Pedia Companion

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Relationship Between Unusual Sleep Patterns and Indoor Environmental Risks in Children with Chronic Cough

Introduction

Chronic cough in children, defined as a cough lasting more than 4 weeks affecting around 5 to 10% of the general population and is a major concern, causing unnecessary medical visits and significant costs.[1] It affects children's sleep, activities, emotions, and overall quality of life. Sleep quality is crucial for children's health, but sleep-disordered breathing (SDB) can disrupt it, leading to various issues. Obstructive sleep apnea syndrome (OSAS), where children snore and may have difficulty breathing during sleep, affects about 25% of those who snore. Indoor environmental factors, such as pollution, mold, pets, and tobacco smoke, also affect sleep quality and respiratory health. However, there was limited research on how these factors impact children with chronic cough.[2] This study aimed to examine the prevalence of abnormal sleep behaviours and the impact of indoor environmental factors on sleep in children with chronic cough.

Methods

This cross-sectional study was conducted on children aged between 3-18 years. Questionnaires were distributed by school teachers to parents or guardians and collected after completion. Children aged 16–18 years completed the questionnaires with their primary carers. Data on sociodemographic factors, allergies, home environmental exposures, and sleep characteristics of the participants were collected using paper-based questionnaires. Logistic regression models were employed to explore associations between abnormal sleep behaviours, chronic cough, and indoor environmental factors, adjusting for confounding variables.

Results

A total of 2,026 valid responses were considered of which 316 responses were from children with chronic cough, and 1,710 were from children without chronic cough, resulting in a survey-weighted prevalence of chronic cough at 15.50%. Children with chronic cough had significantly higher incidences of eczema (45.25% vs. 30.29%), wheezing (24.37% vs. 143%), rhinitis (42.09% vs. 24.32%), food allergy (12.66% vs. 6.90%) and nasosinusitis (8.87% vs. 4.67%) than controls (Figure 1). Family history of sleep disorders (28.16% vs. 19.29%) and adenoid hypertrophy (7.91% vs. 3.92%) was more common in the chronic cough group. The average sleep duration was 8.95 hours for children with chronic cough, and 8.85 hours for

controls. Chronic cough was associated with various sleep disturbances, including snoring, restless sleep, bruxism (teeth grinding), and sweating. Mold exposure was identified as a high-risk factor for chronic cough. In children with chronic cough, recent home decoration was linked to sleepwalking; mold exposure to bruxism; and carpet use to apnea, twitching during sleep, and morning headaches. In the non-chronic cough group, pet ownership was associated with several sleep-related issues.

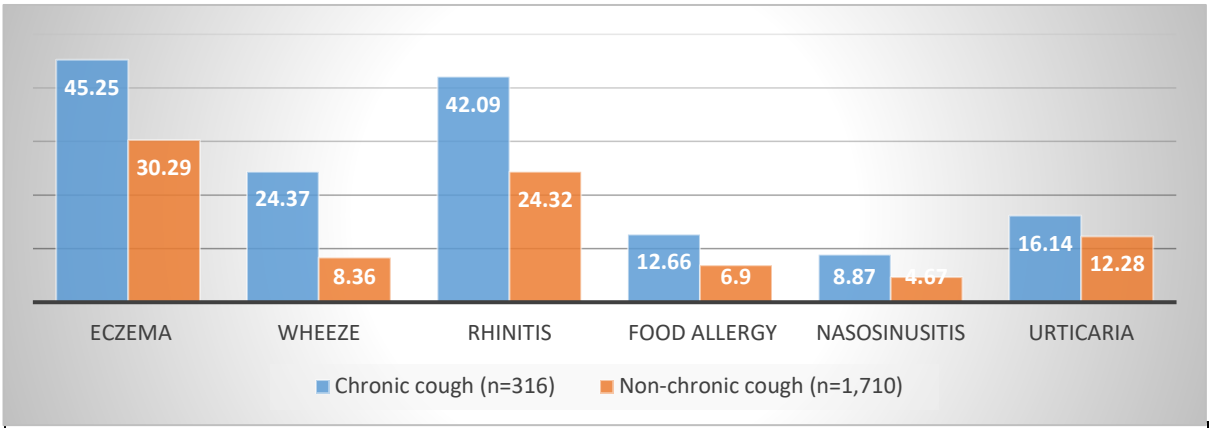

Figure 1. Percentage of participants with different conditions

Discussion

This study highlighted that children with chronic cough were more likely to experience various comorbid conditions and sleep disturbances. These associations align with the notion that chronic cough often accompanies other allergic and respiratory conditions, which are driven by shared underlying mechanisms such as airway inflammation and hyper-responsiveness. A significant aspect of the study is its identification of indoor environmental factors that might contribute to chronic cough and associated sleep disturbances. Specifically, mold exposure, recent home decoration, and carpet use were linked to increased risk of abnormal sleep behaviours in children with chronic cough. The study also reinforces the importance of considering sleep disturbances in the management of chronic cough, as symptoms like snoring, restless sleep, bruxism, and sweating were found to be significantly associated with chronic cough.[2] Additionally, Tiesler et al. found that indoor environmental factors, such as mold and moisture could negatively impact respiratory health and sleep quality, which was consistent with the findings of the present study.[3]

Conclusion

Children with chronic cough were more likely to have abnormal sleep behaviours compared to those without a chronic cough. Factors like recent household decoration, exposure to mold, and carpet use were all linked to these abnormal sleep patterns in affected children.

Children with chronic cough are more prone to some abnormal sleep behaviours.

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Impact of Serum 25-Hydroxyvitamin D Levels on Lung Health in Preterm Infants

Introduction

Vitamin D is a fat-soluble steroid essential for various biological processes, including calcium and phosphorus absorption, immune regulation, and bone health. It is metabolized in the liver to form 25-hydroxyvitamin D_3 [25(OH)D_3], which is further converted in the kidneys to the active form, 1,25-dihydroxyvitamin D_3 [1,25(OH)D_3].[1] In addition, vitamin D is crucial for several aspects of lung development, including branching morphogenesis, the proliferation of alveolar type-2 cells, surfactant phospholipid secretion, and overall lung maturation.[2] Adequate vitamin D levels also helps in maintaining bone health and are believed to impact neonatal lung development and disease.[1] Given the importance of vitamin D, this study aims to investigate the vitamin D deficiency status in preterm infants and its correlation with lung diseases in these infants.

Methods

This retrospective cohort study included preterm infants with the gestational age of less than 37 weeks, and a vitamin D test conducted within 24 hours of birth. Data included infant characteristics (gestational age, birth weight, sex, etc.), maternal data (age, pregnancy complications, etc.), and clinical outcomes (use of lung surfactant, respiratory complications). Serum 25(OH)D levels were measured using electrochemiluminescence immunoassay. Vitamin D levels were classified as deficient (<20 ng/mL), insufficient (20-30 ng/mL), or adequate (>30 ng/mL). Logistic regression was used to analyse the relationship between 25(OH)D levels and pulmonary complications.

Results

The study included 237 preterm infants with a mean gestational age of (34.10 ± 1.20) weeks (28-36 weeks). The mean serum 25(OH)D level was (16.97.1±8.06) ng/mL, with 175 cases (73.84%) of infants showing vitamin D deficiency, 39 cases (16.46%) insufficiency, and 23

cases (9.70%) adequacy. Fall was the season with a higher incidence of vitamin D deficiency compared to other seasons. There were no significant differences between the low- and high-vitamin D groups in terms of gestational age, birth weight, sex, delivery mode, and other variables. The use of lung surfactant was significantly higher in the low-vitamin D group. The incidence of respiratory distress syndrome (RDS) and bronchopulmonary dysplasia (BPD) was significantly higher in the low-vitamin D group compared to the high-vitamin D group (Figure 1). Higher serum 25(OH)D levels were associated with a reduced risk of pulmonary complications. A higher 5-minute Apgar score and prenatal hormone use also reduced the risk of complications.

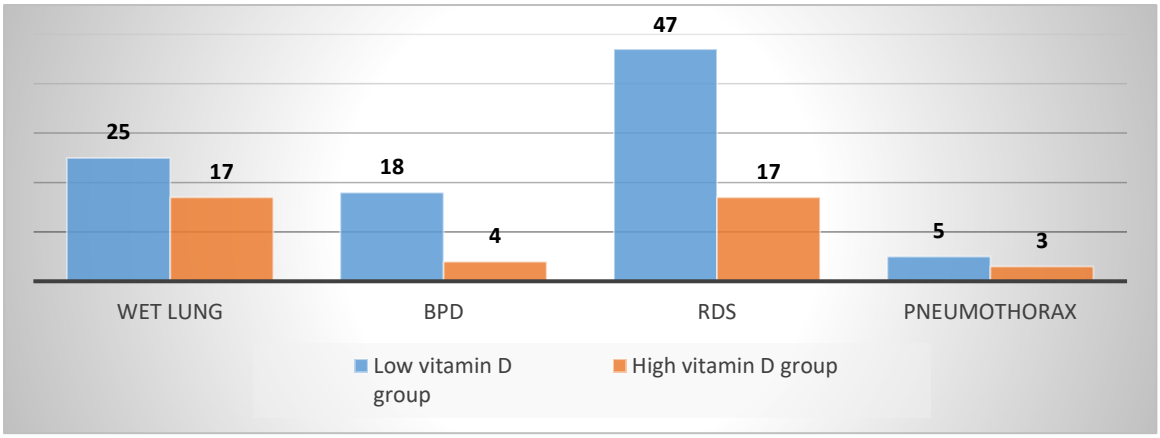

Figure 1. Comparison of pulmonary complications in children between the two groups.

Discussion

Vitamin D deficiency is prevalent among preterm infants and correlates with a higher incidence of lung complications. This study supports existing evidence that vitamin D plays a critical role in lung development and function.[1] Previous study found that low vitamin D levels are associated with a higher incidence of RDS and BPD.[3] Furthermore, Ge et al. demonstrated that vitamin D supplementation reduced the incidence of BPD in preterm infants, reinforcing the protective role of vitamin D against lung diseases.[4] These findings align with the present study results that higher vitamin D levels are associated with reduced pulmonary complications.[1]

Conclusion

Vitamin D deficiency is common in preterm infants and was linked to increased pulmonary complications. Early supplementation of vitamin D could potentially mitigate these risks.

Low vitamin D levels at birth in preterm infants may increase the incidence of respiratory distress syndrome and bronchopulmonary dysplasia.

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Evaluation of Hospitalized Patients with Down Syndrome and Congenital Heart Disease

Introduction

Down syndrome (Trisomy 21) is the most common genetic disorder compatible with life, with a prevalence of about 5 cases per 10,000 individuals in Europe.[1] Those with Down syndrome are more susceptible to various associated health issues, including congenital heart disease (CHD). The prevalence of CHD in individuals with Down syndrome is significantly higher (50%) compared to the general population (1%). CHD leads to increased mortality and morbidity, with patients often experiencing more frequent hospitalizations and reduced life expectancy.[2] Examining both pediatric and adult patients with Down syndrome and CHD can help develop comprehensive management guidelines that improve quality of life and reduce societal burden. So, this study aimed to analyse the impact of individuals with Down syndrome and CHD.

Methods

This was a retrospective, single-cohort, observational study conducted on patients with both Down syndrome and CHD who had at least one hospital admission. Data were categorized by cardiac and non-cardiac admissions, with further distinctions between surgical and non-surgical cases. The analysis included three datasets: total admissions, admissions requiring procedures for CHD, and patients born between 2001 and 2016 with both Down syndrome and CHD. Statistical analyses were performed to evaluate results.

Results

The study analyzed 12,362 admissions involving 6,527 individuals with Down syndrome and CHD. The average age at initial admission was 6.2 ±12.8 years, with 7256 (58.7%) of admissions occurring within the first year of life. Pediatric admissions accounted for 10,701 cases (86.6%), while 1,661 admissions (13.4%) occurred in adulthood. Cardiac diagnoses were predominantly atrioventricular septal defect (AVSD) (65.1%) and ventricular septal defect (VSD) (49.7%). Notably, most of these cardiac surgical procedures were performed on

pediatric patients, totalling 1,911 cases (95.3%). There were 5,846 admissions (47.3%) for cardiac-related symptoms. Both multiple admissions and cardiac admissions were linked to a higher risk of subsequent potential readmissions (Figure 1). Additionally, patients with cardiac admissions had an increased risk of mortality, as did those who underwent at least one cardiac surgical procedure. Mortality was recorded at 2.3% overall, with most deaths occurring in infants under one year old. Cox regression identified age at first admission and cardiac-related admissions as significant predictors of mortality.

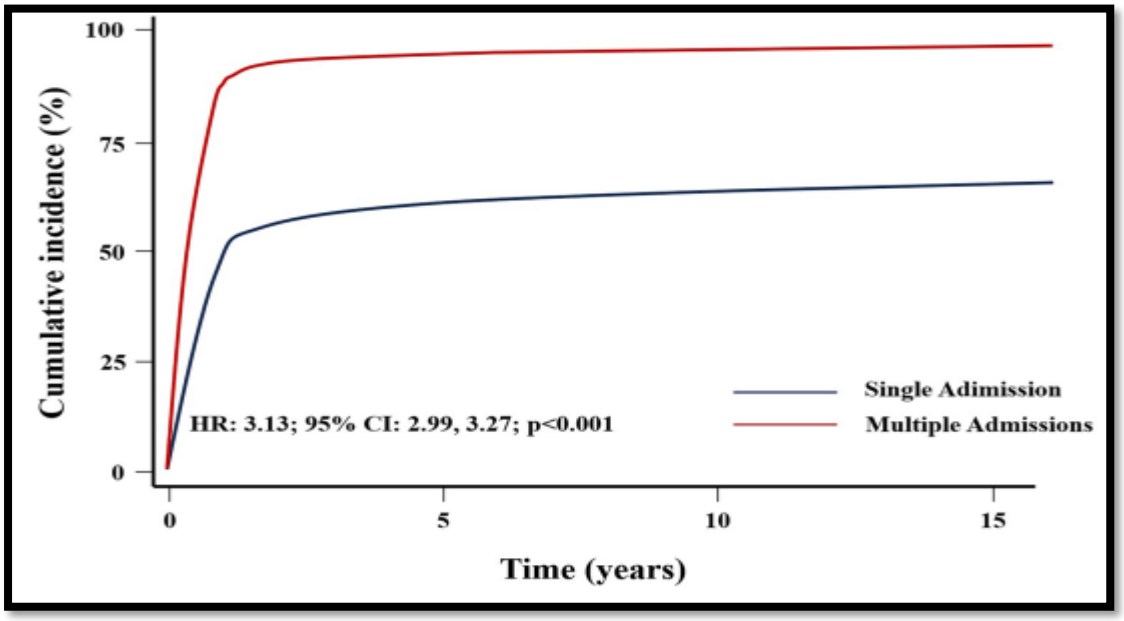

Figure 1. Comparative Risk-Modulated Renewal Regression Depending on no. of admission

Discussion

This study confirmed the high prevalence of CHD among individuals with Down syndrome and the associated increased hospitalizations and mortality. The findings align with previous literature on CHD subtypes and surgical interventions. The observed decline in hospital admissions from 2012 may reflect changing practices in prenatal care and pregnancy terminations. Despite advancements in treatment, CHD remains a major factor affecting survival and quality of life.[2] A previous study has reported that there was an increased likelihood of multiple hospital admissions and prolonged stays in DSP patients with CHD.[3] The early age of hospitalization underscores the need for proactive management to prevent severe outcomes.[2]

Conclusion

CHD significantly impacts mortality and morbidity in individuals with Down syndrome, leading to frequent hospital admissions and reduced survival. This study provides insights that

can help in developing guidelines for managing and improving the care of individuals with Down syndrome and CHD, addressing both medical and economic challenges.

A younger age at first admission is a predictor for mortality in patients with Down syndrome and congenital heart disease

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Case Report on Pediatric Nasopharyngeal Rhabdomyosarcoma

Introduction

Rhabdomyosarcoma (RMS) is a malignant tumor originating from skeletal muscle cells, characterized by highly invasive behavior. It most commonly arises in the head and neck regions, particularly within the parameningeal areas such as the sinuses and nasal cavities.[1] RMS originates from immature cells that have the potential to develop into skeletal muscle cells. This tumor can develop in various soft tissues, including skeletal muscle, connective tissue, bone, bladder, prostate, testis, nose, orbit, and anus.[2] RMS typically presents in children under 5 years old but can occur at any age. The World Health Organization classifies RMS into four subtypes: embryonal, alveolar, spindle cell/sclerosing, and pleomorphic.[1] This case report described an instance of embryonal nasopharyngeal RMS in a 4-year-old patient who underwent chemotherapy and radiotherapy.

Case Presentation

A 4-year-old patient with no significant medical history presented with nasal congestion, mucopurulent rhinorrhoea, and voice changes, without dysphagia or odynophagia. Clinical examination revealed no neurological or ophthalmological abnormalities, and no lymphadenopathy was noted. A CT scan showed a large tumor (53 × 33 × 49 mm) in the right nasal fossa and maxillary sinus, extending into the nasopharynx and the parapharyngeal space, but not invading the retrostylial or prevertebral spaces (Figure 1). Histological analysis confirmed an embryonal rhabdomyosarcoma with primitive skeletal mesenchymal cells in a

myxoid stroma and strong positivity for Desmin and Myogenin. The initial treatment included four cycles of chemotherapy (actinomycin D, cyclophosphamide, vincristine) and 4000 cGy of radiotherapy. Follow-up CT scans indicated tumor progression into the oropharynx (Figure 2), leading to two additional cycles of chemotherapy with Adriamycin added to the regimen.

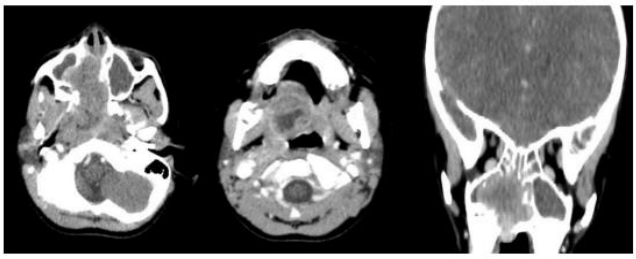

Figure 1. Axial CT scan revealing a tissue mass centered in the right maxillary sinus, extending into the adjacent parapharyngeal space on the same side.

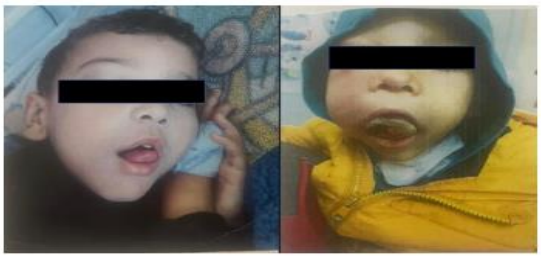

Figure 2. Clinical examination showing that the mass has increased in size and is now invading the soft palate.

Discussion

RMS is a malignant soft tissue neoplasm that often presents without early symptoms, leading to advanced diagnoses. It is most common in children under 10 years old and can arise in various anatomical locations, with the head and neck being frequent sites. The embryonal subtype is the most prevalent in pediatric cases, and diagnosis relies on immunohistochemical profiling to differentiate it from other tumors. Conventional radiology, including CT and MRI, plays a crucial role in assessing the primary tumor, its extension, and potential metastases.[1] In this case, despite initial chemotherapy and radiotherapy, the tumor progressed, and surgical resection was not feasible due to the tumor's size and extent as similarly noted in cases by Dehner et al., where initial treatment often does not prevent disease progression, especially in high-risk locations like the nasopharynx.[3]

Conclusion

Pediatric nasopharyngeal rhabdomyosarcoma is a relatively common soft tissue tumor in children. The diagnosis was confirmed with specific immunohistochemical tests. Conventional radiology helps in assessing the primary tumor, checking if it has spread to nearby organs, and finding any potential metastases.

Rhabdomyosarcomas management is essentially based on surgery, chemotherapy and radiotherapy.

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