
McNally R, Reeves R, James P, Basta N, McKay J, Dorak T. [Correlations of incidence rates of Hodgkin lymphoma subtypes in children and young adults with age, sex and deprivation](#). In: *European Cancer Congress 2015*. 2015, Vienna, Austria: Elsevier.

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DOI link to article:

[http://dx.doi.org/10.1016/S0959-8049\(15\)30021-6](http://dx.doi.org/10.1016/S0959-8049(15)30021-6)

Date deposited:

12/01/2016

Embargo release date:

01 September 2016



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Correlations of incidence rates of Hodgkin lymphoma subtypes in children and young adults with age, sex and deprivation

Rachel M Reeves, Peter W James, Nermine O Basta, Jill M^cKay, M Tevfik Dorak, Richard J Q McNally

Abstract

Background The aetiology of Hodgkin lymphoma (HL) in children and young adults is not well understood. Further clues may be obtained from a systematic analysis of previous observations on age- and sex-related differences in incidence by focussing on subtypes. This study examined the distributions of HL subtypes by age and sex, and assessed potential associations with area-level socioeconomic deprivation within northern England.

Methods Data were extracted from the population-based Northern Region Young Persons' Malignant Disease Registry. The study analysed all 621 cases of HL in patients aged 0-24 years during the period 1968-2003. Age-standardised (world population) rates and 95% confidence intervals (CIs) were calculated. Negative binomial regression was used to examine the dependence of incidence of HL subtypes on age, sex and area-based measures of socio-economic deprivation (Townsend deprivation score and its four components: household overcrowding, non-home ownership, unemployment, households with no car). Significant effects are reported as relative risks (RRs) and associated 95% CIs. Statistical significance was taken as $P < 0.05$.

Results There were 247 cases of the nodular sclerosis (NS) sub-type, 105 mixed cellularity, 58 lymphocyte rich, 68 'others' and 143 were 'not otherwise specified' (NOS). Overall for HL there was a male excess (age-standardised rate (ASR) for males: 18.15 per million persons per year, 95% CI 16.35-19.96; ASR for females: 10.52, 95% CI 9.15-11.89). However, the male: female ratio varied by age-group and sub-type. For NS there were 130 males and 117 females, but most notably there was a reversal of the sex ratio with a female preponderance in this sub-type at ages 20-24 (age-specific rates: for males 14.26 per million

persons per year, 95% CI 10.49-18.02; for females 18.79 per million persons per year, 95% CI 14.45-23.13). Deprivation was associated with reduced incidence of NS HL (RR 0.88 for one percent increase in household overcrowding, 95% CI 0.82-0.94, $P < 0.001$). For the group comprising 'NOS' cases, increased incidence was associated with a one percent increase in household overcrowding (RR 1.17, 95% CI 1.09-1.25). No effect of deprivation on incidence of mixed-cellularity or the lymphocyte-rich subtypes was found.

Conclusion This study demonstrated key differences in patterns of occurrence between HL sub-types. In particular, the female preponderance in older cases of the NS sub-type suggests that hormonal factors might play a role. The apparent protective effect of living in areas with greater household overcrowding for this sub-type indicates that environmental factors are also likely to be implicated (e.g. exposure to infectious agents). The significance of the findings for the 'NOS' cases in relation to deprivation is less certain given the heterogeneity of this group. The role of chance cannot be excluded.

Key words: Hodgkin disease; incidence; epidemiology