



FEED THE FUTURE

The U.S. Government's Global Hunger & Food Security Initiative

Dietary quality over time protects young Nepali children from poor development

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Background

- Early childhood development plays a crucial role in enabling children to acquire the needed intellectual skills and creativity to function as successful adults¹
- 250 million children <5 years in LMIC are at risk of not reaching their developmental potential¹
- Outside of diet supplement studies, relatively little is known about the links between diet, growth, home quality, and developmental status in resource-poor settings
- These relationships are rarely examined longitudinally

¹Lancet. 2017 January 07; 389(10064): 77–90

Previous findings

- NIL Symposium 2017: consumption of ASFs and a more diverse diet in early childhood was associated with better development, even after accounting for socioeconomic status
- However, diet clearly was not the only factor impacting developmental testing results

Questions

Is the relationship between diet and development stable as children grow up?

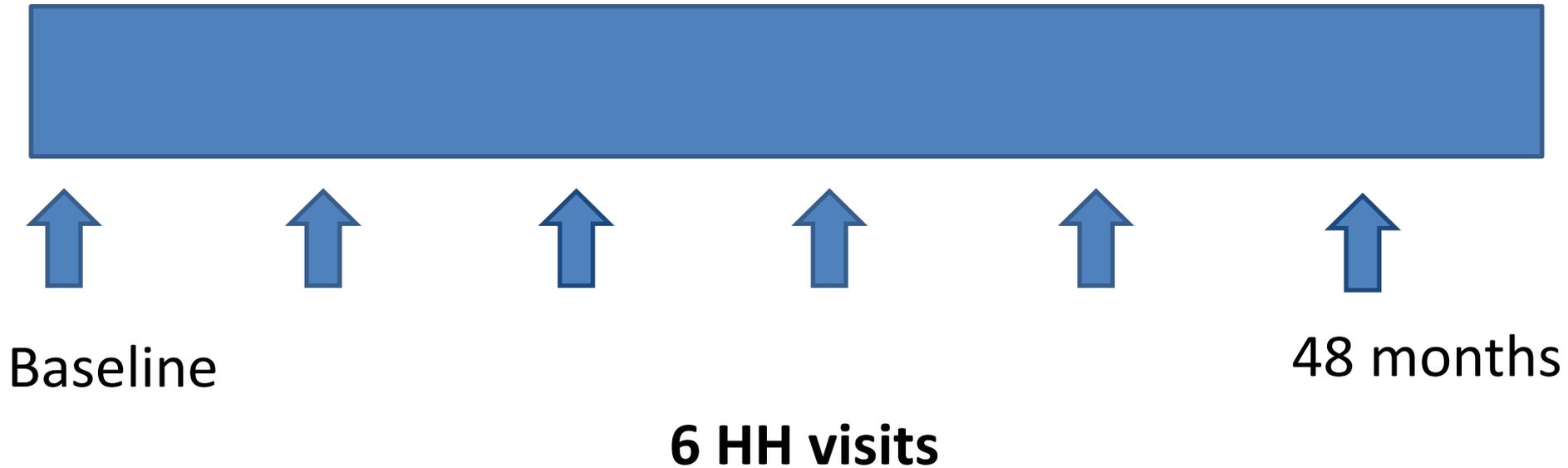
What other (measurable) factors could contribute to child developmental performance?

Objectives

- Assess diet of young rural Nepali children over a period of 4 years
- Evaluate child developmental status at midline and endline
- Explore factors which could influence developmental status
- Relate diet and other factors to developmental status

Methods

Longitudinal study nested within a community development intervention trial in Banke (implemented by Heifer Nepal)





	1	2	3	4	5	6
HH demographics	✓	✓	✓	✓	✓	✓
Anthropometry	✓	✓	✓	✓	✓	✓
Diet recall	✓	✓	✓	✓	✓	✓
Developmental testing			✓			✓
Home quality						✓
Maternal depression						✓



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Developmental testing			✓			✓
Home quality*						✓
Maternal depression^						✓

*Multiple Indicator Cluster Survey, UNICEF

^EPDS Depression Scale

Ages and Stages Questionnaire

- 30 age-specific items, by observation
 - Gross motor
 - Fine motor
 - Problem-solving
 - Personal-social
 - Communication
- Results analyzed by total score and by quartile (lowest 25th %ile vs upper 75th %ile)

Ages & Stages Questionnaire « ASQ »











Participants

- Midline: all 307 children ages 23-38 months

- Endline: all 629 children ages 23-66 months

 - including 207 children who had developmental testing at midline*

- Sub-analysis: 269 children evaluated at all 6 household visits who had developmental testing at least once

*the rest were too old for the ASQ test

Developmental status and household wealth

MIDLINE
N=307

Wealth score



$p < .0001$



ENDLINE
n=629

Wealth score



$p < .0001$



■ upper 75th%ile ■ lowest 25th%ile

ASQ scores

Developmental status and mother's education

MIDLINE
N=307

ASQ score

200

$p < .0001$

ENDLINE
n=629

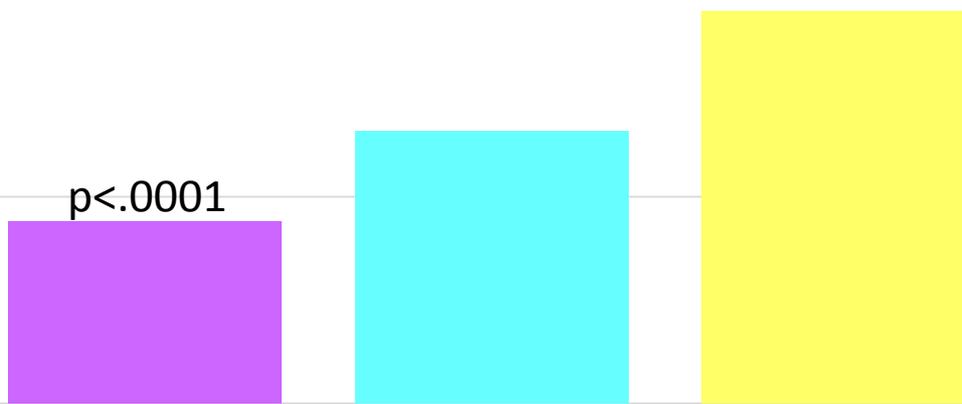
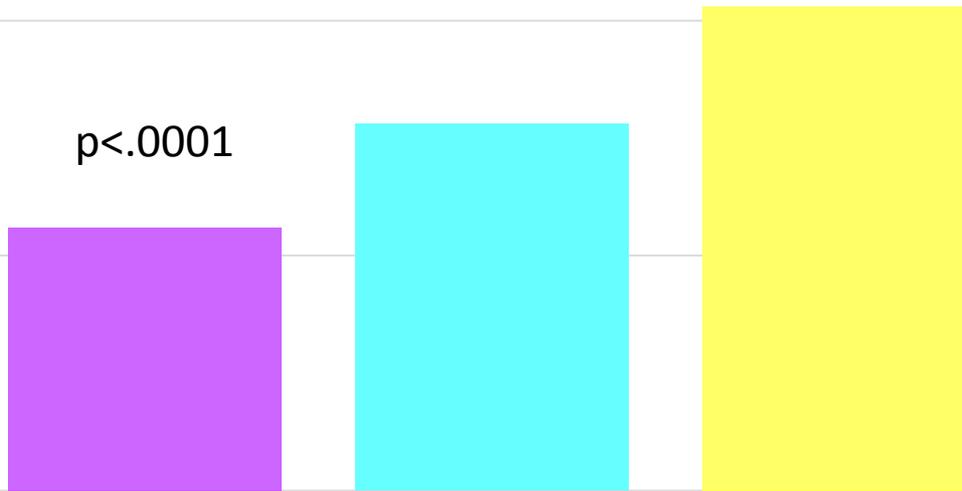
ASQ score

200

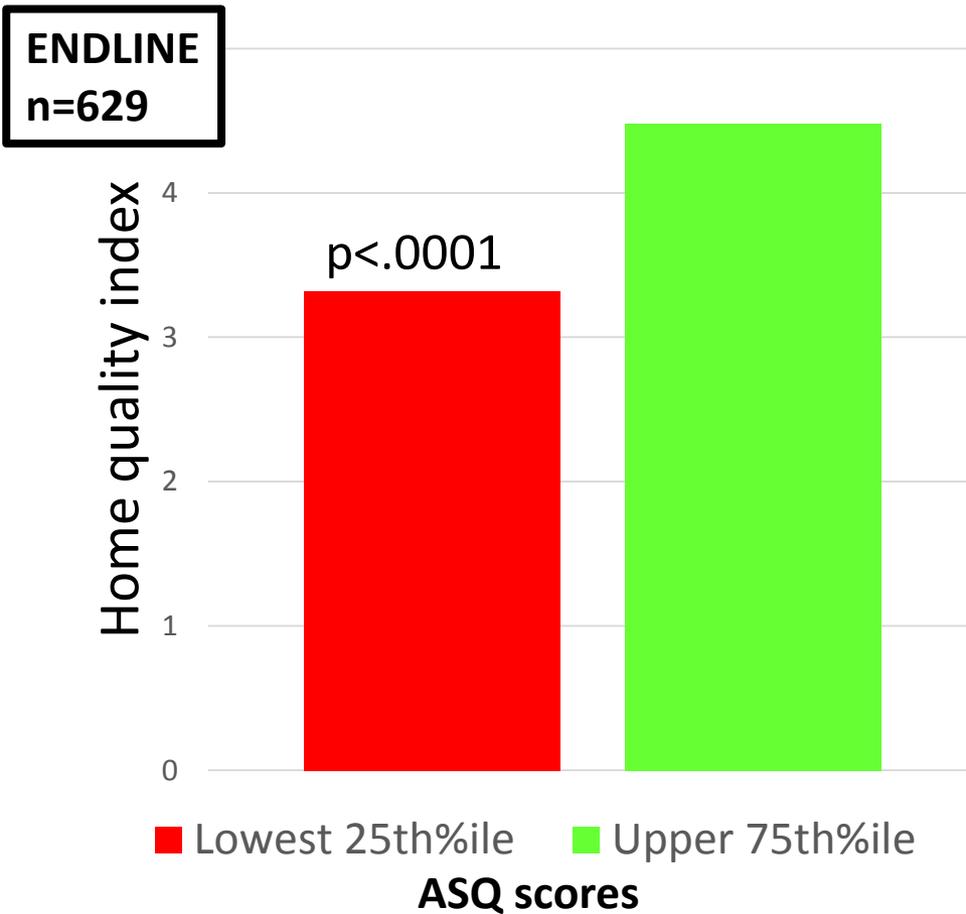
150

None or minimal Primary Secondary

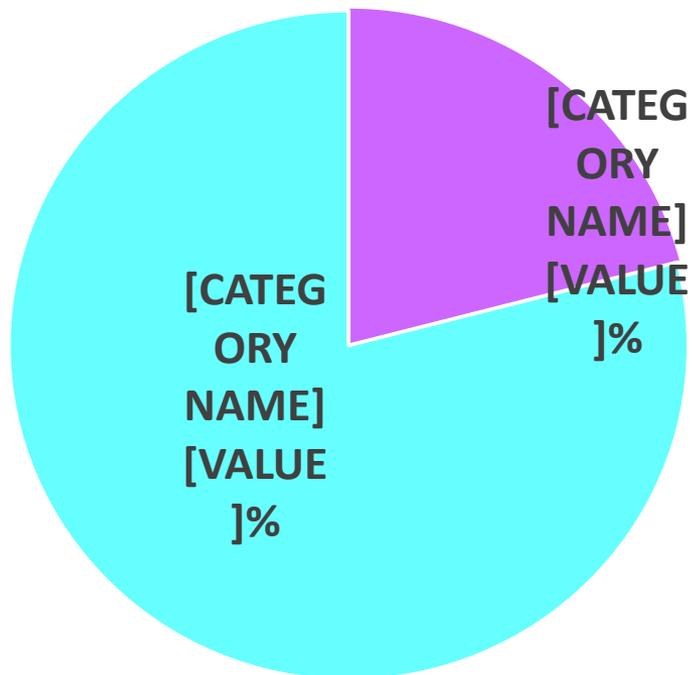
Mother's Educational Achievement



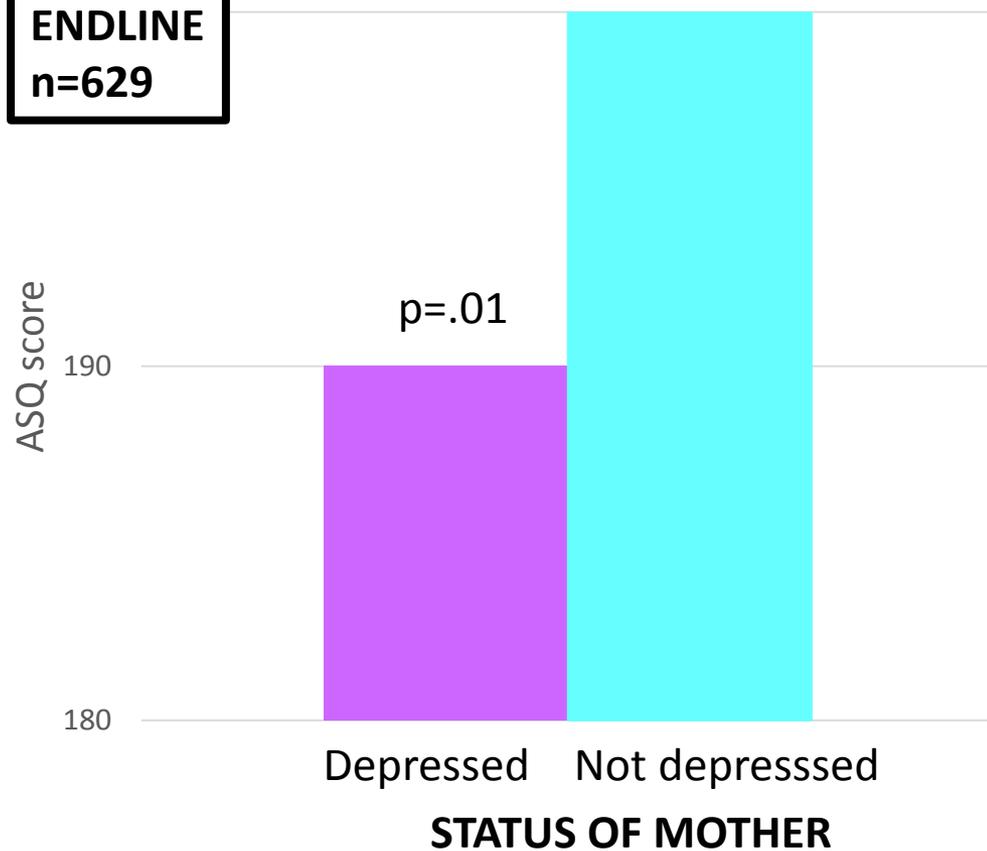
Developmental status and home quality



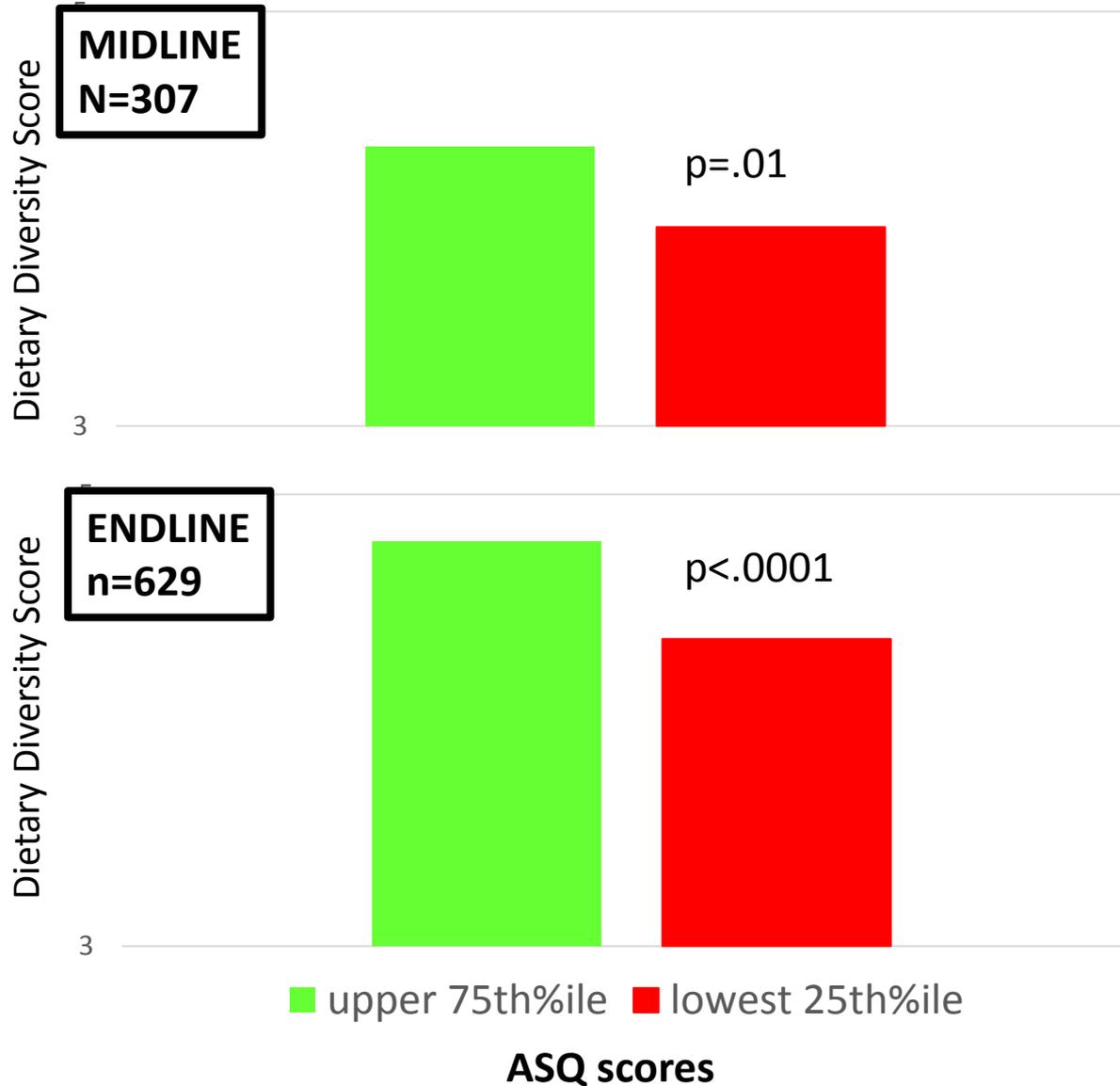
Developmental status and maternal depression



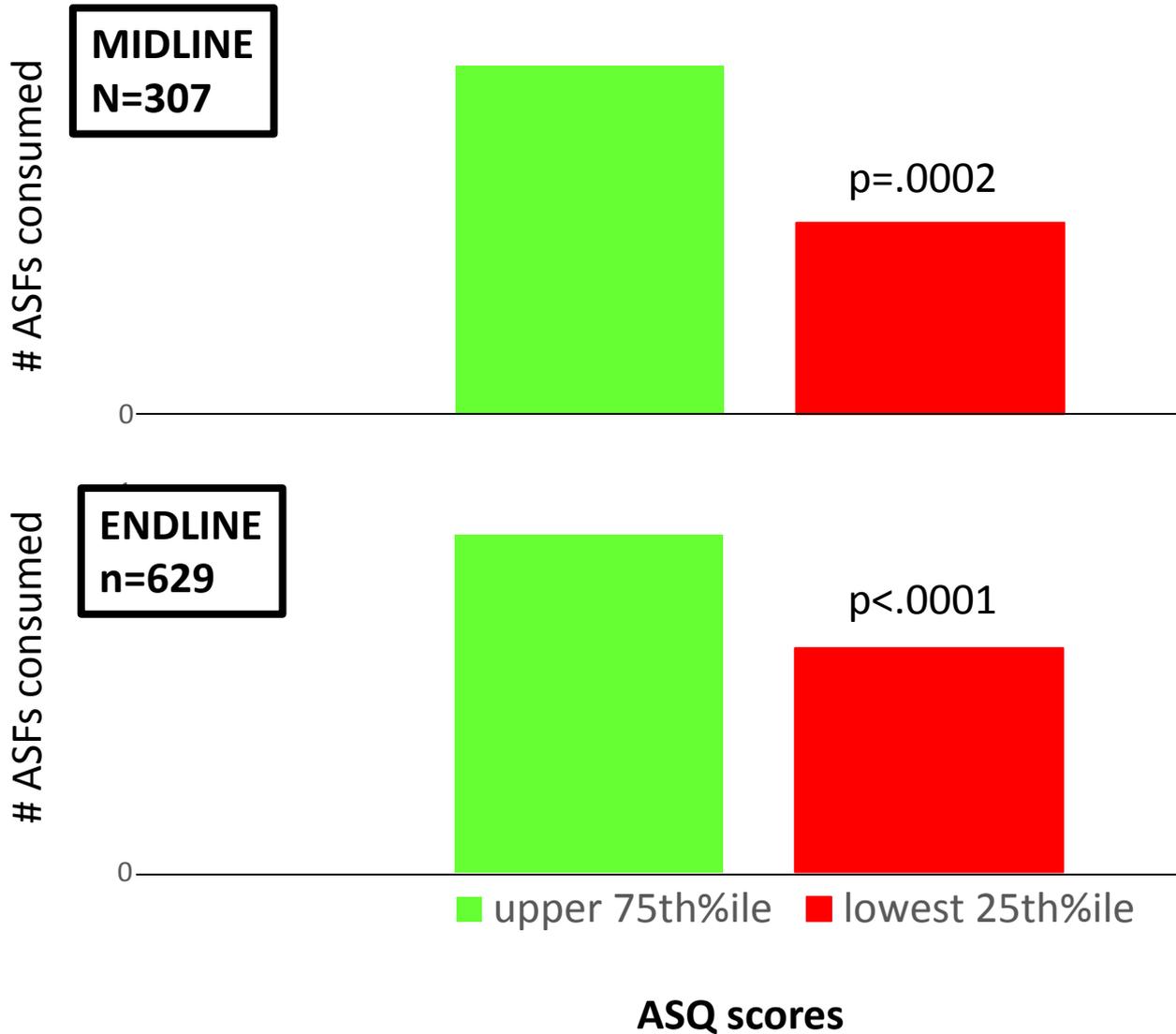
ENDLINE
n=629



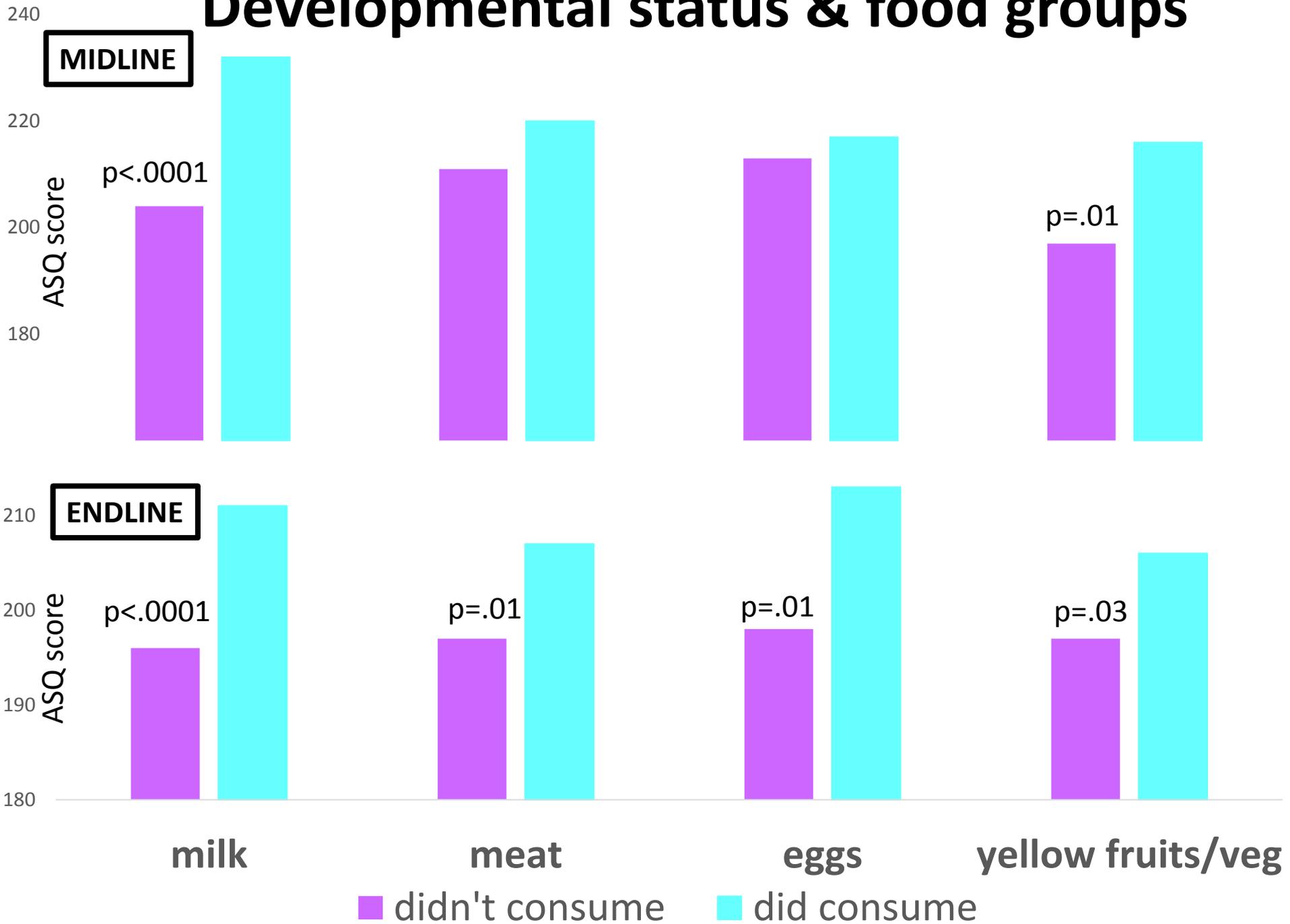
Developmental status & dietary diversity scores



Developmental status & ASF consumption



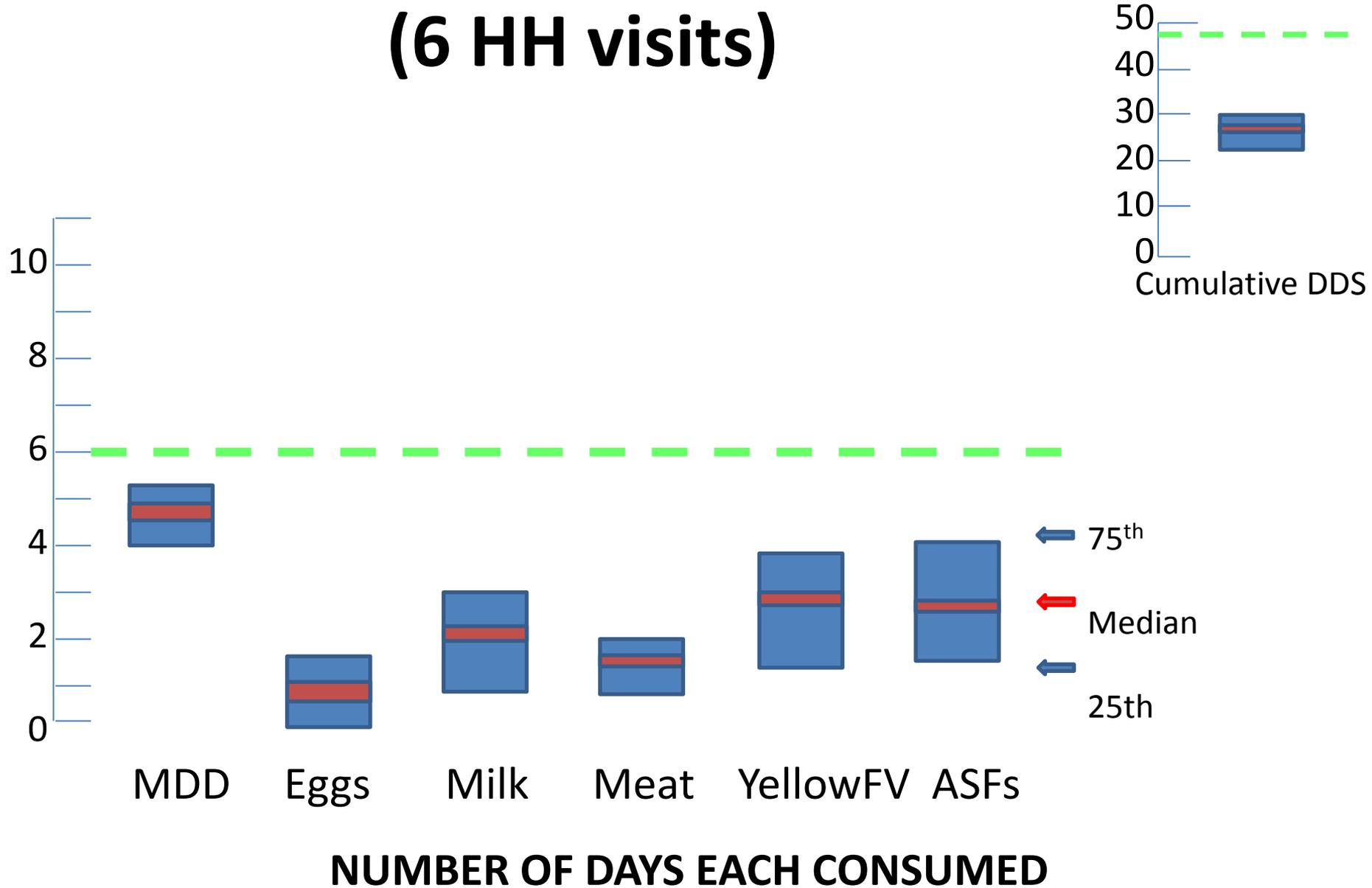
Developmental status & food groups



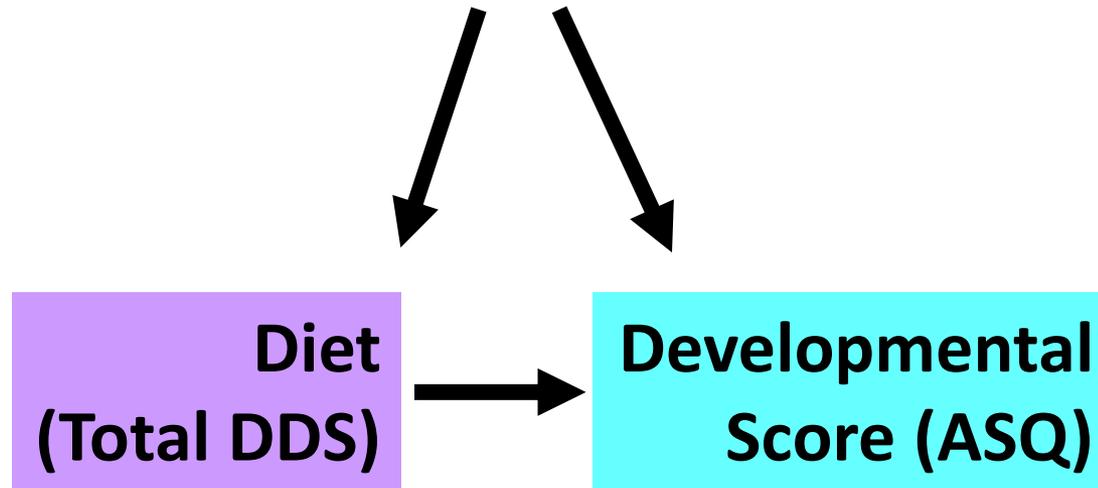
Sub-analysis

- 269 children with all 6 HH visits
- Dietary information over 4 years

Diet intake over 48 months (6 HH visits)

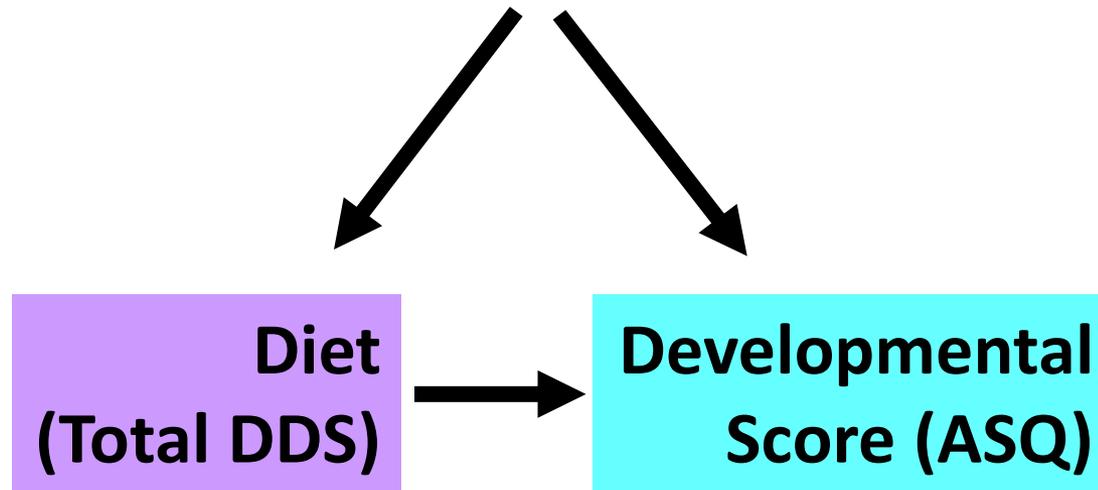


- Age
- Sex
- Intervention group
- Maternal depression
- Maternal education
- Wealth quartile
- Home quality

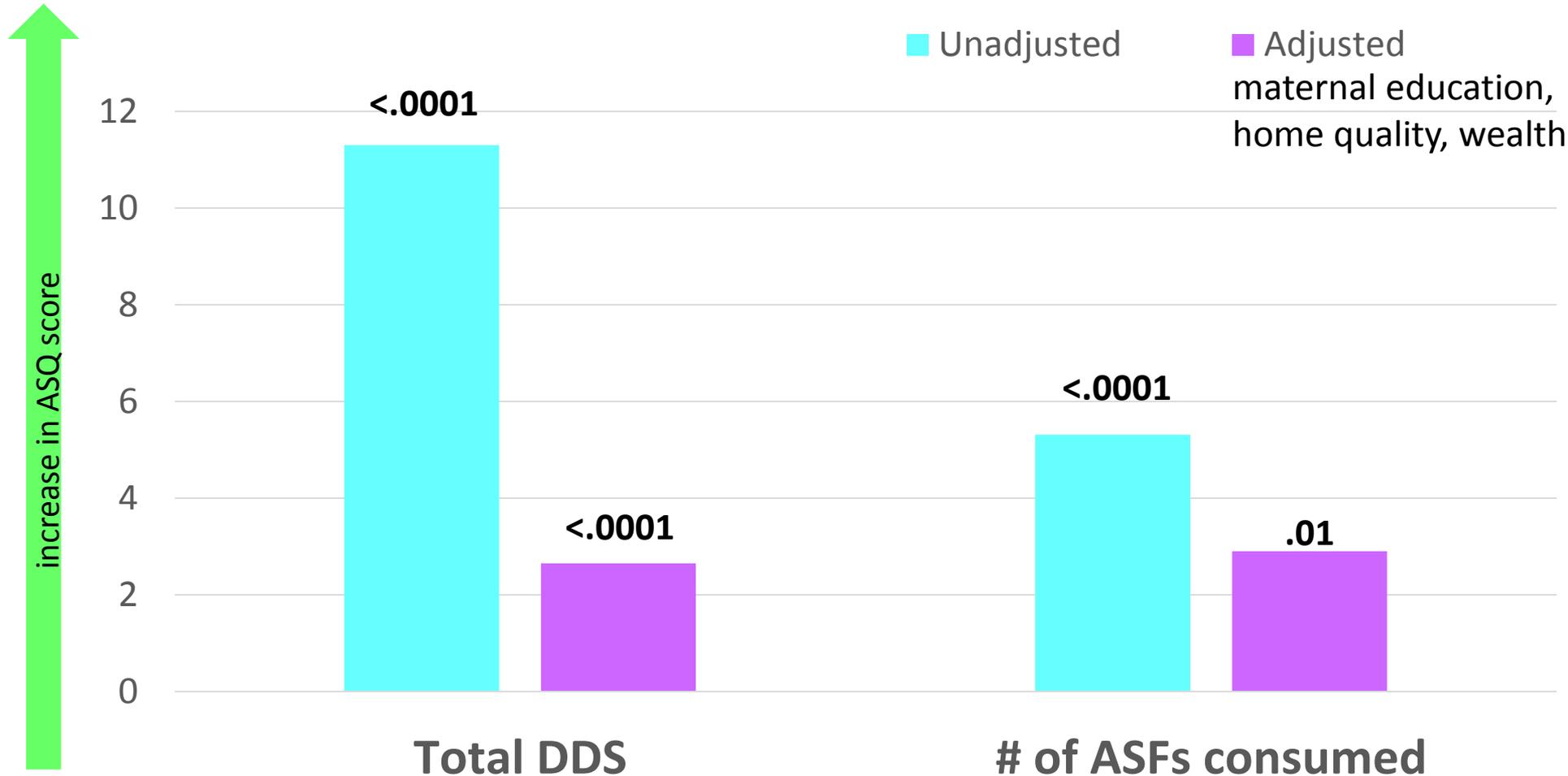


$\geq 10\%$

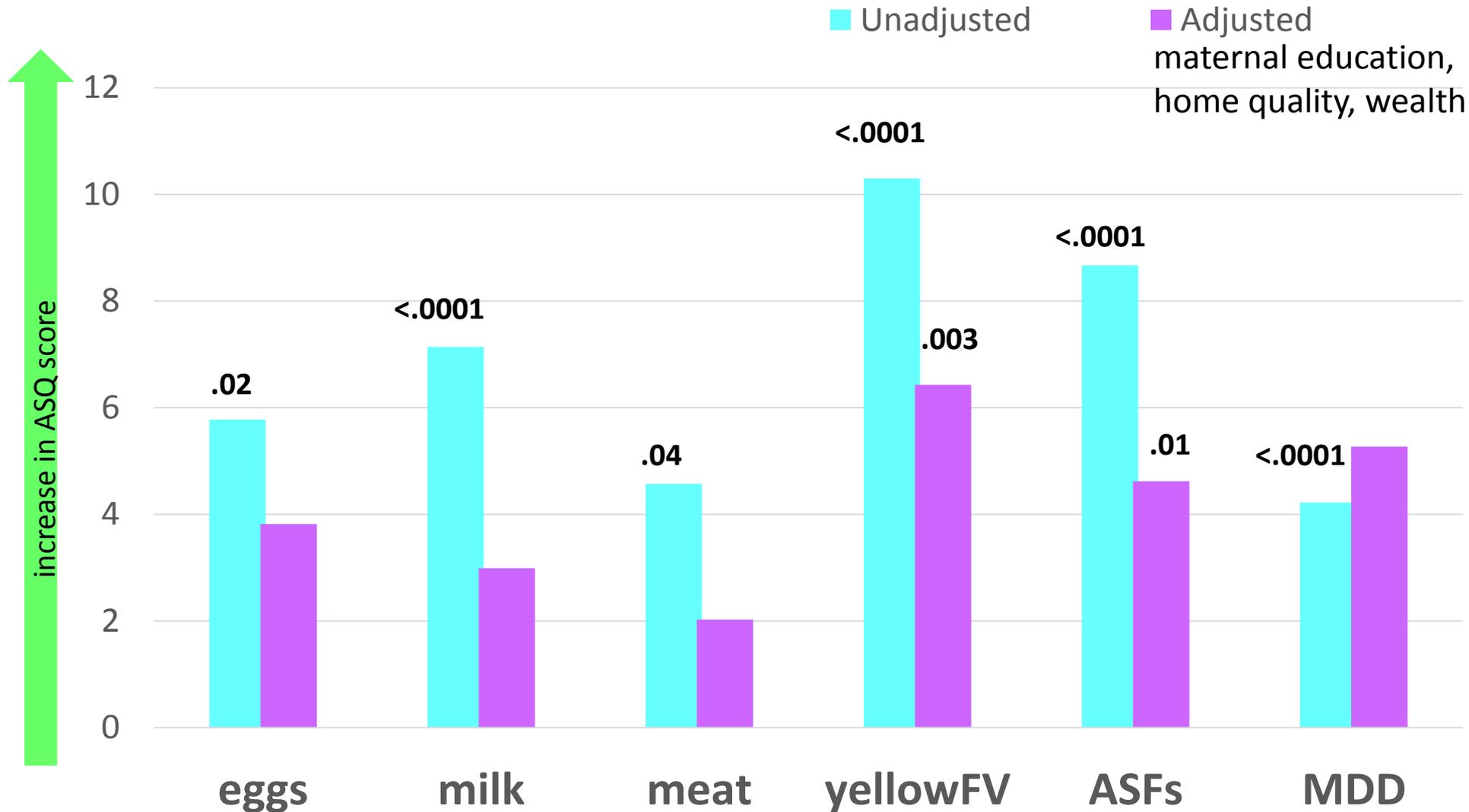
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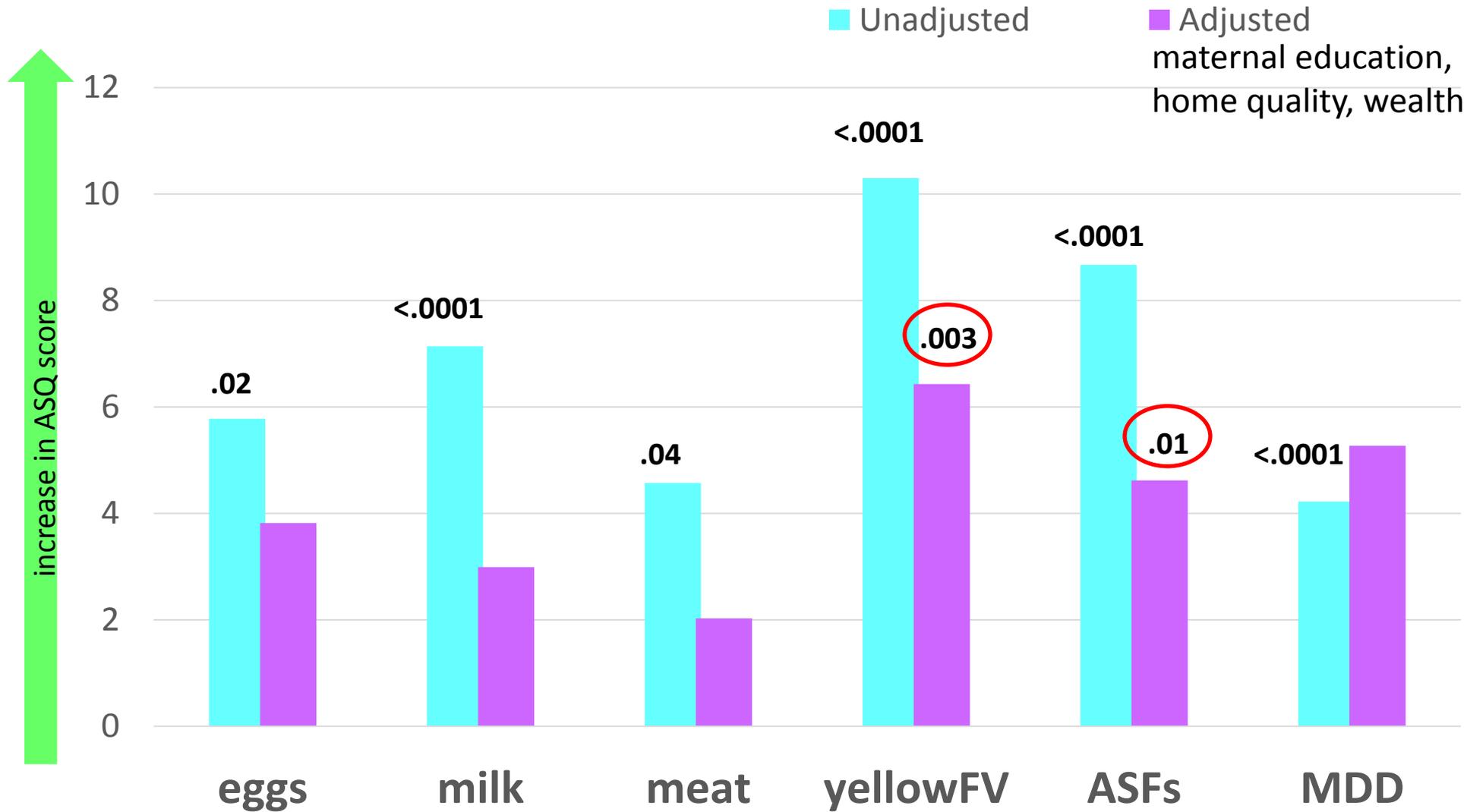
Increase in ASQ score for each increase in...



Increase in ASQ score for each day (of 6) item was consumed



Increase in ASQ score for each day (of 6) item was consumed



Full Model

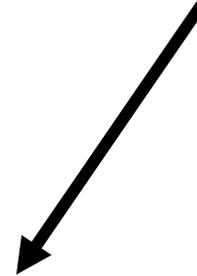
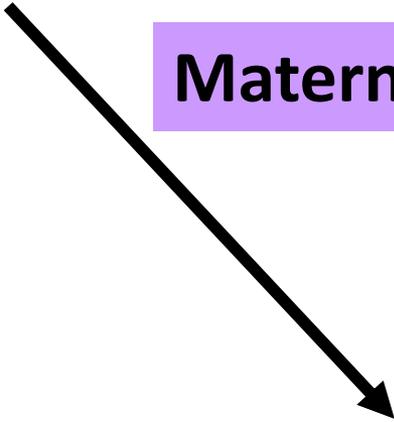
Household wealth

Diet diversity

Maternal education

Home quality

CHILD DEVELOPMENT



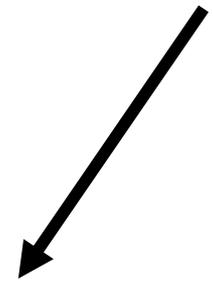
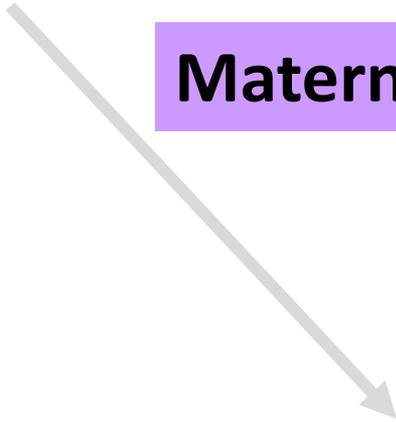
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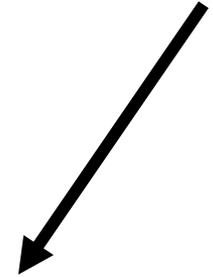
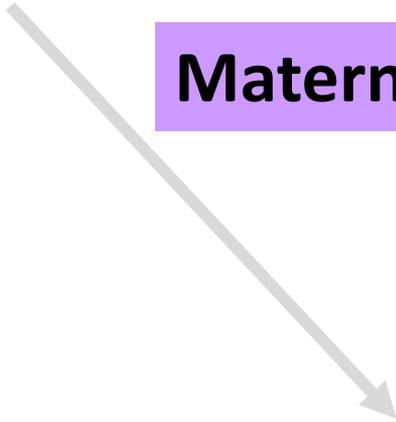
Household wealth

Diet diversity

Maternal education

Home quality

CHILD DEVELOPMENT





- Both cross-sectional and longitudinal results
- Cumulative dietary information 6 times over 4 years provides detailed picture of child diet
- ASQ not “gold standard” test (but informative and practical for use in HH under field conditions)
- Home quality measures by self-report
- Unmeasured variables likely affect outcome

Conclusions

- Dietary quality over time is associated with child developmental performance

- Strength of association between diet and ASQ attenuated by adjusting for confounders

- Multiple aspects of diet and *not just ASFs* are important

- Yellow fruits/veg (possibly as marker of diet diversity)

- Environmental factors including home quality, maternal education, and maternal depression also are associated with child developmental performance (independent of diet)

The Whole Child

Growth assessment is important,
but...

...function is more important



Healthy, developmentally
competent young children
= capable adults



“Early child development is a cornerstone of human development and should be central to how we judge the success of societies”

-World Health Organization, 2018





Acknowledgments

- Heifer Nepal
- Heifer International
- Valley Research Group
- Nutrition Innovation Lab
- Participating families





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Obrigado!

شكراً

Gracias

Merci

Vielen
Dank

Thank You

Ευχαριστώ

धन्यवाद



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