



FOCUS ON RESEARCH

Endogenous and exogenous sex steroid hormones for the primary and secondary prevention of asthma and allergy in women: a systematic review and meta-analysis

Researchers

Prof Aziz Sheikh, Dr Bright Nwaru, Dr Ulugbek Nurmatov, Dr Nicola McCleary

Aim

The established differences in asthma and allergy between females and males may be caused by the impact of female sex hormones. We conducted a systematic review to synthesise the evidence on whether the biological hormonal events in female life (puberty, menarche, menstruation, and menopause) and the use of hormonal contraceptives and hormone replacement therapy (HRT) play any role in the development and clinical expression of asthma and allergy in females.

Project Outline/Methodology

We searched 11 electronic medical databases for epidemiological and experimental studies published from 1990 to October 2015. We supplemented our searches by contacting experts in the field and searching various databases of ongoing studies. We used recommended tools to appraise the level of bias in each study: using the Effective Public Health Practice Project tool for observational studies and the Cochrane Handbook for Systematic Reviews of Interventions for experimental studies. We used a specialist technique (called random-effects meta-analysis) to combine results from studies that were reasonably similar. Finally, we used the Grading of Recommendations Assessment, Development and Evaluation (GRADE) approach to evaluate the strength and quality of the overall evidence on each outcome considered.

Key Results

We identified 22,488 papers of which 64 (based on 57 individual studies) met our inclusion criteria. All experimental studies were at high risk of bias; 82% of the observational studies were at moderate and the rest at high risk of bias. Results from experimental studies were unclear. From observational studies, early onset of puberty, both early and late onset of menarche, irregular menstruation, menopause, and use of HRT increased the risk of onset and expression of asthma, wheeze, and allergic rhinitis. The role of hormonal contraceptives was unclear. Further, the use of HRT

was associated with higher risk of asthma and allergy in non-overweight/obese and non-smoking women than in overweight/obese and ever smoking women, respectively.

Conclusions

Our findings confirm that puberty, menarche, menstruation, menopause, and use of HRT may influence the risk of asthma and allergy in females. The evidence on hormonal contraceptives was unclear. The quality of the overall evidence base was low given poorly designed experimental studies and lack of high quality observational studies, thus the need for better designed longitudinal studies to clarify these findings.

What does this study add to the field?

This is the first comprehensive synthesis of the evidence on the role of both internal and external sex steroid hormones in asthma and allergy in females.

Implications for Practice or Policy

Given the lack of good quality clinical trials, no clear clinical practice or policy recommendations can be made yet based on the results of this review. Confirmation of our findings in better designed longitudinal studies and followed by a clinical trial, needs to be undertaken before clear clinical and policy recommendations can be articulated.

Where to next?

We have now secured a grant from Asthma UK to construct a longitudinal cohort study of using UK primary care data in order to clarify the role of exogenous sex hormones in asthma. We also plan to follow this by undertaking work in collaboration with MRC-Asthma UK Centre in Allergic Mechanisms to try to understand the processes through which sex hormones influence the risk of asthma and allergy. Our ultimate goal is that all these will be followed by mounting a feasibility, pilot, and definitive clinical trials to evaluate the effectiveness of hormonal preparations and HRT for the prevention of asthma in women.

Further details from:

Professor Aziz Sheikh (aziz.sheikh@ed.ac.uk), University of Edinburgh