Cognitive-Affective Growth in Adolescence: second chances and new beginnings

DCP3: Volume 3 part II
Palm Springs Feb 2014

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New Understandings

1. Adolescence in the life course
   – Shifts in adolescent development
   – Biology of puberty and brain development
   – Shift in the social environment

2. Adolescence and health
   – Visibility & data
   – Shifting health priorities

3. Opportunities for interventions
   – Protective systems
   – Health interventions

4. Some economic considerations
The ‘Evo-devo’ of adolescence:

High income countries

Adapted from Gluckman
Menarche trends in some high income countries
The ‘Evo-devo’ of adolescence:

Low & middle income countries

- Age at menarche
- Age at parenthood

Adapted from Gluckman
Nine in ten adolescents live in LMIC

* Source: Population Division of the Department of Economic and Social Affairs of the United Nations Secretariat, World Population Prospects
Growth in size of the body systems

% size attained of total postnatal growth

- Lymphoid
- Brain, liver, kidney, heart, lung, etc
- Musculoskeletal and gastrointestinal
- Reproductive organs

Age (years)

Andrew Prentice 2013
Biology of puberty

- Juvenility
  - Stress responses
- Sexual maturation
- Growth spurt
- Social affiliation
The graphs illustrate the changes in various health parameters over time in response to different treatments. The parameters include:

- Change in HDL Cholesterol (mg/dL)
- Change in Triglycerides (mg/dL)
- Change in Glucose:Insulin ratio
- Change in % Body Fat
- Change in Lean Body Mass (kg)
- Change in Waist Circumference (cm)
- Change in Height (cm)

The graphs compare the changes in the above parameters for individuals treated with Metformin and those in the Untreated group over 60 months. Significant differences are indicated by asterisks (* for p < 0.05, ** for p < 0.01). The shaded area represents the treatment period.
Biology of puberty

- Juvenility
- Gonadal phase

- Age:
  - 7
  - 8
  - 9
  - 10
  - 11
  - 12
  - 13
  - 14
  - 15
  - 16

- Stress responses
- Sexual maturation
- Growth spurt
- Social affiliation
An adolescent window of vulnerability

- Emotion and memory
- Self-harm
- Substance abuse
- Depression
- Impulse control

Age
More than sexual and reproductive health

How do 2.6 million young people die each year?

Male deaths aged 10-24
- Injuries: 27%
- NCDs: 21%
- Infectious: 52%

Female deaths aged 10-24
- Injuries: 15%
- NCDs: 33%
- Infectious: 22%
- Maternal: 30%

Injuries
NCDs
Infectious
Maternal

Patton et al, Lancet 2009
Traffic Injury Deaths (100,000/year) in males 20-24 years: selected countries (high income yellow)
Tobacco use (%) in males 13-15: selected countries
Underweight in girls aged 13-15 years
A quadruple burden: where to invest?

- **Diseases of poverty**
  - HIV
  - Maternal mortality/morbidity
- **Injury epidemics**
- **Rising NCD risks**
- **Intergenerational risk**
New platforms
Guaranteeing investments in early childhood

Introduction of EEC data

Deaths/100,000

Age at death
- 1-4yr
- 5-9yr
- 10-14yr
- 15-19yr
- 20-24yr

Viner et al  Lancet 2009
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- **Neural**: Heart, Upper limbs, Lower limbs, Ear, Eye
- **External genitalia**: Palate, Teeth, External genitalia
- **Loss**: Major abnormalities, Functional and Minor abnormalities

First antenatal visit
one in five adolescents are estimated to have diagnosable mental health
Traffic injury deaths in the Europe in males 20-24 years old
Traffic Injury Deaths (100,000/year) in males
20-24 years: selected countries (high income yellow)