


## National survey of referrals for precocious puberty in Germany

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## ABSTRACT

An unusual high number of girls were referred to our paediatric endocrine clinic with suspected precocious puberty (PP) since the beginning of the COVID-19 pandemic. We analysed our data and initiated a survey among German paediatric endocrinologists. At our centre, less than 10 patients were diagnosed of PP annually between 2015 and 2019. This increased to n=23 (2020) and n=30 (2021). A German survey confirmed this observation: Out of 44 centres which completed the questionnaire, 30/44 (68%) reported an increase of PP. Above this, 32/44 (72%) stated an increase in girls diagnosed with ‘early normal puberty’ since the beginning of the COVID-19 pandemic.

At the beginning of 2020, there was a rapid global expansion of the COVID-19; on 11 March 2020, the WHO declared a worldwide pandemic. To reduce transmission occurring through respiratory droplets, many countries have imposed regulations of social distancing and lockdowns. As in many other countries, this led to significant changes in daily life for children and adults living in Germany. Social contacts were reduced to a minimum, schools and day-care centres, gyms and playgrounds were closed. Meanwhile, it has frequently been shown that the changed social circumstances have led to an increase in obesity in the children.<sup>1</sup> Loss of regular physical exercise and an increase in free time commonly used for sedentary activities<sup>2</sup> was made responsible for the observed weight gain and increase of obesity in children. In addition, it has been shown that the changed social circumstances have led to an increased incidence of psychological disturbances.<sup>3</sup> Obesity and increased psychosocial stress may increase the occurrence of precocious puberty.

Already in 2020, we noticed an unusual increase in girls presenting with precocious puberty at our centre for paediatric endocrinology. We; therefore, analysed our own data for 2020/2021 and compared it with the data from 2015 to 2019. Usually less than 10 patients/year were diagnosed of precocious puberty at our centre. In 2020, a

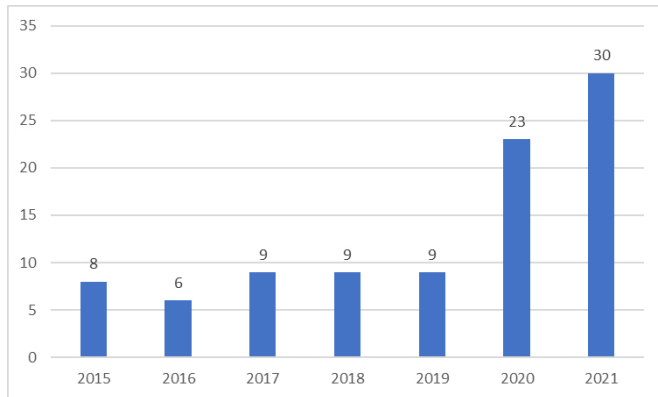
significant increase was seen (n=23) with a further increase to n=30 in 2021 (*figure 1*). We then initiated a Germany-wide survey at all centres for paediatric endocrinology (questionnaire as online supplemental file 1).

The mailing list of the German Society for Paediatric Endocrinology and Diabetology was used. Forty-four centres completed the questionnaire. Of these, n=30 (68%) confirmed an increase in the diagnosis of central precocious puberty since the beginning of the COVID-19 pandemic. Above this, n=32 (72%) stated that they had observed an additional increase in the number of girls diagnosed with ‘early normal puberty’ (Tanner breast stage ‘B2’ between the 8th and 9th year of life). Eighteen out of the 44 centres were able to quantify the numbers of referrals and, again, confirmed an increase of newly diagnosed girls with precocious puberty (*figure 2*).

In accordance with reports out of many other countries (including Italy, Spain, USA, India, China), there was an increase in girls presenting with precocious puberty in 2020/2021 in comparison to previous years in Germany. Various mechanisms have been suspected of being causative.<sup>4,5</sup> The change in lifestyle (decreased activity, increase in sedentary lifestyle, changed sleeping pattern, increase of digital devices) as well as increased mental stress, change in nutrition followed by gain of weight are suspected to be the cause. However, in addition, it must be taken into account that a worldwide trend for secular changes in age of onset of Tanner breast stage 2 (B2) has been reported for the last 20 years.<sup>6</sup> In conclusion, it is recommended to increase the diagnostic criteria for precocious puberty.

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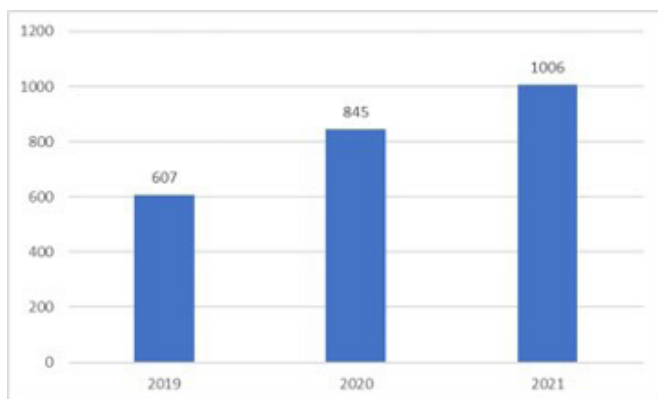
**Contributors** SB collected data, carried out the initial analyses and reviewed and revised the manuscript. DS and JW coordinated and supervised data collection, and critically reviewed the manuscript. FS designed the data collection instruments, collected data, carried out the final analyses, and reviewed and revised



**Figure 1** Numbers of girls diagnosed annually with central precocious puberty from 2015 to 2021 in one tertiary centre.

the manuscript. BG conceptualised and designed the study, drafted the initial manuscript, and reviewed and revised the manuscript. All authors approved the final manuscript as submitted and agreed to be accountable for all aspects of the work.

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**Figure 2** Numbers of girls diagnosed with central precocious puberty in 2019, 2020 and 2021 in 18 German centres of paediatric endocrinology.

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