

Adolescent Health & Nutrition Interventions: A Snapshot!

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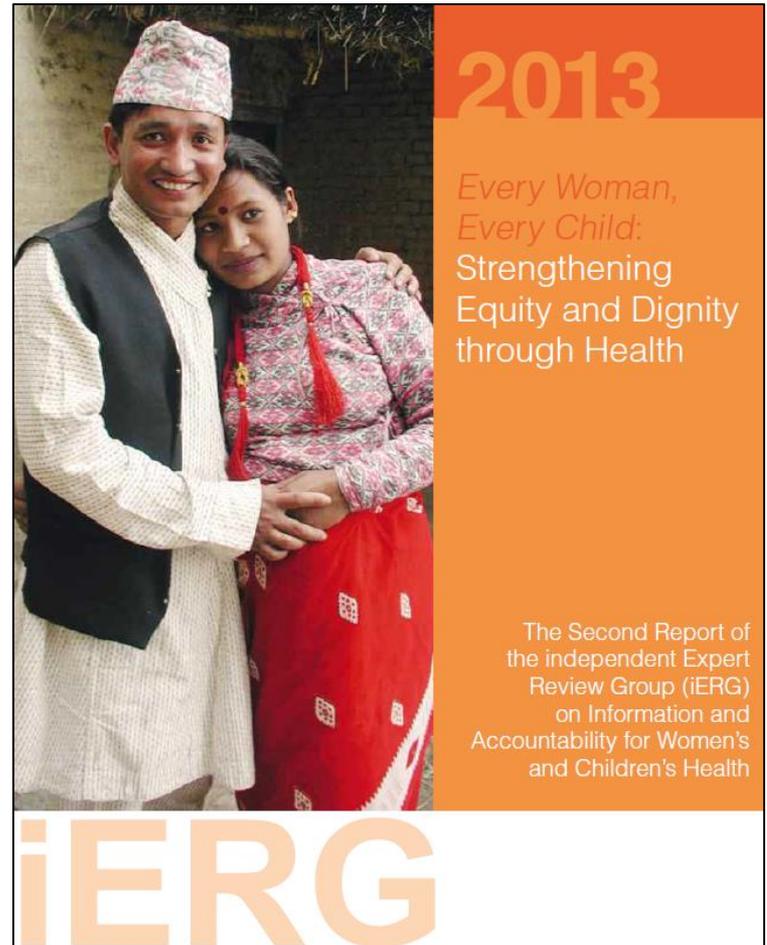
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THE AGA KHAN UNIVERSITY

Global invisibility of adolescents

“There are no adolescent-specific outcomes in *Every woman, Every child* and there is little focus on adolescent health in discussions about accountability, either globally or in countries.”



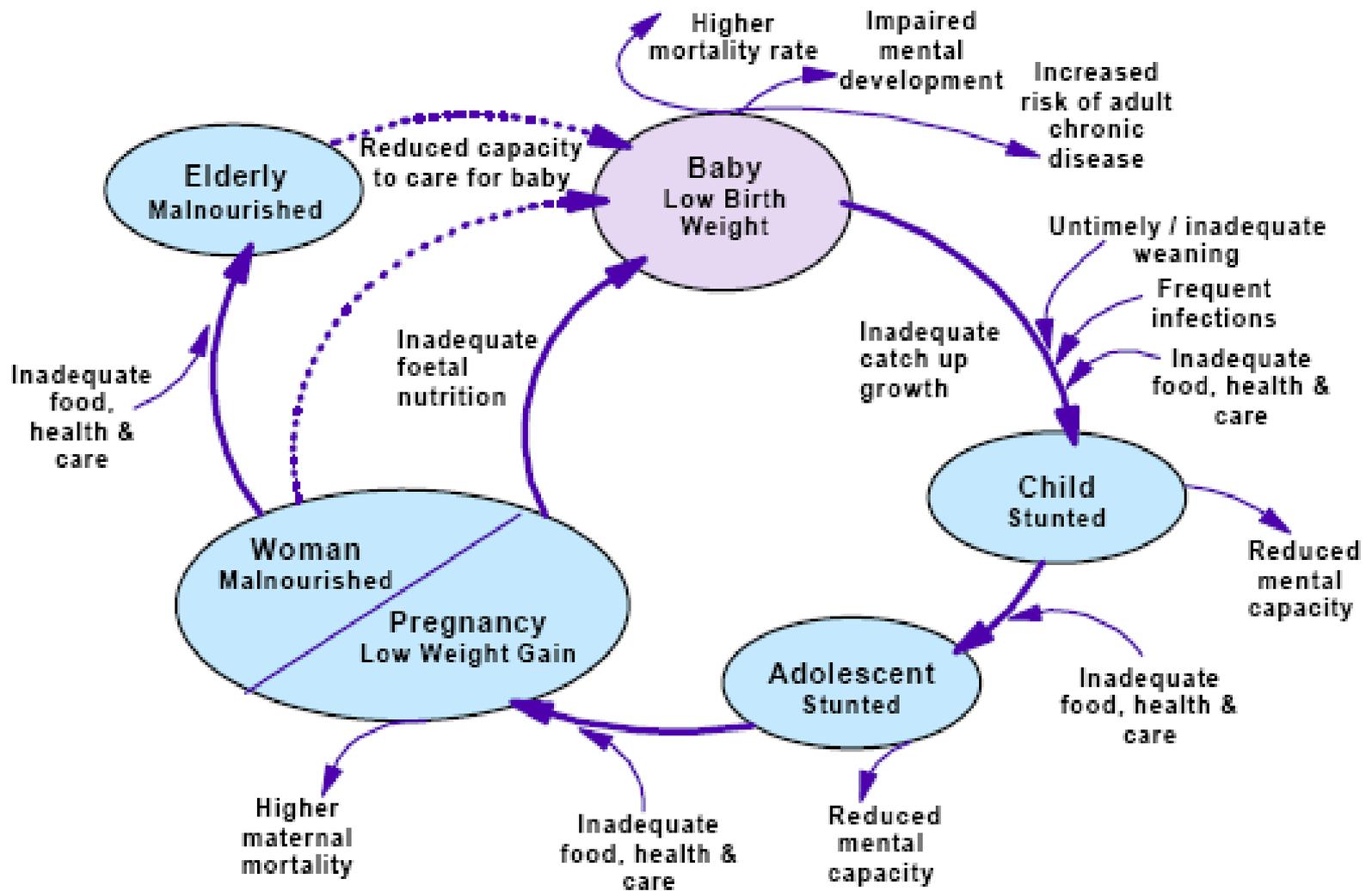
Why adolescent girls?

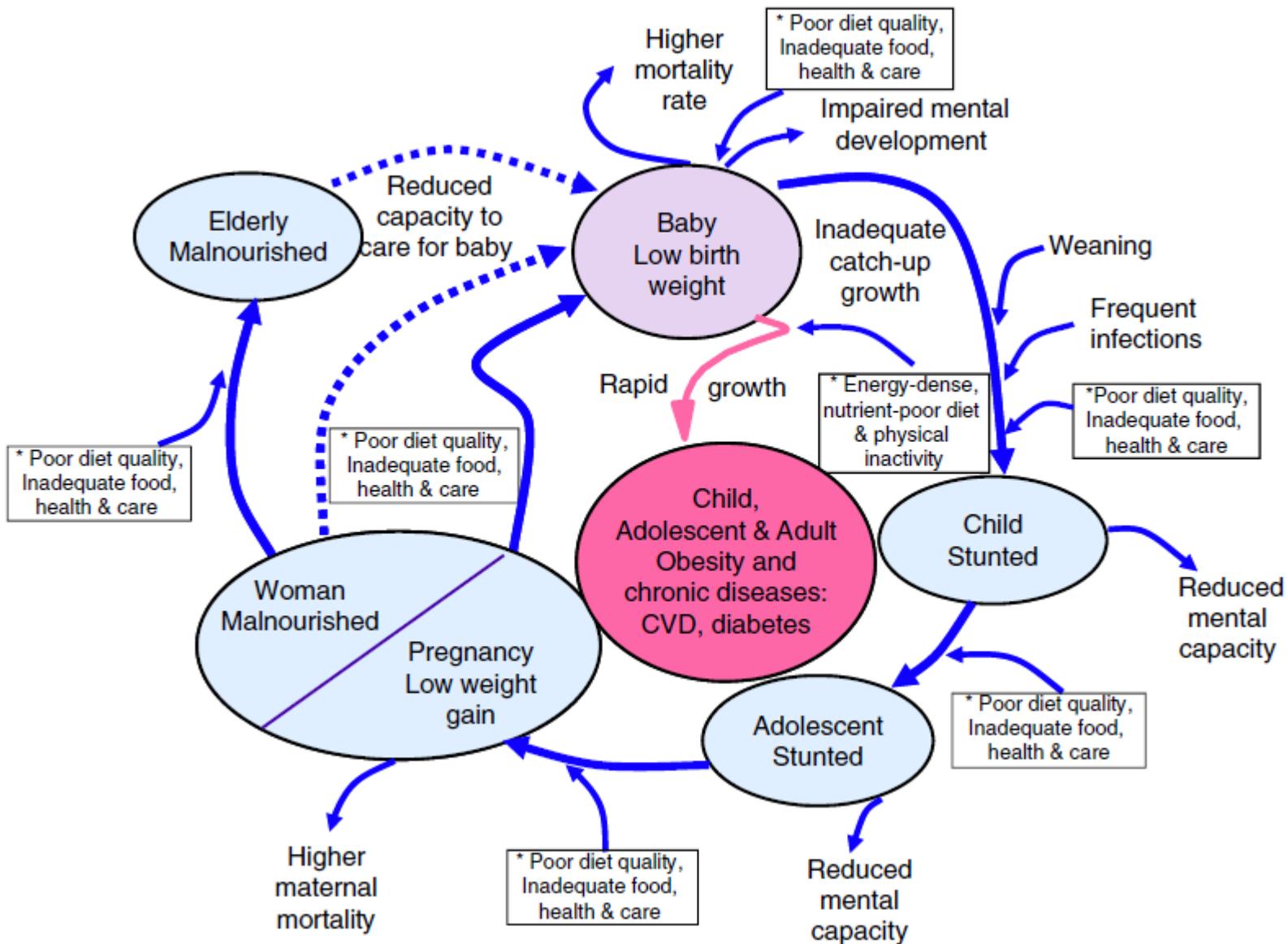
- 20,000 girls give birth every day
- Missed educational and other opportunities
- 70,000 adolescent deaths annually from complications from pregnancy, childbirth
- 3.2 million unsafe abortions among adolescents each year

We don't monitor adolescent health

Mortality	HIV Prevalence	Underweight	Sexual activity	HIV knowledge
Road traffic deaths	Mental health	Overweight	Unemployment	Condom use
Suicides	Tobacco use	Physical activity	Early marriage	HPV vaccine
Violent deaths	Alcohol use	Understanding	Childbirth by 18	Treatment
Maternal deaths	Cannabis use	Self rated health	Education	Health services

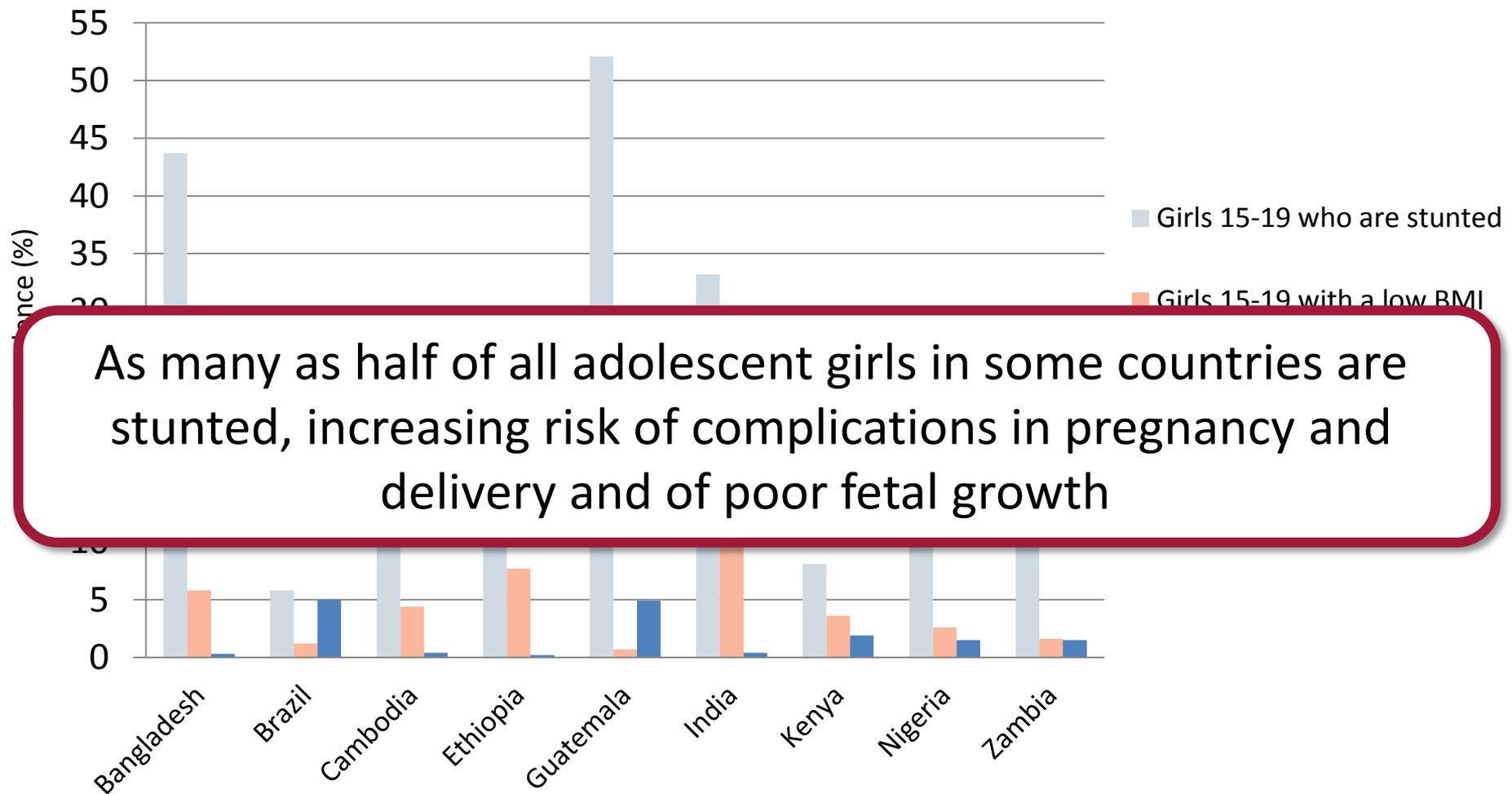
We don't know what to monitor.





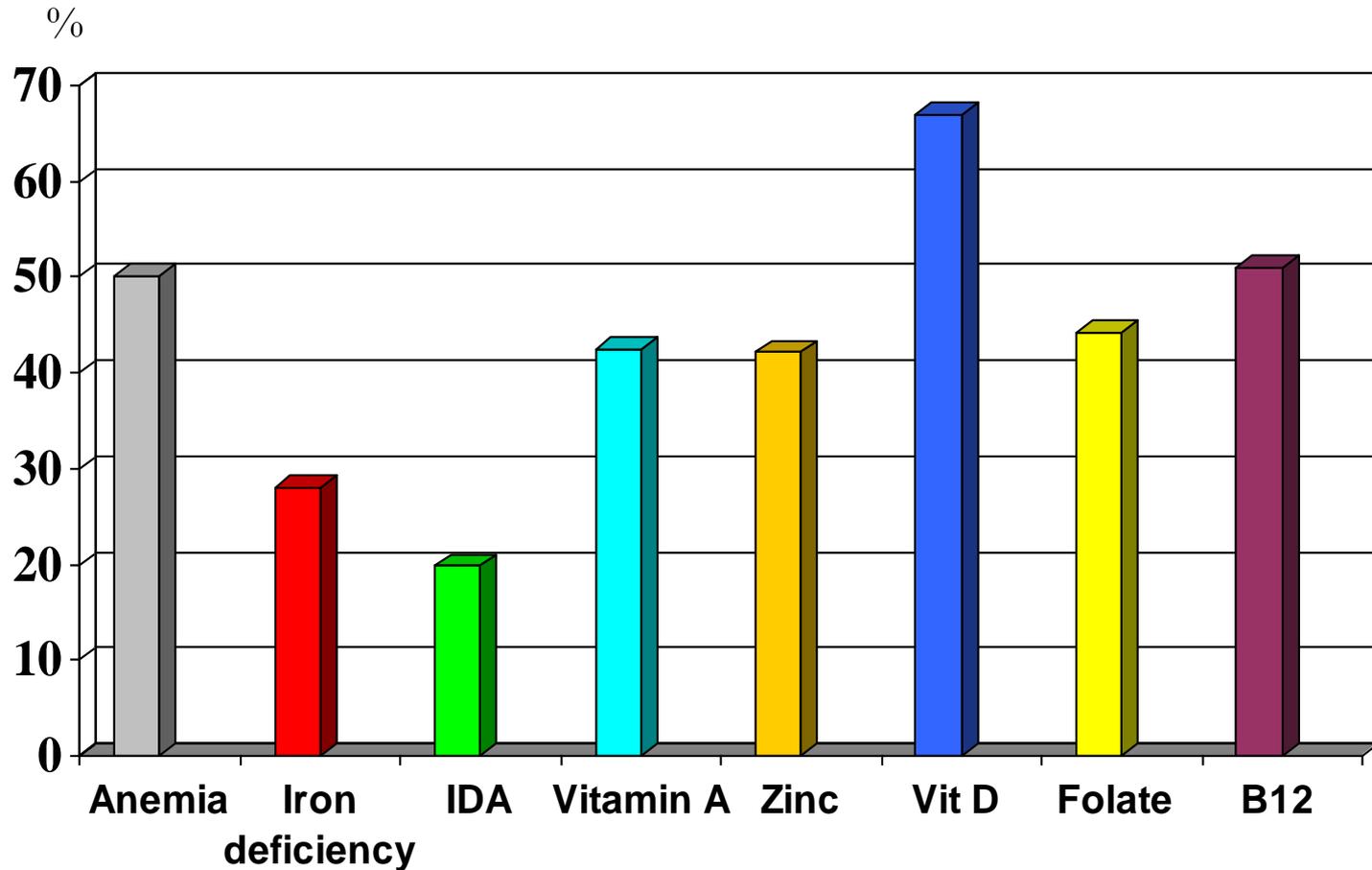
Adolescent Nutrition

Adolescent Nutrition: Important for Girls, and for the Future Generation



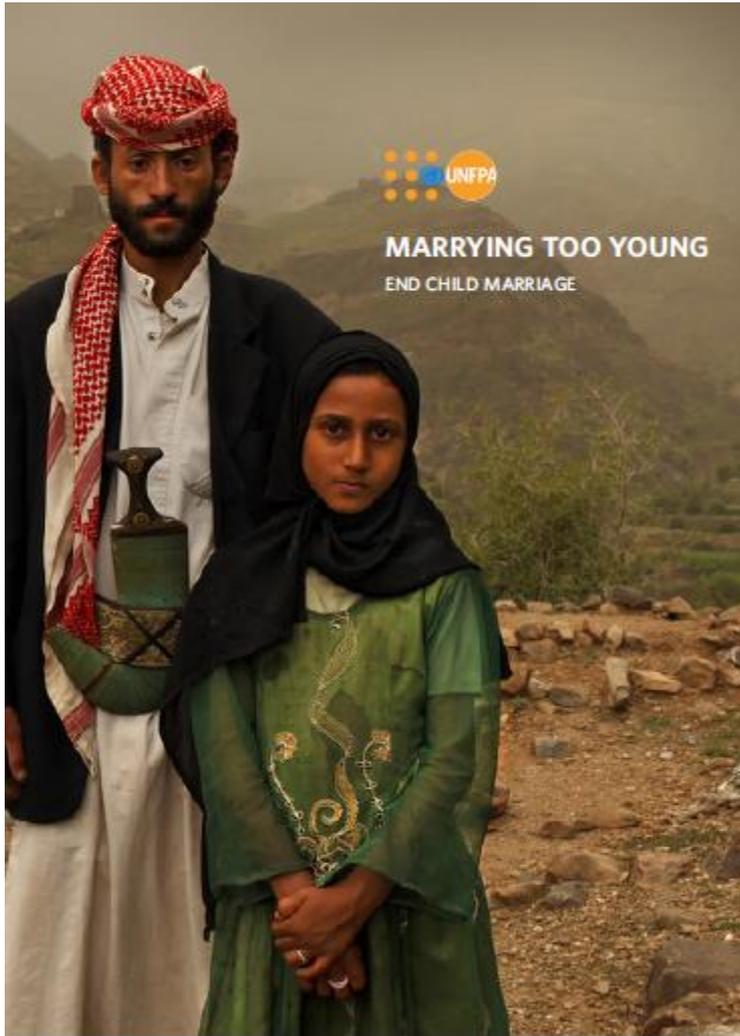
As many as half of all adolescent girls in some countries are stunted, increasing risk of complications in pregnancy and delivery and of poor fetal growth

Multiple Micronutrient Deficiencies in Pakistan (Women of Reproductive Age < 19 years of age)

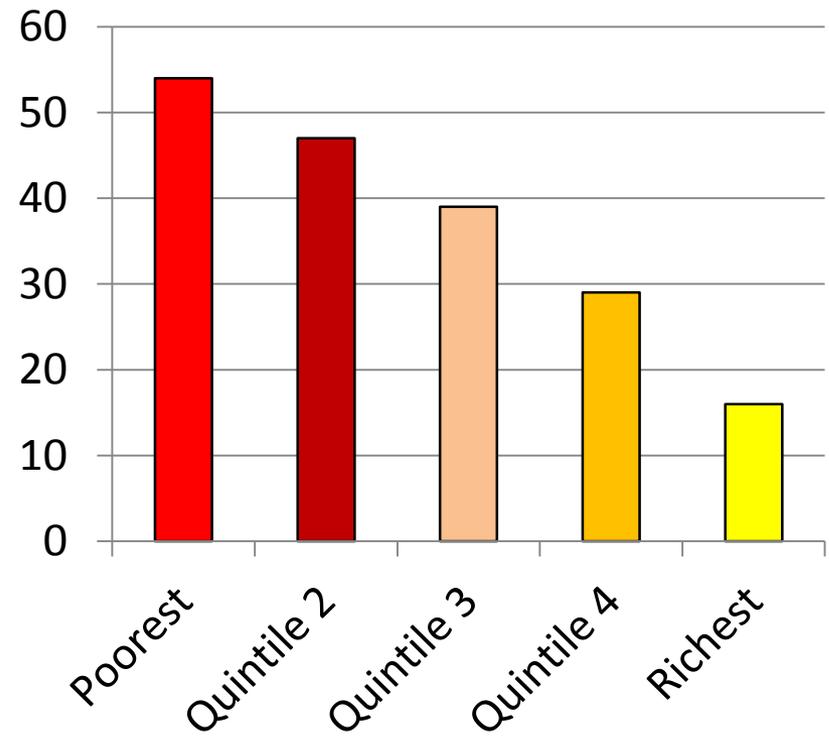


Source: NNS 2011

Girl Brides



% giving birth before 18 years age



Evidence Highlights Importance of Nutritional Status in Women Before and During Pregnancy

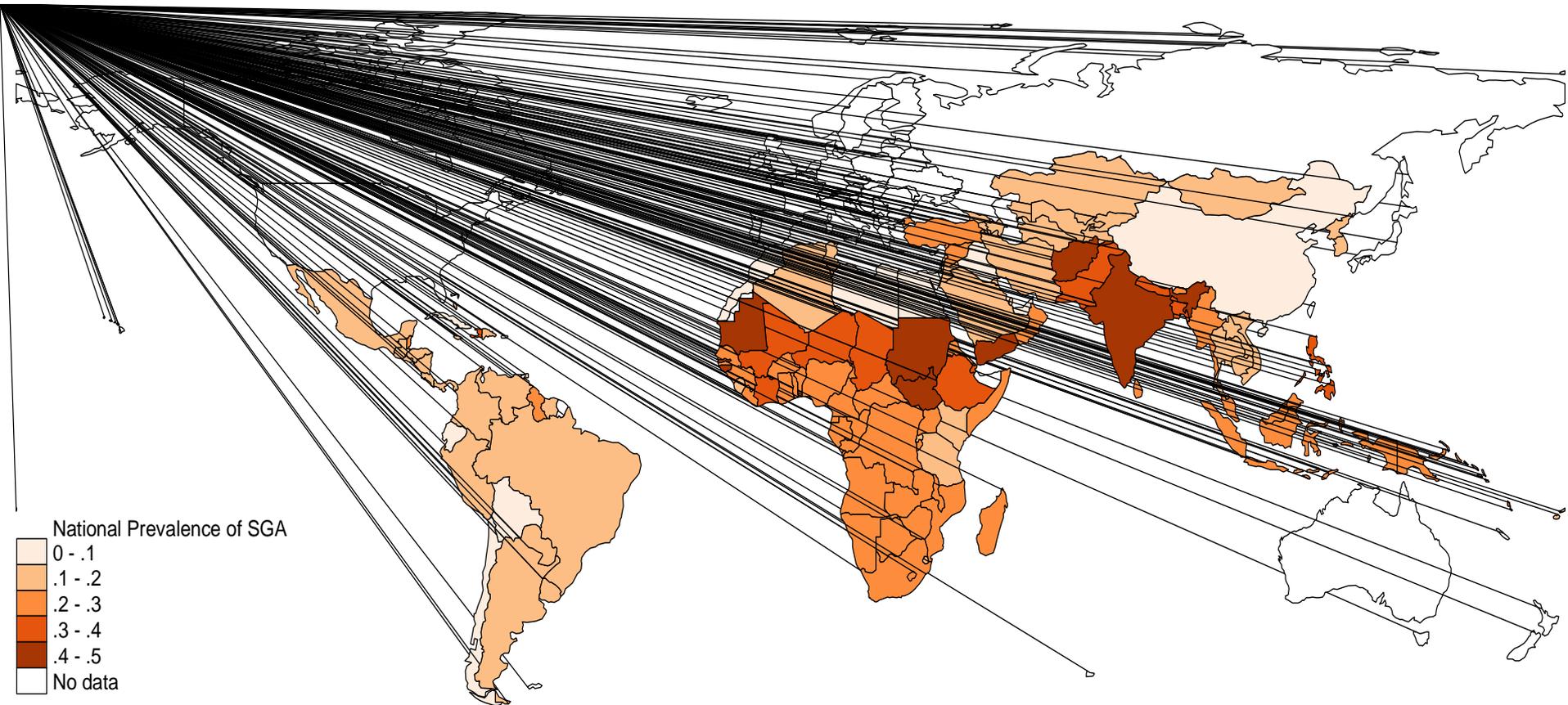
Short maternal stature may lead to obstructed labour and maternal and fetal or neonatal death

Maternal stunting and low Body Mass Index increases the risk of fetal growth restriction (small for gestational age, SGA)

Maternal obesity leads to gestational diabetes, pre-eclampsia, haemorrhage and higher risk of neonatal and infant death

There may be specific micronutrient deficiencies related to SGA among young adolescent pregnancies, among malnourished girls

Global Prevalence of small-for-gestational age births



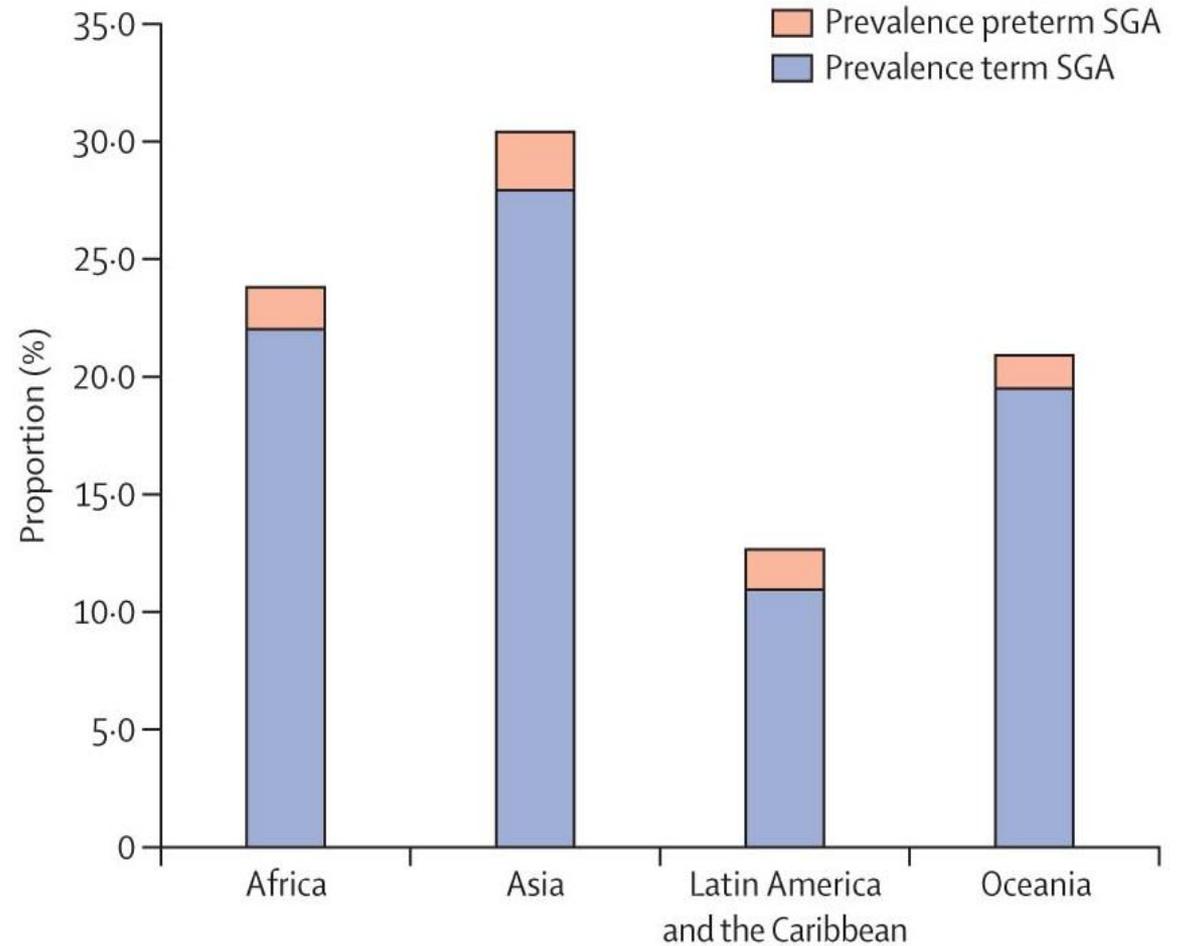
Katz et al (Lancet 2013)

Prematurity AND growth retardation

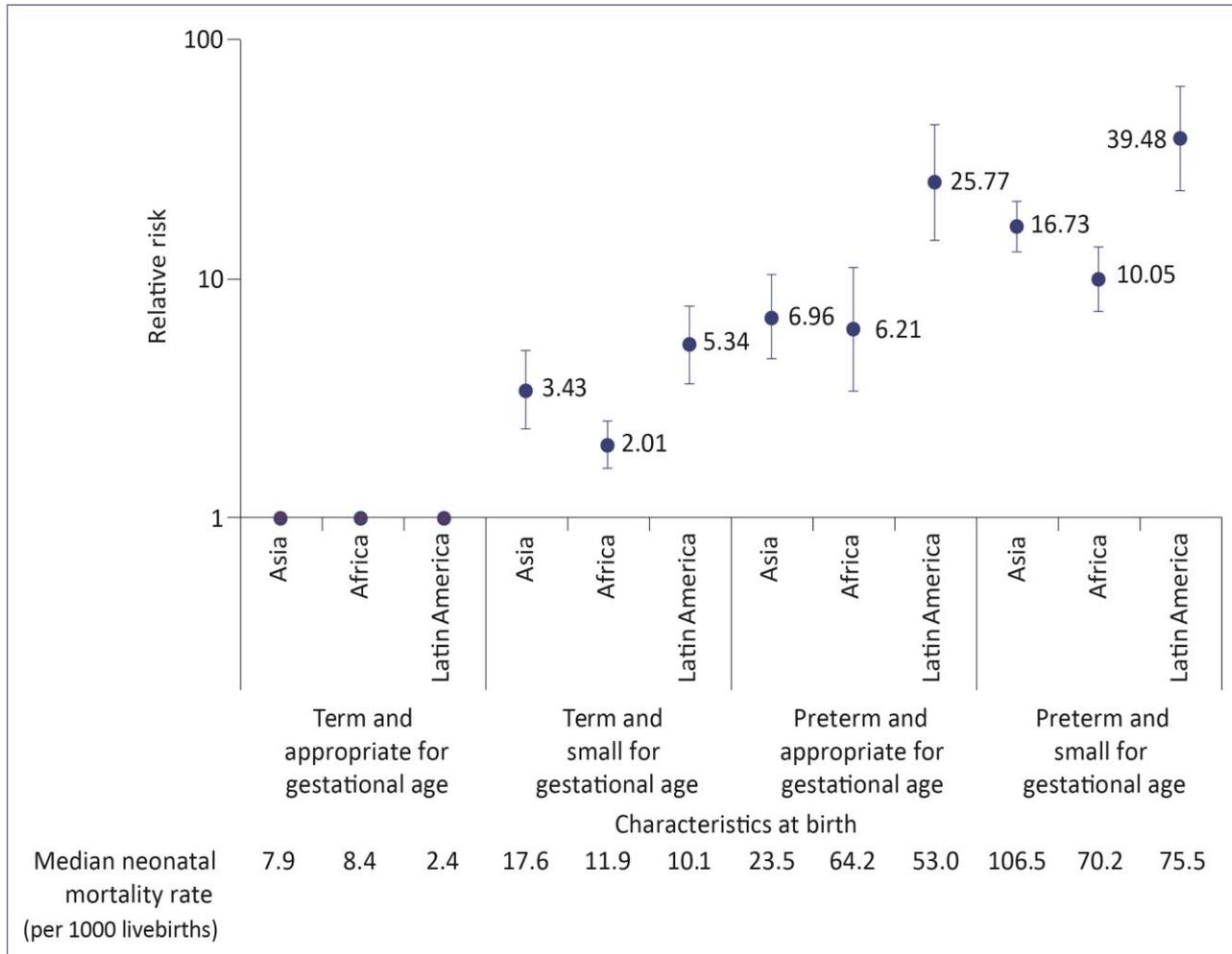


Prevalence of SGA Births

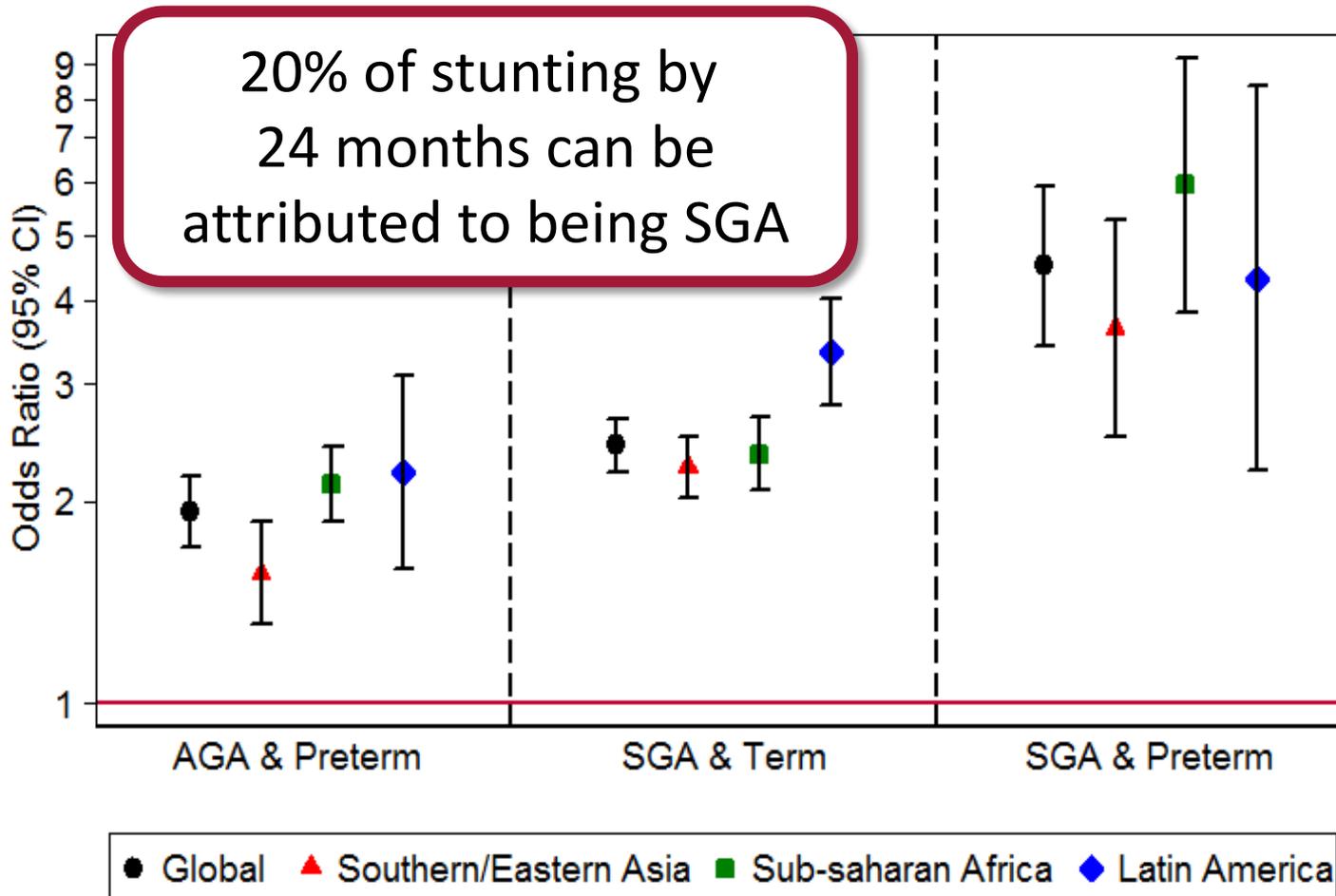
32.4 million babies were born SGA in 2011; 27% of all births in LMICs



Risks of SGA for Mortality and Preterm Birth for Neonatal Mortality

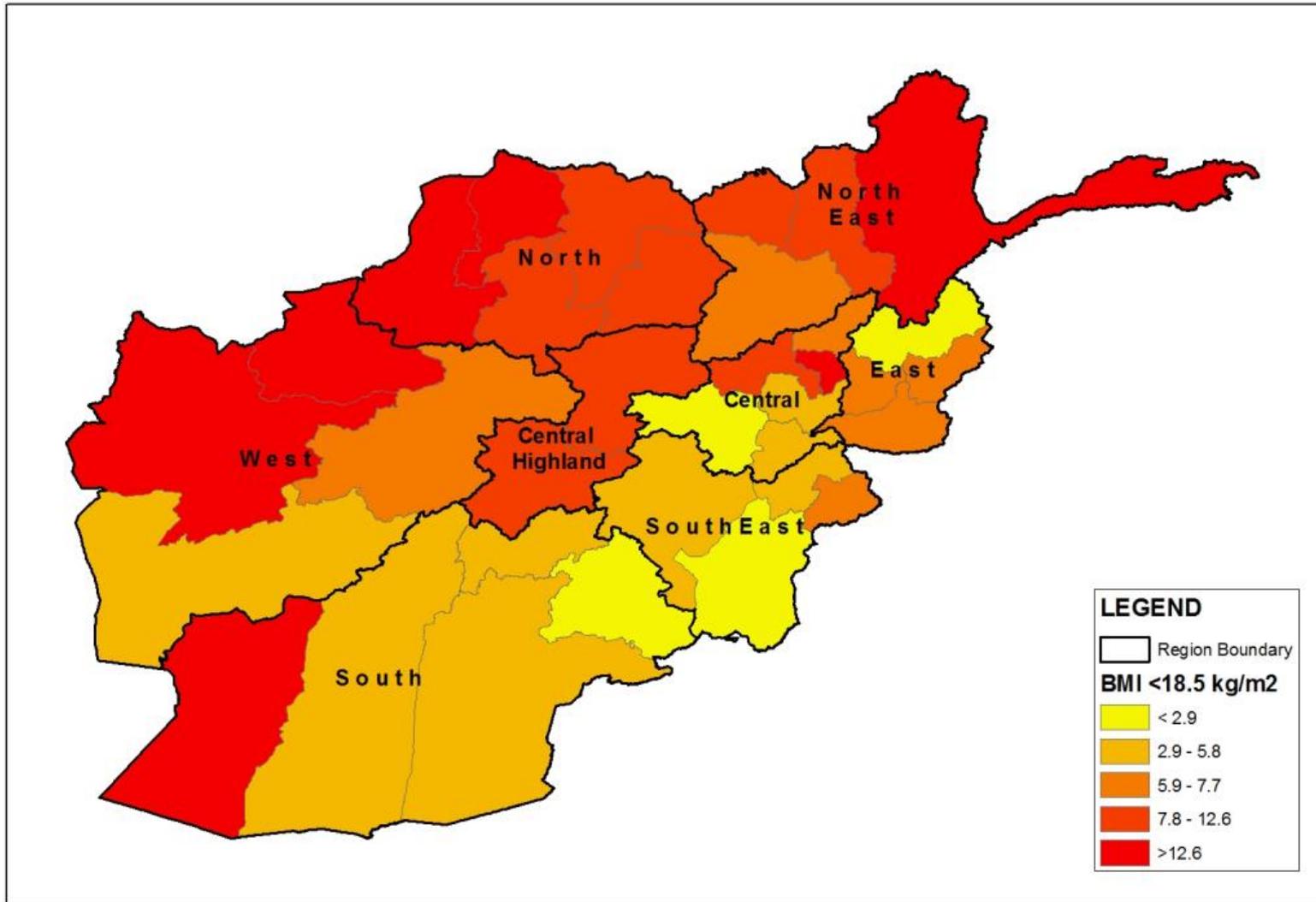


Risk of SGA for Stunting

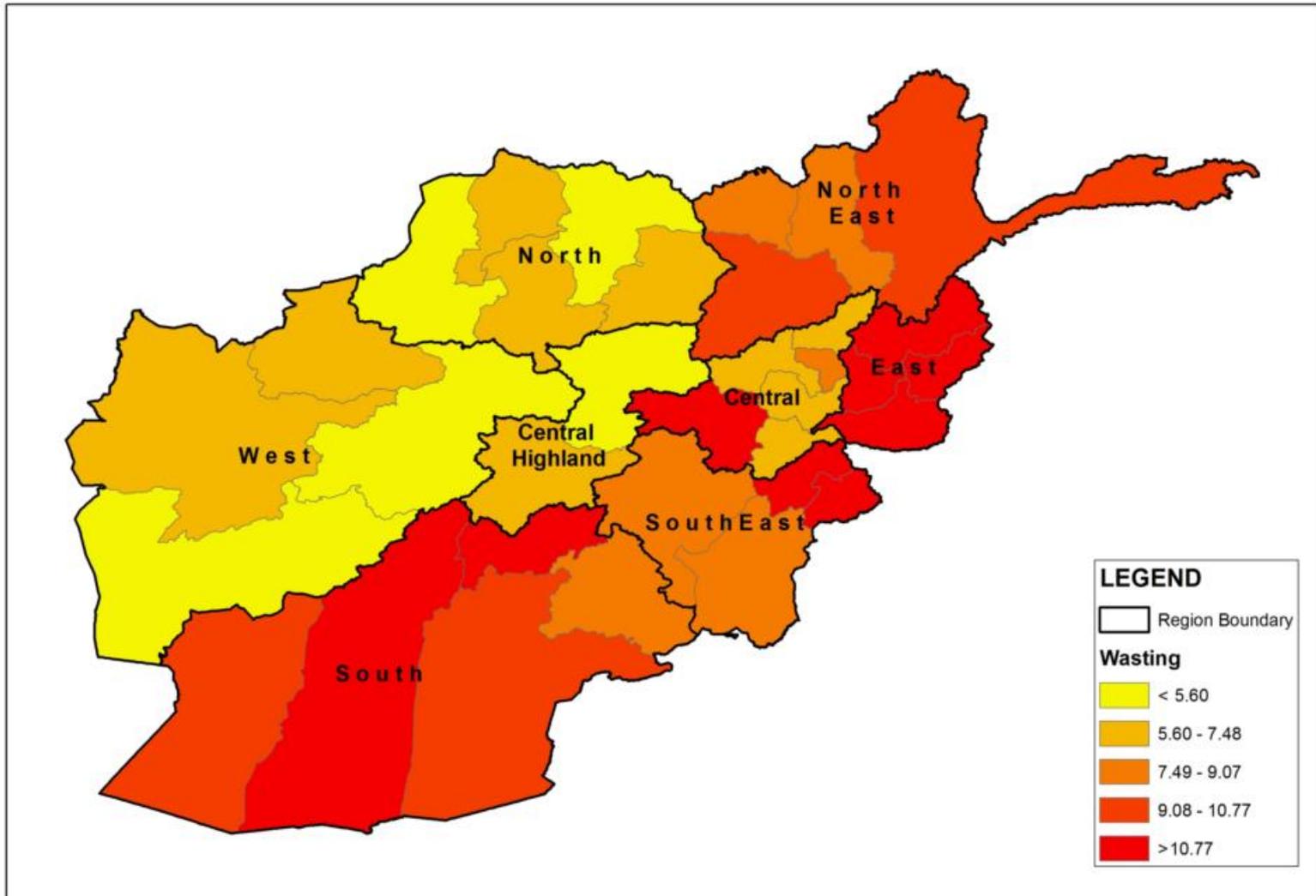




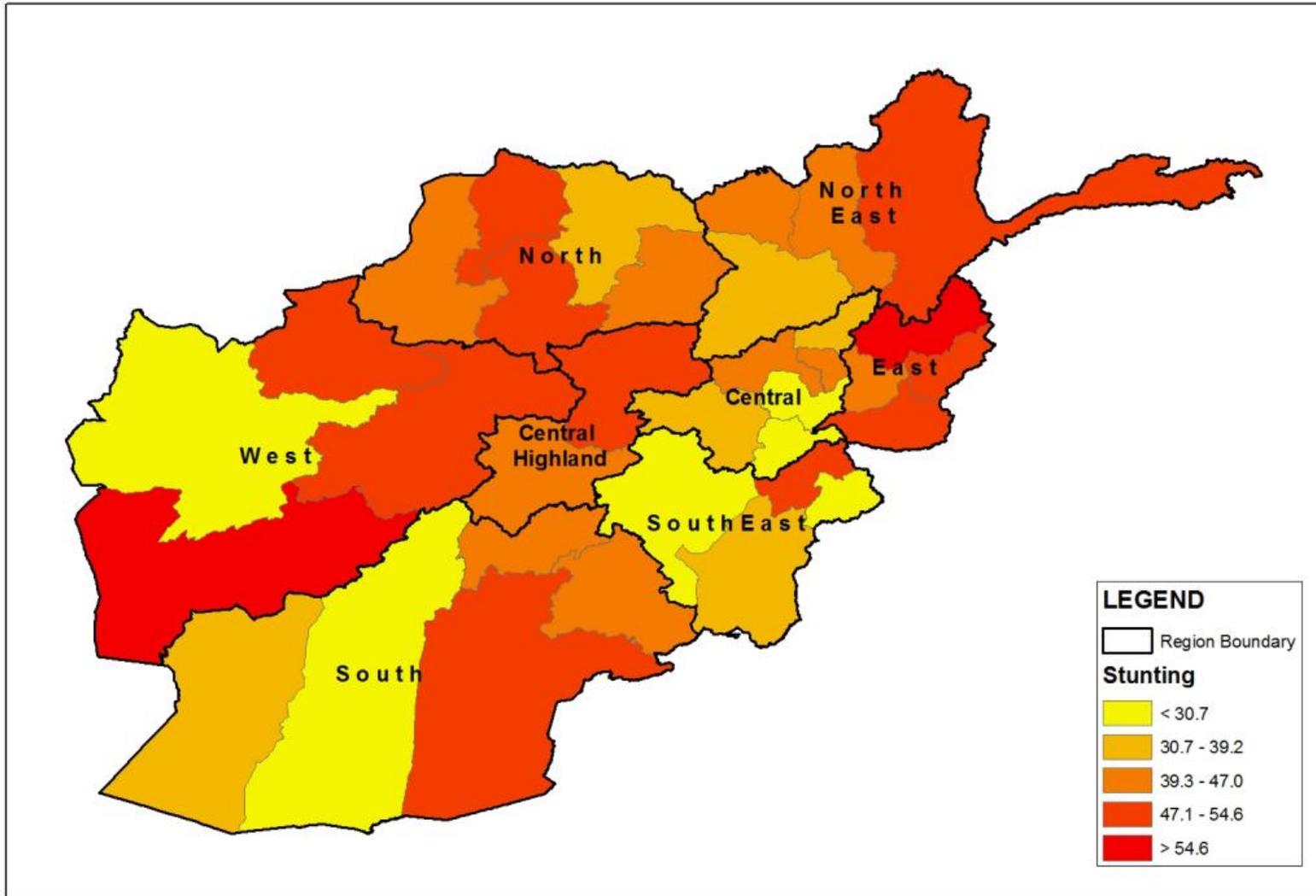
Maternal Under nutrition(BMI < 18.5 kg/m²)



Wasting (<-2SD)



Stunting (<-2SD)



What works?

INTERVENTIONS

DELIVERY PLATFORMS

OUTCOMES

SEXUAL AND REPRODUCTIVE HEALTH

Interventions to prevent unintended pregnancies, Sex education, Interventions to modify sexual risk behaviors, Treatment and management of STI, Dating violence prevention, Coerced sex/Incest, Female

NUTRITION INTERVENTIONS

Interventions to promote healthy nutrition, Intervention for eating disorders, Prevention and management of obesity, Micronutrient supplementation, Nutrition in pregnant adolescents

IMMUNIZATION

HPV, MMR, Varicella

MENTAL HEALTH

Pharmacotherapy for depression and anxiety, Cognitive and psychological therapies, Exercise, Interventions for relapse prevention, Interventions for suicide and suicidal behaviors

SUBSTANCE ABUSE

Tobacco and smoking prevention interventions

INJURY PREVENTION

Education for preventing dog bite injuries, Use of helmet, Violence prevention

CHRONIC DISEASE

Psychological interventions for adolescents living with chronic illnesses, Diabetes Mellitus 1, Seizures, Inflammatory bowel disease, Asthma

COUNSELING

Genetic Counseling and screening, Premarital counseling, couples counseling

INTERVENTIONS SPECIFIC TO THE DISADVANTAGED YOUTH

INTERVENTIONS FOR DISADVANTAGED YOUTHS

Youth drop-in centers, Runaway shelters, Case Management and Vocational Training, Substance Abuse Treatment Interventions, HIV Prevention/Sexual Health Interventions, Peer led interventions, supportive housing

School Based Programs

Information and communication technology for health

Community Based Programs

District and National Level Policy Initiatives

Social and Financial Protection

Youth Empowerment and Ownership

Adolescent/youth friendly health clinics/services

Social Media

↑ IMMUNIZATION COVERAGE
 ↑ HEALTH STATUS
 ↑ OPTIMUM PREGANACY AND BIRTH OUTCOMES
 ↑ LONGETIVITY

↓ MORBIDITY
 ↓ MORTALITY

BETTER ADULT LIFE,
 WORK PRODUCTIVITY,
 ECONOMIC GROWTH,
 NATIONAL PROGRESS

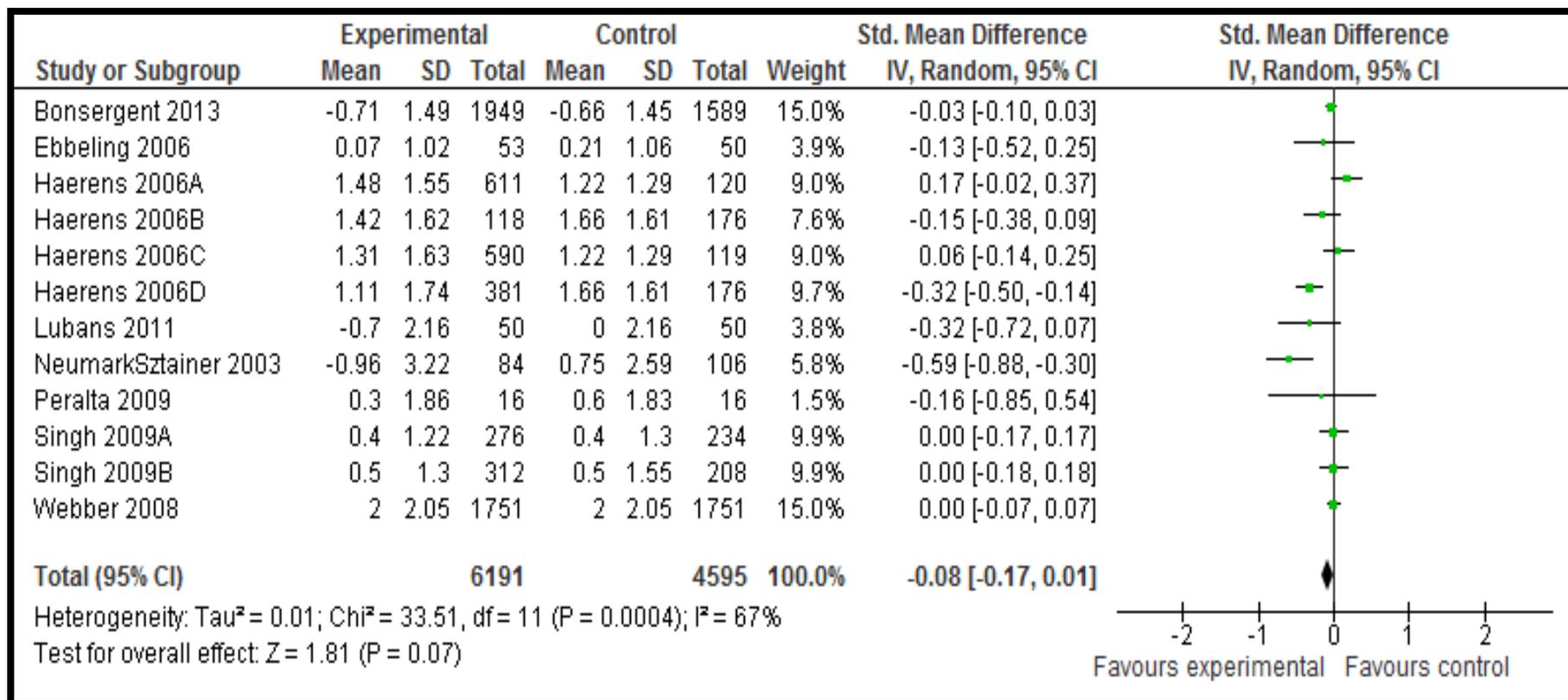
**ADOLESCENT NUTRITION:
Interventions to Promote Healthy
Nutrition and Preventing Obesity
(Updated Review)**

Methods

- We updated the existing review by Waters et al. (2011) for the age group 11-19 years
- A total of 10 studies (5 + 5) were included; all from developed countries
- Interventions included educational, health promotion and/or psychological, family, behavioral therapy, counseling, management interventions which focus on diet, physical activity or lifestyle support, or both with an underlying intention to prevent obesity or further weight gain among adolescents

Quality Assessment						Summary of Findings		
				Directness		No of Participants		
No of studies	Design	Limitations	Consistency	Generalizability to population of interest	Generalizability to intervention of interest	Intervention	Control	SMD (95% CI)
Mean change in BMI: Moderate outcome specific quality of evidence								
12	RCT	Incomplete reporting of outcomes in 3 studies	Three studies showed significant improvement	All studies targeted adolescents	Interventions included diet changes, educations programs and school based physical activity programs.	6191	4595	-0.08 [-0.17, 0.01]

Change in Mean Body Mass Index



Interventions to Promote Healthy Eating and Prevent Obesity

- Pooled data from all included interventions showed a non-significant decrease in BMI in the intervention group
- Subgroup analyses showed that physical activity or dietary control alone were not impactful
- Interventions delivered in school were more effective than those delivered in non-educational settings
- No data from developing countries

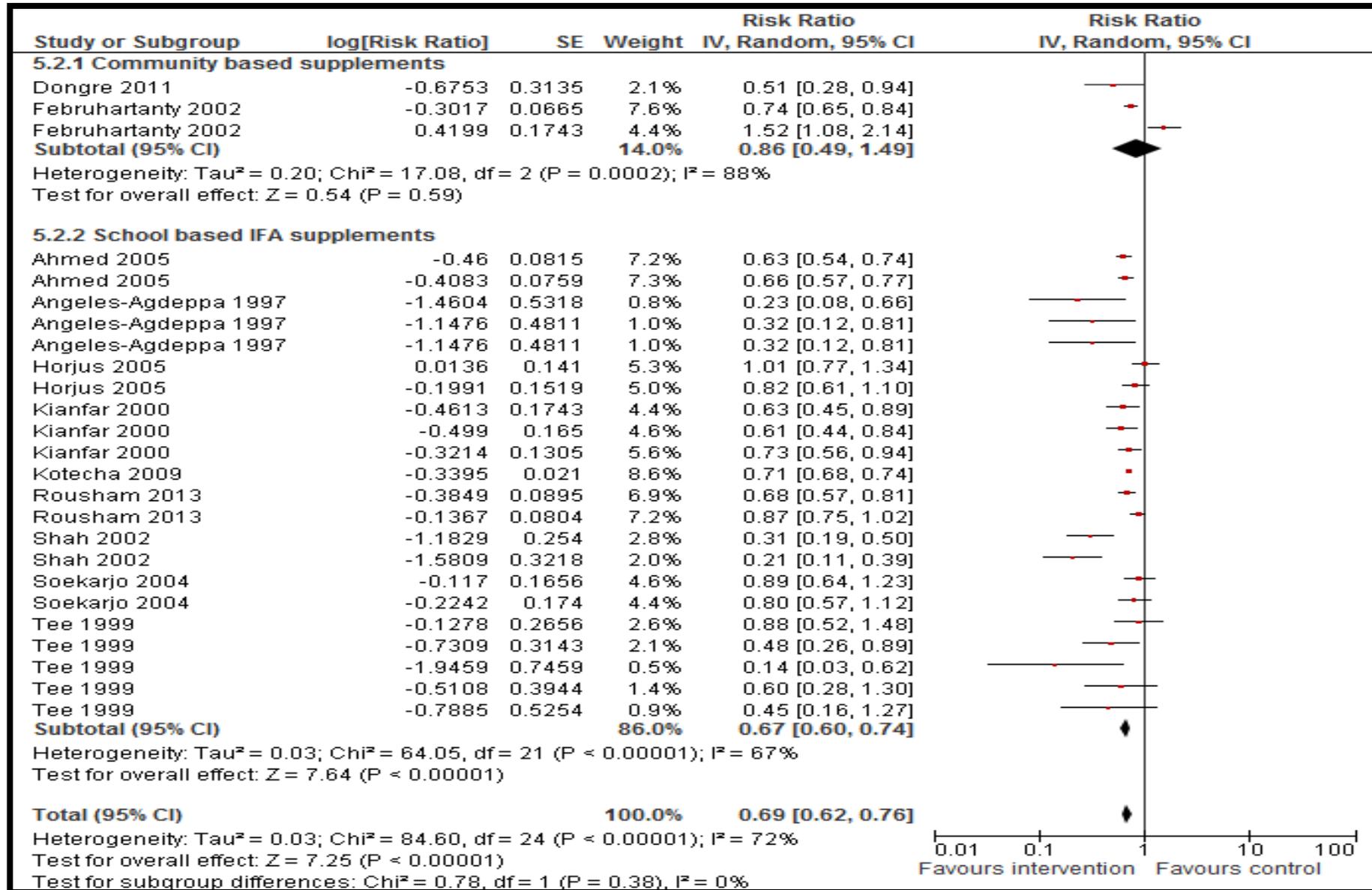
**ADOLESCENT NUTRITION:
Micronutrient and BEP
supplementation

(New Review)**

- We included studies evaluating the effectiveness of micronutrient supplementation in adolescents delivered in community- or school-based settings
- A total of 28 studies were included; 19 from developing and 9 from developed countries
- Four studies delivered iron folic acid supplementation while 24 delivered either MMN, iron folic acid and vitamin D
- We did not find any study on BEP supplementation targeting adolescents

Quality Assessment					Summary of Findings			
				Directness		No of Participants		
No of studies	Design	Limitations	Consistency	Generalizability to population of interest	Generalizability to intervention of interest	Intervention	Control	RR (95% CI)
Anemia: Moderate outcome specific quality of evidence								
11	RCT/Quasi	8 studies had unclear allocation concealment and sequence generation	Two studies showed significant improvement	All interventions targeted adolescents from both developing and developed countries. Most of the studies involved females only	Majority of the studies involved diet, exercise and behavior change for lifestyle modification	6350	5511	0.69 [0.62, 0.76]

Anemia



MMN and BEP Supplementation

- MMN supplementation can reduce anemia by 31%
- School-based MMN supplementation significantly reduced anemia, low ferritin levels and improved hemoglobin, ferritin, iron and zinc in adolescents
- Community-based delivery of MMN was not effective in improving hemoglobin levels
- Intervention is effective in both developed and developing country settings
- No data on BEP supplementation targeting adolescent age group

**ADOLESCENT NUTRITION:
Preconception Nutrition for
Adolescent Females**

(New Review)

Rationale

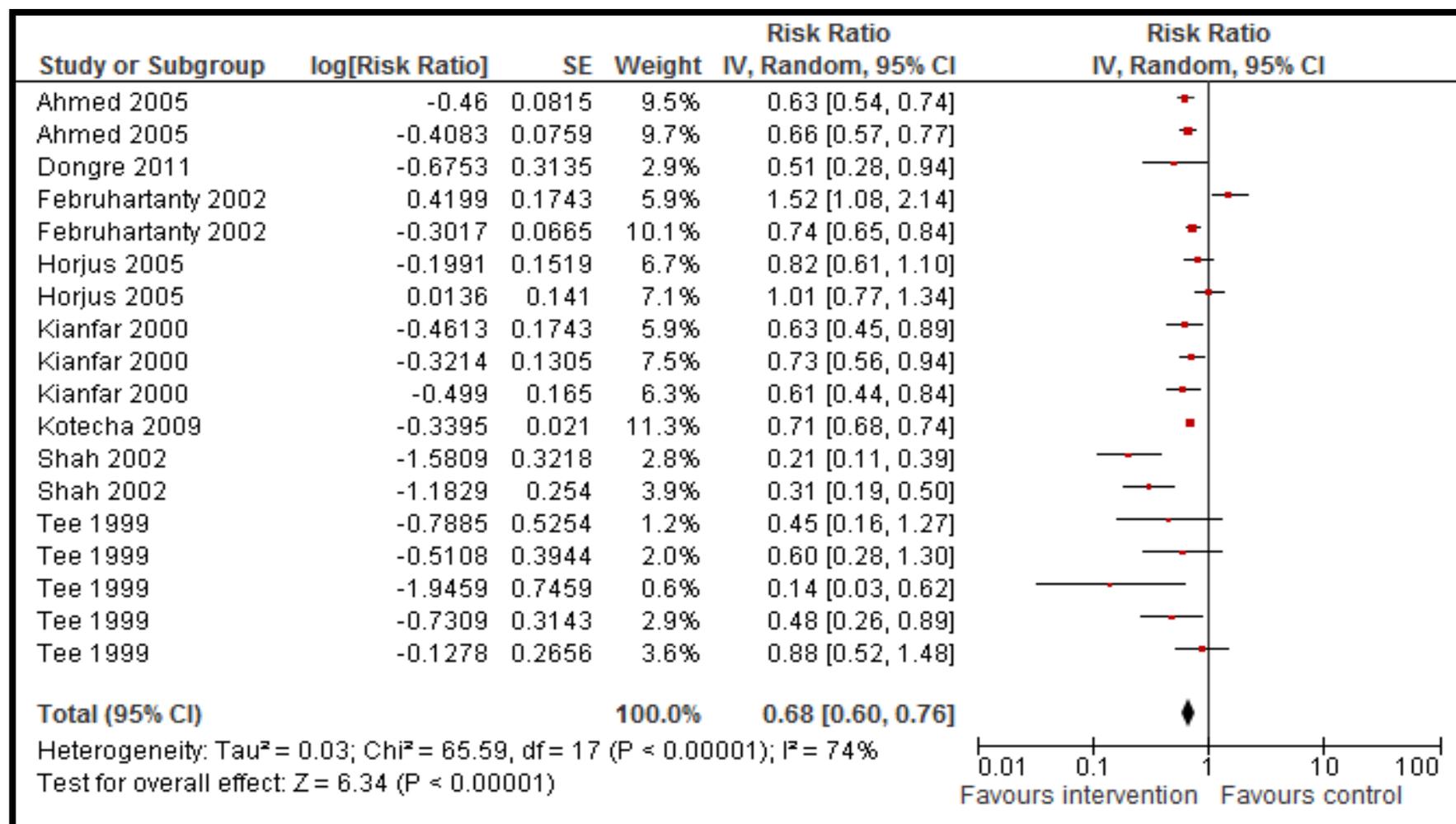
- Preconception nutrition care is recommended as it ensures that women have optimal health at the time of conception
- Pre-pregnancy overweight increases the risk for hypertensive disorders, preeclampsia, GDM, C-sections, LGA and stillbirths
- Pre-pregnancy underweight & micronutrient deficiencies increase the risk of preterm birth and SGA

Methods

- We evaluated nutrition related interventions targeting adolescent females
- Studies were included if any preventive or promotive nutrition intervention was provided to adolescent females preceding conception to improve health and nutrition related outcomes
- We found 11 studies; 4 on MMN, 6 on IFA, 1 on iron alone supplementation in adolescent females
- Six studies from developing countries while 4 from developed countries

Quality Assessment						Summary of Findings		
				Directness		No of Participants		
No of studies	Design	Limitations	Consistency	Generalizability to population of interest	Generalizability to intervention of interest	Intervention	Control	SMD (95% CI)
Urinary tract defect: Low outcome specific quality of evidence								
3	RCT + observational	Low quality and limited data	Two studies showed significant benefit	All studies targeted adolescent females	Interventions included MMN supplementation			0.49 [0.29, 0.82]
Anemia: Moderate outcome specific quality of evidence								
8	RCT/Quasi	Few studies had unclear allocation concealment and sequence generation	Six studies showed significant improvement in many of the intervention groups	All interventions targeted adolescent females	Majority of the studies involved diet, exercise and behavior change for lifestyle modification	6350	5511	0.69 [0.62, 0.76]

Anemia



Preconception Nutrition

- Micronutrient supplementation among adolescent females can significantly reduce anemia prevalence by 32%
- Folic acid supplementation can significantly reduce urinary tract defects but had no significant effects on cleft lip and palate, though the quality of evidence was low
- Intervention is effective in both developing and developed country settings

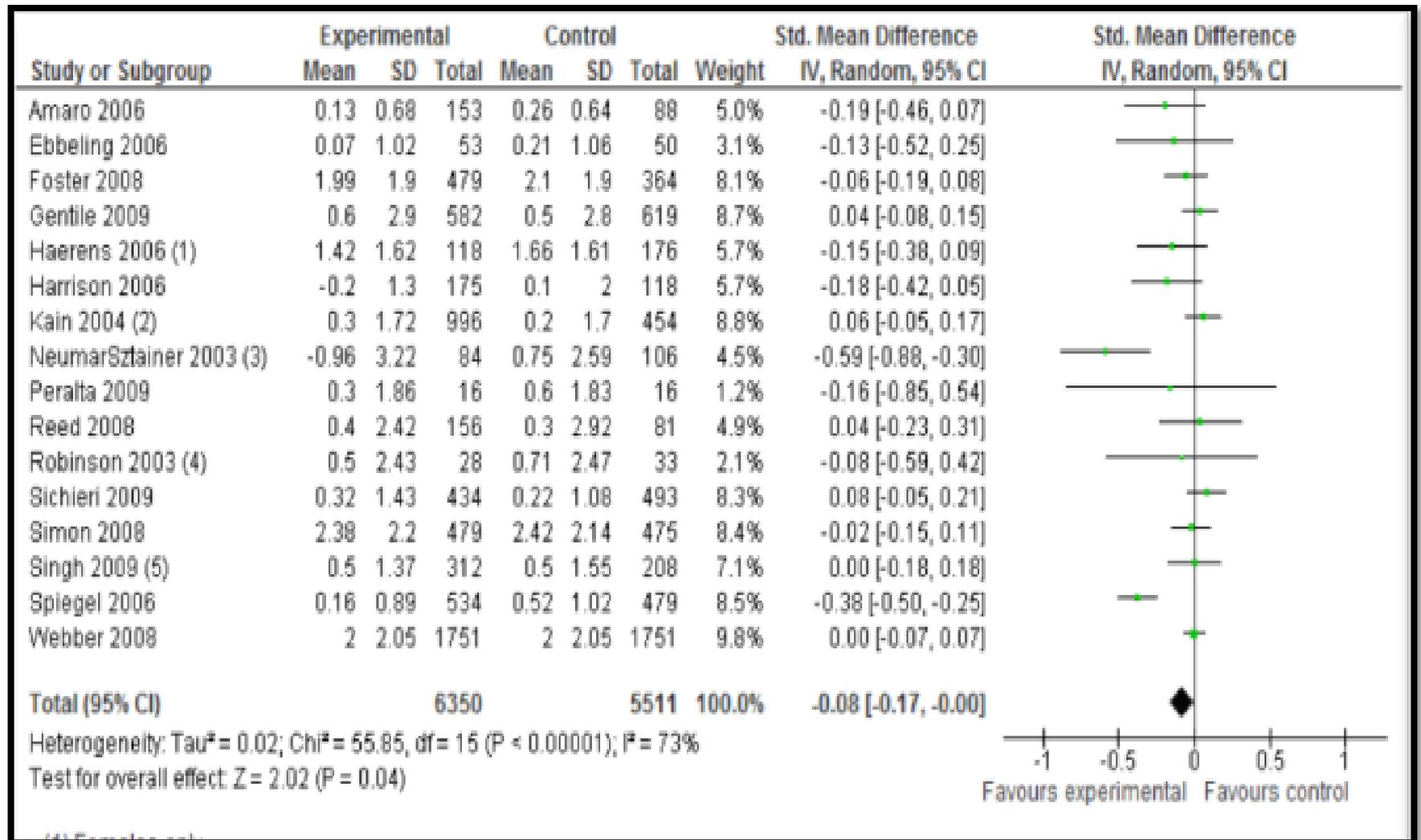
**ADOLESCENT NUTRITION:
Interventions to Prevent Pre-
pregnancy Obesity and Gestational
Diabetes Among Adolescent Females**

(New Review)

- Studies were included if the intervention was delivered to prevent obesity, pre-diabetes or diabetes in *adolescents and young women* prior to conception
- A total of 21 studies were included from developed countries
- Interventions included dietary advice (n=1), and life style modifications (including health promotion and education/counseling on diet, physical activity or life style support) (n=20)

Quality Assessment					Summary of Findings			
				Directness		No of Participants		
No of studies	Design	Limitations	Consistency	Generalizability to population of interest	Generalizability to intervention of interest	Intervention	Control	SMD (95% CI)
BMI: Moderate outcome specific quality of evidence								
16	RCT/ Quasi/ observational		Two studies showed significant improvement	All interventions targeted adolescents	Majority of the studies included life style modifications while few on dietary advice alone	6350	5511	-0.08 [-0.17, -0.00]

BMI



Prevention of Pre-Pregnancy Obesity and Gestational Diabetes

- Pre-pregnancy lifestyle modifications can marginally impact BMI among adolescent females
- No data from developing countries

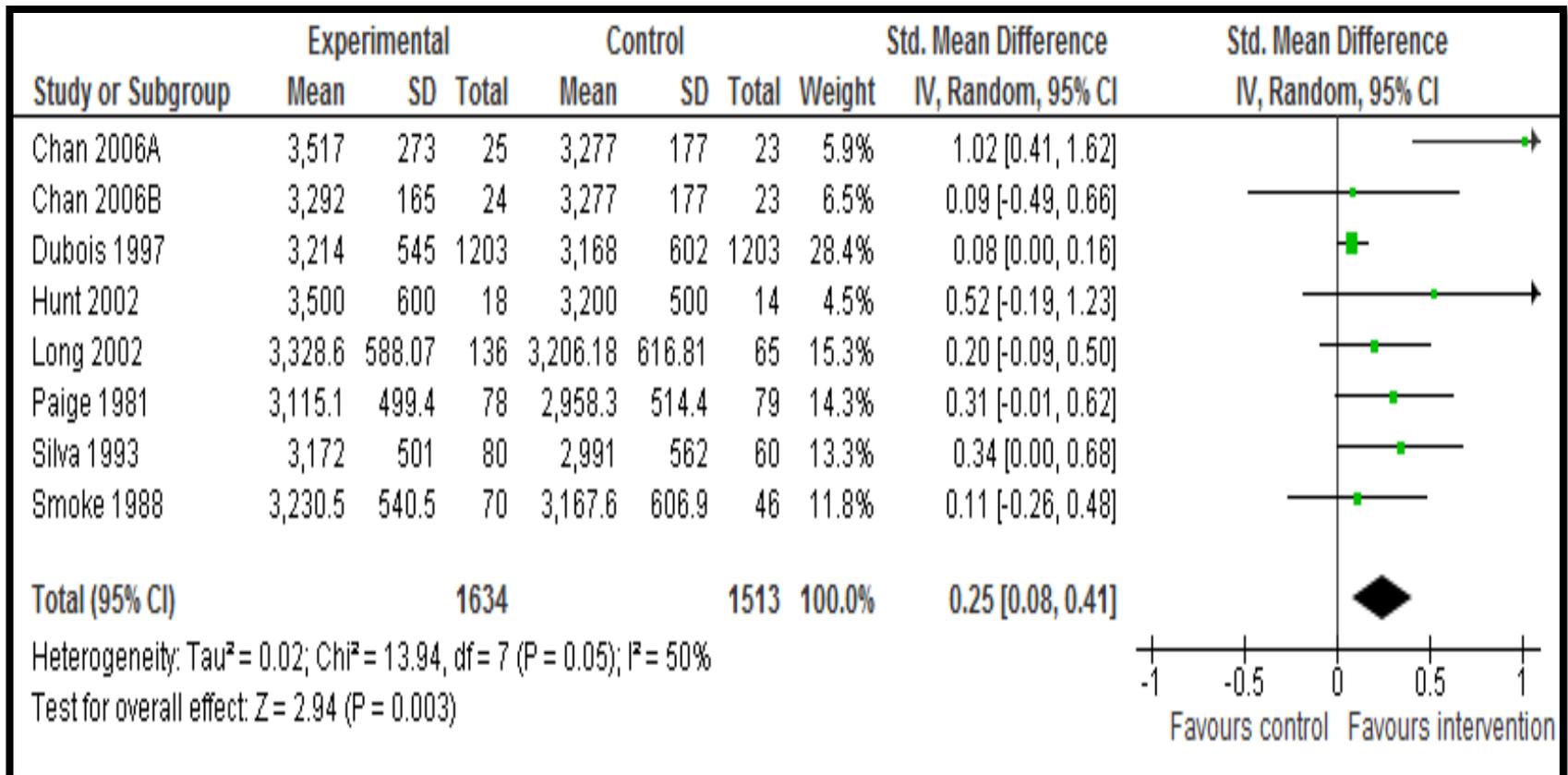
**ADOLESCENT NUTRITION:
Nutrition for Pregnant Adolescents
(New Review)**

Methods

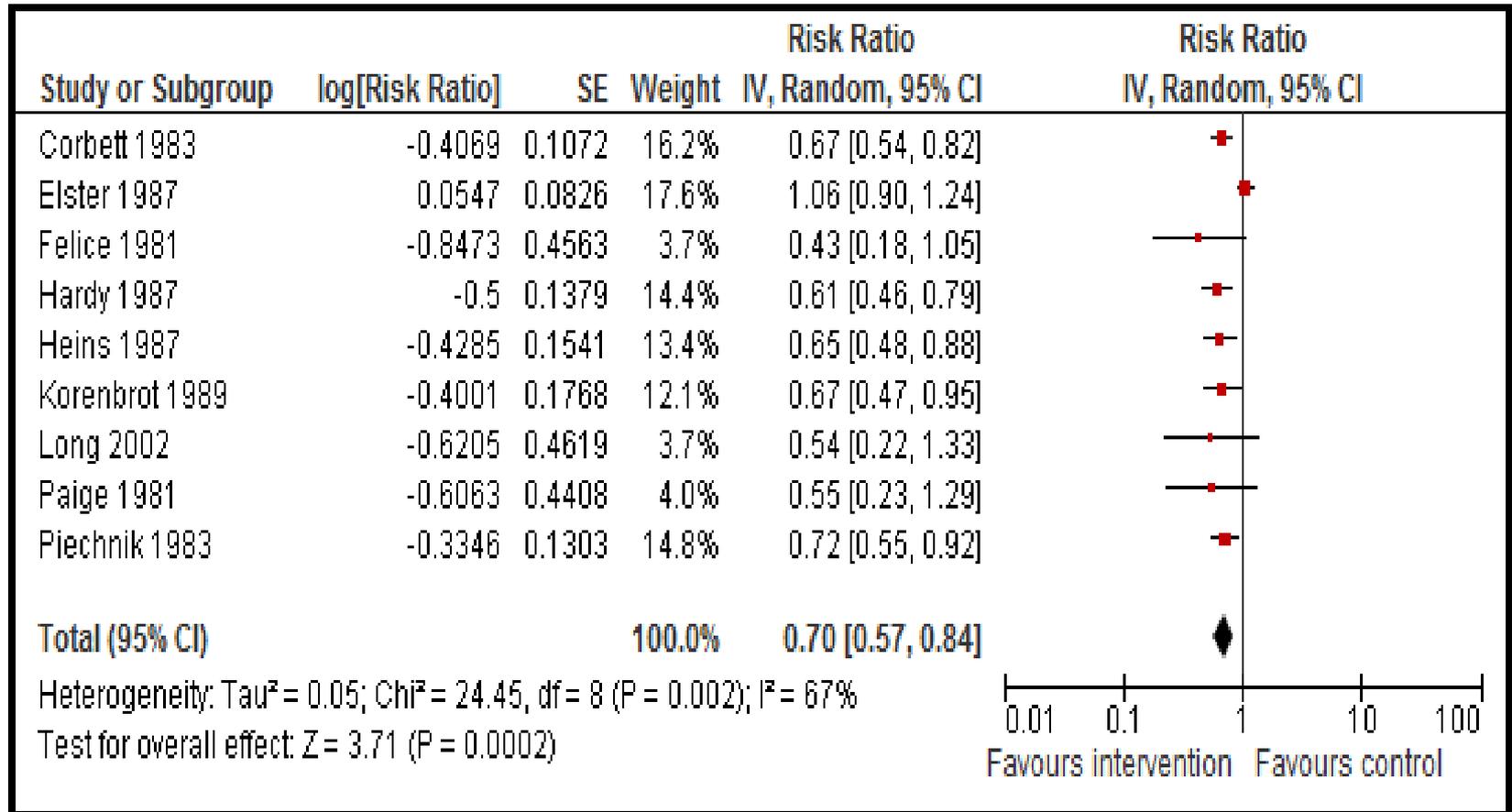
- We evaluated the interventions to improve the nutrition status of pregnant adolescents
- A total of 17 studies were included;
- Intervention strategies mainly involved provision of MMN, routine IFA, and nutritional education sessions

Quality Assessment						Summary of Findings		
				Directness		No of events		
No of studies	Design	Limitations	Consistency	Generalizability to population of interest	Generalizability to intervention of interest	Intervention	Control	RR/SMD (95% CI)
Mean Birth Weight: Low outcome specific quality of evidence								
8	RCT	6 studies not randomized, selective reporting of outcomes in 1 study	Only one study suggests benefit	All studies targeted pregnant adolescents	Interventions included nutritional supplementation and counseling	1634	1513	0.25 [0.08, 0.41]
Low Birth Weight: Low outcome specific quality of evidence								
9	RCT	None of the studies were randomized	Five studies suggest benefit	All studies targeted pregnant adolescents	Interventions included nutritional supplementation and counseling	416	1011	0.70 [0.57, 0.84]
Serum Calcium: Moderate outcome specific quality of evidence								
2	RCT	Selective reporting of outcomes in both studies	No study suggests benefit	All studies targeted pregnant adolescents	Interventions included nutritional supplementation and counseling	49	46	-0.17 [-0.58, 0.23]
Preterm Delivery: Low outcome specific quality of evidence								
2	RCT	Indirect evaluation of effect. One study not randomized, selective reporting of outcomes in one study	One study suggests benefit	All studies targeted pregnant adolescents	Interventions included nutritional supplementation and counseling	294	569	0.73 [0.57, 0.95]

Mean birth weight



Low Birth Weight (LBW)



Nutrition for Pregnant Adolescents

- Nutrition interventions targeting pregnant adolescents can reduce LBW by 30% and prematurity by 27% with improved mean birth weight

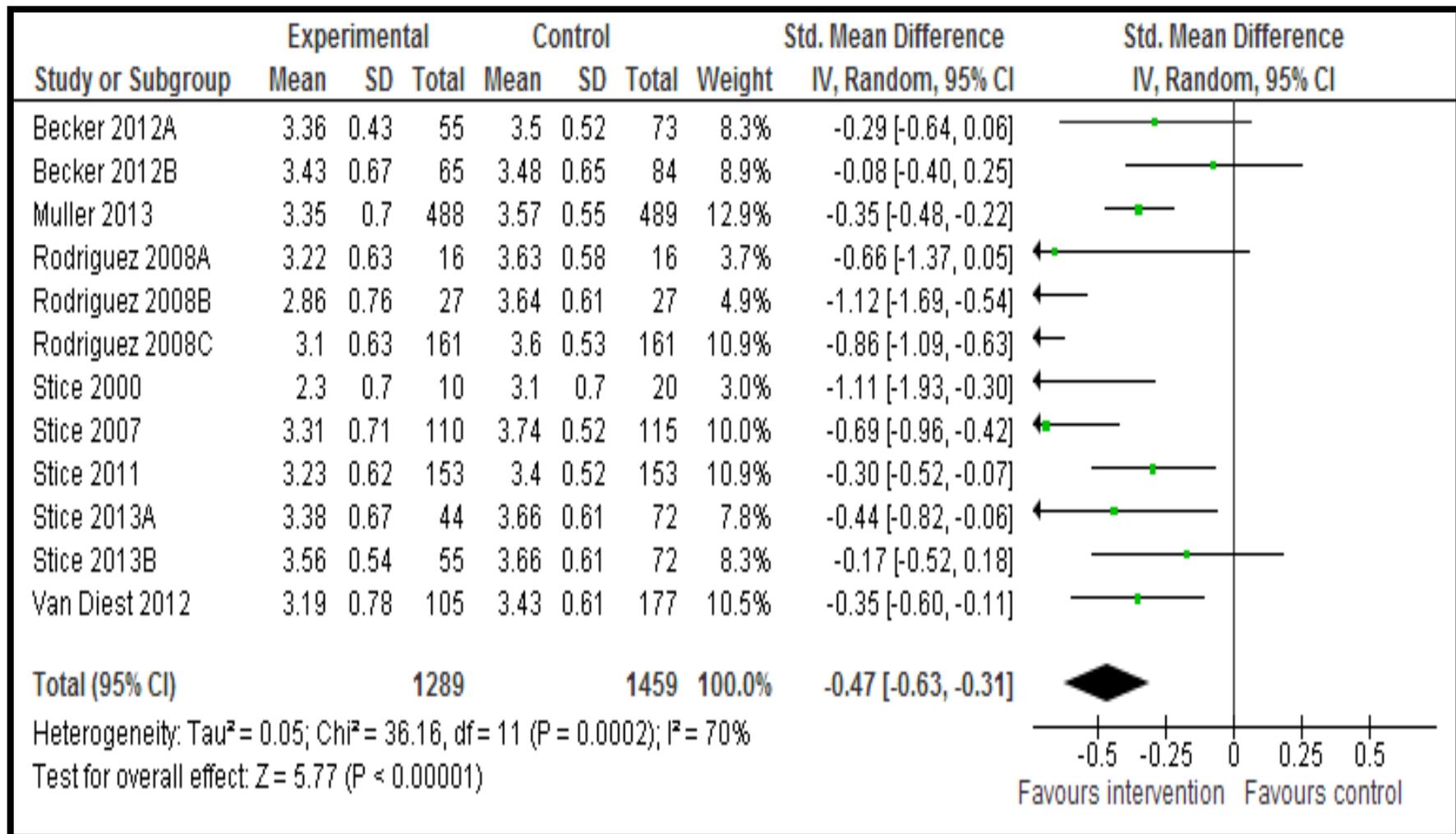
ADOLESCENT NUTRITION: Interventions to Prevent Eating Disorders

(Updated Review)

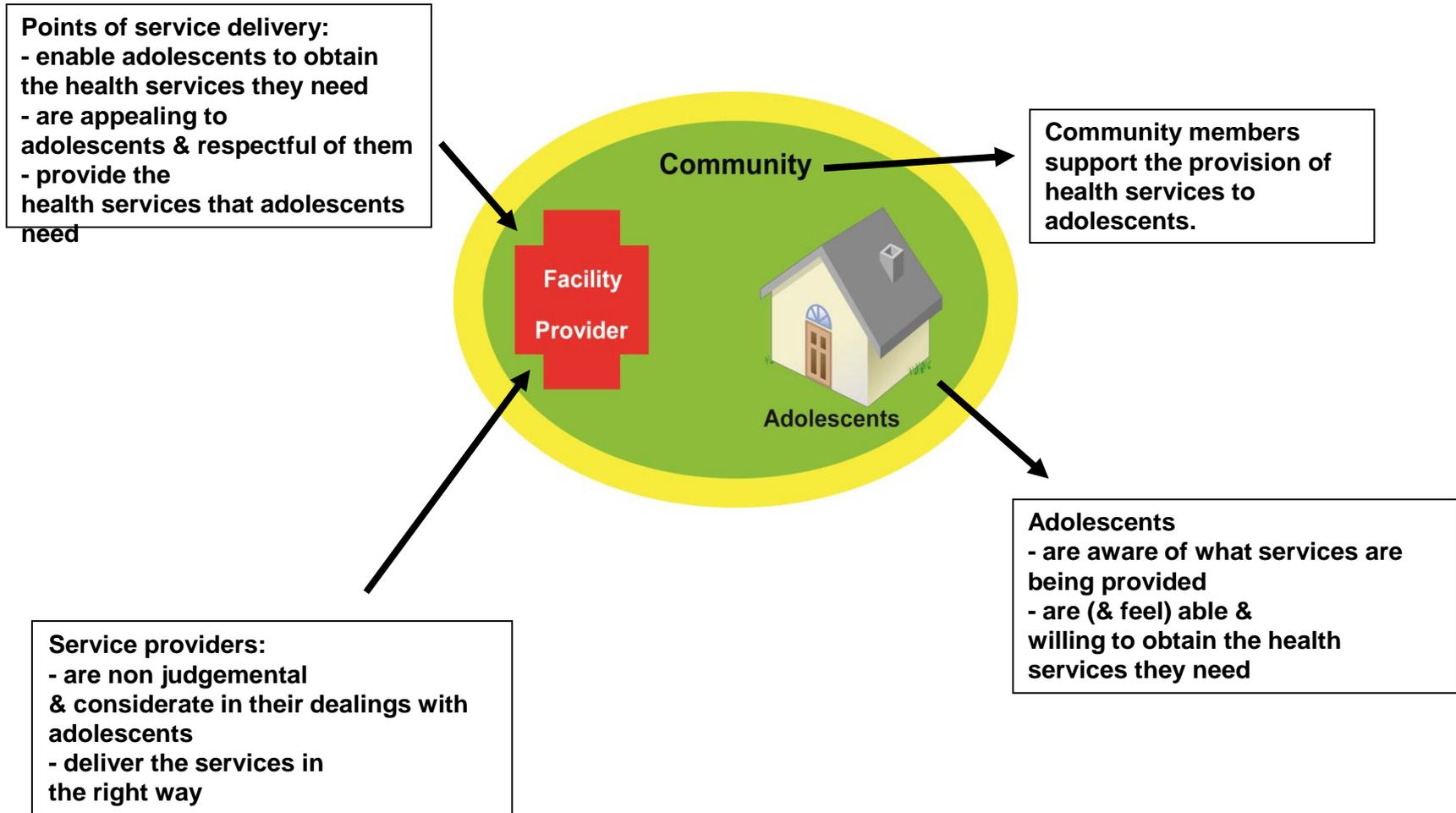
- We updated the existing review by Pratt et al. (2002)
- A total of 12 studies were included with a major focus on eating disorder prevention programs, where there is no known DSM-IV diagnosis of an eating disorder
- All studies from developed countries
- There is currently no conclusive evidence on the impact of prevention programs for eating disorders, although none of the comparisons indicated evidence of harm

Quality Assessment					Summary of Findings			
				Directness		No of Participants		
No of studies	Design	Limitations	Consistency	Generalizability to population of interest	Generalizability to intervention of interest	Intervention	Control	RR/SMD (95% CI)
Mean BMI: Low outcome specific quality of evidence								
12	RCT	4 studies not randomized, incomplete outcome reporting in 4 studies	No study shows significant change	All studies focused on high risk demographic	All studies used validated tools to assess outcomes	1312	1529	-0.02 [-0.10, 0.05]
EAT Total: Moderate outcome specific quality of evidence								
8	RCT	4 studies not randomized, incomplete outcome reporting in 3 studies	One study shows significant improvement	All studies focused on high risk demographic	All studies used validated tools to assess outcomes	671	870	-0.53 [-1.47, 0.41]
EDI Bulimia: Moderate outcome specific quality of evidence								
5	RCT	2 studies not randomized, incomplete outcome reporting in 3 studies	No study shows significant change	All studies focused on high risk demographic	All studies used validated tools to assess outcomes	797	805	-0.06 [-0.16, 0.04]
Thin Ideal Internalization: Low outcome specific quality of evidence								
12	RCT	3 studies not randomized, incomplete outcome reporting in 3 studies	Eight studies show significant improvement	All studies focused on high risk demographic	All studies used validated tools to assess outcomes	1289	1459	-0.47 [-0.63, -0.31]

Thin ideal internalization



'Required' quality of health service provision to adolescents.



Limitations

- Most of the outcomes were rated as low or moderate in methodological quality
- Non-random allocations mostly due to the nature of the intervention
- Lack of standardized outcome measures to maximize the comparability of the results
- Short follow-up time period limit ability to capture impact.

Limitations

- Very few adolescent health interventions were designed with inputs from adolescents
- Most of the studies do not provide much insight into marginalized populations
- Most of these studies were predominantly in HICs
- Studies involving multicultural population not able to draw comparisons between the groups