

Nutritional Knowledge of Mothers of Children with Thalassemia Treated at Tay Nguyen Regional General Hospital and Some Related Factors

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Abstract: Background: Thalassemia results from genetic mutations encoding the alpha or beta-globin chains of hemoglobin. The disease exerts profound effects on the growth, physical development, and quality of life of patients, while imposing financial and healthcare burdens on their families and the community. Establishing an appropriate nutritional regimen will contribute to enhancing treatment efficacy and improving the quality of life for children with thalassemia. Objective: To assess the nutritional knowledge of mothers whose children with thalassemia are undergoing treatment at the Tay Nguyen Regional General Hospital and to identify several related factors. Methods: A cross-sectional descriptive study was conducted on 130 mothers of children with thalassemia treated at the Tay Nguyen Regional General Hospital who consented to participate in the study. Results: 98.5% of the mothers knew to supplement calcium-rich foods in the diet; 88.5% knew that children with thalassemia require a diet rich in protein and vitamins; 82.3% knew that high-iron foods should be restricted; 49.2% correctly understood the benefits of drinking fresh green tea after meals. Overall, 74.6% of the mothers possessed correct nutritional knowledge. Mothers who had received nutritional counseling demonstrated significantly better knowledge than those who had not ($p < 0.05$). Conclusion: 74.6% of the mothers had correct nutritional knowledge. Most mothers were knowledgeable about calcium supplementation, protein- and vitamin-rich diets, and iron-restricted diets, including iron-rich foods. Further research on the nutritional attitudes and practices of mothers of children with thalassemia in Dak Lak province is needed to enhance the future quality of life for these children.

Keywords: Thalassemia; Knowledge; Nutrition.

INTRODUCTION

Thalassemia is a group of hereditary hemolytic anemias characterized by a reduction or absence of globin chain synthesis. According to the Thalassaemia International Federation (2021), there are currently over 270 million people worldwide carrying the disease gene, and more than 300,000 children are born each year with either a thalassemia syndrome or a structural hemoglobin variant. Thalassemia is most prevalent in South Asia, Southeast Asia, Mediterranean countries, and North and Central Africa, with carrier rates ranging from 2% to 25% (Federation, 2021).

In Vietnam, a study by the National Institute of Hematology and Blood Transfusion indicated that the average carrier rate of the thalassemia/hemoglobin gene across all ethnic groups nationwide is 13.8%. A general survey of 7,079 individuals from 16 ethnic groups residing primarily in the South Central Coast and the Central Highlands revealed an exceptionally high prevalence of the thalassemia gene, with an overall carrier rate of 60.5% (Nguyen Thi Thu Ha, 2021).

Children with thalassemia fail to gain weight and grow at the expected rate. Formulating a proper nutritional plan plays a critical role in boosting treatment outcomes and the quality of life for pediatric thalassemia patients, which heavily depends on the parents' nutritional knowledge. In

Dak Lak, statistics from the Department of General Pediatrics at the Tay Nguyen Regional General Hospital showed 2,052 admissions of children with thalassemia in 2023, and 577 admissions in the first quarter of 2024. Therefore, this study was conducted to survey the current state of nutritional knowledge among mothers of children with thalassemia, aiming to propose solutions that contribute to improving treatment efficacy and quality of life for pediatric thalassemia patients in Dak Lak province.

SUBJECTS AND METHODS

Study Subjects

Mothers of children with a confirmed diagnosis of thalassemia who were undergoing treatment at the Department of General Pediatrics – Tay Nguyen Regional General Hospital.

Consented to participate in the study.

Capable of effective communication in Vietnamese.

Study Design

Cross-sectional descriptive study.

Sample Size and Sampling Method

Purposive total sampling.

Data collection period: 6 weeks.

After 6 weeks of data collection, 130 eligible samples meeting the study criteria were obtained.

Data Collection Method

A structured, self-administered interview questionnaire was used. The researcher observed and assisted during the process to clarify any queries the mothers had. The questionnaire consisted of 4 sections:

Section A: 8 questions regarding the general information of the mother.

Section B: 6 questions regarding the general information of the child.

Section C: 3 questions regarding the nutritional counseling information received by the mother.

Section D: 12 questions to assess the nutritional knowledge of the mother of the child with thalassemia.

Mothers were requested to read each question carefully and select the most appropriate response by ticking the correct answer. The researcher remained present to explain any questions that the mothers found unclear.

Data Analysis Method

Data Processing: Immediately after each interview, questionnaires were checked for completeness and consistency. Incomplete or inconsistent forms were either re-interviewed or excluded.

Data Analysis: Data were entered and analyzed using SPSS 26 software.

RESULTS

Table 1: Nutritional Status of Children

Nutritional Status	Frequency (n)	Percentage (%)
Malnourished	47	36.2
Normal	83	63.8
Total	130	100

Survey results showed that the majority of the children had a normal nutritional status,

accounting for 63.8%. However, 36.2% of the surveyed children were still malnourished.

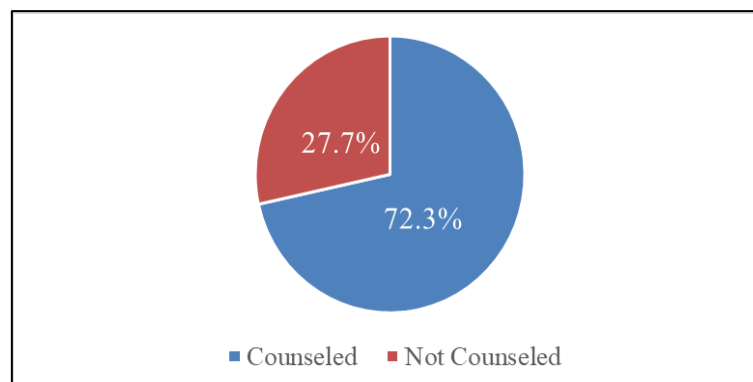


Figure 1: Sources of Nutritional Counseling for Mothers.

The survey findings indicated that most mothers had received nutritional counseling for their children, accounting for 72.3%, whereas 27.7%

reported that they had never received any nutritional counseling.

Table 2: Mothers' Knowledge of Essential Nutrients for Children (n=130)

Nutritional Knowledge	Correct (n, %)	Incorrect (n, %)	Total (n, %)
Calcium Supplementation	128 (98.5%)	2 (1.5%)	130 (100%)
Iron Restriction	107 (82.3%)	23 (17.7%)	130 (100%)
Protein- and Vitamin-Rich Diet	115 (88.5%)	15 (11.5%)	130 (100%)
Drinking Fresh Green Tea After Meals	64 (49.2%)	66 (50.8%)	130 (100%)

Most mothers (98.5%) agreed that calcium-rich foods should be added to the diet; 82.3% believed that high-iron foods should be restricted in the diet

of children with thalassemia; 88.5% recognized that children with thalassemia need a diet rich in protein and vitamins due to their delayed weight

and height development compared to normal children. Only 49.2% of the mothers correctly understood the benefits of drinking fresh green tea,

while the remaining majority (50.8%) believed that children with thalassemia should not drink green tea after meals.

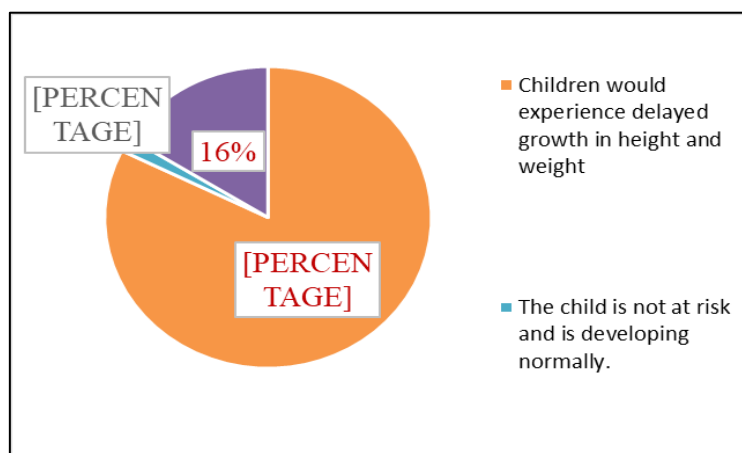


Figure 2: Mothers' Knowledge of Risks to Children for Non-Adherence to the Nutritional Regimen

The survey indicated that 82% of the mothers believed children would experience delayed growth in height and weight and become susceptible to illness due to reduced immunity if

they did not adhere to a proper nutritional regimen. However, 16% reported not knowing about this issue.

Table 3: Summary of Mothers' Nutritional Knowledge (n = 130)

Nutritional Knowledge	Frequency (n)	Percentage (%)
Correct	97	74.6
Incorrect	33	25.4
Total	130	100%

The results revealed that the majority of mothers possessed correct nutritional knowledge, accounting for 74.6%, while 25.4% of the mothers

had incorrect knowledge regarding nutritional care for children with thalassemia.

Table 4: Association Between Sources of Nutritional Information and Mothers' Nutritional Knowledge

Source of Nutritional Information	Correct Knowledge (n, %)	Incorrect Knowledge (n, %)	OR (95% CI)	p-value
Counseled	77 (82.8%)	16 (17.2%)	4.09 (1.76 - 9.48)	0.001
Not Counseled	20 (54.1%)	17 (45.9%)		
Total	97	33		

The group of mothers who had received nutritional counseling for their children with thalassemia had a significantly higher rate of correct knowledge

compared to those who had not, and this difference was statistically significant ($p < 0.05$).

Table 5: Association Between Children's Nutritional Status and Mothers' Nutritional Knowledge

Knowledge	Normal Status (n, %)	Malnourished Status (n, %)	OR (95% CI)	p-value
Correct	69 (83.1%)	28 (59.6%)	3.34 (1.47 - 7.58)	0.003
Incorrect	14 (16.9%)	19 (40.4%)		
Total	83	47		

Among mothers with correct nutritional knowledge, the proportion of children with normal nutritional status was higher than among mothers

with incorrect knowledge. The difference was statistically significant at the level of $p < 0.05$.

DISCUSSION

The results in Table 1 indicate that 36.2% of the surveyed children were malnourished and underweight. This rate is higher than the findings of Hoang Thi Thu Ha *et al.* at Hai Phong Children's Hospital, which reported 29.5% malnourishment (Hoang Thi Thu Ha, 2020). However, it aligns with Elalfy *et al.* in Egypt at 39.1% (Elalfy M.S, 2020) and is lower than the findings of Duong Van Cua with the malnutrition rate reached 90.8% (Duong Van Cua, 2020), as well as Biswas *et al.* in India at 48.2% (Biswas B, 2021). The nutritional status of children with thalassemia depends substantially on their diet and the correct nutritional knowledge of their caregivers. The rate of correct knowledge varies across studies, which may lead to discrepancies in the nutritional status of children with thalassemia.

Figure 1 shows that the percentage of mothers who had received nutritional counseling for their children with thalassemia was 72.3%, while 27.6% had not. This rate is lower than that reported by Duong Van Cua, where 90% of mothers had received counseling and 10% had not (Duong Van Cua, 2020). Adhering to the correct treatment regimen combined with proper nutrition enhances therapeutic efficacy. At the Department of General Pediatrics, health education and counseling are currently provided upon admission and discharge. Furthermore, weekly patient council meetings are organized to answer questions for patients or their relatives. However, designing specific health education plans and content for individual diseases has not been prioritized, and medical staff have not been fully trained in health education skills, limiting overall effectiveness.

Table 2 indicates that a high percentage of mothers (98.5%) knew to supplement calcium-rich foods like milk into the diet. This rate is comparable to the study by Nguyen Thi Tu Ngoc, where 95.8% of mothers had knowledge of calcium-rich diets (Nguyen Thi Tu Ngoc, 2016), and Duong Van Cua with 92.5% (Duong Van Cua, 2020) but significantly higher than the study by Seif in Egypt at 37.1% (Seif M.T.A, 2021). Calcium is a macronutrient that plays a vital role in human development, particularly in children. Most children with thalassemia are at an age where calcium supplementation is critical for normal growth, helping to minimize rickets, osteoporosis,

and bone deformities. Thus, providing calcium-rich foods such as milk and dairy products in their diet is highly essential.

Restricting high-iron foods in the diet of children with thalassemia is a top recommendation by experts during nutritional counseling. The survey results showed that 82.3% of the mothers knew to restrict iron in the diet. This rate is higher than Seif's study (34.3%) (Seif M.T.A, 2021) and comparable to Dinh Thi Thu Hang and Tran Thi Kim Dung (81.7%) (Dinh Thi Thu Hang and Tran Thi Kim Dung, 2022), but lower than Man *et al.*, where 88.5% of caregivers knew that excessive iron supplementation is harmful (Man C.D, 2019), and Duong Van Cua at 95% (Duong Van Cua, 2020). Long-term blood transfusions in children with thalassemia lead to iron overload, requiring iron chelation therapy. Therefore, controlling iron intake through the diet will improve the disease condition and limit complications.

In addition, the proportion of mothers who knew to encourage children to drink fresh green tea after meals accounted for only 49.2%. This rate is lower than the study by Man *et al.* in Peninsular Malaysia at 69.9% (Man C.D, 2019), Dinh Thi Thu Hang and Tran Thi Kim Dung at 73.3% (Dinh Thi Thu Hang and Tran Thi Kim Dung, 2022) and Nguyen Thi Tu Ngoc, where 81.3% of mothers knew that giving children green tea after meals helps inhibit iron absorption (Nguyen Thi Tu Ngoc, 2016). According to the guidelines of the Thalassaemia International Federation, an iron-restricted diet enhanced with iron-inhibiting products helps control iron levels in children with thalassemia. Hence, equipping mothers with knowledge about iron-inhibiting foods is crucial.

A diet rich in protein and vitamins is always recommended for children with thalassemia. In this study, 88.5% of mothers correctly answered this question. This proportion is significantly higher than that in Nguyen Thi Tu Ngoc (56.3%) (Nguyen Thi Tu Ngoc, 2016), Duong Van Cua (65%) (Duong Van Cua, 2020), and Man *et al.* in Peninsular Malaysia (57%) (Man C.D, 2019). When mothers understand the proper and appropriate diet for children with thalassemia, the children's nutritional status will improve substantially.

Figure 2 shows that most mothers (82%) were aware that children would suffer from delayed height and weight development and increased susceptibility to diseases due to lowered immunity if they did not follow an appropriate nutritional regimen. This rate is lower than Duong Van Cua's study, where 92.5% of parents recognized these risks, though 5% of parents in that study believed there were no risks at all (Duong Van Cua, 2020). Enhancing mothers' nutritional knowledge helps them design appropriate menus for their children and choose foods suitable for their children's medical condition, ensuring a balanced diet and preventing nutritional deficiencies.

Table 3 shows that the rate of mothers with correct nutritional knowledge regarding children with thalassemia was 74.6%. This is higher than the study by Dinh Thi Thu Hang and Tran Thi Kim Dung, which found that only 56.7% of mothers had good nutritional knowledge (Dinh Thi Thu Hang and Tran Thi Kim Dung, 2022). This variance can be attributed to differences in study periods, locations, and target populations. Proper nutritional knowledge contributes to better treatment outcomes and an enhanced quality of life for children with thalassemia.

The rate of correct knowledge was 82.8% among mothers who had received nutritional counseling, compared to 54.1% among those who had not. There was a statistically significant association between the source of nutritional information and mothers' nutritional knowledge ($p < 0.05$). This indicates that mothers who received nutritional counseling possess better nutritional knowledge, highlighting the importance and effectiveness of health education counseling programs in improving the health of children with thalassemia (Table 4).

Table 5 demonstrates that among mothers with correct nutritional knowledge, 83.1% of their children had a normal nutritional status, whereas the normal status rate was only 16.9% in the group of mothers with incorrect knowledge. The difference between the child's nutritional status and the mother's correct knowledge was statistically significant ($p < 0.05$). This confirms that health education counseling to improve mothers' understanding of nutrition for children with thalassemia plays an important role in

reducing malnutrition and underweight status in these patients.

CONCLUSION

74.6% of the mothers possessed correct nutritional knowledge. Most mothers had good knowledge regarding calcium supplementation, protein- and vitamin-rich diets, and iron-restricted diets, including iron-rich foods. Further research on the nutritional attitudes and practices of mothers of children with thalassemia in Dak Lak province is recommended to enhance the quality of life for these children in the future.

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