

ORIGINAL STUDY

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A Retrospective Analysis of 100-Year Trends in the Physical Development of Moscow Schoolgirls

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ABSTRACT

BACKGROUND: Healthy biological maturation in young girls is crucial for their future reproductive health. The continuous monitoring of their physical development is critical for early identification of any health problems.

AIM: This study aimed to identify the 100-year trend of girls' growth and development in the city of Moscow.

METHODS: The study focused on the physical characteristics of Moscow schoolgirls over a period of 100 years (1920–2020), including their body height and weight, chest circumference, right-hand grip strength, and time of menarche. In this study, a total of 4581 girls aged 8–17 years were observed from 2003 to 2020. The obtained data were compared with those documented in "Materials on the Physical Development of Children and Adolescents in Urban and Rural Areas of the USSR (Russia)," covering the period from 1920 to 2013. The Kolmogorov–Smirnov normality test was used to determine the normality of distribution. The differences were considered significant at $t \geq 2.0$ ($p < 0.05$).

RESULTS: Comparative analysis of the physical development of Moscow schoolgirls across decades showed an increase of 3–5 cm in the body height and a significant increase in the chest circumference among all age groups of girls at the beginning of the 21st century compared with their peers in the 1960s and 1980s, indicating the completed processes of gracilization that had been observed since the 1980s. The mean body height of 8-year-old schoolgirls in 2003 was 129.12 ± 0.47 cm compared to 125.66 ± 0.32 cm in those in the 1960s ($p < 0.001$). Additionally, the mean chest circumference was 62.34 ± 0.44 cm in 2003 and 60.50 ± 0.22 cm in the 1960s ($p < 0.008$). Moreover, a decrease in the right-hand grip strength has been noted in all age groups (9-year-old girls: 13.2 ± 0.2 kg in the 1960s and 6.9 ± 0.1 kg in 2003; $p < 0.001$). Earlier menarche has been documented in modern Moscow schoolgirls, with an average age of 12 years and 9 months. This phenomenon is accompanied by a shift in the chronology of growth patterns toward earlier stages. The age of first menstruation (menarche) varies with family income.

CONCLUSION: Over a century-long period, Moscow schoolgirls have shown increased total body size and earlier biological maturation.

Keywords: physical development; schoolgirls; body weight; body height; grip strength; menarche; 100-year trend.

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