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# Family Size and Risk of Juvenile Idiopathic Arthritis: A Cross-Sectional Study

Kido Uyamasi

Kesheng Wang
*Department of Biostatistics and Epidemiology, College of Public Health, East Tennessee State University, Johnson City, TN 37614, USA*

Kiana R. Johnson
*Quillen College of Medicine Department of Pediatrics*

# FAMILY SIZE AND RISK OF JUVENILE IDIOPATHIC ARTHRITIS: A CROSS-SECTIONAL STUDY

Kido Harrison Uyamasi[1], Kesheng Wang[2] and Kiana Johnson[3*]

[1]Department of Biostatistics and Epidemiology, College of Public Health, East Tennessee State University, Johnson City, TN 37614, USA

[2]Department of Biostatistics and Epidemiology, College of Public Health, East Tennessee State University, Johnson City, TN 37614, USA

[3]Department of Pediatrics, Quillen College of Medicine, East Tennessee State University, Johnson City, TN 37614, USA

*Sponsoring faculty

EAST TENNESSEE STATE UNIVERSITY

# Outline

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# Background

- Group of auto-immune conditions involving joint inflammation
- Appears before the age of 16
- Affects about 294,000 children in the U.S.
- Largely attributed to genetic factors
- Some environmental factors have been investigated
- Hygiene hypothesis has been used to explain environmental component
- Sibling exposure, common marker for microbe exposure

# Purpose

- Investigate the relationship between Total number of kids/Family size and JIA in the U.S.

# Methods

- Secondary analysis of 2016 National Survey for Child Health (NSCH)
- Requested for data on March 10th
- Granted access on March 12th
- Sample size: 50,212 children (aged 0-17 years)
- Descriptive statistics
- Bivariate analyses
- Multiple logistic regression: 2 models
- SAS version 9.4

# Methods-Variables

## Outcome

- Arthritis

## Predictors

- Total number of kids /Family size
- Someone smokes inside the household
- Born 3 weeks before due date

## Covariates

- Age
- Sex
- Race
- Poverty level
- Education level

# *Results-Table 1: Bivariate Analysis*

| Variables [n(%)] | Arthritis=Yes (N=153) | Arthritis=No (N=44988) | P value |
|---|---|---|---|
| Age | | | <0.0001 |
| 0-3 years | 6 (0.07%) | 8666 (99.93%) | |
| 4-7 years | 18 (0.21%) | 8580 (99.79%) | |
| 8-11 years | 18 (0.19%) | 9299 (99.81%) | |
| 12-14 years | 42 (0.51%) | 8134 (99.49%) | |
| 15-17 years | 69 (0.67%) | 10156 (99.33%) | |
| Sex | | | 0.0075 |
| Male | 62 (0.27%) | 23019 (99.73%) | |
| Female | 91 (0.42%) | 21816 (99.58%) | |
| Race | | | 0.2804 |
| Hispanic | 12 (0.25%) | 4698 (99.75%) | |
| Non-Hispanic White | 114 (0.35%) | 32215 (99.65%) | |
| Non-Hispanic Black | 12 (0.52%) | 2301 (99.48%) | |
| Non-Hispanic Asian | 4 (0.18%) | 2225 (99.82%) | |
| Non-Hispanic Multi racial | 11 (032%) | 3396 (99.68%) | |
| Highest education level | | | <0.0001 |
| Less than High school | 2 (0.23%) | 868 (99.77%) | |
| High school/GED | 32 (0.61%) | 5252 (99.77%) | |
| Some college/technical school | 46 (0.46%) | 9975 (99.54%) | |
| College degree/Higher | 73 (0.25%) | 28740 (99.75%) | |

| Variables [n(%)] | Arthritis=Yes (N=153) | Arthritis=No (N=44988) | P value |
|---|---|---|---|
| Poverty level | | | <0.0001 |
| 0-99% FPL | 27 (0.73%) | 3656 (99.27%) | |
| 100%-199% FPL | 30 (0.44%) | 6764 (99.56%) | |
| 200%-399% FPL | 46 (0.33%) | 14094 (99.67) | |
| 400% FPL or above | 50 (0.25%) | 20321 (99.75%) | |
| Family size | | | <0.0001 |
| 1 | 1 (5.26%) | 18 (94.74%) | |
| 2 | 23 (0.95%) | 2402 (99.05%) | |
| 3 | 43 (0.30%) | 14398 (99.70%) | |
| 4 | 50 (0.29%) | 17198 (99.71%) | |
| 5 | 25 (0.34%) | 7340 (16.37) | |
| 6 | 8 (0.29%) | 2779 (99.71%) | |
| 7 | 1 (0.21%) | 483 (99.79%) | |
| 8 or more | 2 (0.91%) | 217 (99.09%) | |
| Total no of kids | | | 0.3276 |
| 1 | 74 (0.40%) | 18602 (99.60%) | |
| 2 | 52 (0.29%) | 17824 (99.71%) | |
| 3 | 18 (0.30%) | 6041 (99.70%) | |
| 4 | 9 (0.38%) | 2368 (99.62%) | |

| Variables [n(%)] | Arthritis=Yes (N=153) | Arthritis=No (N=44988) | P value |
|---|---|---|---|
| Someone smokes inside the home | | | <0.0001 |
| No one | 116 (0.30%) | 38472 (99.70%) | |
| Someone smokes, not inside | 28 (0.50%) | 5523 (99.50%) | |
| Someone smokes inside the house | 9 (1.06%) | 840 (98.94%) | |
| Born 3 weeks before due date | | | 0.0135 |
| Yes | 26 (0.53%) | 4834 (99.47%) | |
| No | 127 (0.32%) | 40001 (99.68%) | |

# *Table 2: Multiple Logistic Regression (Model 1)*

| Variables | OR Estimate (CI) | P value |
|---|---|---|
| Family size 2 vs 1 | 0.156 (0.019, 1.248) | 0.0799 |
| 3 vs 1 | 0.072 (0.009.0.564) | 0.0122 |
| 4 vs 1 | 0.075 (0.010,0.590) | 0.0138 |
| 5 vs 1 | 0.083 (0.010,0.660) | 0.0187 |
| 6 vs 1 | 0.066 (0.008,0.568) | 0.0133 |
| 7 vs 1 | 0.039 (0.002,0.661) | 0.0246 |
| 8 or more vs 1 | 0.186 (0.016,2.206) | 0.1824 |
| Someone smokes, not inside vs no one smokes | 1.379 (0.897,2.119) | 0.1432 |
| Someone smokes inside the house vs no one smokes | 1.946 (0.957,3.956) | 0.0658 |
| Born 3 weeks before due date<br>Yes vs No | 1.615 (1.056,2.471) | 0.0271 |
| Sex (Female vs Male) | 1.547 (1.118,2.139) | 0.0084 |
| Race | | 0.5013* |
| Highest Education Level | | 0.3133* |
| Poverty level | | 0.0106* |

# *Table 3- Model 2*

| Variables | OR Estimate (CI) | P value |
|---|---|---|
| Total no of kids (2 vs 1) | 0.934 (0.648,1.345) | 0.7127 |
| 3 vs 1 | 0.912 (0.537,1.549) | 0.7336 |
| 4 vs 1 | 1.035 (0.509,2.106) | 0.9234 |
| Someone smokes, not inside vs no one smokes | 1.342 (0.874,2.062) | 0.1793 |
| Someone smokes inside the house vs no one smokes | 1.878 (0.924,3.819) | 0.0817 |
| Born 3 weeks before due date<br>Yes vs No | 1.625 (1.063,2.485) | 0.0251 |
| Sex (Female vs Male) | 1.557 (1.126,2.152) | 0.0074 |
| Age | | <0.0001* |
| Race | | 0.4927* |
| Highest Education Level | | 0.2956* |
| Poverty level | | 0.0037* |

*Type 3 analysis of effects

# Discussion

- Larger families less likely to experience JIA
- Total number of kids not significantly associated with JIA
- Belies an Australian study
- Why was this the case?
- Total number of kids and family size were significantly associated

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# Conclusion

- Hygiene hypothesis appears to be better explained by family size in the U.S.
- Further studies needed to understand JIA risk factors in the U.S.

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