

# **Impact of the Season of Birth on the Development of Juvenile Idiopathic Arthritis in the United States: A Nationwide Registry-based Study**

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Hello, I am pleased to present our paper entitled “Impact of the season of birth on the development of juvenile idiopathic arthritis in United States: A nationwide registry-based study” on behalf of my coauthors.

JIA is a heterogeneous collection of chronic arthropathies in children. JIA is influenced by both genetic and environmental factors

Environmental exposures could possibly influence the development of autoimmunity. An increased risk of JIA has been associated with prior antibiotic use, hospitalizations in the first year or a decreased duration of breast feeding.

An association between month or season of birth and autoimmunity have also been explored. For instance, several large studies of multiple sclerosis, inflammatory bowel disease, celiac disease and autoimmune thyroiditis have found that there is an association between month or season of birth and subsequent development of autoimmunity.

An Israeli study by Berkun et al involving 558 children with JIA and 1.4 million controls found that in JIA also there was an association with season of birth. For instance, the JIA births peaked between November and March compared to the population birth which peaked between June and October.

Our objectives were to determine if the distribution of season and month of birth in a large JIA cohort differed from that of the US population

The JIA cohort came from two registries in the Childhood Arthritis and Rheumatology Research Alliance (CARRA) as well as control cohort that came from the birth data from the United States population from 1990 to 2016 from the Center for Disease Control's National Vital Statistics Reports. The JIA cohort was further selected by excluding those who were born before 1990 or after 2016 in order to match the control cohort as well as those who were living outside the United States at the time of onset of JIA. The final JIA cohort comprised of 10913 children.

Estimates of birth percentages by month and season were calculated by computing the distribution of births for each calendar year between 1990 to 2016.

Season of birth of the JIA cohort was compared to the US population estimate using a two-sided one-sample test for a binomial proportion

Secondary analysis was performed for JIA categories, age of onset, and months of birth.

Compared to the US population estimate, the JIA cohort showed increased births in Winter as shown in this table and figure. 25.72% of all JIA births occurred in the Winter compared to 24.08% of all US births. This was a statistically significant excess for JIA. The other seasons did not show a difference in the proportion of births.

Compared to the US population estimate, JIA cohort also showed increased births in January

Enrollment in CARRA Registry was subject to patient and physician preference and therefore might not reflect all JIA.

Given the large geographic area different parts of US could have differences in timing of infections, climate and amount of sunlight and hence a true seasonality could not be determined.

We could not compare data by gender or States since that data was not available on our control data.

However, this is the largest JIA cohort to address this question and our population estimate was robust by using the CDC National data of over 109 million births.

In conclusion, relative to the US population, children with JIA are more often born in Winter, and specifically in January.

These observations suggest seasonal variations in exposures during the gestational and/or early postnatal periods may contribute to the risk of JIA.

I want to thank the participants, CARRA Registry Sites as well as our various funding sources for helping us carry out this study.

Thank you for your interest. Hopefully you will check out our full article at the Journal of Rheumatology.

Thank you.