

Nutritional deficits among schoolchildren in rural Tanzania*

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- Collaboration between University Hospital Essen and Sokoine University of Agriculture (Department of Food Technology, Nutrition and Consumer Sciences), Morogoro, Tanzania



LVR-Klinikum Essen
Kliniken und Institut der
Universität Duisburg-Essen

- Embedded into "PALEP-Study" focusing on leptin and physical activity among schoolchildren
- Ethical clearance by University Duisburg-Essen & National Institute for Medical Research

Background cont.

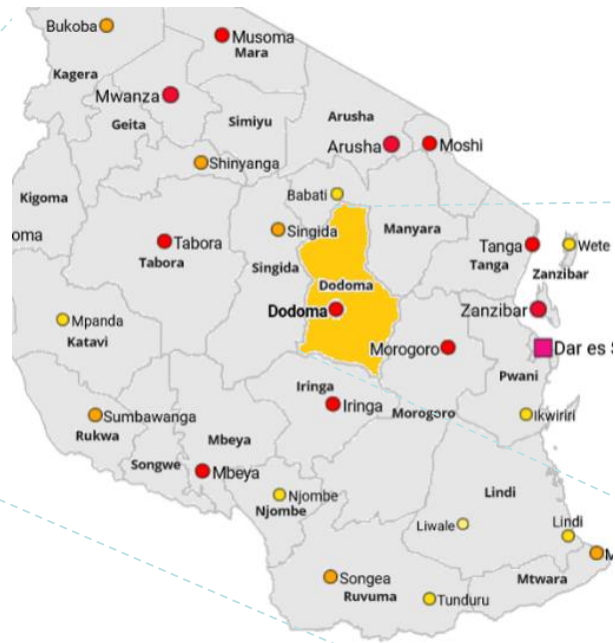
- Lack of nutrition data for schoolchildren in low and middle income countries
- Nutritional status in schoolchildren:
 - BMI-for-age z-scores (BAZ) → thinness
 - Height-for-age z-scores → stunting
 - Mid upper arm circumference (MUAC) → moderate or severe acute malnutrition
- Single studies show rates of undernutrition among schoolchildren in Tanzania 11% to 31%
(Téblick et al., 2017, Comandini et al., 2018, Cordeiro et al., 2012)

To assess ...

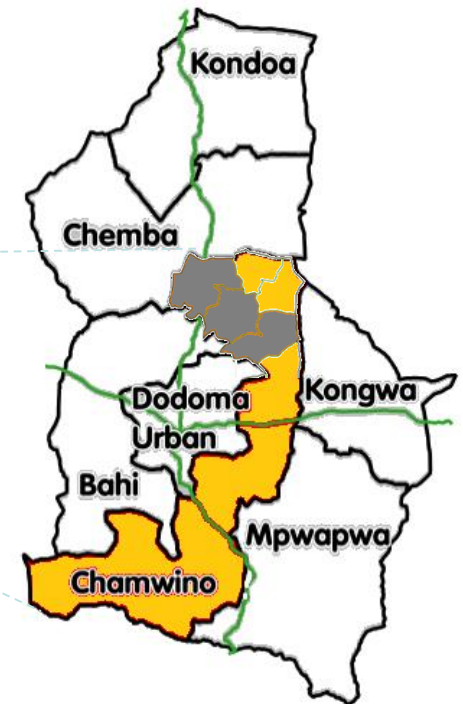
- Nutritional status
- Dietary diversity
- Meal frequency

... among schoolchildren in rural Tanzania

Methods – Study area



(<https://www.citypopulation.de>)



Study population

Inclusion criteria

- Children between 9-12 years of age
- Without chronic or acute disease/infection
- Being able to freely ambulate
- Informed consent form by parents and assent form by children



Data collection (May-September 2019)

Nutritional status

- Body weight
 - Body height
 - MUAC
- } BMI, BMI-SDS/BAZ

Dietary diversity

- 24h dietary recalls
- FAO guidelines for women (10 food groups)
- Individual dietary diversity score (IDDS)
- Minimum dietary diversity (≥ 5 food groups/d)

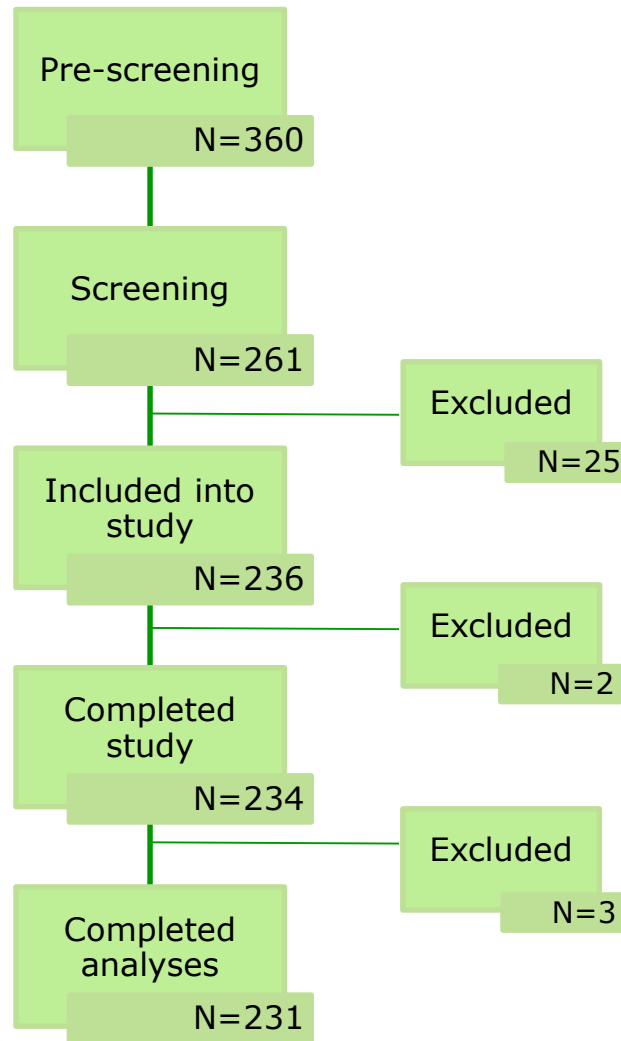
(FAO & FHI 360 2016)

Meal frequency

- 24h dietary recalls
- Recorded time points
- Main meal occasions and snacks



Results – Study flow



Results – Study population

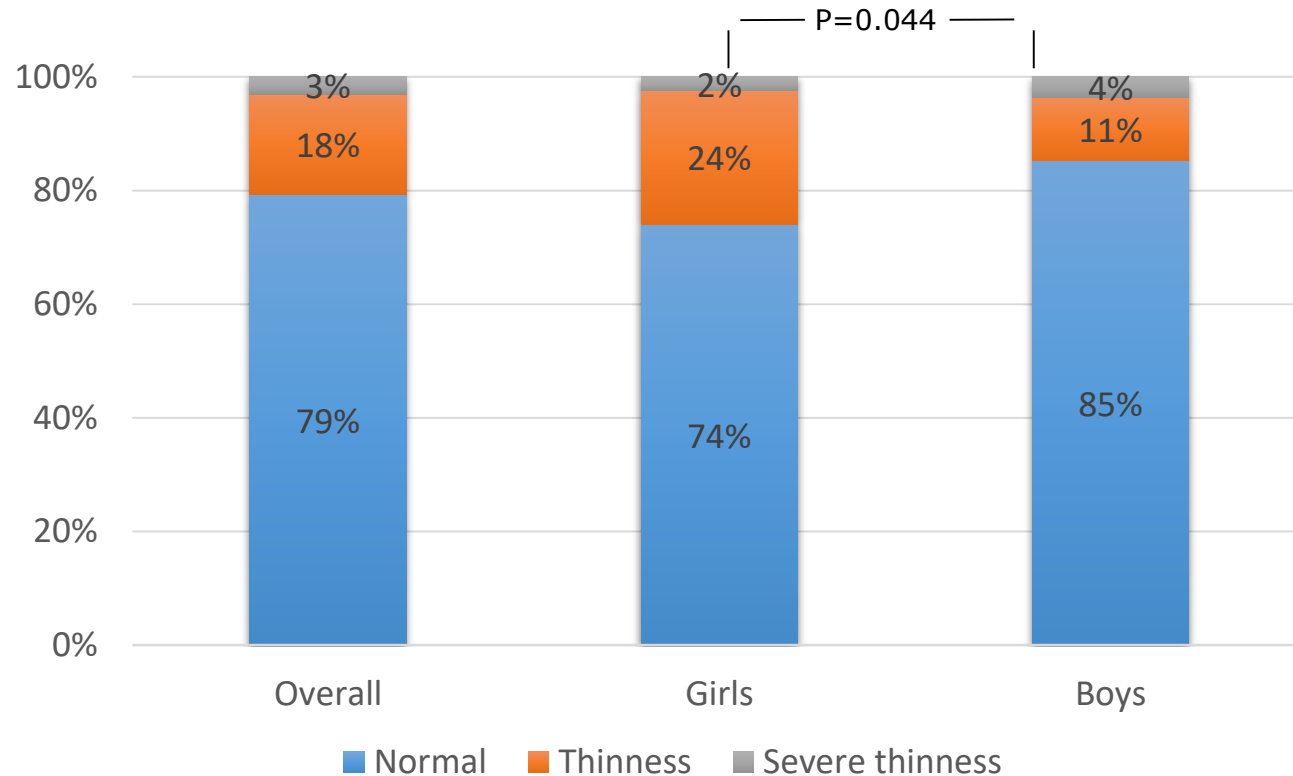
Table 1: Characteristics of schoolchildren in Dodoma Region, n=231

Characteristic	Overall (n=231)	Girls (n=123)	Boys (n=108)
Mother's education [%]	21 no formal education 56 finished primary school		
Father's education [%]	11 no formal education 51 finished primary school		
Household size	6.0 (2.0/13.0)	5.0 (2.0/11.0)	6.0 (2.0/13.0)
Age [years]	11.1 (8.5/12.8)	11.0 (8.8/12.8)	11.1 (8.5/12.6)
BMI [kg/m ²]	14.9 (12.0/18.6)	14.6 (12.0/18.6)*	15.1 (12.8/18.0)*
BMI-SDS	-1.35 ± 6.82	-1.5 ± 0.8	-1.2 ± 0.8

(Results are presented as median (min/max) or mean ± SD *p=0.003)

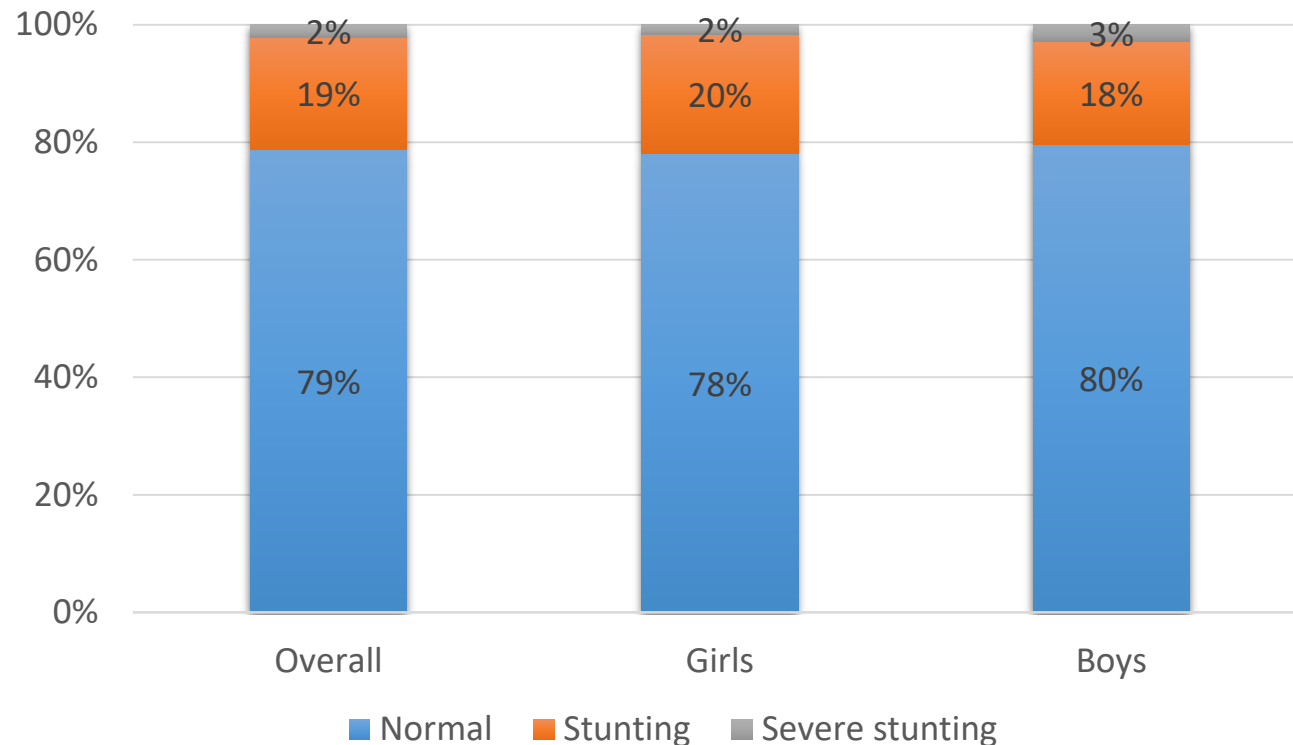
Results – Prevalence of thinness – BMI-for-age

Nutritional status of schoolchildren according WHO growth reference 2007



Results – Prevalence of stunting – height-for-age

Nutritional status of schoolchildren according WHO growth reference 2007



Overall, 36% of children were undernourished (38% girls, 33% boys)

Results – Dietary diversity & meal frequency

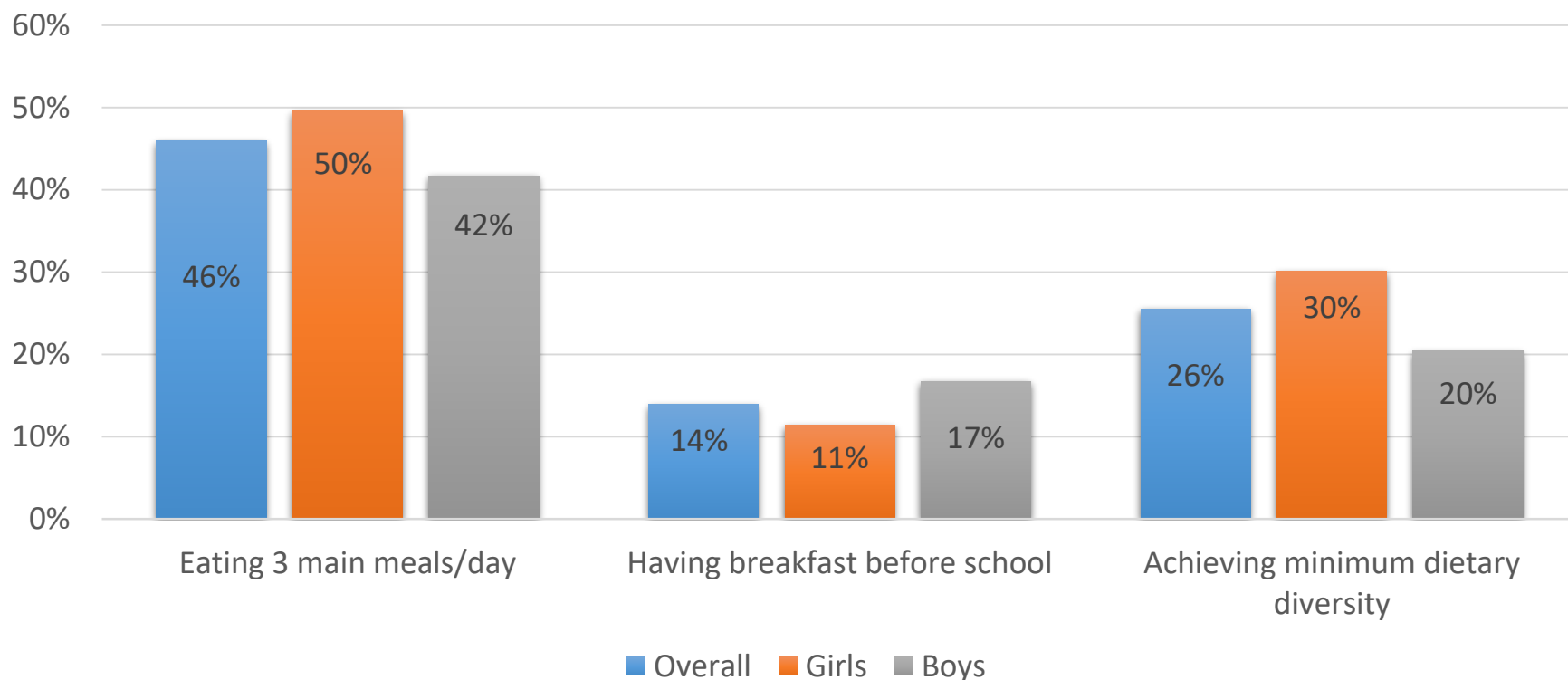
Table 2: Nutrition indicators among schoolchildren in Dodoma Region, n=231

Nutrition indicator	Overall (n=231)	Girls (n=123)	Boys (n=108)
Dietary diversity score	4.5 (2.0/6.5)	4.5 (2.0/6.5)*	4.0 (2.5/6.0)*
Main meal frequency	2.5 (1.5/4)	2.8 (1.5/4)	2.5 (1.5/3.5)
Snack frequency	1.0 (0.0/3.5)	1.0 (0.0/3.5)	1.0 (0.0/3.0)
Total meal frequency	3.5 (2/6)	3.5 (2.0/6.0)	3.5 (2.0/5.5)

(Results are presented as median (min/max), *p=0.02)

Results – Dietary diversity & meal frequency cont.

Percentage of schoolchildren achieving various nutrition indicators



Associations

- No association between dietary diversity and nutritional status
- Age with BAZ -0.217^{**}
- Sex of child (1=girl, 2=boy) with BAZ 0.161^{**} and IDDS -0.153^*
- DDS with main meal 0.283^* and total meal frequency 0.409^*
- Education of mother with main meal frequency 0.153^*

Based on Spearman-Rho; $**p=0.01$, $*p=0.05$

Discussion & Outlook

- No association between dietary diversity and nutritional status
 - Low variance
 - Small sample size
- No representative sample
- Rates of undernutrition are comparable to previous studies
- Risk groups for undernutrition
- Next: calculate macro- and micronutrient intakes
- Need to identify drivers for nutrition/food choices of schoolchildren
- Need of a specific dietary diversity score for schoolchildren?



Thank you!

C. Erfle

Prof. Dr. L. Libuda

Prof. Dr. J. Hebebrand

Dr. A. Mwanri

Enumerators

Drivers

Children and their parents

Schools and communities

Chamwino district administration

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