observational studies:**
 - **Strong evidences, causality?** (Baird J, BMJ 2005)
- **Mechanism studies:**
 - **Some evidences** (Pagemann A, Brain Research, 1999)
- **Efficacy studies:**
 - **Emerging evidences** (Singhal A, Am J Clin Nutr, 2002)

Infancy weight gain

- **Effectiveness studies:**
 - Unknown
- **Promising:**
 - Yes: efficacy, effect size
 - No: feasibility, side effects, acceptability

	Observation studies	Mechanism studies	Efficacy studies	Effectiveness studies	Promising
Pre-pregnancy women weight status					++
Pregnancy weight gain					++
Gestational diabetes					+++
Fetal growth					+
Fetal and infant taste programming					++
Breastfeeding					++
Infancy weight gain					++

Research priorities and summary

- **Efficacy and effectiveness studies:**
 - Identify previous randomized interventions: pre-pregnancy weight status, pregnancy weight gain, gestational diabetes, fetal growth, breastfeeding, infancy weight gain
 - Design new prospective randomized interventions

Research priorities and summary

- **Promising targets:**
 - Gestational diabetes
 - Fetal and infancy taste programming
 - Breastfeeding
 - Infancy weight gain
- **Less studied approached:**
 - Physical activity programming
 - Nutrients during pregnancy
 - Infant feeding / parenting
 - Environment