Hospital Malnutrition Screening and Early Nutritional Intervention

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Malnutrition

- Imbalance in nutrition: under & over nutrition
- Under-nutrition:
  - Deficiency in dietary intake
  - Increased requirements associated with a disease:
    - Poor absorption
    - Excessive nutrient losses

Barker et al, 2011.

Hospital malnutrition by ESPEN: combination of cachexia and malnutrition

- Cachexia, sarcopenia and malnutrition
- Cachexia:
  - A multifactorial syndrome characterized by severe body weight, fat and muscle loss and increased protein catabolism due to underlying diseases
- Sarcopenia:
  - Loss of muscle mass and function
- Malnutrition:
  - Inadequate consumption of nutrients

Barker et al, 2011.

Negative outcomes for patients

- Hospital malnutrition:
  - Higher infection & complication rates
  - Increased muscle loss
  - Impaired wound healing
  - Longer length of hospital stay
  - Increased morbidity & mortality

Barker et al, 2011.

Crit Care Shock (2017) 20:10-16

Prevalence and association of cost and hospital malnutrition in Pediatric Intensive Care Unit Sanglah Hospital during 2015

Daisy Suriadji, Dyah Kanya Wati, I Gusti Lanang Sidiartha, Ida Bagus Suparyatha, I Nyoman Budi Hartawan

Table 3. Independent sample t-test for in-hospital malnutrition and mean of length of stay

Group	n	Mean (SD)	Mean difference (95% CI)	p
In-hospital malnutrition				<0.001
- Yes	13	14.000 (1.225)	10.869	
- No	443	3.231 (0.663)	(10.491-11.247)	

Malnutrition was observed in 72 patients during PICU admission, 56 during discharged and only 13 during hospitalization. Hospital malnutrition was associated with additional cost of Rp 5,500,000.

Identification of malnutrition in hospital

- **All children admitted to hospital are at risk of developing malnutrition, even when nutritional status is normal at the time of admission.**
- Scoring system:
  - Simple pediatric nutritional risk score
    - [intake < 50%(1); pain (1); grade II (1); grade III (3) ➔ score 1-2 moderate risk; score ≥ 3 high risk]
  - Subjective global nutritional assessment (SGNA)
  - **STRONGkids**

Sermet-Gaudilus et al, 2000
Secker et al, 2007
Hulst et al, 2010

Prevention of hospital malnutrition

- **Nutritional Support Team (NST)**
  - implement patient screening for nutritional risk.
  - identify patients who require nutritional support.
  - ensure provision of effective nutritional management for patients.
  - plan home nutrition after discharge.
  - educate hospital staff with respect to identification and management of nutritional problems.
  - monitor and evaluate practice.

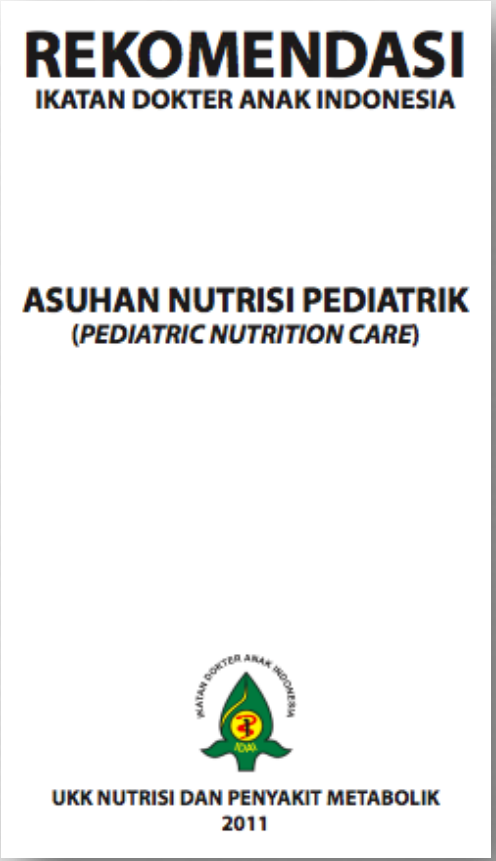
Composition of NST

- Pediatrician knowledgeable in nutrition
- Dietician/nutritionist,
- Nurse and,
- Pharmacist

- **This is our first team ➔**

Nutrition care activities: Pediatric Nutrition Care (PNC)

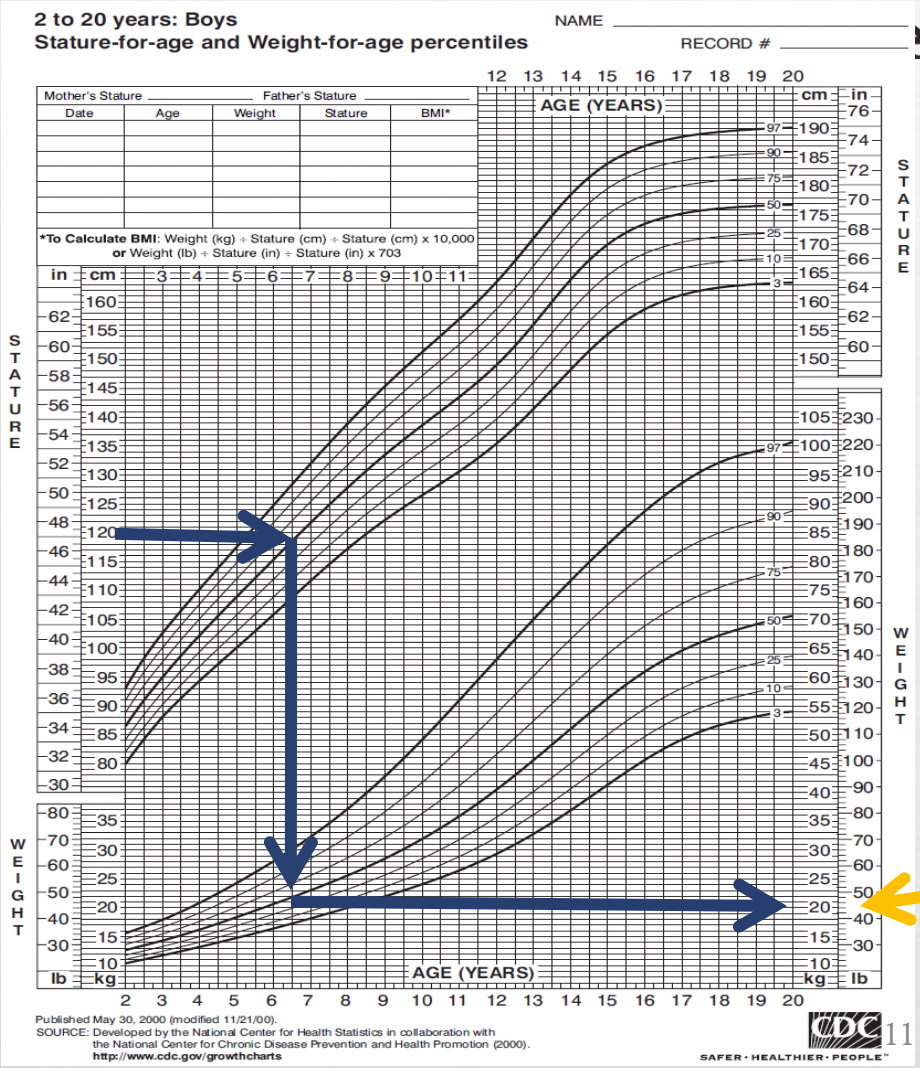
- **5 steps of PNC:**
  1. Nutritional assessment
  2. Nutritional requirements
  3. Routes of delivery
  4. Formula selection
  5. Monitoring & Evaluation



1. Nutritional assessment

- **A**nthropometric
  - Weight, height, upper arm circumference
  - Ideal body weight, height-age
- **B**iochemical
- **C**linical symptom & sign
- **D**ietary history
  - Foods recall

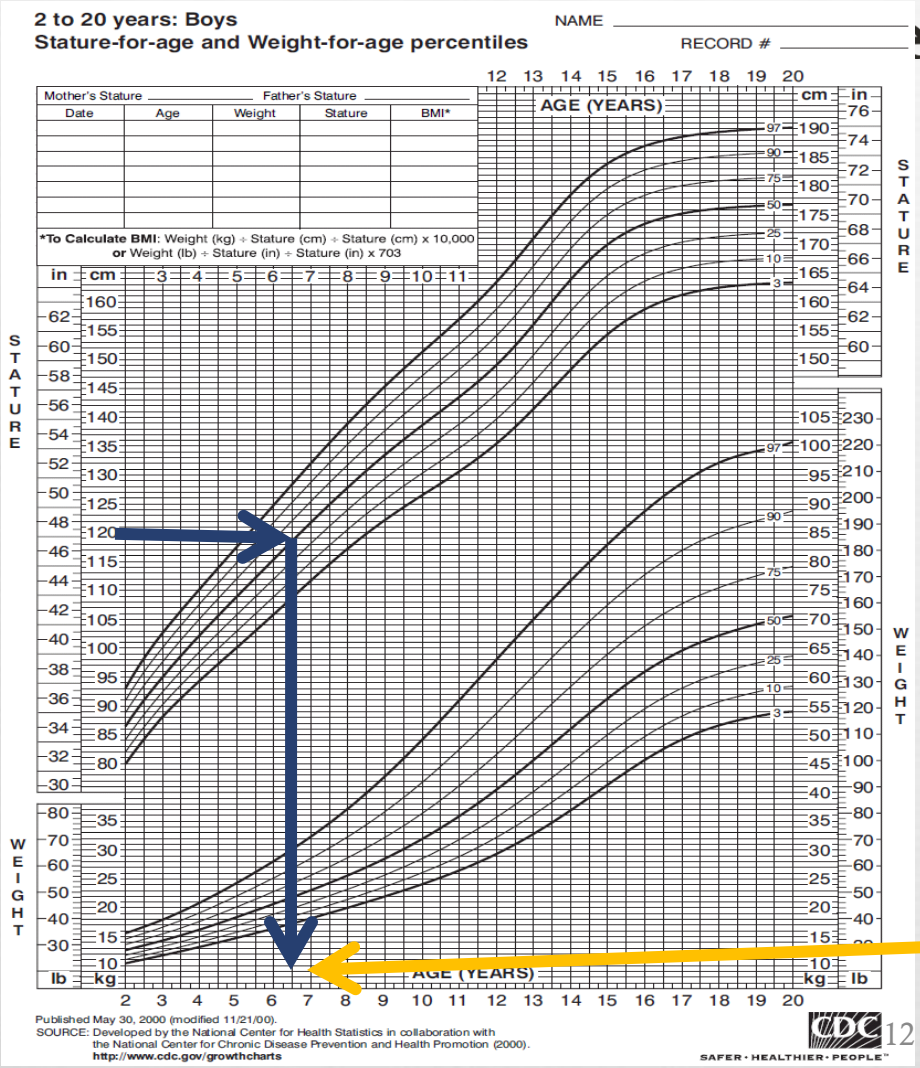
“Ideal body weight for actual height”



Boy, 8 y old, body weight 15 kg
Height 120 cm
Ideal body weight for actual height ➔ 20 kg

Ideal body weight for actual height

“height-age”



Boy, 8 y old, body weight 15 kg
Height 120 cm

Ideal body weight for actual height 20 kg
Height-age ➔ 6.5 y

Height-age ➔ 6.5 y

2. Nutritional requirement

- **Kcal = RDA(kcal/kg) for height age* x ideal weight (kg)****

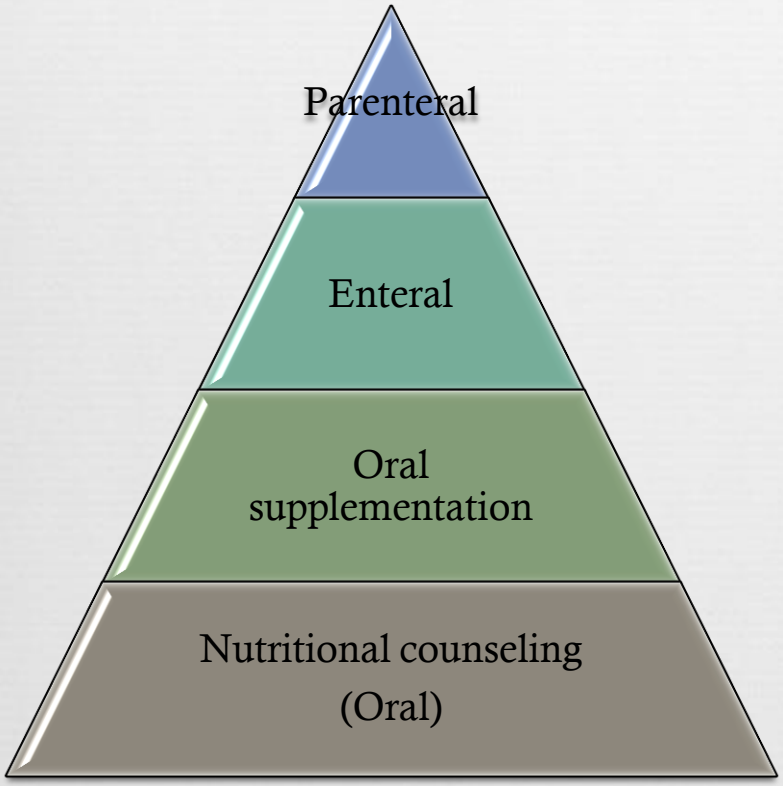
Age (year)	RDA (kcal/kg/Wt)
0-1	100-120
1-3	100
4-6	90
7-9	80
10-12	M: 60-70 F: 50-60
12-18	M: 50-60 F: 40-50

Example

Age (year)	RDA (kcal/kg/Wt)
0-1	100-120
1-3	100
4-6	90
7-9	80
10-12	M: 60-70 F: 50-60
12-18	M: 50-60 F: 40-50

- Boy, 8 y old, body weight 15 kg, height 120 cm
- **Ideal body weight for actual height ➔ 20 kg**
- **Height-age ➔ 6.5 y**
- **Nutritional status: 15/20 x 100% = 75% (moderate malnutrition ~ Waterlow criteria)**
- **Energy need = 90 kcal x 20 kg = 1800 kcal/day**

3. Route of delivery



- Nutritional counseling: a nutrition professional works with patient/caregiver to assess how to improve dietary intake and provides information, education materials, support and follow-up
- Oral nutrition supplementation: providing supplementary nutrition by mouth
- Enteral nutrition: providing supplemental or total nutrition via a feeding tube
- Parenteral nutrition: providing supplemental or total nutrition intravenously

4. Formula selection

- Nutrients and energy needs adjusted for the age and clinical condition of the child:
  - History of food intolerance or allergy
  - Intestinal function
  - Site and route of delivery
  - Taste preference (oral supplementation)
- Formula characteristic:
  - Nutritional composition
  - Osmolality and solute load
  - Caloric density
  - Cost

5. Monitoring & Evaluation

- Biochemical monitoring
  - To prevent electrolyte and fluid abnormalities and hypo/hyperglycemia
- GI tolerance
  - To prevent vomiting, abdominal distention, pain, constipation
- Tube/stoma placement and maintenance
  - To prevent tube displacement, tube clogging, aspiration
- Growth and development
- Psychological aspects
  - (feeding aversion, loss of feeding skills)

Example

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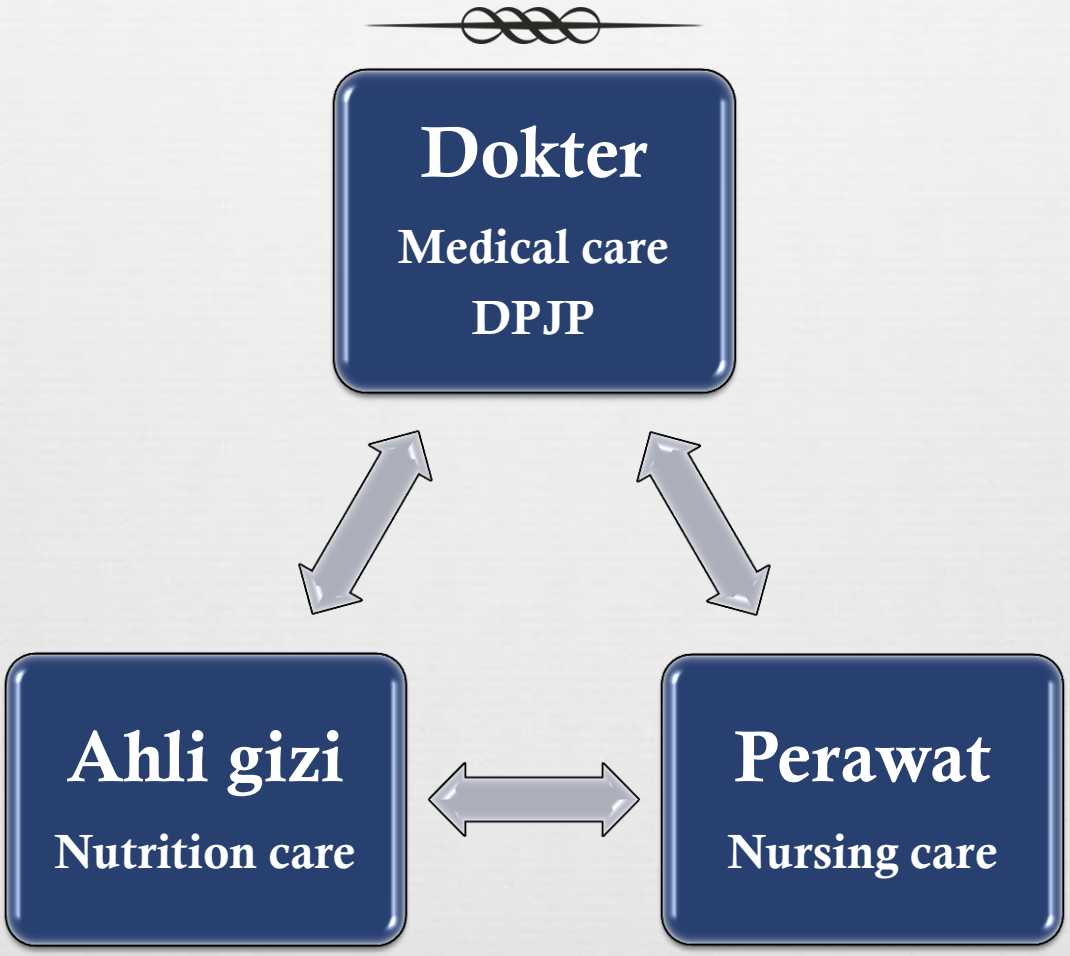
- **Nutritional status: 15/20 x 100% = 75% (moderate malnutrition ~ Waterlow criteria)**
- **Energy need = 90 kcal x 20 kg = 1800 kcal/day**
- **Nutrition support:**
- Oral supplementation: (20-15) x 90 kcal = 450 kcal ➔ high energy density formula: 2 x 225 ml (Pediasure®)
- Solid foods: 3 x 350 kcal and 2 x 150 kcal (snack)
- **Energy target: 1080 - 1350 – 1800 kcal/day**
- **Intake less than 1080 kcal/day for 3 days ➔ enteral nutrition**

RSUP Sanglah



RSUP Sanglah

- **Sebelumnya semua pasien anak-anak mendapat makanan dewasa**

- Upaya sudah dilakukan sejak tahun 2002
- SK Tim Terapi Gizi RS tahun 2009 ?
- Sejak JCI formulir PNC Divisi NPM masuk kedalam rekam medis
  - **Sesudahnya semua pasien anak-anak mendapat makanan (jenis, jumlah dan bentuk) sesuai dengan kebutuhannya**

RSUP SANGLAH DENPASAR — RM.12.1.1/GIZI/2015

PENGKAJIAN GIZI BAYI & ANAK

Nama :
Tgl.Lahir: L/P
No RM :

Ruangan : Tgl : Jam:

ANTROPOMETRI
- □ Berat Badan Lahir (BBL) .....gr
- □ Panjang Badan Lahir :..... cm
- □ Berat Badan Sekarang (BBS) :. ....gr
- □ Berat Badan Idial :.....gr
- □ Panjang Badan (< 2th) :.....cm
- □ Tinggi Badan (> 2 th) :.....cm
- □ Lingkar Kepala(LK) : .....cm
- □ Lingkar Lengan Atas (LLA) :.....cm
- □ Berat Badan/Umur (BB/U) :.....
- □ Tinggi Badan/Umur (TB/U) :.....
- □ Berat Badan/Tinggi Badan :.....
- □ Lingkar Lengan Atas /Umur (LLA/U) :.....
- □ Indek Masa Tubuh /Umur (IMT/U) :.....

BIOKIMIA
- □ Hb :.....gr/dl
- □ Limfosit :....%
- □ Albumin :.....g/dl
- □ Gula darah :.....g/dl
- □ Keton Urin :.....
- □ AGD : - pH :... - pCO3 :... -HCO3
- □ Anion gap :.....
- □ .....

KLINIS
- □ Mual
- □ Muntah
- □ Diare
- □ Sembelit
- □ Kesulitan menguyah
- □ Kesulitan menelan
- □ Mikrosefali
- □ Flag sign
- □ Old man face
- □ Moon face
- □ Anemia
- □ Bitot spot
- □ Papil lidah atropi
- □ Iga gambang
- □ Pembesaran hati
- □ Baggy pant
- □ Edema kaki
- □ Lemak sub kutan sedikit
- □ .....

DIETARY : Food Recall 24 jam
- □ ASI □ Susu formula □ Bubur susu □ Nasi Tim
- □ Makanan Biasa :
  - □ Makanan Pokok :.....
  - □ Lauk :.....
  - □ Sayur/buah :.....

Asupan Energi :.....kkal
Asupan Protein :.....gr

DIAGNOSIS KLINIS :.....

DIAGNOSIS NUTRISI : □ Gagal tumbuh □ Perawakan pendek □ Obese □ Gizi baik □ Gizi kurang □ Gizi buruk □ Kwashiorkor □ Marasmus □ Kwashiorkor - Marasmus □ Lain-lain :.....

KEBUTUHAN NUTRISI : □ Energi :.....kkal □ Protein :....gr □ Cairan :.....ml □ Densitas : .....

JENIS NUTRISI : □ ASI □ Makanan biasa □ Nasi Tim □ Bubur susu □ Formula standar .....kkal □ Formula khusus.....kkal □ Formula Parenteral

CARA PEMBERIAN : □ Oral □ Enteral □ Parenteral : □ Perifer □ Sentral

MONITORING :
- □ Toleransi : muntah /mencret / sisa
- □ Biokimia :
- □ Berat badan
- □ Reefeeding syndrome
- □ Overfeeding syndrome
- □ Asupan makan

Tim Terapi Nutrisi Pediatrik : Nama — Tanda tangan

SpA Nutrisi : _____ _____

Residen Anak : _____ _____

Ahli Gizi : _____ _____

Perawat : _____ _____

Pasien/ Or.tua/ Wali

_____
Nama terang,tanda tangan

Unsur-unsurnya:

1. **Assessment nutrisi**
   - Antropometri
   - Biokimia/lab
   - Clinical
   - Diit
2. Kebutuhan nutrisi
3. Jenis nutrisi
4. Cara pemberian
5. **Monitong**

STRONGkids

Tool	Group	Age	Content item
STRONGkids	Medical & surgical	1 bulan – 18 tahun	• Subjective assessment • High-risk disease • Nutritional intake • Weight loss

Hulst et al. Dutch national survey to test the STRONGkids nutritional screening tool for hospitalized children. ***Clin Nutr***; 2010: 106-111

STRONGkids

- Subjective assessment (0-1)
- High-risk disease (0, 2)
- Nutritional intake (0-1)
- Weight loss (0-1)
  - **Kriteria: 0: no risk; 1-3: moderate risk; 4-5: high risk**

Komponen STRONGkids

Screening risk of malnutrition	Score	
	yes	no
Subjective clinical assessment (1 point) Apakah pasien memiliki gizi kurang/buruk ?	1	0
High risk disease (2 point) Apakah ada penyakit yang mendasari ? Sesuai Tabel.	2	0
Nutritional intake and losses (1 point) Apakah terdapat salah satu keadaan berikut? diare > 5x/hari atau muntah > 3x/hari dalam beberapa hari asupan berkurang dalam beberapa hari sedang mendapatkan terapi nutrisi nafsu makan menurun karena nyeri	1	0
Weight loss or poor weight gain (1 point) Apakah BB turun atau BB naik tidak adekuat (bayi < 1 tahun) dalam beberapa minggu terakhir?	1	0

Tabel "high risk disease" yang berhubungan dengan skrining malnutrisi

High risk disease	
Anorexia nervosa	Cancer
Burns	Liver disease, chronic
Bronchopulmonary dysplasia	Kidney disease, chronic
(maximum age 2 year)	Pancreatitis
Celiac disease	Short bowel syndrome
Cystic fibrosis	Muscle disease
Dysmaturity / Prematurity	Metabolic disease
(corrected age 6 months)	Trauma
Cardiac disease, chronic	Mental handicap/retardation
Infectious disease (AIDS)	Expected major surgery
Inflammatory bowel disease	Not specified (classified by doctor)

STRONGkids *(1 m – 18 y)*

Risk for malnutrition and need for intervention		
4-5 points	**High risk**	Consult doctor and dietician for full diagnosis and nutritional advice. Start prescribing sip feeds until further diagnosis
1-3 points	**Medium risk**	Consult doctor for full diagnosis; consider nutritional intervention with dietician
0 points	**Low risk**	No intervention necessary

Implementation of STRONGkids in Identify Risk of Malnutrition in Government Hospital

I Gusti Lanang Sidiartha [a], I Gusti Ayu Putu Eka Pratiwi [b]

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- Cross-sectional study in 7 Government Hospital in Bali during the period of July until September 2017.
- Screening tool using STRONGkids
- Nutritional status at admission was determined using WHO growth standard (weight-for-height)
- This study including 129 subjects

Sidiartha & Pratiwi. International Journal of Health Sciences (IJHS), 2018;2:18-24.

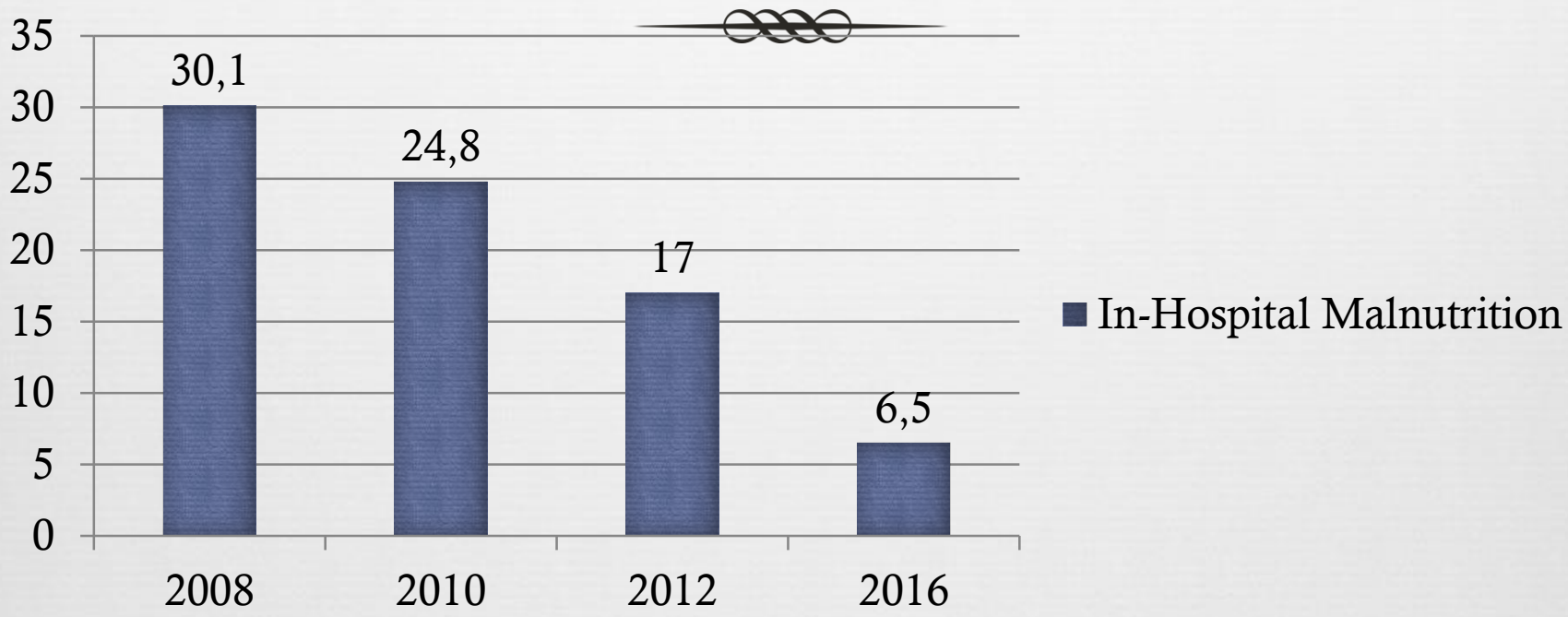
Table 1
The characteristics of subjects

Characteristic	N = 129
Gender, Male, n (%)	73 (56.6)
Female, n (%)	56 (43.4)
Age (year), mean (SD)	4.1 (3.4)
Underlying disease, chronic, n (%)	26 (20.3)
Acute, n (%)	103 (79.7)
Nutritional status, severe, n (%)	8 (6.2)
Moderate, n (%)	33 (25.6)
Well nourish, n (%)	88 (68.2)
STRONGkids, High risk, n (%)	16 (12.4)
Moderate risk, n (%)	113 (87.6)

Table 2
Logistic Regression analysis among variables

Variable	Exp(B)	95%CI for Exp(B)	P
Age	1.0	0.9 – 1.0	0.488
Gender, male	1.2	0.3 – 5.0	0.752
Chronic disease	6.8	1.4 – 32.3	0.015
Severe malnutrition	10.9	3.6 – 33.0	0.0001

Data malnutrisi rumah sakit pasien anak di RSUP Sanglah



2008: data 103 pasien Nop 2006/Jan 2007; insiden 31/103 (30,1%); risiko yg dirawat > 1 minggu
Publikasi di Sari Pediatri
2010: data 310 pasien Sep-Des 2008; insiden 24,8%; Publikasi di Paediatrica Indonesiana
2012: data 460 pasien Jun 2008/Feb 2009; insiden 78 (17%); risiko yg dirawat > 1 minggu
Publikasi di Medicina
2016: 6,5% unpublished

Take home messages

- All children admitted to hospital are at risk of developing hospital malnutrition.
- Prevent hospital malnutrition:
  - Nutrition support team should be formed
  - Screening tools should be implemented (STRONGkids)
  - Five steps of pediatric nutrition care should be done

Thank You