

# Clinical characteristics of girls with atypical precocious puberty

Laura Mawer<sup>[1]</sup>, Carlo L. Acerini<sup>[2]</sup>, Ruben H. Willemsen<sup>[2]</sup>

<sup>[1]</sup> Foundation Year 1 Doctor, University of Cambridge;

<sup>[2]</sup> Department of Paediatrics and Wellcome Trust-MRC Institute of Metabolic Science, University of Cambridge, Cambridge, UK

## Background

Precocious puberty, pubertal development in girls before eight years, has considerable biological, psychosocial and long-term health implications. It is classically ascribed to the premature activation of the hypothalamic-pituitary-gonadal axis, and hence an LH response >5 U/L in the LHRH test. Whilst this group of patients is well understood, there is a paucity of literature characterising patients who show pubertal development not driven by LH - atypical precocious puberty. It has been hypothesised that obesity and endocrine disruptors may play a role.

## Aims

- 1) Identify the number of girls with signs of early puberty and an LH response < 5 in the LHRH test in Addenbrookes' hospital paediatric endocrinology clinic over the last 10 years (atypical precocious puberty)
- 2) To compare clinical and biochemical characteristics of girls with a LH response < 5 to those with a LH response > 5 in the LHRH test

## Method

148 girls had an LHRH test between 2004 and 2014 at Addenbrookes' hospital. Data on Tanner staging, symptoms and signs of puberty, LHRH test results, bone age, height, weight and BMI were collected retrospectively. Girls with premature thelarche (B2+, and P1 or bone age advancement <1 year) were excluded, and patients who had a test for other reasons than concerns regarding early puberty, or organic causes for precocious puberty were also excluded. The remaining 49 patients were divided into two groups for comparison; LH < 5 U/L in the LHRH test (n=20) and LH response ≥ 5 U/L (n=19).

## Results

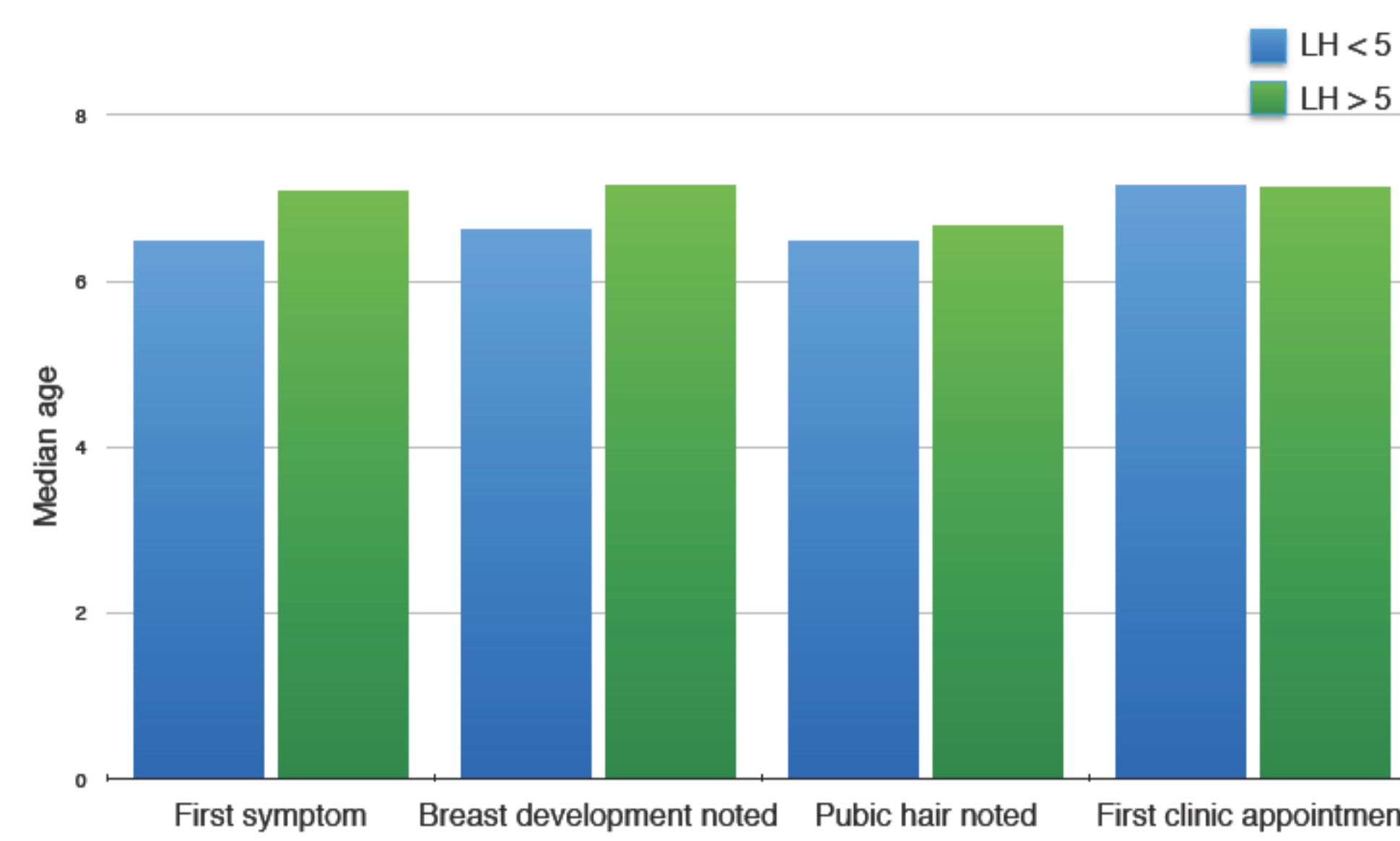


Fig 1. Comparing LH < 5 v LH ≥ 5 groups by age parameters

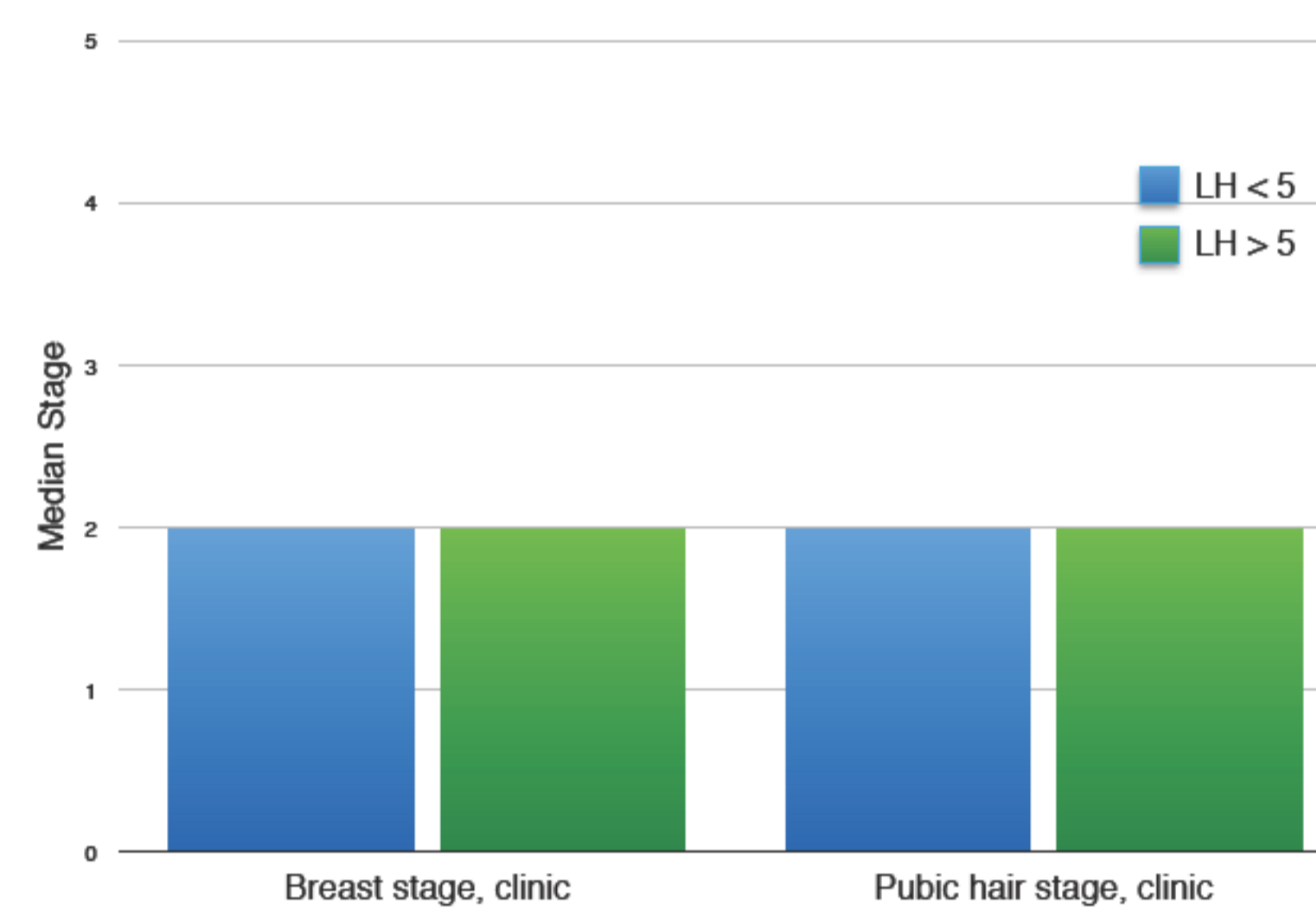


Fig 2. Comparing LH < 5 v LH ≥ 5 groups by Tanner stage at initial clinic presentation

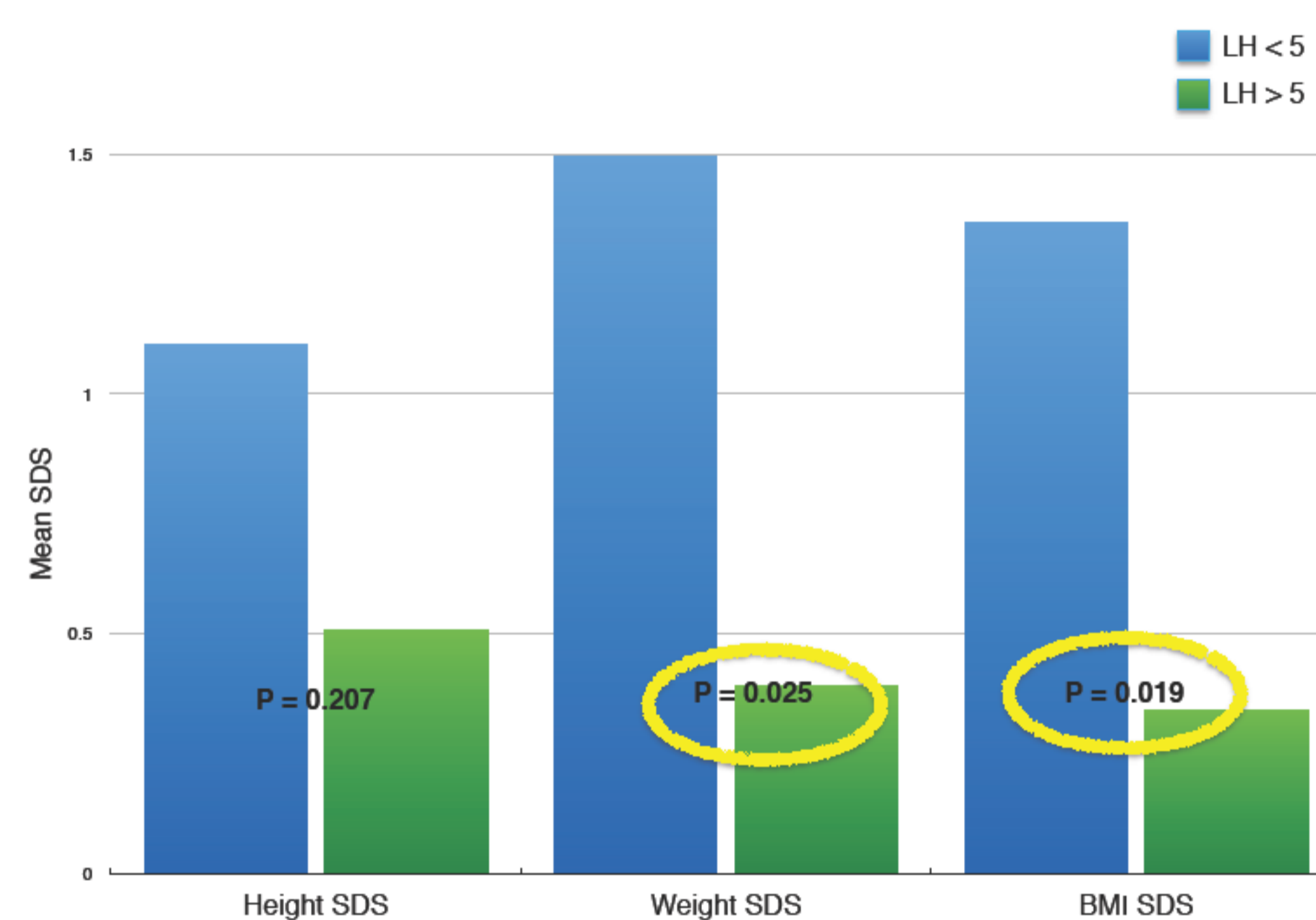


Fig 3. Comparing LH < 5 v LH ≥ 5 groups by height, weight and BMI SDS

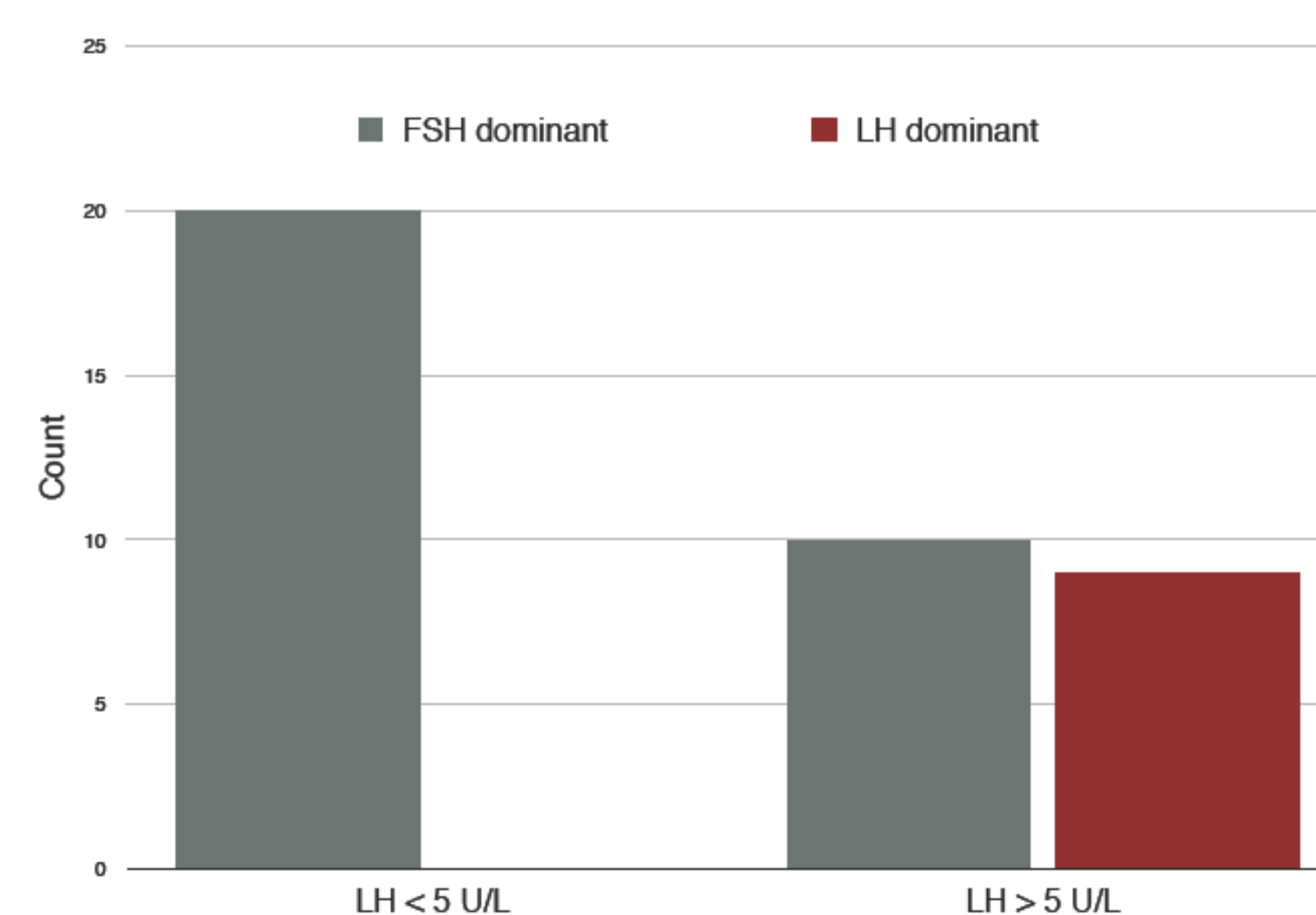


Fig 4. Is there an association between the LH < 5 and LH > 5 groups and an FSH or LH dominant response in the LHRH test?

## Results

We identified 19 patients with a LH response > 5 and 20 patients with a LH response < 5 in the LHRH test. Age at first symptom (breast or pubic hair development) and age at evaluation were not significantly different. Also, there was no significant difference in Tanner staging at presentation, bone age advancement or height SDS between the groups. However, the LH > 5 group had significantly higher weight SDS (p=0.025) and BMI SDS (p=0.019). The LH < 5 group had FSH peak values which were more likely to be higher than the LH peak values.

## Conclusion

Surprisingly, we found as many girls with an LH < 5 response in the LHRH test as girls with an LH > 5 response. Girls with an LH < 5 response presented at a similar age as girls who had an LH > 5 response and had similar Tanner stages and bone age advancement. However, these girls with 'atypical precocious puberty' had higher weight and BMI SDS and a higher FSH response than their peers with classical precocious puberty.

Their increased BMI supports the hypothesis that obesity may result in precocious puberty due to reduced sex hormone binding globulin and increased aromatase activity leading to increased oestrogen bioavailability. Furthermore their FSH predominant response demonstrates a role for GnRH stimulated FSH release in ovarian stimulation and oestrogen production

Cambridge University Hospitals   
NHS Foundation Trust

