

# Reliability of a Malnutrition Risk Screening Tool for Hospitals in Lao PDR

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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, 9% were wasted. From 2014 to 2016 in Lao PDR there was an average of 1.2 million malnourished people over 18 years of age.
- Malnutrition rates may be even higher in hospitalized individuals yet malnutrition screening tools are currently not used to assess risk of malnutrition among hospitalized patients. To address this gap, we designed a malnutrition risk-screening tool (MRST) to identify patients at risk for malnutrition.

**Study Aim:** assess inter-user reliability of the MRST.

## Methods

### General Design:

- A cross-sectional pilot study was conducted between August and September 2018 among patients admitted to two national hospitals in Vientiane, Lao, PDR.
- The MRST was completed by two independent observers. One observer was specifically trained to administer the MRST.
- Study participants include pediatric patients 1 month to 17 years of age and adults  $\geq 18$  years of age who were admitted to the hospital up to 24 hours before completing the MRST.
- This study was approved by the Lao Health Research Ethical Review and written consent was obtained from patients or caregivers.
- Study personnel were trained to execute measurements for consistency of outcomes.



### Study Variables:

- The MRST consists of four items: presence of a high-risk disease, weight loss and inadequate rate of weight gain, subjective clinical assessment, and adequacy of nutritional intake. Each item was allocated a score of 0, 1, or 2 points with a maximum total score of 5 points.
- A final MRST score of 0 points indicates low risk, 1-3 points indicates moderate risk, and 4-5 points indicates high risk of malnutrition.
- Age, sex, height, weight, reason for admission, and admission date and time were recorded. Height and weight were measured using length boards and stadiometer, and digital scales.

### Statistical Analysis:

- Cohen's Kappa Coefficient ( $\kappa$ ) was used to determine inter-rater reliability (Table 2).
- STATA/IC 15.1 was used to perform all statistical analyses.

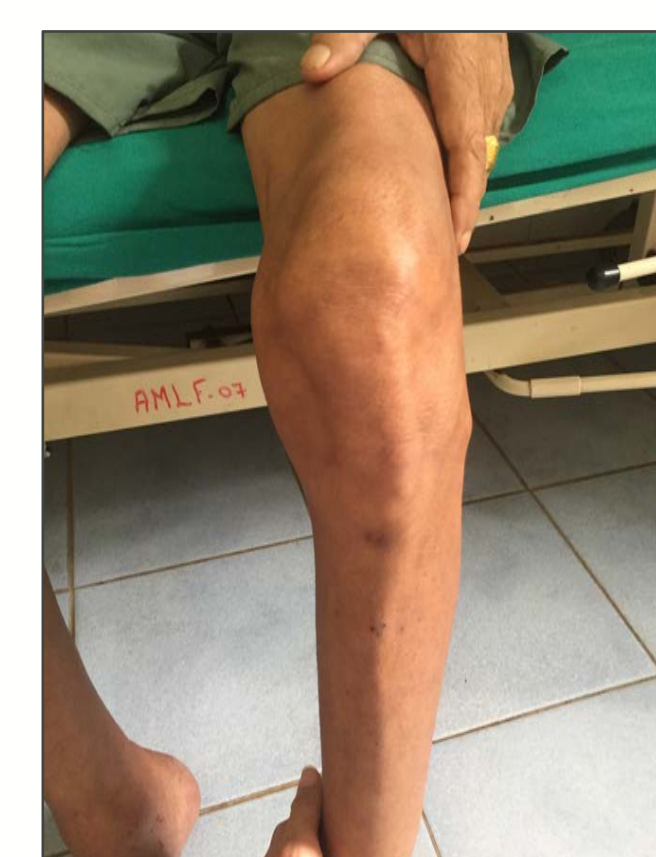
## Results

**Table 1. Patient Characteristics**

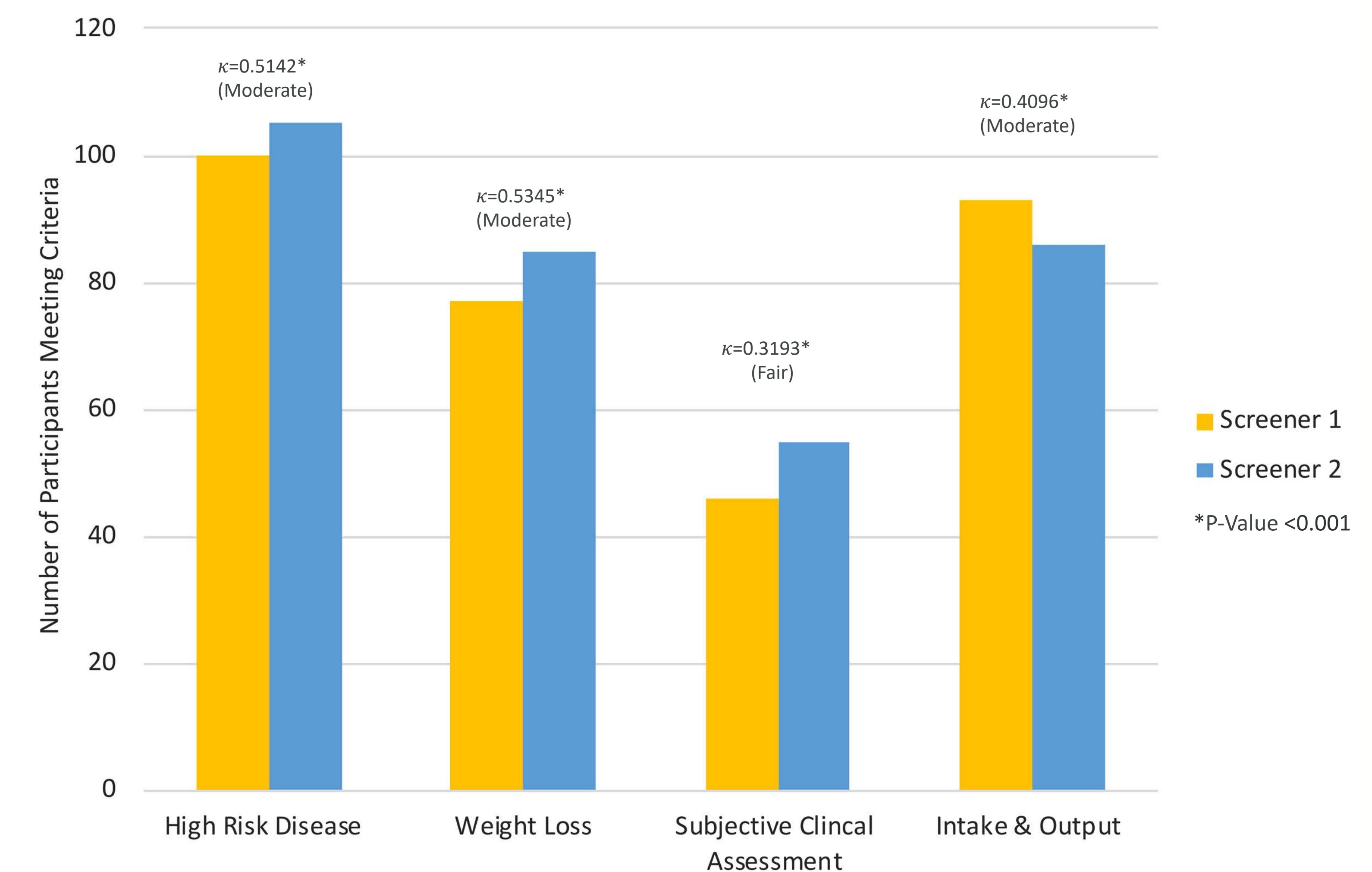
	Total n (%)	Risk of Malnutrition		
		Low n (%)	Moderate n (%)	High n (%)
<b>General</b>	194 (100)	47 (24)	87 (45)	60 (31)
<b>Age</b>				
0-17 years	69 (36)	15 (22)	39 (56)	15 (22)
$\geq 18$ years	125 (64)	32 (26)	48 (38)	45 (36)
<b>Sex</b>				
Male	99 (51)	16 (16)	46 (46)	37 (37)
Female	95 (49)	30 (32)	41 (43)	23 (25)
<b>Hospital</b>				
Mahosot	126 (65)	17 (14)	62 (49)	47 (37)
Setthathirath	68 (35)	30 (44)	25 (37)	13 (19)
<b>Reason for Admission</b>				
Respiratory	50 (30)	7 (14)	25 (50)	18 (36)
Infection	20 (10)	3 (15)	12 (60)	5 (25)
Surgical	12 (6)	5 (42)	4 (33)	3 (25)
Gastrointestinal	17 (9)	3 (18)	8 (47)	6 (35)
Other	94 (48)	29 (31)	37 (39)	28 (30)

**Table 2. Inter-User MRST Final Score Reliability by Variable**

	Agreement (%)	Expected Agreement (%)	Kappa $\pm$ SE	P-Value
<b>Total Population</b>				
Final Score (n=194)	40.21	17.67	0.27 $\pm$ 0.03 (Fair)	< 0.0001
Risk Category (n=194)	60.31	36.37	0.38 $\pm$ 0.05 (Fair)	< 0.0001
<b>Age Group (years)</b>				
0-4 (n=45)	44.44	22.67	0.28 $\pm$ 0.07 (Fair)	<0.0001
5-17 (n=24)	12.50	16.15	-0.04 $\pm$ 0.08 (Poor)	0.695
18-64 (n=108)	44.44	17.36	0.32 $\pm$ 0.04 (Fair)	< 0.0001
$\geq 65$ (n=17)	41.18	20.42	0.26 $\pm$ 0.12 (Fair)	0.0118
<b>Hospital</b>				
Mahosot (n=126)	38.89	16.48	0.27 $\pm$ 0.04 (Fair)	< 0.0001
Setthathirath (n=69)	42.65	22.75	0.26 $\pm$ 0.06 (Fair)	< 0.0001
<b>Ward</b>				
Pediatric (n=60)	30.00	19.94	0.13 $\pm$ 0.06 (Slight)	0.02
Surgery (n=32)	39.29	20.54	0.24 $\pm$ 0.09 (Fair)	0.0048
Internal Medicine (n=16)	31.25	17.58	0.17 $\pm$ 0.10 (Slight)	0.0537
Obstetrics/Gynecology (n=15)	60.00	33.33	0.40 $\pm$ 0.11 (Fair)	0.0002
Infectious Disease (n=33)	43.45	16.99	0.34 $\pm$ 0.07 (Fair)	< 0.0001
Pulmonary (n=27)	48.15	21.95	0.34 $\pm$ 0.09 (Fair)	0.0002
Endocrinology (n=10)	30.00	20.00	0.13 $\pm$ 0.14 (Slight)	0.192



**Figure 1. Inter-User Comparison of MRST Criteria**



## Summary & Conclusion

- To our knowledge this is the first study assessing the use of a screening tool for hospital-based malnutrition in Lao, PDR.
- The MRST final scores showed fair agreeability ( $\kappa = 0.38$ , p-value < 0.001). Comparing the first and second observers, 25% and 24% were classified as low-risk, 51% and 45% as moderate-risk, 24% and 31% as high-risk, respectively.
- For both raters, "presence of high-risk disease" was the most commonly met criteria and had moderate agreeability ( $\kappa = 0.51$ ). "Subjective clinical assessment" was the least met criteria and had the lowest agreeability ( $\kappa = 0.32$ ).
- Patients admitted to pediatric ( $\kappa = 0.13$ ) and endocrinology ( $\kappa = 0.13$ ) wards had the lowest agreeability, while those admitted to obstetrics/gynecology ( $\kappa = 0.40$ ) and infectious disease ( $\kappa = 0.34$ ) wards had the highest level of agreement.

## Future Direction & Relevance

- This preliminary data suggests the need to provide additional user education on all wards for the hospital staff completing the MRST. In particular, the hospital staff working in the pediatric, internal medicine, and endocrinology wards may require additional training.
- Additional training may also be required for completing the subjective clinical assessment criteria of the MRST, as it had only fair agreeability between users.
- A reliable tool is needed to advocate for policy changes to implement malnutrition screening of all patients upon admission to initiate timely nutrition intervention if warranted.

## Acknowledgments

Thank you to OHSU Global who awarded Hannah Wilson with a travel grant and to all of the LANI students and Xayiou Sitpaseuth who served as an interpreter during data collection. All photos were taken with consent.