Lifestyle Influence on Spirometry in Survivors of Childhood Acute Lymphoblastic Leukemia: A Comparative Study

Anne Marie Ryberg, Dorthe Hausted, Sonja I. Meyer and Sune L.M. Rubak

Danish Paediatric Center of Pulmonology and Allergology, Department of Paediatric and Adolescent Medicine. Aarhus University Hospital, Denmark

Introduction

Despite high rates of survival following Acute Lymphoblastic Leukemia (ALL), this study underscores the importance of addressing potentially persistent pulmonary health challenges in life after ALL.

Aims

To compare occurrence of risk factors and their impact on lung function measured by spirometry in childhood ALL survivors compared with matched controls.

Methods

This national cross-sectional study compared spirometry in children (4.5-14.9 years) and adolescents (15-17.9 years) treated under the NOPHO ALL2008 protocol with a gender- and age-matched control group.

Spirometry measurements included FEV1 z-score and bronchodilator response (BDR). Abnormal spirometry was defined as an FEV1 z-score < 1.645 and FEV1 % BDR > 10%.

The study assesses the impact of the following factors on spirometric measured lung function:

- Physical activity
- BMI at examination day
- Fatigue score
- Alcohol consumption
- Smoking or use of other euphoric substances

Conclusion

Children

ALL survivor children particularly those with abnormal spirometry tend to be less active than controls, but the differences were not statistically significant.

Significant BMI z-score differences were observed, especially in those with abnormal spirometry.

ALL survivors reported higher fatigue levels, with significant variation based on age.

A significant difference in the frequency of alcohol tasting among children with normal spirometry.

Alcohol consumption were rare among survivors with abnormal spirometry.

Adolescents

Activity levels were comparable between ALL survivors and controls.

A notable proportion of ALL survivors with abnormal spirometry consume alcohol regularly, unlike the control group.

ALL survivors showed higher rates of smoking or euphoric substance use compared to controls.

ALL survivors with abnormal spirometry were not engaged in these behaviors.

Take home messages

Activity Levels

ALL survivor children tended to be less active compared to controls, particularly those with abnormal spirometry, although the differences were not statistically significant.

Fatigue Scores

ALL survivors experienced significantly lower fatigue levels than control, highlighting a critical area of concern for ALL survivors.

BMI and Lifestyle Factors

Significant BMI z-score differences and variations in alcohol and substance use underscore the need for tailored lifestyle management.

These findings emphasize the importance of addressing fatigue, monitoring activity levels, and managing lifestyle factors to improve the overall health of ALL survivors.

Contact
Anne Marie Ryberg, RN
Annenils@rm.dk
Linkedin.com/in/anne-marie-ryberg-47233b146

Results

Physical activity

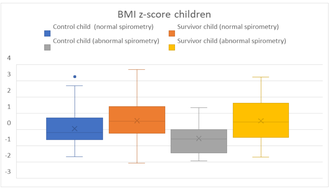
Children: Normal spirometry, no significant difference in activity levels between ALL survivors and the control group (p = 0.256). Abnormal spirometry, there was a trend suggesting that ALL survivors were less active than the control group (p = 0.06).

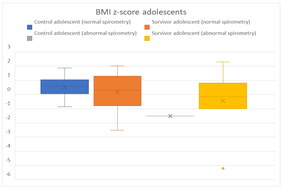
Adolescent: Normal spirometry, no significant difference in activity levels 50% vs. 70% (p = 0.199). Abnormal spirometry, p-value not calculabel due to single control.

BMI z-score

Children: For both normal and abnormal spirometry, ALL survivors had a significantly higher BMI z-score compared to controls (p = 0.0001 and p = 0.0074).

Adolescents: Normal spirometry, ALL survivors had a higher BMI z-score compared to controls, but not statistically significant (p = 0.584). Abnormal spirometry, p-value not calculabel due to single control.

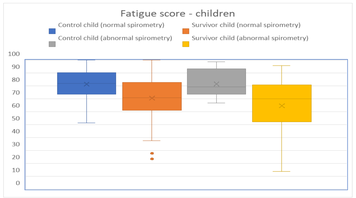


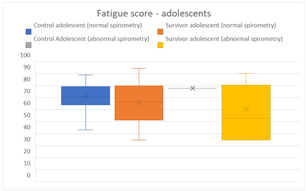


FatigueScore

Children: For both normal and abnormal spirometry, ALL survivors had significantly lower fatigue scores than controls (p = 0.00000 and p = 0.0098).

Adolescents: Normal spirometry, no significant difference in fatigue scores between ALL survivors and controls (p = 0.1909). Abnormal spirometry, p-value not calculable due to single control.





Alcohol Consumption

Children: Normal spirometry, ALL survivors had significantly higher frequency of alcohol tasting (p = 0.023) compared to controls. Abnormal spirometry, no significant difference in alcohol tasting (p=0.256).

Adolescents: Normal spirometry, no significant difference in the frequency of alcohol consumption 29% vs 20% (p=0.253). Abnormal spirometry, p-value not calculable due to single control.

Smoking or use of other euphoric substances

Adolescents: Normal spirometry, significant difference between ALL survivors and controls 29% vs. 7% (p=0.049). Abnormal spirometry, p-value not calculable due to single control.