Interventions in Early Life to Promote Child Development

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WHO Commission on Social Determinants of Health, 2008

- Social Disparities begin early in life
- Social and economic policies impact children’s human capital
  - Life span > 80 years Japan and < 40 years Angola and Zambia
  - Intergenerational transmission of poverty

Life expectancy varies from 75+ to <50

WHO Commission on Social Determinants of Health, 2008

- Social Disparities begin early in life
- Social and economic policies impact children’s ability to grow and develop
  - Life span = 80 years Japan and < 50 years most of Africa
  - Intergenerational transmission of poverty
- Reducing social disparities early in life can disrupt the intergenerational transmission of poverty

Strategies To Close The Gap Multi-level

- Promote early child development (ECD)
- Ensure that communities promote healthy child development
- Interagency policy coherence for early child development
- Country-level child and family-friendly policies

Global Focus on ECD

- Convention on Rights of the Child (CRC)
- Millennium Development Goals
  - End Poverty and Hunger
  - Universal Education
  - Gender Equality
  - Child Health
  - Maternal Health
  - Combat HIV/AIDS
  - Environmental Sustainability
  - Global Partnership
What is the science of social disparities?

Poverty and Brain Development
- Brain development influenced by genes and environment – epigenetics

Impact of Institutionalization on Brain Development
- Event related potential (electrodes)
  - Non-invasive measure of transient changes in brain’s electrical activity in response to stimuli

Attention and Memory
- Event related potential (electrodes)
  - Latency – timing of activation
  - Amplitude – population of neurons
  - Evaluate attention & memory in infants

Developmental Perspective
- Human Brain Development
  - Vulnerable period
    - birth – age 3

Burden et al., 2007, Pediatrics
Thompson & Nelson, 2000
Poverty and Brain Development

- Brain development influenced by genes and environment – epigenetics
- By early in life, low-income children have lower scores in language and attention than middle-income children (Hart & Risley, 1995).
  - Pre-frontal cortex
  - Executive functioning
- Disparities widen over time.

Vocabulary scores by SES quartiles in 36-72 month old children Ecuador

Mean effect sizes in SD between low and middle SES 10-13 year old PA children

Mean Developmental Quotients on Griffiths Test - Kingston, Jamaica

Adjacent neighborhoods in Kingston, Jamaica

Poverty and Brain Development

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  - Pre-frontal cortex
  - Executive functioning
- Disparities widen over time.
- Adult cognition/economic capacity better predicted by poverty during first 5 years of life than poverty during childhood & adolescence (Duncan et al, 2010)
Possible reasons for early associations between poverty and brain development

- **Biological/medical**
  - Nutrition
  - Infections
- **Toxins**
  - Lead
- **Parenting/Home/Community**
  - Limited cognitive/language stimulation
  - Non-responsive parenting styles
- **Chronic stress**
  - Maternal depression/anxiety
  - Violence

Accumulation of risks associated with developmental delays

[Graph showing developmental delays with a bar chart indicating significant adversity impairing development in the first three years.]
Accumulation of risks associated with adverse health consequences

Maternal Hardship Linked to Poor Health & Development Among Children < Age 3
- Food Insecurity
- Housing Insecurity
- Energy Insecurity

Theories to Enhance Child Development
- Ecological theory
  - Children influenced by proximal and distal
  - Direct and indirect
  - Children active participants

Millions of Cases of Diabetes in 2000 and Projections for 2030

Child and Caregiver Outcomes by Food Security Status, n = 30,098

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- Transactional theory
  - Reciprocal interactions
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Risks and protective factors

Early experiences interact with biological systems to influence trajectories of health and development

Influences on Child Development

Social Norms  Physical/social setting

Caregiver

Expectations
Feeding Hx
Mental Health

Child

Temperament
Clarity of cues

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Developmental Trajectories

Prenatal  0  3  5  School Age  Adolescence  Adult

Adult
Human Capital

Developmental Risks
To estimate the number of children in LAMI countries not reaching their developmental potential and review interventions:

- Poverty
- Stunting

Limitations

- Other risk factors not included (micronutrients)
- Cut off for poverty uncertain
- Estimate for numbers of children based on poverty rates for total population
  - Underestimate

Loss of yearly adult income

1. Deficit in grades attained (Brazil)
2. Deficit in learning per grade (Philippines, Jamaica)
3. Estimate total deficit (1+2)
4. Using estimate of 9% loss in income per grade (53 countries Psacharopoulos 2004, Duflo 2001)
  - 20% loss of yearly adult income
Intergenerational transmission of poverty

Child
- poor early development
- poor school achievement
- behavioral problems

Parent
- low educational attainment
- low skilled job / no work
- high fertility
- depressed/stressed

Interventions to Promote Child Development
- Child
  - Home (0-3)
  - Preschool (4-5)
- Mother
  - Caregiving
  - Reduce depression
- Community
- Policies

Child Development
- Stable, caring relationships form the basis for secure and healthy development

- Children need:
  - Protection, Predictability, Responsivity
  - Opportunities to develop increasing skills and independence
- Reciprocal: Children viewed as active partners in their own development
- Long-term development more important than short-term compliance

What is Parental Responsivity?
- Sensitive to infant cues, based on internal regulatory cues
- Prompt, developmentally appropriate response to infant cues

Parental Responsivity – can be applied to feeding
- Sensitive to child's cues
- Response to child's cues:
  - Prompt
  - Appropriate
    - Development/age
    - Culture
    - Situation

Parental Responsivity is not:
- Giving children whatever they want.
- Letting children be in charge of what they want, whenever they want it.
Responsive Parenting – applied to feeding

How does responsive feeding work?

Cultural Environment

- Caregiver offers a bite of food
- Caregiver waits, smiles, finger food
- Child opens mouth and accepts
- Child looks away, mouth shut
- Child picks up food and eats

Time

Responsive Parenting – applied to feeding

How does responsive feeding work?

Cultural Environment

- Caregiver offers a bite of food
- Caregiver offers another bite
- Caregiver holds child’s mouth & forces
- Child opens mouth and accepts
- Child looks away, mouth shut
- Child cries and spits out food

Time

Forceful Feeding

Responsive Feeding

Parent-Child Responsivity is Universal

- Cross-cultural study of responsivity:
  3-mo-olds, US, Germany, India, Cameroon, China
- 66% of infants’ vocalizations (non-distress) received a response within 1 second
- 50% of infants’ non-vocal signals (gestures) received a response within 1 second

Parent Responsivity & Child Development

- Language: 5-month-olds continue to vocalize when 30-50% of their non-distress vocalizations are followed by parent response
  - Otherwise escalate or shut-down
  
  Goldstein et al., 2009

- Security: Toddlers show stronger security when parents are responsive
  
  Van den Boom, 1994

- Play: Responsive play interaction in infancy associated with cognitively advanced play in toddlerhood

Tamis-Le Monda et al., 1996
3-6 Months Care For Development

- What you can do
  - Have large colorful objects for your child to see and to reach for
  - Talk to and respond to your child. Get a conversation going with sounds or gestures.

- What children can do
  - Around 6 months, most children can hold head steady when held upright.
  - Turn to a voice.
  - Reach out for objects.

Age up to 6 months: Talk to your child and get a conversation going with sounds or gestures.

Care for Development

- Turkey
  - Physicians trained to give Care for Development messages to parents of children < 2 y during visits for minor illnesses
  - Increase visit by ~ 7 min
  - Encourage parent to talk and listen to child
  - After 1 mo
    - Intervention parents more likely to recall messages (95% vs. 13%)
    - Intervention parents had more toys (42% vs 10%), reported reading to child (20% vs 3%)

- China
  - RCT among children < age 2
  - Intervention: Two counseling sessions
  - Evaluation
    - Mothers: improved knowledge and skills re early child development
    - Children: improved fine motor, speech, communication
  - Non-blinded

Ertem, 2006

Care for Development

- Pakistan Early Child Development Program (PEDS)
  - Responsive care and responsive feeding
  - Positive support for mothers and caregivers
  - Training parents in skills to improve children’s development through psycho-social stimulation
  - Implemented through lady health workers
    - Play and communication activity guide

Aisha Yousafzai, AKU

Promote Attachment

- South Africa
  - Pregnant mothers thru child age 12 mos
  - Promote parent responsivity
  - Promote attachment
    - Reduce depression at 6 months (not sustained)

Cooper et al., 2009
Sustained Benefits at 17-18 years from early childhood intervention in stunted children

(Parker et al 2005)

Preschool Programs

Bangladesh

- Compared children in villages with and without preschool (adj for age, nutr status, maternal ed, assets)
- Preschool children > non-preschool children
  - Vocabulary
  - Verbal and non-verbal reasoning
  - School readiness
- Preschools enhance academic skills

About, 2006

Preschool Programs

Jamaica

- Teacher training “The Incredible Years” (Webster-Stratton)
  - Monthly workshops, in-class consultation, child lessons
  - 2 days training
- Effects
  - Teachers: Promote children’s social and emotional skills
  - Children: Interest, enthusiasm, appropriate behavior
- Emphasizes effectiveness of teacher training in strategies to promote children’s socio-emotional development

Baker-Henningham, 2009

Preschool Programs

Argentina

- Roll out of pre-primary schooling (age 3-5)
- Evaluated effects of pre-primary attendance on classroom attendance, effort, discipline in third grade.
  - One year of pre-primary increased third grade performance by 8% mean performance in math and Spanish
  - Improved behavior (attention, effort)
- Suggests high quality preschools are beneficial – suggests no negative effects of separating children from mothers (did not really test)

Berlinski, 2009

Preschool Programs

Uruguay

- Rapid increase of pre-primary schooling (age 3-5)
- Evaluated effects of pre-primary attendance on schooling at age 15.
  - Children who attended pre-primary 0.8 years more of total education.
  - 27% points more likely to be in school
- Suggests long term benefits of pre-primary on grade retention and academics.

Berlinski, 2008

Scaling Up

Wolfensohn Center for Development (Brookings)

- Cuba
- South Africa
- Madagascar
- Chile
- India
- The Philippines
Scale Up – Grade “R” – Pre-first
South Africa

- Intention: Universal & Compulsory
- Challenges
  - Facilities: safety
  - Quality
  - Crowding
  - Transportation
- No evaluation of impact
- Enough to eliminate gap??


Preschool Programs

- Cuba – Educa a tu hijo – Educate your child
  - Challenges to children’s health and development associated with the embargo
  - Home visits – empower family to promote early development
  - Provide evidence of improved development
  - Popular throughout South America


UNESCO: Education For All, Global Monitoring Report 2010

- 72 million out-of-school children – 20 countries
- Number of countries mandating pre-schools increasing
  - Limited attention to quality

Programs to Reduce Maternal Depression

- Jamaica
- Pakistan
- Beneficial effects of programs conducted by community health workers

- No studies have reported evidence showing benefits to children

Rahman, 2008

Benefit of investment in early child nutrition and development

Rate of return = 1

Optimal Investment Levels

Source: Heckman & Carneiro Human Social Policy, 2003, Voices for America and the Child and Family Policy Center. Early Learning Call to Action: An Examination of Public Investment in Education and Development by Child Age, 2004
Characteristics of Successful Programs

- Comprehensive – all levels of intervention
- Disadvantaged children
- Younger children
- Sufficient intensity and duration
- Quality
  - Staff training and supervision
  - Children have opportunities for initiative and exploration in their learning environment
  - Partnership with families
  - Blend traditional child rearing with evidence-based approaches

Conclusions

- Effective interventions are available
- Early child interventions are more cost effective than interventions later in life
- Response to Early Child Development has been too slow

To achieve the MDGs, we need more attention to comprehensive early child development programs

One more thing –

Take care of me, I am your future!

Thank You!!