Distribution of Type-2 Biomarkers of Asthma in a Healthy Adult Population – A Cross-Sectional Study

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Background

Asthma is characterised by distinct phenotypes, with 50-70% of severe cases involving type-2 (eosinophilic) inflammation, which can be treated with oral or inhaled steroids and biological treatments. Type-2 inflammatory biomarkers can be easily measured in the community using fractional exhaled nitric oxide (FeNO) and blood eosinophil count (BEC). We hypothesise that some individuals may have type-2 inflammation present without symptoms, which may represent a target for earlier identification and treatment.

Objective:

To identify the distribution of type-2 biomarkers (FeNO and BEC) in healthy young adults without asthma

Methods

Inclusion: **Aged 18-50 without respiratory disease**

Exclusion: **Respiratory disease and/or immunosuppressive medication use.**

Participants underwent FeNO measurement using the **NIOX VERO®** (see below) and eosinophil measurement using the **HemoCue® WBC DIFF system** from a fingerprick blood sample.

Following FeNO testing and point-of-care BEC measurement, participants were stratified according to the following biomarker categories:

Biomarker stratification category	FeNO and BEC cut-offs
Low	**FeNO < 25 ppb** or **BEC ≤ 0.15 x 10^9/L**
Moderate	**FeNO 25 – 49 ppb** or **BEC 0.15 – 0.29 x 10^9/L**
High	**FeNO ≥ 50 ppb** or **BEC ≥ 0.3 x 10^9/L**

Results

Data from 87 participants is reported:

Mean age = **30.3 years** (±9.1)
28 (32%) of participants were **male**
11 (13%) of participants were **current or ex-smokers**
Median FeNO = **18 ppb** (range: 12 – 32)
Median BEC = **0.1 x 10^9/L** (range: 0.1 – 0.2)

***Figure 1*:**
There was a **positive correlation between FeNO and BEC** (Spearman p = 0.227; p = 0.009)

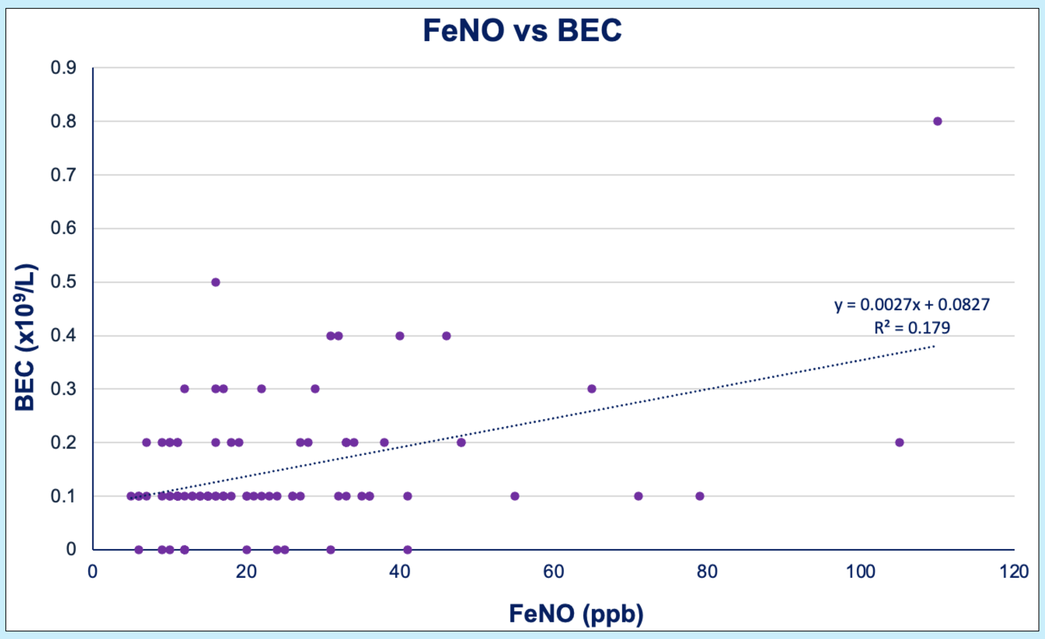


***Figure 2*:**
Males had a higher median FeNO than females (31.5 vs. 16; p < 0.001), but there was no significant difference between the sexes for BEC.

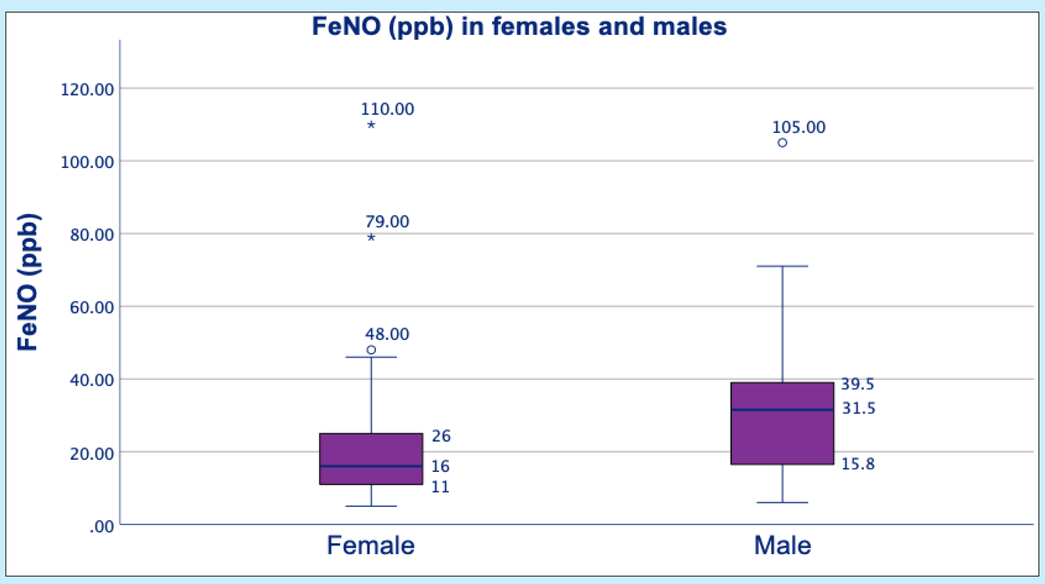
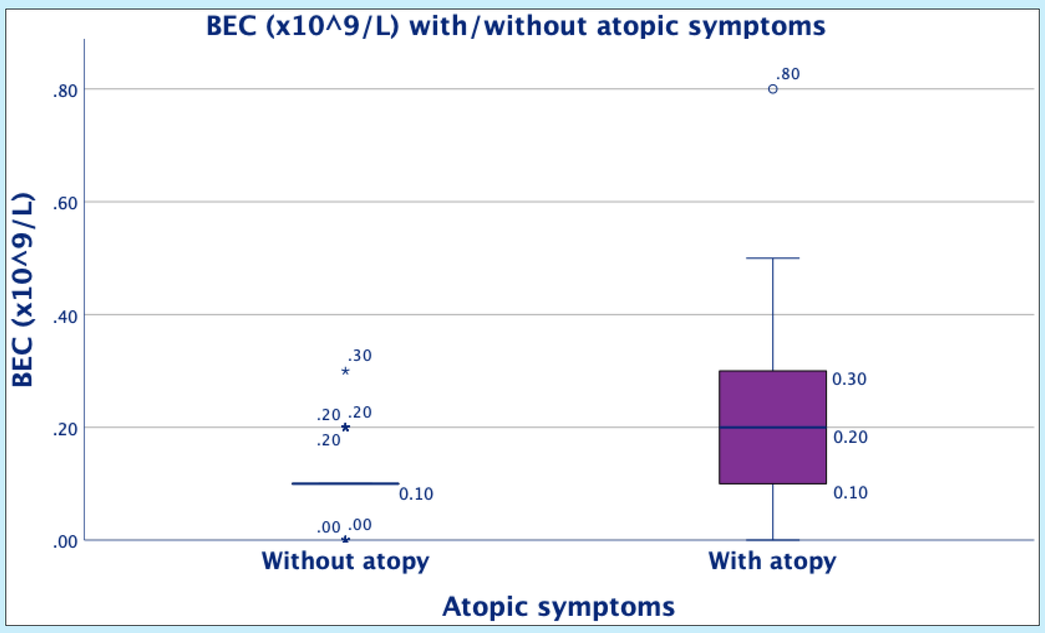


***Figure 3*:**
Higher BEC (≥ 0.3 x 10^9/L) was associated with increased atopy – 92% of those with BEC ≥ 0.3 x 10^9/L experienced atopic symptoms compared to 34.7% of those with BEC < 0.3 x 10^9/L (p = 0.002).



Conclusion

Our study found that 18.4% of healthy young adults have ≥ 1 raised biomarker indicative of eosinophilic airways disease. This was associated with atopy, suggesting pre-symptomatic of subclinical airways disease. Long-term evaluation of these individuals is required to explore their future airways disease risk and whether pre-symptomatic treatment to reduce inflammation could alter their disease trajectory.

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