

Changes in trajectories of physical growth in a domestic adoptees sample: A preliminary study

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Internationally adopted infants experienced profound institutional deprivation in early infancy. Adoption may have a positive effect on child development, providing a massive catch-up growth in the developmental parameters.

In this preliminary study we examined the effect of family deprivation on abandoned children placed in high quality foster care during infancy. We also investigated the presence of a growth delay in Italian domestic adoptees at the time of family placement and the potential physical recovery after adoption.

Anthropometric measures (weight, length or height /head circumference) and Body Mass Index (BMI) were measured on arrival (T₀) and 6 (T₁), 12 (T₂) and 24 months (T₃) after adoption.

The results show moderate delays in physical growth on the children's arrival into the adoptive family and a significant catch-up growth in all auxological parameters from T₀ to T₃.

This is one of few Italian studies that points out a positive change in trajectories of growth after child adoption.

Key words: domestic adoptive families, growth delay, adopted children, catch up growth.

Several researches have focused on developmental outcome in internationally adopted infants who experienced profound institutional deprivation in early infancy.¹ These children were severely developmentally impaired at the time of family placement, presenting delays in mental, social, and physical growth.² Adoption may have a positive effect on child development, providing a massive catch-up growth in the developmental parameters.³ The aims of our study are to investigate the presence of a growth delay in domestic adoptees at the time of family placement and to examine the degree of recovery at 6th, 12th and 24th months after adoption in order to perform a global evaluation of physical growth in these children.

We evaluated 39 children adopted from January 2013 and October 2014, with the permission of

the Juvenile Court of Rome. Both caregivers of each child provided their informed consent. This preliminary study was conducted in accordance with the regulatory standards of Good Clinical Practice and the Declaration of Helsinki (1996) and with the permission of Guarantor of the Child and Adolescent and of Lazio's Regional Council. Eighteen children (46.2%) were males and 21 (53.8%) females. There were 6 (15.4%) adopted biologically related sibling pairs in our sample. Before adoption, all infants were placed in high quality foster care; the mean time spent in foster care was 16.25 ± 26.18 months (range 0.5-110). Age at family placement was 8.25 ± 8.99 months. Excluding 6/39 domestic adoptees lost to follow-up, 33/39 children were investigated concerning body mass index (BMI) and anthropometric measures (weight, length/height and head circumference) on arrival

Table I. Anthropometric Measures at T₀, T₁, T₂ and T₃ (N=33).

	Weight	Length/Height	Head circumference	Body mass Index
T ₀	-1.16	-1.08	-1.10	-0.59
T ₁	-0.34 (p<0.5 T ₀ - T ₁)	-0.58	-0.21 (p<0.5 T ₀ - T ₂)	0.11 (p<0.5 T ₀ - T ₁)
T ₂	0.12 (p<0.5 T ₀ - T ₂)	-0.15 (p<0.5 T ₀ - T ₂)	0.65 ⁰ (p<0.5 T ₀ - T ₂) (p<0.5 T ₁ - T ₂)	0.27 (p<0.5 T ₀ - T ₂)
T ₃	0.22 (p<0.5 T ₀ - T ₃)	-0.16		1.09 (p<0.5 T ₀ - T ₃) (p<0.5 T ₁ - T ₃)

(T₀) and 6 (T₁), 12 (T₂) and 24 months (T₃) after adoption. Data were converted into z scores using Anthro statistical software. The comparison between anthropometric data at T₀, T₁, T₂, T₃ was performed using ANOVA for repeated measures and post-hoc Bonferroni test. Statistical significance is set at a nominal two-tail P<0.05. Data on weight, length/height, head circumference and BMI at T₀, T₁, T₂ and T₃ are shown in Table I.

In regards to weight recovery process, we observed a statistically significant increase in weight z scores between T₀ and T₁, T₀ and T₂, T₀ and T₃ (p<0.05). With respect to length/height catch-up, the only significant increase in median height z score was observed between T₀ and T₂ (p<0.05). Regarding head circumference, we found a statistically significant difference in head circumference z score between T₀ and T₁, T₀ and T₂ and T₁ and T₂ (p<0.05). The increase in terms of BMI was already statistically significant between T₀ and T₁ and between, T₀ and T₂, T₀ and T₃, and from T₁ to T₃ (p<0.05).

We suppose that the growth delay observed in our sample was probably due to low birth weight (LBW). This condition is generally associated with several maternal risk factors, medical risks before or during gestation and unhealthy lifestyle. The large number of congenital anomalies detected in our experience (inter-ventricular septal defect, patent foramen ovale, club foot, spina bifida, congenital syphilis and HIV) suggests that biological mothers may have received inadequate prenatal care, resulting in LBW infants.⁴ Regarding weight, we found that catch-up was statistically significant already within the first 6 months after adoption, demonstrating a faster recovery than height. This result is congruent with evidence that

weight gain is more dependent on recent food intake, while catch-up in height requires bone growth through the secretion of growth hormone.⁵

Several studies found substantial lags in anthropometric parameters in internationally adopted children at the time of adoption and showed that later age at arrival was related to less complete catch-up of height and weight.⁶

For what regards head circumference, previous researches about physical catch-up growth following severe early deprivation, demonstrate that the recovery process was incomplete. It suggests that brain size (and IQ) was more susceptible than height and weight to persisting deficits following profound institutional deprivation.⁷

Children adopted from orphanages were severely physically deprived because of malnutrition and neglect.⁸ Additionally, some researchers have concluded that cortisol curves of adopted children may differ from those of non-adopted. Particularly, the lack of sensitive care may lead to chronic stress and chronic activation of the Hypothalamic-Pituitary-Adrenal axis, that subsequently reduced appetite and suppressed growth hormones.⁹

According to other studies, it was found that not only Hypothalamic-Pituitary-Adrenal axis dis-regulation but also malnutrition, neurotrophic and neurotransmitter changes resulting from institutional deprivations can interfere with the plasticity of the developing brain.^{10,11} Conversely, we found a significant and complete catch-up in head circumference 6 months after family placement. It may indicate a more successful compensatory response, probably due to the fact that children of our sample didn't experience a deprived institutional

rearing. Our findings are also consistent with a significant change in trajectories of growth after adoption. Discontinuity in care and relationships may have a negative impact on physical development of adopted children. Furthermore, stable and responsive caregiving may improve the social and psychological adjustment of adoptees, contributing to a physiological growth of children.¹²⁻¹⁴

In conclusion, pediatricians should be aware of special medical, mental and developmental needs, to help and assist adoptive families.

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