Letter to the Editor

Parental somatic illnesses and their association with prodromal symptoms of psychosis among offspring

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To the Editors,

A number of studies have found evidence for parental somatic illnesses as risk factors for psychological problems in children (Chen, 2017; Merikukka et al., 2018; Sieh et al., 2010). Few studies have addressed the association between parental somatic illness and offspring psychosis (see Benros et al., 2013; Fernandez-Egea et al., 2008; Räsänen et al., 2017), however, the results have been inconsistent. Further, no study has investigated prodromal symptoms of psychosis in offspring.

Different parental somatic illnesses may vary in their impact on offspring psychopathology due to variations in illness patterns (e.g. onset, course and fatality), differing psychosocial demands and impact on parenting behaviour. Identifying the specific parental illnesses that confer risk for offspring psychosis and related psychopathology has the potential to facilitate development of more effective targeted interventions to help offspring at risk for psychosis.

The aim of our study was to investigate the association between different maternal and paternal hospital-treated somatic illnesses during offspring's childhood and later prodromal symptoms of psychosis among offspring in adolescence. We investigated these associations separately for different parental illnesses because this has the potential to identify previously unrecognised associations for different parental illnesses. Previous studies have suggested that parental chronic illnesses with physical impairment have greater impact on children than other illnesses (Sieh et al., 2010). Therefore, we hypothesised that parental illnesses with potential physical impairments, such as diseases of the musculoskeletal system, would be associated with higher levels of prodromal symptoms of psychosis among offspring as compared to offspring without the parental illness. We focused on adolescent prodromal symptoms, as previous research suggests that the impact of childhood adversities on development of psychotic-like experiences may begin early in life (Loewy et al., 2019). All analyses were stratified by offspring sex as previous studies have noted sex differences; with males more affected (Pruessner et al., 2019). Prior research has also suggested that maternal illness has a greater adverse effect on children than paternal illness (Connell and Goodman, 2002). Accordingly, we hypothesized that male offspring's prodromal symptoms of psychosis would be more pronounced than female symptoms, particularly of ill mothers.

The cohort included all children (N = 9432, 99%) born during one year (expected date of birth 1.7.1985–30.6.1986) in Northern Finland. Data on offspring's psychological symptoms before the onset of parental somatic illness was collected using the teacher-reported Rutter child behaviour questionnaire (Rutter, 1967) at age 7–8 (1994). Prodromal symptoms of psychosis were assessed with a 21-item self-reported screen for prodromal symptoms of psychosis (PROD) at age 15–16 (2002, n = 6609) (Heinimaa et al., 2003). Twelve of the questions are considered specific psychotic-like symptom items (specific) and nine questions are non-specific general symptom items (general) (Heinimaa et al., 2003). Attrition rates are presented in Supplemental Figure 1. Data on parental hospital-treated somatic illness diagnosed between offspring's mid-childhood and adolescent assessments (from 1994 to 2002) was obtained from hospital discharge registers. Parental somatic illnesses were classified into 15 categories according to International Classification of Diseases coding (Munk-Jørgensen et al., 1999).

We used an independent sample t-test to define the sex-specific associations between PROD-scores with and without each parental somatic illness category. Analysis of variance was used to evaluate group difference in mean PROD-scores adjusting for offspring's psychological symptoms before the parental illness (Rutter questionnaire scores), parental psychiatric diagnoses from 1994 to 2002 and socioeconomic status. We used standardised mean difference as an effect size measure (Cohen's d, d; 95% Confidence Interval, 95%CI) when comparing PROD-scores between offspring with and without each parental somatic illness category (Cohen, 1992). P-values were corrected for multiple comparisons using the Benjamini-Hochberg correction (Benjamini, 2010).

The only finding to remain significant after adjustments, and multiple testing correction, was an effect whereby total (mean 3.2 vs. 2.6, d = 0.205, 95%CI 0.082–0.328) and general (mean 1.4 vs. 1.0, d = 0.263, 95%CI 0.141–0.386) PROD-scores were higher among males with maternal diagnosis of diseases of the musculoskeletal system and connective tissue, than male offspring without the maternal illness in question, see Table 1. Other associations were found but they did not survive correction for multiple comparisons. Effect sizes were mostly small. The prevalence for each parental diagnosis category is shown in Supplemental Table 1. All results are shown in Supplemental Tables 2–3 for males and in Supplemental Tables 4–5 for female offspring outcomes.

The key finding was thus that maternal musculoskeletal disorders were associated with male children's prodromal symptoms. As such, our hypothesis that parental illnesses with physical impairments would be particularly associated with offspring symptoms was supported. Further, our findings indicate that the impact of parental illness on children is greater for those with ill mothers than fathers, with male children more affected, which is consistent with our hypothesis and previous studies (Connell and Goodman, 2002; Pruessner et al., 2019).

Strengths of this study include a large cohort and validated assessment tools. The PROD-scores may not only predict vulnerability to psychosis, but they are relevant in themselves, and children who display prodromal symptoms may also subsequently develop other psychiatric disorders than psychosis, especially in general population (Therman et al., 2011). We took account of offspring's psychological symptoms prior to the onset of parental somatic illness, which has not been done in previous studies; this strengthens the possibility that the parental illness itself explains the association. Limitations include small sample sizes for some of the parental somatic illness categories and different informants for different measures. There are likely to be a large number of parents with somatic illnesses who were not hospitalised; hence, the numbers may be underestimated. Yet, the underestimation of parental illness levels would have resulted in a reduced likelihood of finding an association rather than create spurious findings.

In summary, maternal musculoskeletal disorders stand out as an epidemiologically relevant risk factor for elevated prodromal symptoms of psychosis in male children, which warrants further study, and yet, calls for attention and preventive strategies to be implemented by the adult somatic health care system.

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