CONSENSUS OF VIETNAM PEDIATRIC ASSOCIATION: GUIDELINES FOR NUTRITIONAL SCREENING, ASSESSMENT AND INTERVENTION FOR PEDIATRIC PATIENTS

Dinh Anh Tuan[a], Tran Thanh Duong[b], Tran Minh Dien[c], Khu Thi Khanh Dung[d], Tran Kiem Hao[d], Nguyen Thanh Hung[e], Phan Huu Phuc[c], Trinh Huu Tung[g], Truong Quang Dinh[h], Tran Van De[i], Le Anh Phong[k], Luong Duc Son[l], Tran Thi Ngoc Hoa[m], Tran Van Cuong[n], Ha Hoang Minh[o], Nguyen Thi Diem Chi[p], Tran Thanh Tu[c], Do Thi Thuy Nga[q], Luu Thi My Thuc[c], Nguyen Thi Thuy Hong[c], Nguyen Thi Thu Hau[f], Duong Cong Minh[g]

[a] Department of Maternal and Child Health - Ministry of Health
[b] National Institute of Nutrition
[c] National Children's Hospital
[d] Vietnam Pediatric Association
[e] Children's Hospital 1, Ho Chi Minh City
[g] Children's Hospital 2, Ho Chi Minh City
[h] Ho Chi Minh City Children's Hospital
[i] Can Tho City Children's Hospital
[k] Dong Nai Children's Hospital
[l] Thai Binh Children's Hospital
[m] Hai Phong Children's Hospital
[n] Nghe An Obstetrics and Pediatrics Hospital
[o] Thanh Hoa Children's Hospital
[p] Children's Center, Hue Central General Hospital
[q] Hanoi Children's Hospital

Nutritional status plays an important role in diagnosing and treating nutritional risks or malnutrition and supporting other treatments. Therefore, screening and correct assessment of nutritional status is necessary for early detection and timely intervention for children in the hospital. According to regulations, for inpatients, it is mandatory to classify and determine nutritional risks within 36 hours of admission and prescribe nutritional regimen. For outpatients, all patients need to be screened for nutritional risk factors. Previously, a very large proportion of children were not screened and assessed for nutritional status upon admission, leading to failure to receive timely nutritional interventions. Currently, hospitals have implemented nutritional screening and assessment for children using forms developed by the hospital itself or referenced from other organizations. However, in general, the new forms only focus on inpatients and there is no form for outpatients. Moreover, stunting malnutrition has not received due attention even though the rate of stunted children is still high.

Therefore, there is a need for a unified set of tools in pediatrics to screen, assess and intervene in nutrition for children. The Vietnam Pediatric Association organized an expert workshop on the topic *"Nutrition to improve height of Vietnamese children - Timely diagnosis and intervention of malnutrition"* with the participation of Professors, Doctors, and Physicians who are leading experts in nutrition and pediatrics.

Through this workshop, the experts compiled the document **"Consensus: GUIDELINES FOR NUTRITIONAL SCREENING, ASSESSMENT AND INTERVENTION FOR PEDIATRIC PATIENTS"**. The content of the guideline aims to provide a sample form for risk screening, nutritional status assessment and intervention flowchart for pediatric inpatients and outpatients in accordance with the policy of the Circular 18/2020/TT-BYT regulating nutrition activities in hospitals and the Hospital Quality Criteria to help medical staff in the pediatric system quickly detect nutritional problems and provide appropriate interventions for pediatric patients as well as accurately report results to the professional system.

MAIN RECOMMENDATIONS ON NUTRITIONAL SCREENING, ASSESSMENT AND INTERVENTION FOR PEDIATRIC PATIENTS

Recommendation 1: Patients coming for outpatient examination and treatment are screened for nutritional risk factors. Inpatients

are screened, assessed for nutritional status, diagnosed and prescribed nutritional treatment within 36 hours of admission and recorded in the medical record. Nutritional screening, assessment and intervention must be maintained throughout the treatment process and before discharge.

Malnutrition includes undernutrition (wasting, stunting, underweight), vitamin or mineral deficiency, overweight, obesity and non-communicable diseases related to diet. The rate of malnutrition in general, stunting in particular, is still high in both pediatric inpatients and outpatients, adversely affecting clinical treatment, leaving bad consequences in the short and long term. Nutritional status plays an important role in diagnosing, managing nutritional risks/malnutrition and supporting other treatment measures. Therefore, screening and correct assessment of nutritional status is necessary for early detection and timely intervention for children in the hospital. According to the US Medical Examiner's Committee, nutritional screening is mandatory for all patients within 24 hours of admission to an acute care center. In Vietnam, for inpatients, they are required to be classified and identified for nutritional risk within 36 hours of admission (Article 4, Circular 18/2020/TT-BYT) and given a nutritional regimen (Decision No. 2879/QD-BYT dated August 10, 2006 of the Ministry of Health). For outpatients, all of them must be screened for nutritional risk factors (Article 3, Circular 18/2020/TT-BYT).

Recommendation 2: It is necessary to strengthen screening and early detection of nutritional problems for patients with a standardized "Nutritional Screening and Assessment Form" developed according to phenotype criteria (change in weight, anthropometric index, change in muscle mass and/or striated muscle function), and etiological criteria (reduced intake, reduced absorption, increased protein catabolism), while not missing stunting malnutrition.

Maintaining and improving nutrition during treatment is not only an urgent need but also a decisive factor in the outcome of treatment. To have an appropriate nutritional intervention strategy, the first thing to do is to assess nutritional status, screen for risks as well as other nutritional problems. Previously, a very large proportion of patients were not screened and assessed for nutritional status upon admission, leading to not receiving timely nutritional interventions.

Currently, hospitals have implemented nutritional screening and assessment for patients using forms developed by the hospital itself or referred to from other organizations. However, in general, the new forms only focus on inpatients and there is no form for outpatients. Furthermore, stunting malnutrition has not received due attention because the priority of the health sector in recent years has focused on addressing underweight malnutrition and acute malnutrition, although the rate of stunted children is still high (17.3-42%). With the goal of preventing and treating acute malnutrition, not missing stunting malnutrition, contributing to improving the stature of Vietnamese children, medical examination and treatment facilities need to take advantage of the treatment stage to screen, assess nutrition, and plan timely nutritional interventions to optimize the golden period of children's development.

Recommendation 3: Use the "Nutritional Screening and Assessment Form" (Tables 1,2) and "Nutritional Screening and Assessment Flowchart" (Tables 3,4) for inpatients and outpatients that have been developed by the Vietnam Pediatric Association and have been 100% agreed upon.

Accurate and close screening, assessment and monitoring of nutritional status help increase the effectiveness of drug and chemical use for patients, contributing to improving the quality of treatment. To be able to plan timely and effective nutritional interventions for patients with malnutrition, screening and assessment of nutritional status is the first important step. Currently, in the world and in Vietnam, there are many different pediatric screening tools, mainly used to screen and assess the nutritional status of inpatients, most of which are established and used depending on each hospital or country. The lack of uniformity in nutritional assessment, diagnosis and intervention among hospitals

makes it difficult to compare assessment results and intervention effectiveness. Therefore, the toolkit and nutritional screening and assessment form for inpatients and outpatients need to be developed in addition to ensuring compliance with the criteria of the Circular 18/2020 BYT on professional nutrition activities in hospitals and the Decision 6858/QD-BYT dated November 18, 2016 of the Ministry of Health on promulgating the Vietnam Hospital Quality Criteria, it must ensure convenience, speed, simplicity, ease of use by all medical staff while still ensuring high sensitivity and accuracy. Therefore, the Vietnam Pediatric Association, with the participation of pediatric nutrition experts, pediatricians, and leaders of pediatric hospitals representing the three regions of North - Central - South, has developed a "Nutritional Screening and Assessment Form" and "Nutritional screening, assessment and intervention flowchart" for inpatients and outpatients to be used in the pediatric system nationwide, helping to improve pediatric examination and treatment, while facilitating the retrieval of statistical and reporting data, professional support, and training for grassroots health facilities when needed.

Recommendation 4: Inpatient and outpatient nutritional intervention plans for malnourished children must be appropriate and ensure sufficient time. Specific intervention solutions using oral nutritional supplements (ONS) - medical nutritional foods should be initiated early to help children ensure they receive enough energy and micronutrients needed to fight the disease, increase resistance, reduce the burden of disease and catch up and maintain healthy growth. Before discharge, medical staff need to advise on the risk of malnutrition/ stunting and guide parents to monitor and re-evaluate their children's nutritional status during home care.

In the hospital environment, nutritional support for children plays an important role in the recovery and treatment process, especially for children with acute malnutrition/ stunting malnutrition problems. Specific intervention solutions using oral nutritional supplements(ONS), which are medical nutritional foods: have clear clinical evidence of improving treatment effectiveness and helping children catch up on growth, maintaining healthy growth. Timely intervention for children with growth problems needs to ensure enough time, starting as soon as the child is hospitalized and continuing after discharge. Stunting malnutrition (especially in children under 5 years old) must be focused on investment and intervention, requiring early, general, and comprehensive intervention strategies and the participation of the entire society, especially the role of the health sector, to contribute to limiting the impact of growth retardation in adulthood. Depending on the risk status and level of malnutrition, the treating doctor will make appropriate nutritional intervention decisions. Two inpatient (Table 3) and outpatient (Table 4) flowcharts have guided how to handle children with nutritional problems. In overweight or obese children, the treating doctor should provide guidance on nutritional examination/ menu development (if necessary). In children at risk of stunting, stunting malnutrition, wasting and wasting malnutrition, the flowchart emphasizes the role of nutritional counseling and ONS supplementation (oral nutritional supplements). For outpatients, to support children in catching up on growth, effective ONS intervention is needed with an average duration of 3 - 6 months or more depending on the child's nutritional status.

Recommendation 5: Hospitals and medical facilities need to technologize software to screen and assess the nutritional status of patients.

Currently, medical staff do not pay attention to properly assessing nutritional status because manually looking up anthropometric indicators is time-consuming. Therefore, for the implementation to be practical, there needs to be an automatic, easy-to-use application software that supports the calculation of anthropometric indicators to help quickly assess and accurately classify nutritional problems while storing data to monitor the nutritional status of patients for subsequent examinations and nutritional consultations.

Recommendation 6: The ability to organize screening, risk assessment, intervention, staff

training, etc. requires the participation of hospital leaders, information technology of pediatricians in general, and nutritionists in particular.

The Vietnam Pediatric Association - hospitals, medical facilities strengthen the organization of training activities to improve the capacity of pediatricians in nutritional screening and intervention for medical staff through continuous medical training programs.

Deploying support processes for implementation according to the consensus of pediatricians and nutritionists, at the same time, for nutrition work in hospitals to operate effectively, it is necessary to have the participation of hospital leaders to make decisions for implementation, support installation in the information technology software system of each hospital, pay attention and perform screening, assessment, and intervention of pediatricians in general and nutritionists in particular with the aim of complying with current regulations and improving the nutritional status of children, improving the stature of Vietnamese people.

Table 1. Screening and assessment form for nutritional status of pediatric inpatients

Medical examination and treatment facility ……	**NUTRITIONAL SCREENING AND ASSESSMENT FORM FOR PEDIATRIC INPATIENTS**	Code: DD-04 Admission number: Patient code :

Patient's full name: ..... Age: ..... ☐ Male ☐ Female
Department: ..... Room: ..... Bed: .....
Diagnosis: .....
Weight (kg): ..... Height (cm): ..... BMI (kg/m^2) : .....
CN/T……..…… SD, CC/T…..……..…… SD, CN/CC…….....…… SD, BMI/T.....SD
Conclusion on malnutrition status according to WHO: .....

Part I: Screening for the risk of acute malnutrition

Risk factors	**Score**
1. Have underlying disease that causes malabsorption or limits gastrointestinal intake	☐ No ☐ Yes (1score)
2. Have a disease that causes nutritional metabolism disorders	☐ No ☐ Yes (1score)
3. CN/CC or BMI < -1SD or clinically losing muscle or subcutaneous fat	☐ No ☐ Yes (1score)
4. Decreased food intake in the past week	☐ No ☐ Yes (1score)
5. Weight loss or no weight gain in the past month	☐ No ☐ Yes (1score)

Total scores:……..……

Part II: Confirmation of nutrition care plan

Results (WHO assessment of malnutrition and risk of acute malnutrition):

☐ No malnutrition and low risk (0 score): Reassess after 7 days

☐ Moderate malnutrition and/or intermediate risk (1 - 4 scores): Nutritional intervention recommended, risk reassessment every 5-7 days or sooner if necessary.

☐ Severe malnutrition and/or high risk (5 scores): Nutritional intervention, reassess every 5 days or as advised by a nutritionist.

Nutritional care/support plan (many suitable solutions can be selected)

☐ Oral nutritional supplementation
☐ Catheter nutrition
☐ Total parenteral nutrition
☐ Supplemental parenteral nutrition
☐ Nutritional consultation
☐ Nurturing regime:.....

Part III: Assessment of chronic malnutrition (provide guidance on nutritional examination if necessary)

☐ Moderate - severe stunting malnutrition (CC/T ≤ -2 SD)

☐ Risk of stunting malnutrition (-2 SD < CC/T ≤ -1 SD)

☐ Overweight - Obesity (Obesity when CN/CC ≥ 3 SD for children < 5 years old and BMI/T ≥ 2 SD for children > 5 years old)[16]

Day ... month ... year 20...

Doctor

(Sign, specify full name)

Bảng 2. Phiếu sàng lọc, đánh giá tình trạng dinh dưỡng bệnh nhi ngoại trú

Cơ sở KB, CB
.....

PHIẾU SÀNG LỌC VÀ ĐÁNH GIÁ DINH DƯỠNG BỆNH NHI NGOẠI TRÚ

MS: DD-04
Số vào viện.....
Mã người bệnh.....

Họ và tên người bệnh:..... Tuổi: .....☐ Nam ☐ Nữ
Phòng khám:.....
Chẩn đoán:..... Tiền sử bệnh:.....
Cân nặng (kg):..... Chiều cao (cm):..... BMI (kg/m^2) :.....

CHỈ SỐ NHÂN TRẮC		ĐÁNH GIÁ TÌNH TRẠNG DINH DƯỠNG	CAN THIỆP
Chiều cao/ Tuổi (CC/T)	CC/T < -3 SD	☐ SDD thấp còi mức độ nặng	☐ BSĐT cảnh báo trẻ có **"Nguy cơ SDD thấp còi"** hoặc **"SDD thấp còi"** ☐ BSĐT tư vấn dinh dưỡng, bổ sung ONS 3-6 tháng để trẻ hồi phục và bắt kịp tăng trưởng ☐ Hướng dẫn khám DD/xây dựng thực đơn (nếu cần)
	-3 SD ≤ CC/T < -2 SD	☐ SDD thấp còi mức độ trung bình	
	-2 SD ≤ CC/T <-1 SD	☐ Nguy cơ SDD thấp còi	
	CC/T ≥ -1 SD	☐ Bình thường	☐ Tiếp tục chế độ ăn phù hợp lứa tuổi
Cân nặng/ Tuổi (CN/T)	CN/T < -2 SD	☐ SDD nhẹ cân mức độ trung bình - nặng	☐ BSĐT cảnh báo trẻ có "**Nguy cơ SDD nhẹ cân"** hoặc **"SDD nhẹ cân"** ☐ BSĐT tư vấn dinh dưỡng, bổ sung ONS 3-6 tháng để trẻ hồi phục và bắt kịp tăng trưởng ☐ Hướng dẫn khám DD/xây dựng thực đơn (nếu cần)
	-2 SD ≤ CN/T <-1 SD	☐ Nguy cơ SDD nhẹ cân	
	-1 SD ≤ CN/T < 2 SD	☐ Bình thường	☐ Tiếp tục chế độ ăn phù hợp lứa tuổi
	2 SD ≤ CN/T	☐ Thừa cân - Béo phì	☐ BSĐT cảnh báo trẻ có **"Nguy cơ thừa cân - béo phì"** ☐ Hướng dẫn khám DD ☐ Hướng dẫn xây dựng thực đơn (nếu cần)
Cân nặng/ chiều cao (CN/CC) hoặc BMI/tuổi (BMT/T) (trẻ dưới 5 tuổi)	CN/CC < -2 SD	☐ SDD gầy còm mức độ trung bình - nặng	☐ BSĐT cảnh báo trẻ có **"Nguy cơ SDD gầy còm"** hoặc **"SDD gầy còm"** ☐ BSĐT tư vấn dinh dưỡng, bổ sung ONS 3-6 tháng để trẻ hồi phục và bắt kịp tăng trưởng
	-2 SD ≤ CN/CC <-1 SD	☐ Nguy cơ SDD cấp (gầy còm)	
	-1 SD ≤ CN/CC < 2 SD	☐ Bình thường	☐ Tiếp tục chế độ ăn phù hợp lứa tuổi
	2 SD ≤ CN/CC	☐ Thừa cân - Béo phì	☐ BSĐT cảnh báo trẻ **"Thừa cân"** hoặc **"Béo phì"** ☐ Hướng dẫn khám DD ☐ Hướng dẫn xây dựng thực đơn (nếu cần)
BMI/tuổi (BMI/T) (trẻ trên 5 tuổi)	BMI/T < -2 SD	☐ SDD gầy còm mức độ trung bình - nặng	☐ BSĐT cảnh báo trẻ có **"Nguy cơ SDD gầy còm"** hoặc **"SDD gầy còm"**
	-2 SD ≤ BMI/T < -1 SD	☐ Nguy cơ SDD cấp (gầy còm)	
	-1 SD ≤ BMI/T < 1 SD	☐ Bình thường	☐ Tiếp tục chế độ ăn phù hợp lứa tuổi
	1 SD ≤ BMI/T	☐ Thừa cân - Béo phì	☐ BSĐT cảnh báo trẻ **"Thừa cân"** hoặc **"Béo phì"** ☐ Hướng dẫn khám DD ☐ Hướng dẫn xây dựng thực đơn (nếu cần)
Bệnh lý		☐ Cần thay đổi chế độ ăn	☐ BSĐT cảnh báo tình trạng dinh dưỡng của trẻ ☐ BSĐT hướng dẫn chế độ ăn phù hợp tình trạng bệnh lý ☐ Hướng dẫn khám DD/xây dựng thực đơn (nếu cần)

Ghi chú: BSĐT: Bác sĩ điều trị, SDD: suy dinh dưỡng, DD: dinh dưỡng, ONS: Dinh dưỡng bổ sung đường uống.

Ngày.....tháng.....năm 20.....

Bác sĩ

(Ký, ghi rõ họ tên)

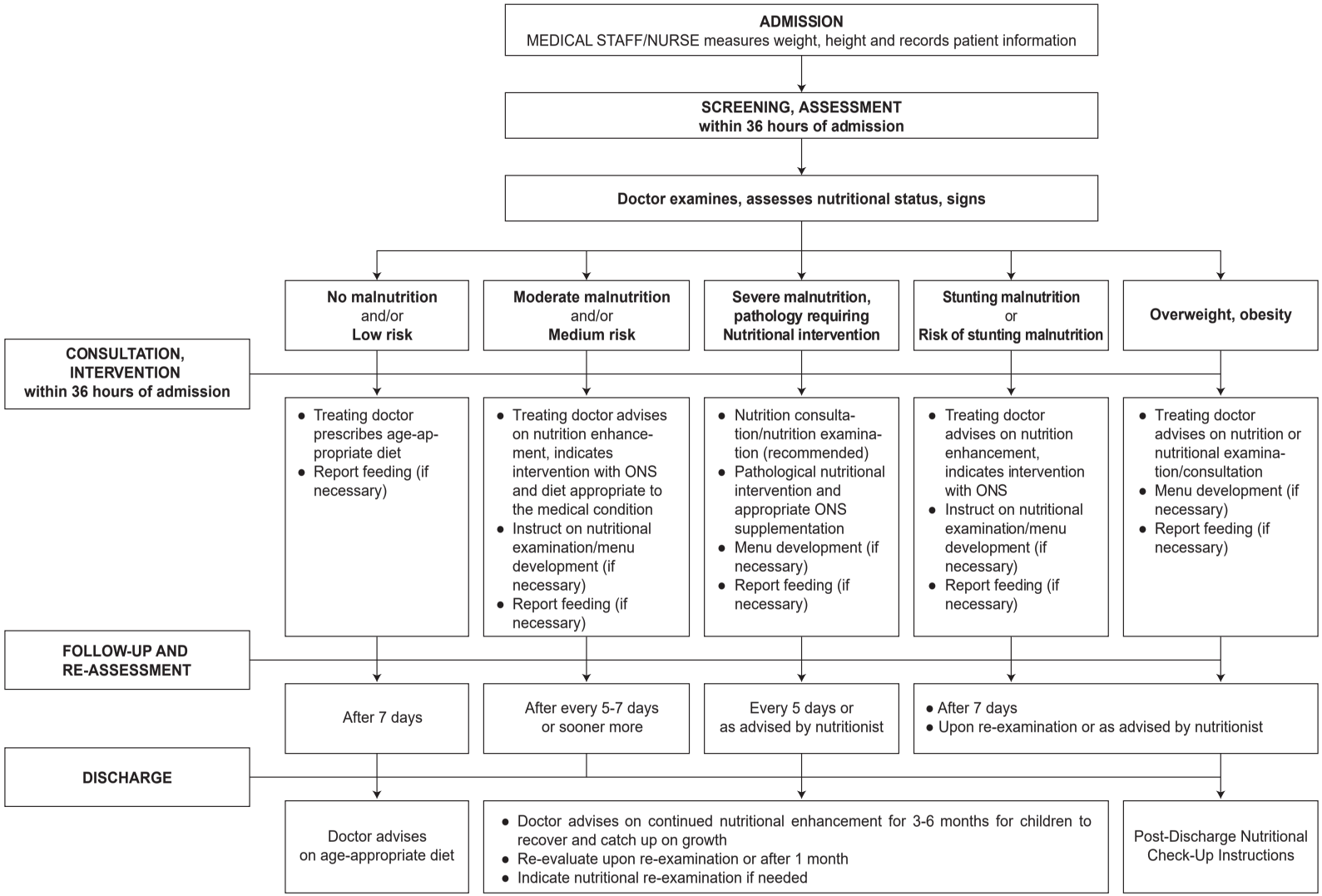

Figure 1. Flow chart for nutritional screening and assessment for pediatric inpatients

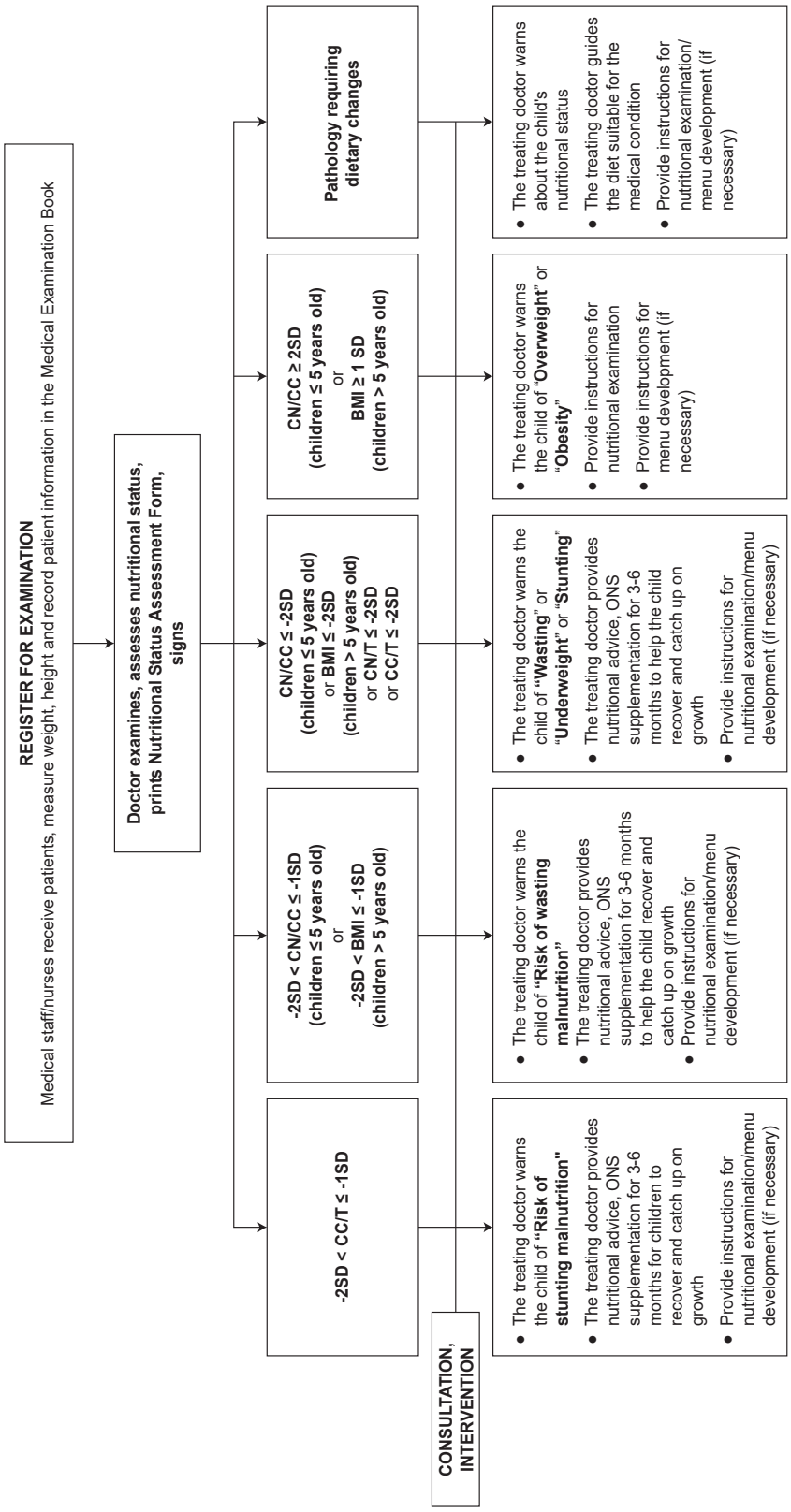

Figure 2. Flowchart for nutritional screening and assessment for outpatients

REFERENCES

1. **de Onís M, Monteiro C, Akré J, Glugston G.** The worldwide magnitude of protein-energy malnutrition: an overview from the WHO Global Database on Child Growth. Bull World Health Organ. 1993;71(6):703-712.
2. **UNICEF/WHO/WB.** Levels and Trends in Child Malnutrition: UNICEF/WHO/World Bank Group Joint Child Malnutrition Estimates: Key Findings of the 2023 Edition. Accessed August 26, 2024.
3. **Shaughnessy EE, Kirkland LL.** Malnutrition in Hospitalized Children: A Responsibility and Opportunity for Pediatric Hospitalists. Hosp Pediatr. 2016;6(1):37-41.
4. **Huong PTT.** Nutritional status of hospitalized children at the National Children's Hospital. Journal of Preventive Medicine. Published online March 2015.
5. **Hoa NTN, Nguyet PH, Vinh BQ.** Evaluation of the Yorkhill pediatric malnutrition scale (PYMS) in hospitalized children with pneumonia. Ho Chi Minh City Journal of Medicine. 2020;24. Accessed May 24, 2024.
6. **Dung NTT, Hau NTT, Phuong TTH, Phuong TP.** Current status of nutritional examination indications for inpatients at Children's Hospital 2. Vietnam Medical Journal. 2022:122-128.
7. **Linh DM, Lan BN, Hong NTT.** Nutritional status and some related factors of cancer patients under 5 years old at the National Children's Hospital. Journal of Research Medicine. 2023;170(9):254-260.
8. Fact sheets - Malnutrition. Accessed May 24, 2024. https://www.who.int/news-room/fact-sheets/detail/malnutrition
9. **Martins VJB, Toledo Florêncio TMM, Grillo LP,** *et al*. Long-Lasting Effects of Undernutrition. Int J Environ Res Public Health. 2011;8(6):1817-1846.
10. **Gambra-Arzoz M, Alonso-Cadenas JA, Jiménez-Legido M,** *et al.* Nutrition Risk in Hospitalized Pediatric Patients: Higher Complication Rate and Higher Costs Related to Malnutrition. Nutr Clin Pract Off Publ Am Soc Parenter Enter Nutr. 2020;35(1):157-163.
11. **Mueller C, Compher C, Ellen DM, the American Society for Parenteral and Enteral Nutrition (A.S.P.E.N.) Board of Directors. A.S.P.E.N.** Clinical Guidelines: Nutrition Screening, Assessment, and Intervention in Adults. J Parenter Enter Nutr. 2011;35(1):16-24.
12. **Joint Commission on Accreditation of Healthcare Organizations.** Comprehensive Accreditation Manual for Hospitals.; 2007.
13. **Ministry of Health.** Circular 18/2020/TT-BYT on regulations on nutrition activities in hospitals.
14. **Haute Autorité de Santé, Fédération Française de Nutrition.** Diagnostic de la dénutrition chez l'enfant, l'adulte, et la personne de 70 ans et plus.; 2021.
15. **Bouma S.** Diagnosing Pediatric Malnutrition. Nutr Clin Pract. 2017;32(1):52-67.
16. Development of a WHO growth reference for school-aged children and adolescents - PMC. Accessed September 10, 2024.
17. **World Health Organization.** WHO Child Growth Standards: Length/Height-for-Age, Weight-for-Age, Weight-for-Length, Weight-for-Height and Body Mass Index-for-Age: Methods and Development. World Health Organization; 2006. Accessed September 8, 2024. https://www.who.int/publications/i/item/924154693X