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CHAPTER 3

Obesity in asylum seekers' children in The Netherlands- the use of national reference charts

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Abstract

Background: Growth assessment can be used to monitor health at individual and population level. For asylum seekers' children with different geographic backgrounds, growth reference values are frequently not available. We assessed nutritional condition and growth of asylum seekers' children upon arrival and follow-up in The Netherlands, using national growth charts, and related these parameters to geographic origin.

Methods: Height and weight of 135 children originating from Africa (n=47), Central Asia (n=41), and Eastern Europe (n=47), were assessed longitudinally (median follow-up 3 yr, range 1 - 8 yr). Body-mass-index (BMI) was calculated, and overweight and obesity were defined according the international BMI cut-off values for age and gender.

Results: Upon arrival at a median age of 4.5 yr (range 0-11.5 yr), 13% of the children were small for age (below -2SD of the Dutch height for age reference), which decreased to 5% during follow-up (p<0.05). During follow-up, 90% of the height measurements in boys and 85% in girls were within the normal range (+/-2SD) of the Dutch references. The proportion of children with overweight including obesity increased from 15% at arrival to 21% during follow-up (p<0.05). Irrespective of age, children originating from African were taller than children from Central Asia or Eastern Europe at follow up (p<0.05). Overweight and obesity was most prominent among children of Eastern Europe.

Conclusion: Dutch national reference values allow monitoring growth and the development of overweight or obesity in asylum seekers' children in The Netherlands. Prevention strategies to reduce the development of overweight and obesity among these children seem warranted.

Keywords: asylum seekers' children, growth monitoring, obesity

Introduction

Growth of children is influenced both by the environment, such as the availability of nutrients, physical activity, behaviour and by genetic factors. Despite ethnic differences, growth rates have been considered the best indicator for the health of children at individual and at population level.¹⁻³ During the last decennia many countries have compiled national growth references and prefer to use these rather than corresponding references from the World Health Organisation.⁴⁻⁸ In many Western countries a secular trend towards earlier maturity and increasing adult size has recently led to revision of reference growth curves.⁹⁻¹¹ The reference curves used in The Netherlands were revised in 1997, based on the fourth nationwide growth study performed in 1996-1997.¹² Children from ethnic minorities were not included in this reference. Separate reference curves for children grown up in The Netherlands with parents from Turkish or Moroccan origin have recently been published.^{13,14}

Asylum seekers' children in The Netherlands originate from many different countries and growth references from these countries are usually not available. Previous studies in the United State indicated that growth and nutritional conditions among asylum seekers' children were suboptimal.^{15,16} In the general population, the prevalence of childhood obesity in general has increased strongly during the past two decades.¹⁷⁻¹⁹ It is unclear to what extent this phenomenon has occurred in asylum seekers' children. The use of the BMI to assess the nutritional condition with respect to overweight and obesity is widely accepted.^{20,21} Other anthropometrical measurement such as mid-upper-arm circumference, triceps skin fold thickness, waist circumference, hip circumference and the waist-hip ratio are used to assess body fat distribution.²²⁻²⁴ We determined the growth of asylum seekers' children of different geographic background relative to the Dutch references and assessed the prevalence of overweight and obesity among these children. Additionally the body fat distribution of the children was assessed in relation to the geographic background.

Methods

Growth and nutritional status of were longitudinally determined in pre-adolescent asylum seekers' children from asylum seekers' centres in the North of The Netherlands. The study was approved by the Ethical Committee of the Medical Center Leeuwarden. Parents and children were invited to participate in the study using an informative letter translated into their native languages. The procedure was explained with the use of an independent language interpreter and formal permission to participate in the study was obtained from the parent (caregiver) of each child. 135 children and/or their parents signed consent. In total

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33 children did not participate, because of moving to another facility (n=6), refusal to participate (n=9) or non-response (n=18). Non-response analyses showed that these 33 children did not differ by gender, age, origin or length of stay in The Netherlands compared with the study cohort (n=135; data not shown). The anthropometrical measurements for growth and body fat distribution included height, weight, mid upper arm circumference, waist circumference, hip circumference and triceps skin fold thickness. Measuring skin fold thickness at other locations and calculating their sum could have been informative. However, the limitations of the present design included determination of triceps skin fold to be used as the only indicator for skin fold thickness. Measurements were performed following the standard procedures as described in Paediatric Morphometrics using Seca medical precise weight scale (Van Seenus Nederland B.V.) and the standing height with a Seca 208 somatometre (Van Seenus Nederland B.V.)²⁵ The triceps skin fold thickness was determined with the Holtain skin fold calliper. All anthropometrical measurements were performed by one trained medical doctor except for the height and weight measurements, retrieved from the medical files in which measurement performed following the same procedures regularly had been recorded since arrival in The Netherlands. All measurements were indexed upon the Dutch reference. Standard deviation scores were calculated for each child using the computer based Growth Analyser Information program (version 2 Dutch growth foundation 2001-2003).

Overweight or obesity was defined according the Dutch guidelines based on the international BMI cut-off values for age and gender.²⁵ Children who were below 2 year of age were not considered overweight or obese since no cut-off values are available.

The general characteristics of the children are listed in Table 1. Data were analysed, using the SPSS statistical software package (SPSS 11.5 2003). The χ^2 test was used for statistical analysis of the prevalence of small for age children at arrival and at follow-up, and for the relationships between origin and prevalence of overweight and obesity at arrival and at follow-up. The Mann Witney test was used to analyse the mean Z-scores of mid upper arm circumference, triceps skin fold thickness, waist circumference, hip circumference and waist-hip ratio in relation to geographic background. A p-value below 0.05 was considered statistical significant.

Table 1 General characteristics of the study population

	Africa, n = 47	Central Asia, n = 41	Eastern Europe, n = 47
Country of origin	Angola 20 Somalia 18 Sudan 8 Other 1	Afghanistan 18 Iraq 11 Iran 6 Other 6	Azerbaijan 15 Former Yugoslavia 18 Armenia/Russia 12 Other 2
Female/male	20/27	20/21	17/30
Age upon arrival (year; median and range)	3.9 (0.9-11.0)	3.7 (0.9-11.5)	5.7 (0.8-10.2)
Follow up in The Netherlands (months; median and range)	35 (12-94)	32 (17-58)	42 (14-65)

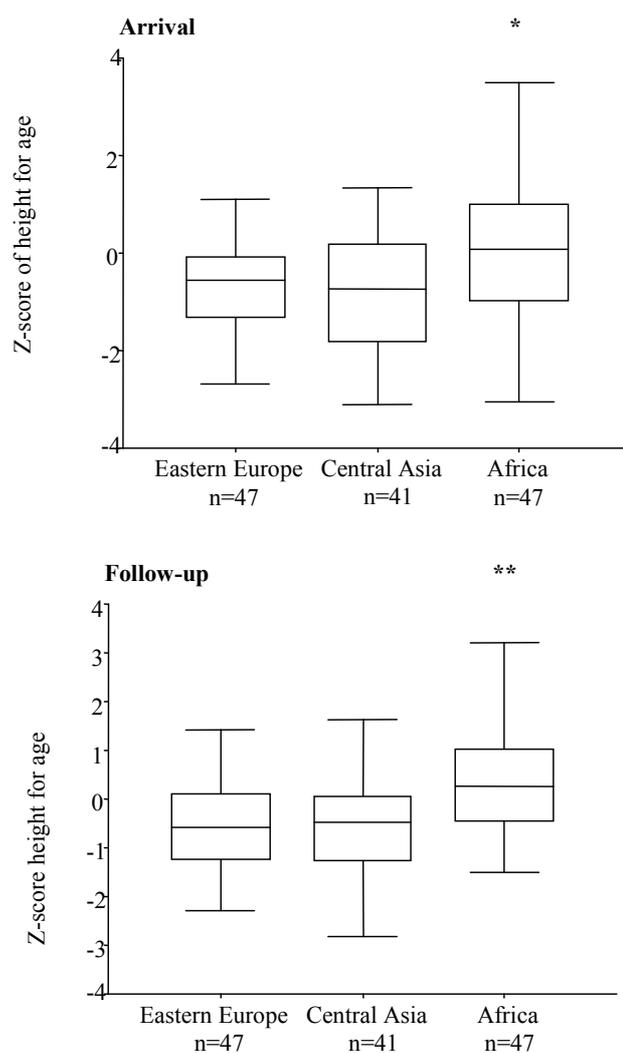
Results

Growth

The height for age of the children at arrival was in 85% and during follow-up in 91% within the normal range (± 2 SD) of the Dutch references. The mean height for age for boys in our sample remained between ± 3 cm of the Dutch reference and for girls between ± 4 cm of the Dutch reference. We did not find a significant difference between the mean height for age of boys and girls in our sample. Upon arrival in The Netherlands, thirteen percent of the children were small for age (height for age below -2 SD on the Dutch reference curve). During follow-up (2.5 ± 1.3 yr, mean \pm SD) this fraction significantly decreased (5% at follow-up; $p < 0.05$). Those children small for age upon arrival, originated from Eastern Europe ($n=8$), Central Asia ($n=7$) and Africa ($n=3$). Independent of age, the height for age of the African children at arrival [median Z-score (range) height for age -0.1 (-3.0, 3.5)] and at the end of follow-up [median Z-score (range) height for age 0.3 (-1.5, 3.2)] was higher than that of the children from Central Asia [-0.7 (-3.1, 1.3) at arrival ($p < 0.05$), and -0.5 (-2.8, 1.6)] at follow-up ($p < 0.01$) or Eastern Europe [-0.6 (-2.7, 1.9) at arrival and -0.6 (-2.3, 1.4)] at follow-up ($p < 0.01$). (Figure 1). At the end of follow-up, 8% of the African children had a height above $+2$ SD of the Dutch reference compared to none of the children from Eastern Europe or Central Asia ($p < 0.01$). The height for age upon arrival or during follow-up was not significantly different between children originating from different countries within one continent.

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Figure 1 Z-scores of Height to age according Dutch references of preadolescent asylum seekers' children from different geographical origin upon arrival and follow up in The Netherlands.



Box plot represent first and third quartiles of Z-scores of height for age plus 3rd and 97th centiles.

Difference of Height to age of African children to children of both other origin analysed by Mann-Whitney U test; * $P < 0.05$, ** $P < 0.01$

Overweight and obesity

The weight for height of the children at arrival was in 87% and during follow-up in 89% within the normal range ($\pm 2SD$) of the Dutch references. Upon arrival in The Netherlands, five percent of the children had a weight for height below $-2SD$ on the Dutch reference curve, and this fraction did not significantly change during follow-up (4%, NS). The weight for height at arrival of the children did not significantly differ according to their origin. During follow-up the median Z-score (range) of the weight for height of the children from Central Asia [-0.4 (-3.3, 2.5)] was below those of Africa [0.3 (-1.6, 4.7)] ($p < 0.05$), and of Eastern Europe [0.0 (-2.1, 3.6)].

Between children of different countries within one continent no significant difference in the weight for height upon arrival or during follow-up was seen.

Overweight and obesity

The number of children crossing the international cut-off values of the BMI for overweight and obesity increased from 15% at arrival to 21% at follow-up. The prevalence of overweight and obesity was higher among children from Eastern Europe than among children from Africa or Central Asia (Odds Ratio 1.6 vs 0.9 and 0.6; resp.). Fifteen children had overweight upon arrival in The Netherlands, which increased to 19 at follow-up. The number of obese children increased from 6 at arrival to 9 during follow-up. Figure 2 shows the increase of children with overweight and obesity during follow-up to geographic background.

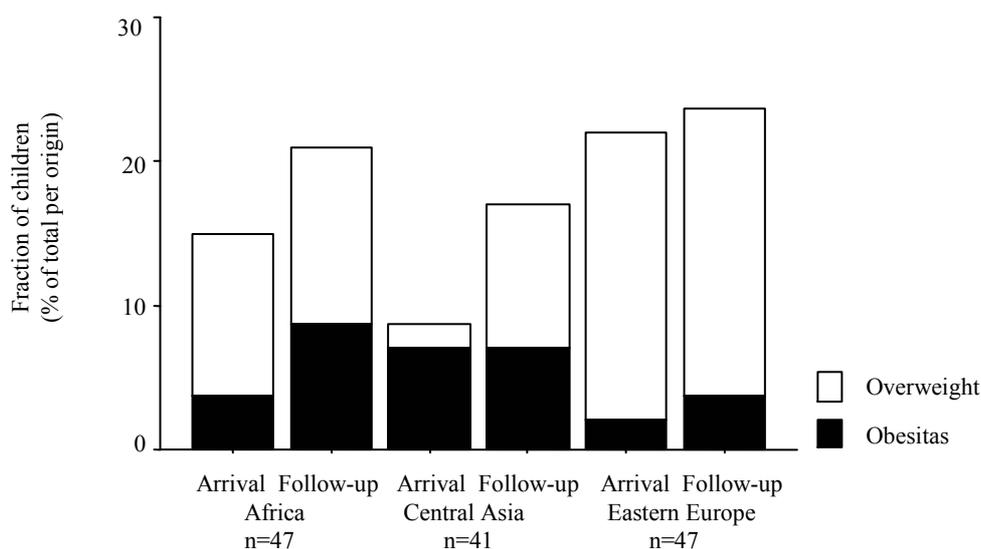
Fat distribution

Compared to the age and gender specific Dutch Z-scores, we found 13% of the children with a mid upper arm circumference above $+2SD$ and 5% below $-2SD$ during follow up. For triceps skin fold thickness similar values were found: 15% of the measurements above $+2SD$ and none below $-2SD$. None of the children had a mid upper arm circumference less than the 13 cm as used by WHO as a cut-off-value to indicate malnutrition. During follow-up the median Z-score (range) of the mid upper arm circumference of the children from Central Asia [-0.9 (-3.1, 3.1)] was significantly lower than in children from Africa [-0.7 (-2.2, 6.2); $p < 0.05$] or Eastern Europe [0.2 (-1.7, 7.3), $p < 0.01$], respectively. The median Z-score (range) of the triceps skin fold thickness of the children from Central Asia [0.5 (-1.4, 4.0)] was similar to that of children from Africa [0.8 (-0.8, 4.5), NS], and lower than that of children from Eastern Europe [1.0 (-0.6, 4.9), $p < 0.05$], respectively. Except for two boys from Eastern Europe with severe obesity, all our measurements of waist circumference, hip circumference and the waist-hip ratio were within the $+2SD$ and $-2SD$ of the recently published gender and age specific Dutch references.²⁶ We found 17 (13%) children with a waist circumference above the $1.3SD$ and another 8 (6%) with a waist circumference above

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+2.3SD, which are the suggested cut-off values to screen on abdominal fat. The median waist-hip ratio of the African children (0.96) was higher than that in children from Asia (0.94; $p<0.05$) or Eastern Europe (0.93; $p<0.01$). Our data did not show a high risk for children small for age or with a low weight on arrival to develop overweight obesity, or an increased waist-hip ratio during follow-up.

Figure 2 Prevalence of overweight and obesity in preadolescent asylum seekers' children from different geographical origin upon their arrival and subsequent follow up in The Netherlands



Discussion

This study shows that growth and nutritional condition of asylum seekers' children can meaningfully be monitored by using Dutch reference curves. Height for age and weight for height of the pre-adolescent asylum seekers' children did not significantly differ from the Dutch reference. Our results correspond with the conclusions of the Multi-centre Growth reference Study by WHO that stated that all children have the same growth potential, provided that they are exposed to an optimal nutritional environment.²⁸ Although our

Overweight and obesity

sample size was small and the age range wide we observed an increase of the prevalence of overweight and obesity among the asylum seekers' children during the average 2.5 year period of follow-up, which appears to follow the trend reported in urban areas of The Netherlands. Differences in weight for height between urban and non-urban populations are well known, however, the responsible mechanism has not been elucidated, apart from epidemiological associations.²⁹

In the present study we observed a slight difference in height for age according to origin of the asylum seekers' children, with the height for age of the African children to be higher than these of children of Central Asia and Eastern Europe. This difference corresponded with earlier reports on ethnic differences in height for age among minorities in Europe. Chinn described that African children were taller (0.6 SD) and Asian children were shorter (0.5 SD), compared to the UK reference of 1990.²⁷ The ethnic differences we found appeared to be smaller than reported data of children from Morocco in The Netherlands whose final height was estimated to be 10cm less than that of their Dutch peers.¹³ These height variations among ethnic minorities may be influenced by a generation effect, the social status and intermarriage. The use of national reference therefore is preferable independent of the child's ethnic background.⁹ The statistically not significant differences in the height for age between boys and girls in our study is surprising but might be related to the pre-pubertal stage of the present study group.

We assessed the prevalence and subsequent development of overweight and obesity in the asylum seekers' children using international cut-off values of the BMI. We found a high prevalence of overweight and obesity compared to the national Dutch reference of 1997 based on the fourth growth study. The present data shows the prevalence of overweight among girls at arrival (12%) corresponds with the prevalence among girls of the same age in an urban population in The Netherlands (11%) and the prevalence among girls at follow-up (17%), corresponds with the prevalence among girls of the same age in other regions in The Netherlands (17%) at time of the fourth growth study.

The prevalence of obesity among girls at arrival and at follow-up (7%) in our study was much higher than reported in the fourth growth study (3% urban and 1.4% other regions). For boys the prevalence of overweight (12%) at arrival and follow-up did not vary much from the prevalence among Dutch boys of the same age (13% urban and 9% other regions). The prevalence of obesity in our study among boys 3% at arrival and 6% during follow-up was higher than the prevalence reported in boys of the same age (1.6% urban and 1.4% other regions).¹²

The prevalence of overweight and obesity among other minorities in The Netherlands such as Turkish and Moroccan children at the time of the fourth growth study was higher than those found in our study among the asylum seekers' children.³¹ We reported an increase of

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the prevalence of overweight and obesity among asylum seekers' children during follow-up. In the general Dutch population the prevalence of overweight and obesity since the fourth growth study has almost doubled.³²

Too much body fat at young age is related with cardiovascular diseases, diabetes mellitus and respiratory compromise and therefore with deterioration of health.^{33,34} Monitoring trends in overweight and obesity with BMI alone will fail to identify variation in body fat distribution. A high waist circumference is related to abdominal fat and an increase of risk on cardiovascular diseases in adulthood. Age-sex and ethnicity-specific waist circumference percentiles have been made available to monitor body fat distribution for The Netherlands. We found a high prevalence of an increased waist circumference particularly among African children. The present analysis does not allow, however, identifying underlying causes for the observed differences according to origins. Almost irrespective of the origin of asylum seekers' children, our data indicate that their exposure to a Western society rapidly increases the prevalence of overweight and obesity. Recently, we reported that asylum seekers' children in The Netherlands frequently consume diets that are energy-rich and micronutrient-poor.³⁵ This diet composition is considered to carry a high risk on the development of overweight and obesity.³⁶ It would be interesting to delineate the relationship between the previous nutritional condition and the risk on developing overweight or obesity while exposed to a western society. Our present data do not indicate that a relative low weight upon arrival predisposes to overweight or obesity during follow up. Yet, previous exposure to poor nutrition or traumatizing experiences could have influenced the nutritional status at arrival. Specific information on these individual circumstances of the children was not available and, theoretically, we cannot exclude that variation of these parameters over the different groups confounds the results to some extent. Notwithstanding, our results support strategies for this vulnerable group of children to prevent development of overweight and obesity, including nutritional, physical and environmental approaches.

Key-points

- Growth is considered to be the best indicator for the health of children at an individual and population level, Dutch national growth references can be used for meaningful monitoring the nutritional status and growth of asylum seekers' children.
- Growth of children is influenced by the availability of nutrients and genetic factors. However, ethnic and gender differences in growth of pre-adolescent asylum seeker children are relatively small.
- The prevalence of overweight and obesity increases rapidly among asylum seekers' children in The Netherlands
- Prevention of overweight and obesity should include strategies aimed at this specific group of children upon their exposure to a Western society.

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