Parents, Poverty and Child Potential: Family Effects of Interventions

Lia Fernald, Ph.D., MBA
Professor, School of Public Health, UC Berkeley
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Questions for today

• How do family factors shape early child development (ECD)?
  – What role does maternal depression play in ECD in the context of poverty?
  – What role do parental perceptions play for ECD?

• How do interventions focused on children affect maternal outcomes?
  – How to these results vary by intervention (e.g. cash transfer programs, WASH promotion, cognitive stimulation)
>250 million disadvantaged children, 0-5y
Optimal child development

- Improved cognitive, motor & social development
- Improved school performance & learning
- Improved work capacity & productivity

Nurturing care

Health
- Immunizations
- Water/sanitation
- Disease prevention

Nutrition
- Breastfeeding
- Micro-nutrient suppl.
- Dietary diversity
- Supplementary food

Caregiving
- Simulating environ.
- Parenting support
- Home visiting
- Books, toys, materials

Education
- Access to daycare
- Preschool education
- Primary school readiness

Figure 2. Average number of cognitive (■) and socioemotional (□) caregiving activities of mothers in developing countries in the past 3 days, arranged by high, medium, and low national Human Development Index.

Parental activities by region and income

1-3 activities with children in past 3 days for poorer income quintiles

0-1 activities with children in past 3 days for poorer income quintiles

Figure 2: Mother’s (A) and father’s (B) total activities in the past 3 days by sampled countries within region and within-country wealth quintile for 38 countries

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Enabling environment for caregiver & family
- Adequate nutrition during pregnancy, antenatal care, safe delivery, maternal mental health

Social, economic, political context
- Good governance, employment, security, housing, political commitment (e.g., parental leave/support for childcare, child protection, social safety nets (e.g., CCTs)

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Maternal knowledge & perceptions

• Maternal knowledge and perceptions of parenting are critical for child development (Hernandez-Martinez et al. 2011, Pauli-Pott et al. 2006, Olson et al., 1989)

• Given that a mother’s time is limited and often split between multiple responsibilities, how a mother perceives her child to be developing could influence her investment and interactions with her child

• However, there is little research on parental perceptions in low-income countries.
### ASQ-I Measurement

#### Problem Solving

<table>
<thead>
<tr>
<th>1 up to 3 month babies start here:</th>
<th>3 up to 6 month babies start here:</th>
<th>6 up to 9 month babies start here:</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Does your baby look at objects that are 8-10 inches away?</td>
<td>3. When you move a toy slowly from side to side in front of your baby’s face (about 10 inches away), does your baby follow the toy with her eyes, sometimes turning her head?</td>
<td>6. When you hold your baby in a sitting position, does she look at a toy (about the size of a cup or rattle) that you place on the table or floor in front of her?</td>
</tr>
<tr>
<td>2. When you move a small toy up and down slowly in front of your baby’s face (about 10 inches away), does your baby follow the toy with his eyes?</td>
<td>4. When you move around, does your baby follow you with his eyes?</td>
<td>5. When you put a toy in her hand, does your baby look at it?</td>
</tr>
</tbody>
</table>

Please mark either a: Y for Yes, S for Sometimes, and N for Not Yet

<table>
<thead>
<tr>
<th>1st</th>
<th>2nd</th>
<th>3rd</th>
<th>4th</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
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<td></td>
</tr>
</tbody>
</table>

**Starting point:**
- Defined by child age

**Stopping point:**
- Three consecutive "Not Yet"

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Chung, Fernald, Galasso et al. 2019
Maternally-perceived child development

Chung, Fernald, Galasso et al. 2019
Maternal estimation of ECD

- Underestimation: 275 (8.2%)
- Approximately correct: 1,655 (49.3%)
- Overestimation: 1,431 (42.6%)
• **n=3361** children from rural Malagasy households

• **Maternal estimation of ECD**: took the difference between maternally perceived and objective ECD (range: -5 to 6)
  – Underestimation: difference ≤ -2
  – Approximately correct: difference between –1 to 1
  – Overestimation: difference ≥ 2

• Multinomial logit models included child, maternal, and household factors, controlled for treatment arm and region, and corrected for clustering at the village level

Chung, Fernald, Galasso et al. 2019
<table>
<thead>
<tr>
<th></th>
<th>Mean ± SD or Frequency (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Child Characteristics</strong></td>
<td></td>
</tr>
<tr>
<td>Age (months)</td>
<td>29.38 ± 5.15</td>
</tr>
<tr>
<td>Height-for-age z-score</td>
<td>-2.34 ± 1.05</td>
</tr>
<tr>
<td>Weight-for-age z-score</td>
<td>-1.56 ± 0.93</td>
</tr>
<tr>
<td>Stunted</td>
<td>2,130 (63.37)</td>
</tr>
<tr>
<td>Wasted</td>
<td>137 (4.08)</td>
</tr>
<tr>
<td><strong>Maternal Characteristics</strong></td>
<td></td>
</tr>
<tr>
<td>Age (years)</td>
<td>28.57 ± 7.78</td>
</tr>
<tr>
<td>Education</td>
<td></td>
</tr>
<tr>
<td>Did not attend school</td>
<td>841 (25.02)</td>
</tr>
<tr>
<td>Primary or less</td>
<td>1779 (52.93)</td>
</tr>
<tr>
<td>Secondary or higher</td>
<td>741 (22.05)</td>
</tr>
<tr>
<td><strong>Household Characteristics</strong></td>
<td></td>
</tr>
<tr>
<td>Household size</td>
<td>6.52 ± 2.67</td>
</tr>
</tbody>
</table>

Chung, Fernald, Galasso et al. 2019
Findings

• Maternal perceptions of ECD were not consistent with an objective measure of ECD, with 8% of caregivers underestimating and almost 50% over-estimating their children’s development.

• More accuracy at estimating children’s developmental abilities was associated with children having better nutritional status (HAZ and WAZ), a greater belief of influence on child intelligence, and those with higher education and greater wealth were.

• Mothers who were more likely to under-estimate their children’s abilities were more likely to be depressed
Conclusions & Questions

• Maternal perceptions of child development in this Malagasy population do not align with a more objective measure.
  – Are mothers who over- or under-estimate their children’s development less willing to participate in parenting programs and/or less likely to change their behavior?

• Weight or height may be a proxy for healthy development and thus parents may be missing cues relating to cognitive or language development.
  – Are there cues that parents can use to help understand if their children are “on-track” for child development?

• How can programs in low-income settings incorporate maternal perceptions based on the context in order to optimize messages and behavior range?
  – What are ethics involved in giving parents feedback about child development?
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  – **What role does maternal depression play in ECD in the context of poverty?**

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Risks for children living in low-income countries

- Poor housing, dangerous neighborhoods
- Lack of sanitation, clean water
- Larger family size, household crowding
- Less nutritious foods, malnutrition
- Exposure to infectious diseases, toxic metals, malaria
- Lack of access to schools and health care centers
- **High levels of maternal depression**

Photo: Tricia Kariger
What is depression and how do we measure it?

Major depressive disorder (or “clinical depression”)

• At least 5 symptoms for 2 weeks (e.g. depressed mood, anhedonia, reduced energy, sleep disturbance, diminished ability to think or concentrate)

• Diagnosis based on examination of mental status using diagnostic guide (e.g. DSM: Diagnostic and Statistical Manual of Mental Disorders).

Depressive symptom scale (e.g. CES-D, Edinburgh Scale, Beck)

• Questions about categories as above

• Scored as continuous measure, or as percent of population above/below cut-off

Photo: Migrant Mother (Dorthea Lange), 1936
Measurement issues

• Differences in screening methods
• Lack of formal validation of methods in a particular country or language against a gold standard (to establish appropriate cutoff scores for detecting symptoms)
• Cultural influences (e.g. somatic symptoms)
Leading causes of disability, 1990 & 2017

Global all-age YLDs

1990 rank
1. Low back pain
2. Headache disorders**
3. Dietary iron deficiency
4. Depressive disorders
5. COPD
6. Age-related hearing loss
9. Diabetes

2017 rank
1. Low back pain
2. Headache disorders**
3. Depressive disorders
4. Diabetes
5. Age-related hearing loss
6. COPD
7. Dietary iron deficiency

Communicable, maternal, neonatal, and nutritional diseases
Non-communicable diseases

“Headache disorders mainly include migraine.
*Chronic obstructive pulmonary disease

While diabetes emerged as the fourth-leading cause of disability globally in 2017, many of the top leading causes of disability in 1990 remain so in 2017, namely low back pain, headaches, and depression. This reflects a lack of progress in addressing these conditions.

Global Burden of Disease study, 2017
*YLDs represent time lived in less-than-ideal health. Nutritional deficiencies primarily include iron deficiency anemia; mental disorders are mainly composed of anxiety and depression; musculoskeletal disorders consist largely of back pain and neck pain; and sense organ diseases mostly include hearing loss and vision loss.
Lifecycle of risk factors for mental disorders

**Age-specific risks**
- Preconceptional
  - Unwanted pregnancy
  - Inadequate child spacing
  - Adolescent pregnancy
  - Consanguinity

**Next generation**

**Adolescence**
- Family, peer, or school problems
- Developmental-behavioural problems
- Substance misuse
- Early sexual activity
- Risk-taking behaviour

**Life-long risks**
- Genetic background
- Problems in physical or mental health of child or family
- Deficiencies in psychosocial or educational environment
- Exposure to harmful substances or toxins
- Exposure to violence, abuse, or neglect

**Prenatal or perinatal**
- Inadequate prenatal care
- High-risk pregnancy
- Inadequate adaptation to pregnancy or newborn
- Perinatal maternal mortality

**Infancy or early childhood**
- Inadequacies in nurturing and stimulating qualities of caregiving environment
- Developmental-behavioural problems

**School age**
- Family, peer, or school problems
- Inadequacies of schools or teachers
- Developmental-behavioural problems
- Risk-taking behaviour

*Figure 1: The lifecycle approach to risk factors for mental disorders*
Depression in women

- Depression among women (on average, 2x prevalence of men) (Herba et al. 2016)
- United States
  - 8-16% major depressive disorder in representative samples of non-pregnant women 18-50 years old (Kessler et al., 2003 and Vesga-Lopez et al. 2008)
  - 29% among low-income women (Farr et al. 2010)
- Low- and middle-income countries
  - Pooled prevalence estimate: 25.3% (95% CI, 21.4-29.6) Antepartum depression, 51 studies, 20 LMICs, n= 48,904
  - Pooled prevalence estimate: 19% (95% CI 15.5-23.0) Postpartum depression, 53 studies, 23 LMICs, n= 38,142 participants. (Gelaye et al. 2016)
Why is risk for depression exacerbated in LMICs?

• Low maternal education, low socio-economic status, lack of social support, history of abuse and mental illness (Gelaye et al. 2016)
• War, disasters, food insecurity, shortage of health-care services, high prevalence of TB, malaria, HIV, STDs, etc. (Herba et al. 2016)
• Nutrient deficiencies (e.g. folate, vitamin B-12, calcium, iron, selenium, zinc, and n-3 fatty acids) (Leung & Kaplan, 2009)
• Intimate partner violence (IPV) prevalence is 10%-52%, & includes psychological abuse (9 country review, WHO, 2013)
• Culture-specific factors (e.g. sex bias – increase risk for moms of girls (Mithra, 2016)
Maternal depression & child outcomes

Figure: Model of mechanisms linking maternal depression and child mental health outcome: a focus on low-income and middle-income countries

Mechanisms underlying associations between maternal depression and child mental health outcomes are likely to be similar in high-income countries, and in low-income and middle-income countries. However, the context in which maternal depression occurs is likely to be different, with risk factors increased in low-income and middle-income countries. We expect such contextual risk factors might have both additive and interactive effects. Some risk factors could also be considered as both biological and psychosocial (eg, illness could have a biological and psychosocial effect on wellbeing). BDNF - brain-derived neurotrophic factor. *For example, iodine or iron deficiency. †Include HIV, tuberculosis, malaria. ‡Includes war, natural disasters, and political and interpersonal violence. §Includes food insecurity and unmet needs. ¶Includes views of mental illness, family structure, gender roles, and maternal education.

Consequences of maternal depression

- Increased risk of having a child perceived as having a difficult temperament, behavior problems, child depressive symptoms, low academic achievement (Systematic review: Wachs, Black & Engle, 2009)

- Lower cognitive function among children, poorer school performance, risk for mental disorders later in life (Systematic review: Herba et al. 2016)

- Increased risk of having a child who is underweight or stunted (based on 17 studies from 11 countries) (Meta-analysis: Surkan et al., 2011)
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Types of interventions that might affect maternal depression

- Cash transfer programs
- Flooring improvement
- Water and sanitation programs
- Home visiting to promote child development
- Group-based delivery of cognitive stimulation, and child health interventions
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- Cash transfer programs
- Flooring improvement
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- Home visiting to promote child development
- Group-based delivery of cognitive stimulation, and child health interventions
Conditional cash transfer programs

Fig. 32.1 Theoretical framework linking CCT programs with improved child development outcomes. Parental behaviors
Mexico’s CCT and maternal depression

Table 2. Treatment effect on depressive symptoms, unadjusted and adjusted for other covariates.

<table>
<thead>
<tr>
<th>CES-D Scores Continuous (range)</th>
<th>Control mean (SD)</th>
<th>Treatment mean (SD)</th>
<th>Adjusted(^a) Effect (β)(^b)</th>
<th>(95% CI)(^d)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Full depression scale (0–60)</td>
<td>18.7 (10.2)</td>
<td>16.9 (9.8)</td>
<td>−1.71</td>
<td>(−2.46 to −0.96)***</td>
</tr>
<tr>
<td>Depression subscales</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Depressed affect/mood (0–15)</td>
<td>4.7 (4.0)</td>
<td>4.1 (3.7)</td>
<td>−0.59</td>
<td>(−0.87 to −0.31)***</td>
</tr>
<tr>
<td>Lack of positive affect (0–12)</td>
<td>4.8 (2.9)</td>
<td>4.7 (3.0)</td>
<td>−0.10</td>
<td>(−0.32 to 0.12)</td>
</tr>
<tr>
<td>Somatic symptoms (0–15)</td>
<td>4.7 (3.2)</td>
<td>4.0 (3.0)</td>
<td>−0.59</td>
<td>(−0.84 to −0.34)***</td>
</tr>
<tr>
<td>Interpersonal relations (0–6)</td>
<td>1.4 (1.6)</td>
<td>1.3 (1.6)</td>
<td>−0.17</td>
<td>(−0.28 to −0.06)**</td>
</tr>
<tr>
<td><strong>Dichotomous with cut-off</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Depression score ≥ 26</td>
<td>347 (26.8)</td>
<td>987 (19.5)</td>
<td>0.74</td>
<td>(0.67 to 0.83)***</td>
</tr>
<tr>
<td>Depression score ≥ 16</td>
<td>740 (57.2)</td>
<td>2552 (50.5)</td>
<td>0.90</td>
<td>(0.84 to 0.95)***</td>
</tr>
</tbody>
</table>

\(^a\)Adjusted for the following covariates: maternal age, education and head of household status and household ethnicity, crowding, dependency ratio, wealth index, head of household occupation indices and state.

\(^b\)Adjusted average treatment effect sizes are OLS regression coefficients (β) for the continuous scores.

\(^c\)Adjusted relative risk estimates are Poisson regression coefficients for a dichotomous outcome based on a cut-off score.

\(^d\)Standard errors for the estimates were adjusted for clustering at the community level.

\(*P < 0.05; \ **P < 0.01; \ ***P < 0.001.\)
Mexico’s CCT, perceived stress & control

- Perceived stress was significant mediator of treatment effect on depressive symptoms (accounted for 34% of treatment effect)
- Perceived control was also a significant mediator (accounted for 12% of treatment effect)

Mexico: effect of CCT on child cortisol

- Program effect on cortisol significant only in children of depressed mothers
  - Non-depressed mothers can act as buffer to children, protecting from poverty; or
  - Children of depressed mothers are more sensitive to context
Dom Rep: Effect of living wage on depression

• Dominican Republic: Increase in wages in Alta Gracia factory of 338% percent, to achieve living wage

• Longitudinal results (1 year later) Compared with women who were in a matched factory, women in the Alta Gracia factory had:
  
  – 5 points (out of 60) lower on the scale for depressive symptoms (results significant while controlling for all baseline variables).
  
  – Increased expenditures on groceries, clothes, home repair, school fees

Fernald, Rehkopf, et al. 2018
Photo source: Alta Gracia website
“With a \textit{salario digno [living wage]}, I don’t lose sleep anymore, as a mother, wondering how I will make ends meet. I would say Alta Gracia is the salvation for a lot of mothers.”

“To live dignified means to have a bathroom inside; it means being able to eat three times a day; it means being able to get an education and being able to have your children get education. A not dignified life is not having a future.”

Fernald, Rehkopf, et al. 2018

Photo source: Alta Gracia website
Types of interventions that might affect maternal depression

- Cash transfer programs
- Flooring improvement
- Water and sanitation programs
- Home visiting to promote child development
- Group-based delivery of cognitive stimulation, and child health interventions
Mexico: effect of *piso firme* on mental health

- Large-scale Mexican program to replace dirt floors with cement ones
- Significant reductions in maternal depression (2 points on CES-D) and perceived stress (1.8 points on perceived stress scale)
- Significant effects on growth and child development scores (e.g. 4-5 more words spoken in toddlers)

Types of interventions that might affect maternal depression

- Cash transfer programs
- Flooring improvement
- **Water and sanitation programs**
- Home visiting to promote child development
- Group-based delivery of cognitive stimulation, and child health interventions
WASH-B, Bangladesh, participant enrollment

- Canvassed study area seeking women in their 1\textsuperscript{st} or 2\textsuperscript{nd} trimester of pregnancy.
- Mapped the location of pregnant women
- Identified cluster of 8 pregnant women
  - who could be reached by a single health promoter on foot
  - Separated from nearest cluster by a 1 kilometer buffer zone
- After 8 clusters identified
  - Cluster ID numbers assigned
  - Off site statistician randomly assigned each cluster to one of 6 interventions; with 2 clusters assigned to control

Tofail, Fernald et al. *Lancet Child & Adolescent Health* 2017
Interventions: Water quality

Children

Water quality 630

Interventions:
- Aquatabs (NaDCC) + Safe Storage

Tofail, Fernald et al. *Lancet Child & Adolescent Health* 2017
Interventions: Sanitation

Interventions: Handwashing

- Water quality: 630
- Sanitation: 630
- Hand washing: 630

Children

Tofail, Fernald et al. *Lancet Child & Adolescent Health* 2017

Interventions: Nutrition

**Nutritional Promotion**

- Exclusive breastfeeding through 6 months
- Continued breastfeeding through 24 months
- Diverse nutrient dense weaning foods

**Daily lipid based nutrient supplement**

- 6 – 24 months
- 10-gm sachet twice daily
  - 118 Kcal
  - 9.6 gm fat
  - 2.6 gm protein
  - ≥100% RDA of 12 vitamins
  - 9 minerals

Children

- Water quality: 630
- Sanitation: 630
- Hand washing: 630
- Water + Sanitation + Handwashing: 630
- Nutrition: 630

Tofail, Fernald et al. *Lancet Child & Adolescent Health* 2017
## Interventions: Summary

<table>
<thead>
<tr>
<th>Intervention</th>
<th>Children</th>
</tr>
</thead>
<tbody>
<tr>
<td>Water quality</td>
<td>630</td>
</tr>
<tr>
<td>Sanitation</td>
<td>630</td>
</tr>
<tr>
<td>Hand washing</td>
<td>630</td>
</tr>
<tr>
<td>Water + Sanitation + Handwashing</td>
<td>630</td>
</tr>
<tr>
<td>Nutrition</td>
<td>630</td>
</tr>
<tr>
<td>Water + Sanitation + Handwashing + Nutrition</td>
<td>630</td>
</tr>
<tr>
<td>Control</td>
<td>1260</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>5040</strong></td>
</tr>
</tbody>
</table>

Tofail, Fernald et al. *Lancet Child & Adolescent Health* 2017
MacArthur Bates Communicative Development Inventories
Bangladesh adapted short form

• Structured parental interview
• List of words
  – Does the child:
    • Understand?
    • Understand and say?
  – # of words summed
• Valid, reliable, normed, translated
• Adjusted difference for:
  – Child sex, child age, mother age, parents education, number of household members, number of household rooms, household roof, floor, wall materials, availability of electricity, type of fuel for cooking, household asset

<table>
<thead>
<tr>
<th>UNDERSTANDS</th>
<th>AND SAYS</th>
</tr>
</thead>
<tbody>
<tr>
<td>choo choo</td>
<td></td>
</tr>
<tr>
<td>meow</td>
<td></td>
</tr>
<tr>
<td>ouch</td>
<td></td>
</tr>
<tr>
<td>uh oh</td>
<td></td>
</tr>
<tr>
<td>bird</td>
<td></td>
</tr>
<tr>
<td>dog</td>
<td></td>
</tr>
<tr>
<td>duck</td>
<td></td>
</tr>
<tr>
<td>kitty</td>
<td></td>
</tr>
</tbody>
</table>
Communicative Development Inventory
Understanding after 2 years

- Control: 0.00
- Nutrition: 0.19 *
- Water: 0.20 *
- Sanitation: 0.18 *
- Handwashing: 0.22 *
- W+S+H: 0.18 *
- Nutrition + W+S+H: 0.26 *

* p < 0.05 difference from control

Tofail, Fernald et al. *Lancet Child & Adolescent Health* 2017
Communicative Development Inventory
Saying after 2 years

Control 0.00
Nutrition 0.18 *
Water 0.18 *
Sanitation 0.17 *
Handwashing 0.19 *
W+S+H 0.11 *
Nutrition + W+S+H 0.20 *

* p < 0.05 difference from control

Tofail, Fernald et al. Lancet Child & Adolescent Health 2017
Personal social skills after 2 years
(Extended Ages and States Questionnaire)

Control 0.00
Nutrition 0.22 *
Water 0.13 *
Sanitation 0.29 *
Handwashing 0.28 *
W+S+H 0.27 *
Nutrition + W+S+H 0.35 *

Standardized age adjusted mean differences from control

*p < 0.05 difference from control

Tofail, Fernald et al. Lancet Child & Adolescent Health 2017
# WASH-B effects on maternal depression

<table>
<thead>
<tr>
<th></th>
<th>Mean (SD)</th>
<th>Mean Difference vs. Control (CI)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Maternal depressive symptoms after 1 year</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Control</td>
<td>1172 0.00 (1.00)</td>
<td>Ref</td>
</tr>
<tr>
<td>Water</td>
<td>526 -0.19 (0.73)</td>
<td>-0.19 (-0.28, -0.09)</td>
</tr>
<tr>
<td>Sanitation</td>
<td>521 -0.20 (0.69)</td>
<td>-0.20 (-0.28, -0.13)</td>
</tr>
<tr>
<td>Handwashing</td>
<td>509 -0.22 (0.69)</td>
<td>-0.22 (-0.30, -0.13)</td>
</tr>
<tr>
<td>WSH</td>
<td>512 -0.17 (0.78)</td>
<td>-0.17 (-0.26, -0.08)</td>
</tr>
<tr>
<td>Nutrition</td>
<td>510 -0.31 (0.71)</td>
<td>-0.31 (-0.40, -0.22)</td>
</tr>
<tr>
<td>Nutrition+WSH</td>
<td>532 -0.27 (0.72)</td>
<td>-0.28 (-0.36, -0.19)</td>
</tr>
<tr>
<td><strong>Maternal depressive symptoms after 2 year</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Control</td>
<td>1106 0.00 (1.00)</td>
<td>Ref</td>
</tr>
<tr>
<td>Water</td>
<td>515 -0.22 (0.73)</td>
<td>-0.23 (-0.33, -0.13)</td>
</tr>
<tr>
<td>Sanitation</td>
<td>506 -0.23 (0.74)</td>
<td>-0.23 (-0.32, -0.15)</td>
</tr>
<tr>
<td>Handwashing</td>
<td>484 -0.18 (0.77)</td>
<td>-0.19 (-0.28, -0.10)</td>
</tr>
<tr>
<td>WSH</td>
<td>512 -0.19 (0.78)</td>
<td>-0.19 (-0.30, -0.09)</td>
</tr>
<tr>
<td>Nutrition</td>
<td>501 -0.24 (0.78)</td>
<td>-0.24 (-0.34, -0.14)</td>
</tr>
<tr>
<td>Nutrition+WSH</td>
<td>508 -0.27 (0.78)</td>
<td>-0.29 (-0.38, -0.19)</td>
</tr>
</tbody>
</table>

Tofail, Fernald et al. *Lancet Child & Adolescent Health* 2017
WASH-B findings and interpretation

- ECD effects were modest (0.2-0.35) and not biologically distinguishable across arms.
- Effects on maternal depression also ~0.2-0.3, with similar effects across arms.
- 4-6 home visits per month (much higher than number for standard HV programs).
- Less depressed mothers better able to care for children? Able to absorb messages from HV promotors? Is depression the key pathway by which WASH-B intervention affected outcomes?

Tofail, Fernald et al. *Lancet Child & Adolescent Health* 2017
Types of interventions that might affect maternal depression

• Cash transfer programs
• Flooring improvement
• Water and sanitation programs
• **Home visiting to promote child development**
• Group-based delivery of cognitive stimulation, and child health interventions
How would a HV program affect depression?

• Theoretical basis – HV programs have modest effects on cognitive development \( (d = 0.42; n = 22) \) and language development \( (d = 0.47; n = 9) \) (Aboud 2016)

• Target the parent and child, involves coaching, encouraging, and counseling caregivers to enhance parenting knowledge, beliefs, attitudes, and practices and foster positive parent-child interactions

• Hypothesized parenting mechanisms are rooted in idea that parenting knowledge -> improved home caregiving -> influence children’s development
Goals of systematic review

• Studies focusing primarily on enhancing children’s learning and play activities through promoting caregiver/child interaction
• Studies using RCTs
• Children <24 months
• Took place in LMIC
• Measured psychosocial or parenting-related outcomes after start of the intervention.
Benefits for home caregiving environment

FIGURE 2
Forest plot for effect of stimulation interventions on the home caregiving environment. Weights are from random effects analysis.

Jeong, Pitchik, Yousafzai, Pediatrics, 2018
Benefits for mother-child interaction

FIGURE 3
Forest plot for effect of stimulation interventions on mother-child interactions. Weights are from random effects analysis.

Jeong, Pitchik, Yousafzai, Pediatrics, 2018
Benefits for maternal knowledge

**FIGURE 4**
Forest plot for effect of stimulation interventions on maternal knowledge of ECD. Weights are from random effects analysis.

Jeong, Pitchik, Yousafzai, *Pediatrics*, 2018
No benefits for maternal depression

Note: most studies not powered to detect maternal depression

Jeong, Pitchik, Yousafzai, *Pediatrics*, 2018
Types of interventions that might affect maternal depression

- Cash transfer programs
- Flooring intervention
- Water and sanitation programs
- Home visiting to promote child development
- Group-based delivery of cognitive stimulation, and child health interventions
RINEW: Integrated Intervention, Bangladesh

Research on Integrated Nutrition, Early Child Stimulation and WASH

<table>
<thead>
<tr>
<th>Traditional Responsive Stimulation Curriculum</th>
<th>Maternal and Child Nutrition</th>
<th>Water Sanitation Hygiene</th>
<th>Lead and Arsenic Consumption Prevention</th>
<th>Maternal Mental Health</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Age-specific activities with toys and picture books</td>
<td>• Breastfeeding</td>
<td>• Handwashing with soap</td>
<td>• Encouraging well switching for arsenic contaminated wells</td>
<td>• Adapted Thinking Healthy Program</td>
</tr>
<tr>
<td>• Singing local rhymes</td>
<td>• Maternal and child dietary diversity</td>
<td>• Free of human and animal feces</td>
<td>• Teaching about sources of lead and how to avoid them</td>
<td></td>
</tr>
<tr>
<td>• Conversing during daily activities</td>
<td>• Complementary feeding</td>
<td>• Safe water and food storage</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Responsive feeding</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Pitchik, Tofail, .... & Fernald, under review
Benefits to child development of integrated, group-based intervention

Play activities in the home, by activity

- Name, Draw, Count
- Play
- Take Outside
- Songs
- Stories
- Books

Group
- Control
- Group
- Mixed

Proportion participating in activity

Pitchik, Tofail, .... & Fernald, under review
## Benefits to mental health of integrated, group-based intervention

<table>
<thead>
<tr>
<th>CESD score</th>
<th>mean (SD)</th>
<th>Mean adjusted difference vs. control</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Control</strong></td>
<td>n=282</td>
<td>15.0 (9.0)</td>
</tr>
<tr>
<td><strong>Any Intervention</strong></td>
<td>n=294</td>
<td>13.59 (8.13)</td>
</tr>
<tr>
<td><strong>Group</strong></td>
<td>n=144</td>
<td>13.1 (7.0)</td>
</tr>
<tr>
<td><strong>Combined</strong></td>
<td>n=150</td>
<td>13.99 (9.1)</td>
</tr>
</tbody>
</table>
Conclusions

• 1 in 4 women in LMICs is depressed, either while pregnant or after pregnancy.
• Depression has serious consequences for the mother herself, and also for her children.
• Maternal perceptions of her children are a potential barrier for targeting interventions.
• Programs targeting children can benefit mothers too, and possibly reduce depressive symptoms, e.g. cash transfer programs, WASH, floors.
• Home visiting programs do not appear to have substantial benefits for mothers, but group-based programs have potential.
Next Steps and Future Questions

• Role of father and other adults (grandparents) in providing cognitive stimulation – how best to engage family members?
• Role of siblings – can/should older siblings play a role in cognitive stimulation for younger children?
• Time use – how can we avoid over-burdening women who are already busy – how to find the time for ECD? Can we avoid exacerbation of gender roles, and “feminization of responsibility and obligation.”
• Partnering with center-based care to provide break for parents, and also supplies, education & support?
• How best to develop holistic interventions for families?
• How best can women get the support they need for optimal mental health?
Thank you!
Questions?

Contact information:
fernald@berkeley.edu