Bone Mineral Density in Cystic Fibrosis: Few Concerns

Gupta, *et al*.[1] published their study on bone mineral density of Indian children and adolescents with cystic fibrosis in a recent issue of *Indian Pediatrics*. I seek following clarifications:

Pubertal development was determined by a self-assessment questionnaire in the study. However, validity of self-assessment of pubertal maturation has shown conflicting results. Tanners' breast, genital and pubic hair classification [2] also did not use self-assessment questionnaire. Rasmussen, *et al.* [3] concluded in their study that breast stage was assessed correctly by only 44.9% of the girls and genital stage by 54.7% of the boys. For pubic hair stage, 66.8% of girls and 66.1% of boys made correct assessments. Girls underestimated, whereas boys overestimated their pubertal staging. Therefore, pubertal assessment by children/ adolescents is not a reliable measure of exact pubertal staging and should be validated by physical examination.

Physical activity level of patients in this study was estimated using Habitual Activity Estimation Scale (HAES) [4]. Was physical activity estimated for controls too? Was there any significant difference? Difference in bone mineral density (BMD) and bone mineral apparent density (BMAD) may be attributable to differences in physical activity levels between patients and controls.

There was no mention of detailed method of calculation of BMD and BMAD. Patient positioning during procedure is a source of error in repeat bone density tests and data are not always reproducible on repeat tests. Study [1] reports significant differences in both BMD and BMAD in patients and controls. As BMD changes with age in children, only BMAD should have been compared.

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REFERENCES

1. Gupta S, Mukherjee A, Khadgawat R, Kabra M, LodhaR, Kabra SK. Bone mineral density of indian children and adolescents with cystic fibrosis. Indian Pediatr. 2017;54:545-9.
2. Tanner JM, Whitehouse RH. Clinical longitudinal standards for height, weight, height velocity, weight velocity, and stages of puberty. Arch Dis Child. 1976;51:172-9.
3. Rasmussen AR, Wohlfahrt-Veje C, Tefre de Renzy-Martin K, Hagen CP, Tinggaard J, Mouritsen A, *et al*. Validity of self-assessment of pubertal maturation. Pediatrics.2015;135:86-93.
4. Hay JA, Cairney J. Development of the Habitual Activity Estimation scale for clinical research: A systematic approach. Pediatr Exer Sci. 2006;18:193-202.

AUTHORS' REPLY

We are thankful to the author for his interest in our study [1]. The concern regarding self-assessment of pubertal growth is well noted. However, many children may not consent for detailed examination, and self-assessment may be acceptable [2]. It may be possible that few of the subjects may have not interpreted their pubertal stage correctly, but the influence of this misinterpretation was assumed to have influenced both the groups equally.

Physical activity level was estimated using HAES only for Cystic fibrosis patients. Several factors such as nutrition, pulmonary function, physical activity, puberty and glucocorticoids affect bone mineral density (BMD) in patients. Therefore, lower physical activity may only be a partly contributing for the difference in BMD and bone mineral apparent density (BMAD) of the two groups.

Due to word limit in main manuscript we were unable to provide details of measuring BMD and BMAD. DXA scan (Hologic QDR 4500A, Hologic Inc., Bedford, MA, USA) was performed of whole body using standard positioning techniques (as mentioned in the manufacturers manual). The measurements taken were: (*i*) Whole body bone mineral content (in g); (*ii*) Whole body bone mineral area (in cm^2); (*iii*) Whole body bone mineral density (in g/cm^2). BMAD was calculated for lumbar spine and whole body using the methods suggested by Katzman, *et al*. [3]. Quality control procedure, which included whole body (Hologic WB # 1252) phantom scanning before subject evaluation, was completed prior to testing on each testing day and it remained stable during the entire study period. In addition to this, short term precision error for the DXA scans was calculated by triplicate measurement of 15 healthy subjects as per the method suggested by Glûer, *et*