Prevalence and Characteristics of Malnutrition in Hospitalized Children in Lao People's Democratic Republic

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Introduction

- Malnutrition is defined as an imbalance between nutrient requirements and intake; resulting in deficiencies of energy, protein, or micronutrients that may negatively impact cognitive and physical development, immunity, wound healing, and other important health outcomes.
- In 2017, an estimated 33% of children under five years of age were stunted in Lao PDR, 21.1% were underweight, and 9% were wasted.
- Malnutrition rates may be even higher in hospitalized children yet malnutrition screening tools are currently not used to assess risk of malnutrition among hospitalized pediatric patients.

Methods

General Design:

- A cross-sectional pilot study was conducted between August and September 2018 to determine prevalence of malnutrition among pediatric patients admitted to Mahosot and Settathirath Hospitals, two national hospitals in Vientiane, Lao PDR.
- Malnutrition diagnosis was determined within 24 hours of admission in all children 1 month to 5 years of age who were admitted to infectious disease and general pediatric wards.
- This study was approved by the Lao Health Research Ethical Review and written consent was obtained from caregivers.
- All study personnel received training to execute measurements for consistency of outcomes.

Study Variables:

- Height and weight were measured using length boards, stadiometer, and digital scales.
- Length/height-for-age, weight-for-height/length and BMI-for-age z-scores were calculated using World Health Organization (WHO) reference data.
- Mid-Upper Arm Circumference (MUAC) was measured using a flexible, non-stretch tape measure, measuring half way between the elbow and the acromion process. Three measurements were taken and the average was used for analysis.
- Malnutrition diagnosis was categorized as mild, moderate, or severe using Academy/ASPEN criteria.
- Stunting, underweight, and moderate to severe wasting was defined by a value two standard deviations below the WHO standards.

Statistical Analysis:

- Frequency was used to determine prevalence of malnutrition by sex and age.
- Odds ratios with a 95% confidence interval determined likelihood of being malnourished between groups (boys/girls; 1-24 months/>2-5 years). Significance was set at $P < 0.05$.
- STATA/IC 15.1 was used to perform all statistical analysis and to generate images and figures.

Results

Table 1. Participant Characteristics*

Anthropometric Measurements for Lao Pediatric Hospitalized Patients			
Characteristics	**Total**	**Boys**	**Girls**
1-24 months	**n=23**	**n=13**	**n=10**
Age	11 ± 6.13	12 ± 6.69	11 ± 5.62
	(1-23)	(1-23)	(3-22)
Wt (kg)	8.3 ± 2.03	8.5 ± 2.16	7.9 ± 1.91
	(4.7-12.1)	(4.7-12.1)	(5.2-11)
Ht (cm)	69 ± 7.54	70 ± 7.25	68 ± 8.18
	(55-83)	(58-83)	(55-81)
MUAC (mm) Boys n=10; Girls n=9	144 ± 20	143 ± 16	145 ± 28
	(107-170)	(107-170)	(113-150)
>2-5 years	**n=24**	**n=13**	**n=11**
Age	3.16 ± 0.98	3.11 ± 0.91	3.23 ± 1.10
	(2-5)	(2-4.83)	(2-5)
Wt (kg)	13.0 ± 2.83	12.5 ± 1.64	13.6 ± 3.82
	(9-21.3)	(10.8-16)	(9-21.3)
Ht (cm)	93 ± 7.97	91 ± 6.80	96 ± 8.61
	(80-106)	(0.81-1.03)	(80-106)
MUAC (mm) Boys n=10; Girls n=9	151 ± 24	144 ± 12	161 ± 32
	(130-213)	(130-173)	(130-213)

*Values represent: mean ± standard deviation (range)

Figure 1. Z-Score Distribution by Age Group

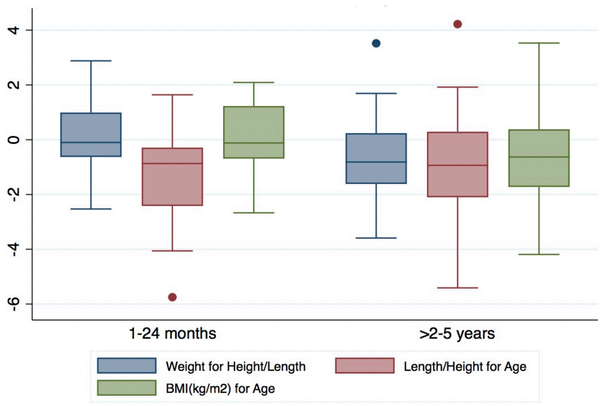


Figure 2. Prevalence of Underweight by Age Group

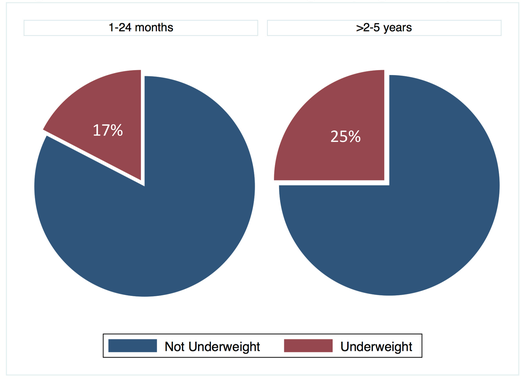


Figure 3. Prevalence of Stunting by Age Group

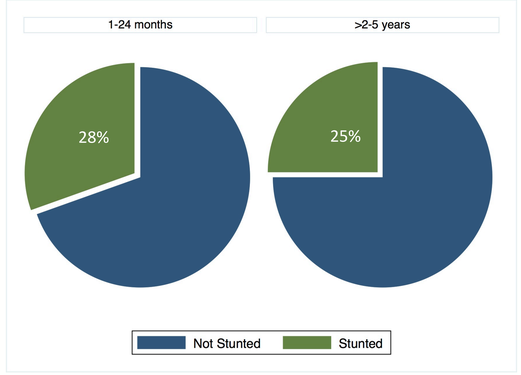
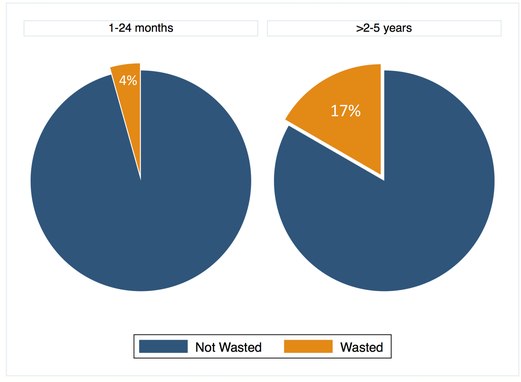


Figure 4. Prevalence of Wasting by Age Group



Hospitalized malnourished children in Lao, PDR

Figure 5. Malnutrition Diagnostic Category by Age Group

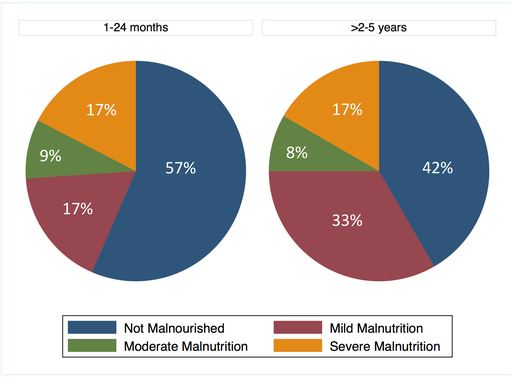
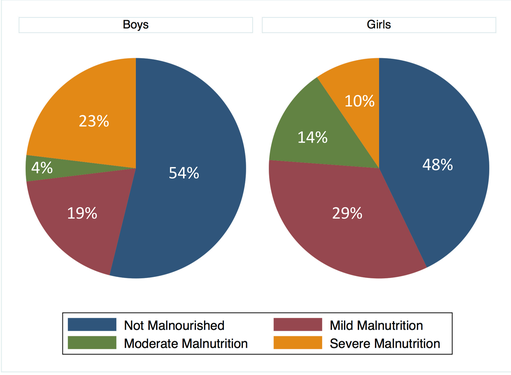


Figure 6. Malnutrition Diagnostic Category by Sex



Summary & Conclusion

- To our knowledge this is the first study assessing rates of hospital based pediatric malnutrition in Lao, PDR.
- Our results indicate that nearly half of hospitalized pediatric patients presented with a malnutrition diagnosis of mild, moderate, or severe protein-calorie-malnutrition.
- Rates of wasting and underweight were higher in a hospitalized setting for children >2-5 years of age compared to 2017 WHO community data as stated in the introduction.
- The 1-24 month age group was no more likely to be malnourished than the >2-5 years age group (OR: 0.59, 95% CI: 0.18-1.90, p=0.38).
- Boys were no more likely to be malnourished than girls (OR: 0.78, 95% CI: 0.25-2.47, p=0.67).

Future Direction & Relevance

- This preliminary data provides information that can be used to create future hypothesis driven, powered studies.
- Such studies are needed to secure funding and create policies for implementing malnutrition screening and intervention protocols in Lao, PDR.

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