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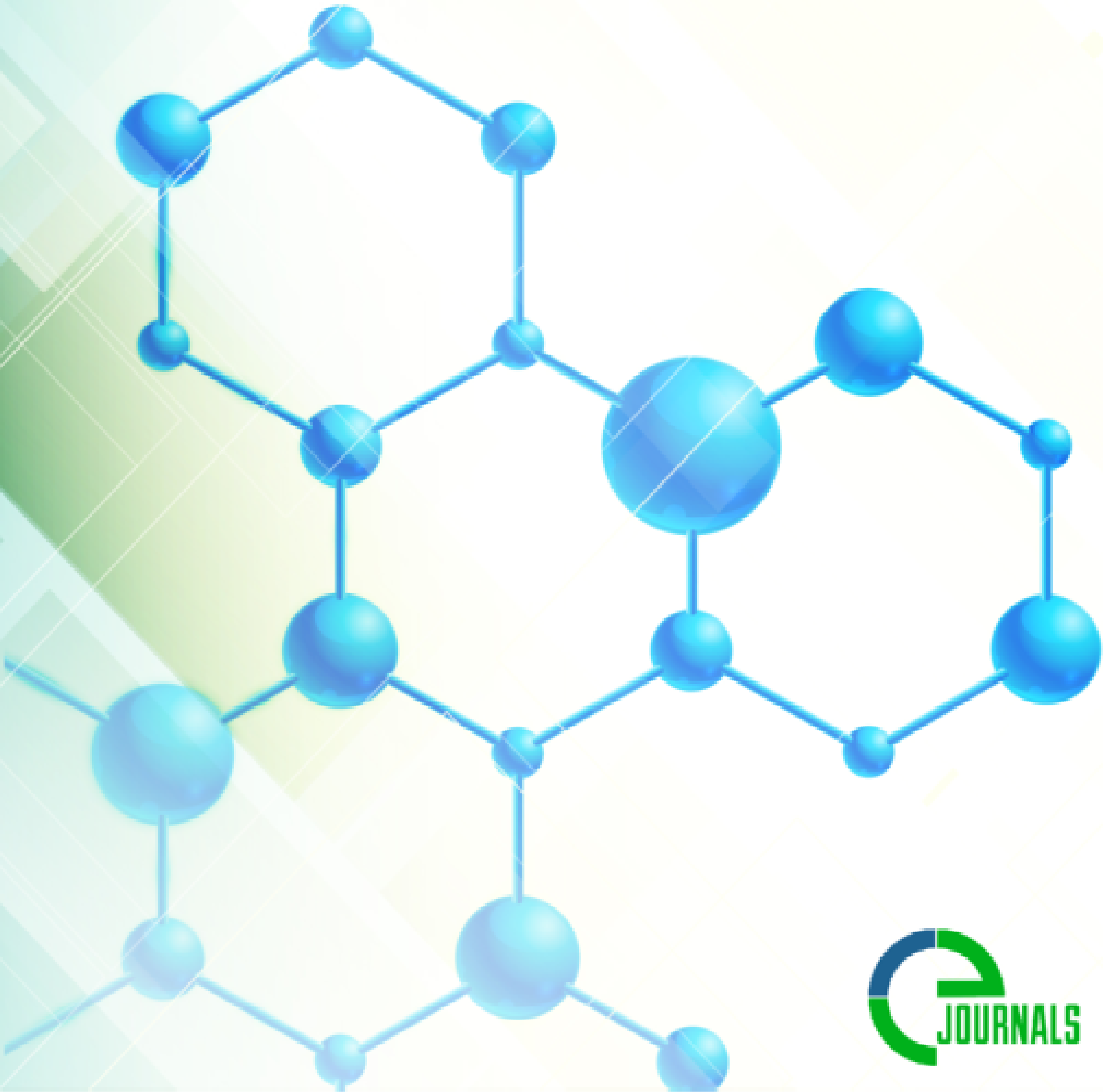

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ASSESSMENT OF NUTRITIONAL STATUS IN PEDIATRIC PATIENTS WITH ACUTE BRONCHIOLITIS

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Background. Acute bronchiolitis remains one of the most common lower respiratory tract infections in infants and young children worldwide, representing a significant burden on healthcare systems. According to recent epidemiological data, bronchiolitis accounts for approximately 2-3% of all pediatric hospitalizations in developed countries, with higher rates observed in developing nations. The disease primarily affects children under two years of age, with peak incidence occurring between 2 and 6 months of life. Respiratory syncytial virus (RSV) is identified as the causative agent in 50-80% of cases, though other viral pathogens including rhinovirus, adenovirus, and human metapneumovirus also contribute to the disease burden.

The relationship between nutritional status and the severity of acute respiratory infections has been increasingly recognized in recent years. Malnutrition compromises immune function through multiple mechanisms, including impaired cell-mediated immunity, reduced antibody production, decreased phagocytic activity, and compromised mucosal barrier integrity. Children with suboptimal nutritional status demonstrate increased susceptibility to infections, prolonged disease duration, and higher rates of complications. Biochemical markers of nutritional status, particularly serum albumin and total protein levels, serve as valuable indicators not only of nutritional adequacy but also of disease severity and inflammatory response.

The Nutritional Risk Index (NRI), originally developed for adult surgical patients, has been adapted and validated for use in pediatric populations. This objective assessment tool combines anthropometric measurements with biochemical parameters to provide a comprehensive evaluation of nutritional status and predict clinical outcomes. Despite growing evidence supporting the importance of nutritional assessment in hospitalized children, limited data exist regarding the specific impact of nutritional status on the clinical course of acute bronchiolitis, particularly in Central Asian populations. This knowledge gap underscores the necessity for targeted research to optimize nutritional management strategies and improve outcomes in this vulnerable patient population.

Objective. To evaluate the nutritional status of children hospitalized with acute bronchiolitis and determine its impact on clinical presentation, laboratory parameters, and disease outcomes.

Materials and methods. This prospective observational study was conducted between January 2024 and March 2025 at the Department of Pediatrics, Tashkent State Medical University Children's Hospital, a tertiary care facility in Uzbekistan. The study protocol was approved by the institutional ethics committee, and written informed consent was obtained from parents or legal guardians of all participants prior to enrollment.

A total of 104 children diagnosed with acute bronchiolitis were enrolled in the study. The diagnosis was established based on clinical criteria including age less than 24 months, first episode of wheezing, respiratory distress with tachypnea and/or increased work of breathing, and evidence of viral upper respiratory infection. Diagnostic confirmation was supported by chest radiography and viral testing when clinically indicated.

Inclusion criteria:

- Age 1-24 months
- Clinical diagnosis of acute bronchiolitis confirmed by attending pediatrician
- Admission within 48 hours of hospital presentation
- Parental/guardian consent for participation

Exclusion criteria:

- Chronic lung disease (bronchopulmonary dysplasia, cystic fibrosis)
- Congenital heart disease with hemodynamic significance
- Immunodeficiency disorders (primary or acquired)
- Prematurity (<37 weeks gestational age)
- Previous episodes of wheezing
- Chronic systemic diseases affecting nutritional status
- Use of corticosteroids within 2 weeks prior to admission

Comprehensive nutritional evaluation was performed within 24 hours of hospital admission and included:

Anthropometric measurements:

- Weight measured using calibrated digital scales (accuracy ë10g)
- Length measured using standard infantometer (accuracy ë0.1cm)
- Weight-for-length z-scores calculated using WHO growth standards
- Mid-upper arm circumference (MUAC) measured at midpoint between acromion and olecranon

Biochemical parameters:

- Serum total protein determined by biuret method (reference range: 60-80 g/L)
- Serum albumin measured by bromocresol green colorimetric method (reference range: 35-50 g/L)
- Prealbumin levels assessed by immunoturbidimetric assay (reference range: 200-400 mg/L)

Nutritional Risk Index calculation:

The modified pediatric Nutritional Risk Index was calculated using the formula:

NRI = 1.519 x serum albumin (g/L) + 41.7 ? (current weight (kg) / usual weight (kg))

Interpretation of NRI values:

- NRI > 97.5: No nutritional risk
- NRI 83.5-97.5: Moderate nutritional risk
- NRI < 83.5: Severe nutritional risk

Based on NRI results, patients were stratified into two groups:

- Group 1: Children with nutritional compromise (NRI ≤ 97.5)
- Group 2: Children with adequate nutritional status (NRI > 97.5)

Standardized clinical evaluation was performed at admission and daily throughout hospitalization, documenting:

Respiratory parameters:

- Respiratory rate (breaths per minute)
- Oxygen saturation (SpO_2) measured by pulse oximetry
- Clinical severity score (modified Tal score: 0-12 points)
- Need for supplemental oxygen therapy
- Requirement for non-invasive ventilation or mechanical ventilation

General clinical features:

- Fever (temperature ≥38.0°C)

- Feeding difficulties (reduced intake >50% of usual)
- Hydration status
- Activity level and irritability

Laboratory Investigations

Blood samples were collected at admission for:

- Complete blood count with differential
- C-reactive protein (CRP) by immunoturbidimetric assay
- Erythrocyte sedimentation rate (ESR)
- Serum electrolytes
- Blood gas analysis (when clinically indicated)

Outcome Measures

Primary outcomes:

- Length of hospital stay (days)
- Duration of oxygen therapy (days)
- Time to clinical improvement (defined as respiratory rate normalization and SpO_2 >92% on room air)

Secondary outcomes:

- Need for intensive care unit (ICU) admission
- Requirement for mechanical ventilation
- Development of complications (pneumonia, respiratory failure, apnea)
- In-hospital mortality

All hospitalized patients received age-appropriate nutritional support according to institutional protocols:

- Continuation of breastfeeding when possible
- Standard infant formula for non-breastfed infants
- Nasogastric tube feeding for patients unable to maintain oral intake
- Intravenous fluid therapy for dehydrated patients
- Nutritional supplementation for identified deficiencies

Data were analyzed using SPSS Statistics version 26.0 (IBM Corporation, Armonk, NY, USA). Descriptive statistics included means with standard deviations for continuous variables and frequencies with percentages for categorical variables. Normal distribution was assessed using Kolmogorov-Smirnov test. Independent samples t-test was used for comparing continuous variables between groups, while chi-square test or Fisher's exact test (when appropriate) was employed for categorical variables. Pearson correlation coefficient was calculated to assess relationships between nutritional parameters and clinical outcomes. Multivariate logistic regression analysis was performed to identify independent predictors of prolonged hospitalization. Statistical significance was set at $p<0.05$ (two-tailed).

RESULTS. Of the 104 enrolled patients, complete data were available for 98 children (94.2%). Six patients were excluded due to early discharge against medical advice (n=4) or incomplete laboratory data (n=2). The final study cohort comprised 98 patients with mean age of 7.8±4.6 months (range: 1-23 months). Male predominance was observed with 58 boys (59.2%) and 40 girls (40.8%).

Based on NRI assessment, 64 patients (65.3%) were classified as having nutritional compromise (Group 1), while 34 patients (34.7%) had adequate nutritional status (Group 2). The baseline demographic characteristics are presented in Table 1.

Table 1. Baseline Demographic and Anthropometric Characteristics

Parameter	Group 1 (n=64)	Group 2 (n=34)	p-value
Age, months (mean±SD)	7.4±4.8	8.5±4.2	0.243
Male gender, n (%)	39 (60.9%)	19 (55.9%)	0.621
Weight, kg (mean±SD)	6.8±1.9	8.4±1.6	<0.001
Length, cm (mean±SD)	65.3±7.2	69.8±6.4	0.003
Weight-for-length z-score	-1.8±0.9	0.2±0.8	<0.001
MUAC, cm (mean±SD)	12.4±1.3	14.2±1.1	<0.001
Breastfeeding, n (%)	38 (59.4%)	26 (76.5%)	0.089
Previous hospitalization, n (%)	18 (28.1%)	6 (17.6%)	0.248

Children in Group 1 had significantly lower weight (6.8±1.9 kg vs. 8.4±1.6 kg, p<0.001), shorter length (65.3±7.2 cm vs. 69.8±6.4 cm, p=0.003), and markedly reduced weight-for-length z-scores (-1.8±0.9 vs. 0.2±0.8, p<0.001) compared to Group 2. Mid-upper arm circumference was also significantly smaller in nutritionally compromised children (12.4±1.3 cm vs. 14.2±1.1 cm, p<0.001).

The clinical features at hospital admission demonstrated significant differences between the two groups, as detailed in Table 2.

Table 2. Clinical Features at Hospital Admission

Clinical Feature	Group 1 (n=64)	Group 2 (n=34)	p-value
Fever (≥38.0°C), n (%)	52 (81.3%)	22 (64.7%)	0.069
Respiratory rate, breaths/min	58.6±8.4	52.3±7.1	<0.001
SpO_2 <92% on room air, n (%)	48 (75.0%)	16 (47.1%)	0.005
Moderate-severe respiratory distress, n (%)	54 (84.4%)	19 (55.9%)	0.002
Modified Tal score	7.8±2.1	5.6±1.8	<0.001
Feeding difficulties, n (%)	58 (90.6%)	21 (61.8%)	0.001
Dehydration, n (%)	36 (56.3%)	9 (26.5%)	0.004
Lethargy, n (%)	42 (65.6%)	12 (35.3%)	0.004
Wheezing, n (%)	64 (100%)	34 (100%)	1.000
Crackles on auscultation, n (%)	56 (87.5%)	28 (82.4%)	0.487

Patients with nutritional compromise presented with significantly higher respiratory rates (58.6±8.4 vs. 52.3±7.1 breaths/min, p<0.001) and more severe respiratory distress as evidenced by higher modified Tal scores (7.8±2.1 vs. 5.6±1.8, p<0.001). Hypoxemia (SpO_2 <92% on room air) was observed in 75.0% of Group 1 patients compared to 47.1% in Group 2 (p=0.005). Feeding difficulties were reported in 90.6% of nutritionally compromised children versus 61.8% of those with adequate nutrition (p=0.001). Clinical signs of dehydration were more prevalent in Group 1 (56.3% vs. 26.5%, p=0.004).

Comprehensive nutritional assessment revealed significant differences in biochemical markers between the two groups, as shown in Table 3.

Table 3. Nutritional and Biochemical Parameters

Parameter	Group 1 (n=64)	Group 2 (n=34)	p-value
Total protein, g/L	54.6±6.3	66.8±5.1	<0.001
Albumin, g/L	30.4±4.2	40.2±3.6	<0.001
Prealbumin, mg/L	168.4±32.6	256.3±38.4	<0.001
NRI	87.3±7.8	105.6±5.2	<0.001
Hemoglobin, g/L	102.6±14.3	116.8±11.2	<0.001
Hematocrit, %	31.4±4.2	35.8±3.6	<0.001
Lymphocytes, ×10⁹/L	3.2±1.4	5.1±1.8	<0.001
Total lymphocyte count	2.8±1.1	4.6±1.4	<0.001

Mean serum total protein was significantly lower in Group 1 (54.6±6.3 g/L vs. 66.8±5.1 g/L, p<0.001), as was albumin (30.4±4.2 g/L vs. 40.2±3.6 g/L, p<0.001). Prealbumin levels, a sensitive marker of acute nutritional status, were markedly reduced in nutritionally compromised patients (168.4±32.6 mg/L vs. 256.3±38.4 mg/L, p<0.001). The mean NRI in Group 1 was 87.3±7.8, indicating moderate nutritional risk, compared to 105.6±5.2 in Group 2, reflecting adequate nutritional status (p<0.001).

Anemia was more prevalent in Group 1, with mean hemoglobin of 102.6±14.3 g/L compared to 116.8±11.2 g/L in Group 2 (p<0.001). Lymphocyte counts were significantly lower in nutritionally compromised children (3.2±1.4×10^9/L vs. 5.1±1.8×10^9/L, p<0.001), suggesting impaired immune function.

Analysis of inflammatory parameters revealed more pronounced inflammatory responses in children with nutritional compromise, as presented in Table 4.

Table 4. Inflammatory Markers and Laboratory Parameters

Parameter	Group 1 (n=64)	Group 2 (n=34)	p-value
White blood cells, ×10^9/L	12.8±4.6	10.4±3.2	0.006
Neutrophils, %	48.6±12.4	42.3±10.8	0.014
C-reactive protein, mg/L	42.6±28.4	24.8±16.2	0.001
ESR, mm/h	28.4±14.6	18.6±10.2	<0.001
Platelet count, ×10^9/L	342.6±98.4	318.4±82.6	0.212
Serum sodium, mmol/L	136.4±4.2	138.6±3.4	0.008
Serum potassium, mmol/L	4.1±0.6	4.3±0.5	0.098

C-reactive protein levels were significantly elevated in Group 1 (42.6±28.4 mg/L vs. 24.8±16.2 mg/L, p=0.001), indicating more severe inflammatory response. Similarly, ESR was higher in nutritionally compromised children (28.4±14.6 mm/h vs. 18.6±10.2 mm/h, p<0.001). White blood cell counts were elevated in Group 1 ($12.8±4.6×10^9$/L vs. $10.4±3.2×10^9$/L, p=0.006), with higher neutrophil percentages (48.6±12.4% vs. 42.3±10.8%, p=0.014).

The impact of nutritional status on clinical outcomes was substantial, with nutritionally compromised children experiencing significantly worse outcomes across multiple parameters, as detailed in Table 5.

Table 5. Clinical Outcomes and Hospital Course

Outcome	Group 1 (n=64)	Group 2 (n=34)	p-value
Length of hospital stay, days	9.8±3.6	6.4±2.2	<0.001
Duration of oxygen therapy, days	5.6±2.8	3.2±1.6	<0.001
Time to clinical improvement, days	6.8±2.4	4.6±1.8	<0.001
Need for supplemental oxygen, n (%)	56 (87.5%)	22 (64.7%)	0.008
High-flow nasal cannula, n (%)	24 (37.5%)	6 (17.6%)	0.040
ICU admission, n (%)	16 (25.0%)	3 (8.8%)	0.050
Mechanical ventilation, n (%)	6 (9.4%)	0 (0%)	0.088
Nasogastric tube feeding, n (%)	38 (59.4%)	8 (23.5%)	0.001
Complications, n (%)	22 (34.4%)	5 (14.7%)	0.037

Mean length of hospital stay was significantly prolonged in Group 1 (9.8±3.6 days vs. 6.4±2.2 days, p<0.001), representing a 53% increase compared to adequately nourished children. Duration of oxygen therapy was nearly doubled in nutritionally compromised patients (5.6±2.8 days vs. 3.2±1.6 days, p<0.001). Time to clinical improvement, defined as normalization of respiratory rate and maintenance of SpO_2 >92% on room air, was significantly longer in Group 1 (6.8±2.4 days vs. 4.6±1.8 days, p<0.001).

The need for supplemental oxygen was higher in Group 1 (87.5% vs. 64.7%, p=0.008), and these patients more frequently required high-flow nasal cannula therapy (37.5% vs. 17.6%, p=0.040). ICU admission rates were nearly three times higher in nutritionally compromised children (25.0% vs. 8.8%, p=0.050). Although mechanical ventilation was required only in Group 1 patients (9.4%), this difference did not reach statistical significance (p=0.088), likely due to small numbers.

Nasogastric tube feeding was necessary in 59.4% of Group 1 patients compared to 23.5% in Group 2 (p=0.001), reflecting more severe feeding difficulties in malnourished children. Overall complication rates were significantly higher in Group 1 (34.4% vs. 14.7%, p=0.037).

Detailed analysis of complications revealed distinct patterns between the groups, as shown in Table 6.

Table 6. Types of Complications

Complication	Group 1 (n=64)	Group 2 (n=34)	p-value
Secondary bacterial pneumonia, n (%)	12 (18.8%)	2 (5.9%)	0.078
Respiratory failure, n (%)	8 (12.5%)	1 (2.9%)	0.125
Apnea episodes, n (%)	6 (9.4%)	1 (2.9%)	0.262
Atelectasis, n (%)	10 (15.6%)	2 (5.9%)	0.165
Dehydration requiring IV therapy, n (%)	28 (43.8%)	7 (20.6%)	0.021
Electrolyte imbalance, n (%)	14 (21.9%)	3 (8.8%)	0.104
Prolonged oxygen dependency, n (%)	18 (28.1%)	4 (11.8%)	0.060

Although individual complication rates did not always reach statistical significance due to relatively small numbers, nutritionally compromised children consistently showed higher rates across all complication types. Secondary bacterial pneumonia occurred in 18.8% of Group 1 patients versus 5.9% in Group 2 (p=0.078). Dehydration requiring intravenous fluid therapy was significantly more common in malnourished children (43.8% vs. 20.6%, p=0.021).

Correlation analysis revealed significant relationships between nutritional parameters and clinical outcomes, as presented in Table 7.

Table 7. Correlation Between Nutritional Parameters and Clinical Outcomes

Variables	Correlation coefficient (r)	p-value
NRI and length of hospital stay	-0.72	<0.001
Albumin and duration of oxygen therapy	-0.68	<0.001
Total protein and time to clinical improvement	-0.64	<0.001
NRI and modified Tal score	-0.58	<0.001
Prealbumin and CRP levels	-0.56	<0.001
Weight-for-length z-score and complications	-0.52	<0.001
Albumin and ICU admission	-0.48	<0.001
Total lymphocyte count and hospital stay	-0.46	<0.001

Strong negative correlations were identified between NRI and length of hospital stay (r=-0.72, p<0.001), indicating that better nutritional status was associated with shorter hospitalization. Similarly, serum albumin showed strong negative correlation with duration of oxygen therapy (r=-0.68, p<0.001), and total protein correlated inversely with time to clinical improvement (r=-0.64, p<0.001).

Moderate negative correlations were observed between NRI and disease severity at presentation (modified Tal score: r=-0.58, p<0.001), and between prealbumin and inflammatory markers (CRP: r=-0.56, p<0.001). Weight-for-length z-score showed moderate negative correlation with complication rates (r=-0.52, p<0.001).

Multivariate logistic regression analysis was performed to identify independent predictors of prolonged hospitalization (defined as >7 days), as shown in Table 8.

Table 8. Multivariate Analysis of Predictors for Prolonged Hospitalization

Variable	Odds Ratio	95% CI	p-value
NRI <90	4.82	1.86-12.48	0.001
Albumin <32 g/L	3.64	1.42-9.32	0.007
Modified Tal score ≥7	3.28	1.34-8.02	0.009
Age <6 months	2.86	1.18-6.94	0.020
CRP >30 mg/L	2.42	1.04-5.64	0.041
SpO_2 <92% at admission	2.18	0.92-5.16	0.076

After adjusting for confounding variables, NRI <90 emerged as the strongest independent predictor of prolonged hospitalization (OR 4.82, 95% CI 1.86-12.48, p=0.001). Hypoalbuminemia (<32 g/L) was also independently associated with extended hospital stay (OR 3.64, 95% CI 1.42-9.32, p=0.007). Other significant predictors included higher disease severity at presentation (modified Tal score ≥7: OR 3.28, p=0.009), younger age (<6 months: OR 2.86, p=0.020), and elevated inflammatory markers (CRP >30 mg/L: OR 2.42, p=0.041).

Among the 64 patients in Group 1, targeted nutritional interventions were implemented based on individual assessment. Table 9 summarizes the nutritional support provided and associated outcomes.

Table 9. Nutritional Interventions and Outcomes in Group 1

Intervention	Number (%)	Mean hospital stay, days	p-value*
Standard feeding only	26 (40.6%)	11.2±3.8	-
Nasogastric tube feeding	38 (59.4%)	8.8±3.2	0.008
Protein supplementation	18 (28.1%)	8.4±2.8	0.003
Multivitamin supplementation	42 (65.6%)	9.2±3.4	0.042
Zinc supplementation	32 (50.0%)	9.0±3.2	0.028

*Compared to standard feeding only

Children who received nasogastric tube feeding when oral intake was inadequate had significantly shorter hospital stays compared to those maintained on standard feeding alone (8.8±3.2 vs. 11.2±3.8 days, p=0.008). Protein supplementation was associated with the shortest hospital stays (8.4±2.8 days, p=0.003). Micronutrient supplementation, including multivitamins and zinc, also showed beneficial effects on hospitalization duration.

DISCUSSION. This prospective observational study demonstrates a high prevalence of nutritional compromise among children hospitalized with acute bronchiolitis (65.3%), significantly higher than rates reported in some developed countries but consistent with findings from other resource-limited settings. Our results provide compelling evidence that impaired nutritional status substantially impacts the clinical presentation, disease severity, and outcomes of acute bronchiolitis in young children.

The strong association between nutritional compromise and disease severity, as evidenced by higher modified Tal scores and increased oxygen requirements, aligns with the known effects of malnutrition on respiratory mechanics and immune function. Malnourished children exhibit reduced respiratory muscle strength, impaired mucociliary clearance, and compromised surfactant production, all of which contribute to more severe respiratory distress. The 53% increase in length of hospital stay observed in nutritionally compromised children represents not only a clinical concern but also a significant economic burden on healthcare systems and families.

The biochemical markers evaluated in this study—total protein, albumin, and prealbumin—demonstrated strong correlations with clinical outcomes. Hypoalbuminemia, observed in 78.1% of Group 1 patients, reflects both chronic nutritional deficiency and acute inflammatory response. The negative correlation between albumin levels and CRP (r=-0.56) suggests that inflammation-induced catabolism exacerbates pre-existing nutritional deficits. Prealbumin, with its shorter half-life of 2-3 days, proved particularly valuable for assessing acute nutritional status and monitoring response to nutritional interventions.

The immunological implications of malnutrition were evident in our findings of lymphopenia and reduced total lymphocyte counts in Group 1 patients. Protein-energy malnutrition impairs both cell-mediated and humoral immunity, increasing susceptibility to secondary bacterial infections and prolonging viral clearance. The 18.8% rate of secondary bacterial pneumonia in malnourished children, though not reaching statistical significance, represents a clinically important trend warranting attention.

The Nutritional Risk Index proved to be a practical and reliable tool for stratifying patients and predicting outcomes. Its strong negative correlation with length of hospital stay (r=-0.72) and emergence as an independent predictor of prolonged hospitalization in multivariate analysis (OR 4.82) support its routine use in clinical practice. The NRI's advantage lies in its combination of objective anthropometric and biochemical data, providing a more comprehensive assessment than either parameter alone.

Our findings regarding nutritional interventions, though limited by the observational study design, suggest potential benefits of aggressive nutritional support. Children receiving nasogastric tube feeding when oral intake was inadequate had shorter hospital stays, highlighting the importance of maintaining adequate caloric and protein intake during acute illness. The apparent benefit of protein supplementation warrants further investigation in randomized controlled trials.

Several mechanisms likely explain the adverse outcomes associated with nutritional compromise. First, malnutrition impairs respiratory muscle function, reducing the ability to maintain adequate ventilation and clear secretions. Second, immune dysfunction increases susceptibility to secondary infections and may prolong viral replication. Third, impaired wound healing and tissue repair delay recovery of damaged respiratory epithelium. Fourth, micronutrient deficiencies (particularly zinc, vitamin A, and vitamin D) compromise multiple aspects of immune function and epithelial integrity.

The high prevalence of nutritional compromise in our population raises important questions about underlying causes. Factors may include suboptimal infant feeding practices, food insecurity, recurrent infections, and limited access to healthcare for preventive interventions. These findings underscore the need for comprehensive approaches addressing both acute illness management and underlying nutritional vulnerabilities.

Limitations of this study include its single-center design, which may limit generalizability to other populations and settings. The observational nature precludes definitive conclusions about causality—while nutritional compromise clearly predicts worse outcomes, the extent to which nutritional interventions can modify these outcomes requires confirmation in randomized trials. We did not assess all potentially relevant micronutrients (vitamin D, zinc, iron status) or perform detailed body composition analysis. Long-term follow-up data on growth and development were not available. Finally, socioeconomic factors that may confound the relationship between nutritional status and outcomes were not comprehensively evaluated.

Despite these limitations, our study provides valuable insights into the relationship between nutritional status and bronchiolitis outcomes in a population where such data are limited. The findings have important implications for clinical practice, suggesting that routine nutritional screening should be incorporated into the initial assessment of children hospitalized with bronchiolitis. Early identification of nutritional risk enables targeted interventions that may improve outcomes and reduce healthcare costs.

Future research directions should include: (1) randomized controlled trials evaluating specific nutritional interventions in malnourished children with bronchiolitis; (2) investigation of optimal timing and composition of nutritional support; (3) assessment of micronutrient supplementation effects; (4) long-term follow-up studies examining growth trajectories and developmental outcomes; (5) cost-effectiveness analyses of nutritional screening and intervention programs; and (6) exploration of preventive strategies to reduce malnutrition prevalence in at-risk populations.

CONCLUSIONS. This study demonstrates that nutritional compromise is highly prevalent among children hospitalized with acute bronchiolitis and significantly impacts disease severity, clinical course, and outcomes. Children with impaired nutritional status, as assessed by the Nutritional Risk Index and biochemical markers, experience more severe respiratory distress, longer hospitalization, increased oxygen requirements, and higher complication rates compared to adequately nourished children.

The Nutritional Risk Index emerges as a valuable, practical tool for identifying children at risk for adverse outcomes, demonstrating strong correlations with clinical parameters and independent predictive value in multivariate analysis. Biochemical markers including serum albumin, total protein, and prealbumin provide objective assessment of nutritional status and correlate significantly with disease severity and inflammatory response.

These findings support the implementation of routine nutritional screening for all children hospitalized with acute bronchiolitis, enabling early identification of at-risk patients and facilitating targeted nutritional interventions. Aggressive nutritional support, including nasogastric tube feeding when oral intake is inadequate and consideration of protein supplementation, may improve outcomes in nutritionally compromised children, though randomized controlled trials are needed to definitively establish efficacy.

The high prevalence of nutritional compromise in our population highlights the need for comprehensive approaches addressing both acute illness management and underlying nutritional vulnerabilities. Public health initiatives focusing on optimal infant feeding practices, micronutrient supplementation, and early intervention for growth faltering may reduce the burden of severe bronchiolitis and improve outcomes in vulnerable populations.

In conclusion, nutritional status represents a critical, modifiable risk factor influencing the clinical course of acute bronchiolitis. Integration of nutritional assessment and support into standard care protocols has the potential to improve outcomes, reduce complications, and decrease healthcare costs in this common and potentially serious pediatric illness.

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