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Summary

It is important to monitor the growth of children especially in the first five years of life in order to ensure their health and nutritional status. Growth charts are the most sensitive, practical and effective way to detect growth and nutritional problems in growing children. The new WHO Child Growth Standards are prescriptive. They describe how children should grow, rather than how children under certain conditions actually grow.

In addition there is a local Egyptian growth charts were constructed since 2002 for Egyptians. Adoption of growth charts will not be a simple process.

To our knowledge, there is no study that compared the differences between WHO-CGS and Egyptian Growth Charts (EgGS) particularly in relation to early infant feeding practices. Hence, the aim of this study is to assess the growth of children under-five who are exclusively breastfed for six months according to the WHO and UNICEF criteria then to compare their growth patterns on WHO-CGS and the local Egyptian growth charts (EgGS).

This study was carried out on 1000 healthy breastfed infants (600 infants from 6 months to 2 years and 400 infants from 2years to 5 years) who were randomly selected from children attending FHC in 6 districts in Gharbia governorate including: 320, 290, 120, 100, 90 and 80 infants from El Mahalla El Kobra, Tanta, Kafr El Zayat, Alsanta, Qotor and Bassion respectively. They were attending for routine child care visits. They were exclusively breastfed infants from birth to 6

months of age, the study exclude any infancy with birth weight below2500 gm, preterm or with congenital anomalies and those exposed to formula fed before 6 months or pacifiers.

We found that W/A by using Z-score system for our population aged 6-11, 12-23 and 24-59 months, the rates were 1.2, 3 and 0 below -2 SD respectively. When using WHO-CGS percentile system, the rates were 1.25%, 2.99% and 0% below 3rd centile and 0, 1.36 and 0 above 97th centile respectively. Also by using EgGS, the rates were 0, 2.17 and 3.53 below 3rd centile and 1.56, 0 and 0 above 97th centile respectively.

For the assessment of underweight, our findings indicate that exclusive breastfeeding for six months protects from against malnutrition and underweight in children probably by preventing repeated exposure to infective episodes that cause growth faltering and lead to underweight. When we used the WHO Growth Chart Z-score system, we found that there are a few percentages of underweight. For example, in the age group 6-11 months, we found only 1.2 under -2SD. This indicates that breastfeeding helps the healthy growth of children. Also, when we used the WHO-GCS, the rates of underweight were few. These rates increased with age. This is explained by the children's infection diseases such as acute chest infections and gastroenteritis.

We found that L/A by using Z-score system for our population aged 6-11,12-23, 24-35, 36-47 and48-59 months, the rates were 0.6, 2.7,3.3, 0 and 1.2 below-2 SD respectively. When using WHO-CGS percentile system for our population aged 6-11,12-23 and 24-59 months, the rates were 0.63, 2.72 and 1.6 below 3rd centile and none above 97th centile. Also by using EgGS, the rates were none below 3rd centile and above 97th centile for all age groups.

From the results of this study, Egyptian children who were on exclusive breastfeeding showed no evidence of stunting. This was confirmed using both the EgGS, and the WHO-GCS. We also found that stunting increases with age, indicating that these children are exposed to chronic malnutrition once they stop breastfeeding.

We found that W/H by using Z-score system for our population aged 6-11, 12-23, 24-35, 36-47 and 48-59 months, the rates were 0, 2.5, 0.8, 0 and 1.2 below-2SD. Also the rates were 7.8, 2.5, 2.4, 2.9 and 9.3 above +2SD respectively. When using WHO-CGS percentile system for our population aged 6-11, 12-23 and 24-59, the rates were 0, 2.45 and 0.63 below 3rd centile and 7.81, 2.44 and 1.89 above 97th centile respectively. Also by using EgGS, the rates were 0, 1.09 and 0.63 below 3rd centile and 10.63, 4.08 and 1.89 above 97th centile respectively.

For the assessment of wasting and overweight, using both the "national" and "international" growth charts show that exclusive breastfeeding for six months protect children from wasting which represents an acute state of malnutrition. By using the z-score system of WHO, we found that no cases in the age group 6-11. On the contrary, we found that there is an increase in the proportion of cases above the +2 SD rates of 7.8 of the cases used for the study. We have noted that among the older age groups there is an increase in the proportion of cases that are fall below-2SD and the fewer children above the +2 SD up to the age group 36-47 months then there is an increase in the proportion of cases for the age group 48-59 months above +2 SD. This may be due to the erroneous feeding practices of children and increase exposure of children to infection. By using WHO-GCS, the rate of overweight (above the 97th centile) was 7.8% for the age group 6-11 month decrease to 2.44% at 12-

23 months and 1.89% for the age group of 24-59 months. On the other hand the rate of wasting, below 3rd centile for the age group of 12-23 months was 2.45%, probably reflecting erroneous practices of weaning. The similar findings were detected when we used the EgGS.

We found that BMI by using Z-score system for population aged 6-11, 12-23, 24-35, 36-47 and 48-59 months were 0.6, 3.6, 0.8, 1.9 and 1.2 below -2SD. Also the rates were 5.9, 8.7, 8.1, 7.7 and 9.3 above +2SD respectively. When using WHO-CGS percentile system for our population aged 24-59 months, the rates were 1.28 below 3^{rd} centile and 9.62 above 97^{th} centile for the population aged 24-59. Also by using EgCS, the rates were 4.81 below 3^{rd} centile and 0 above 97^{th} centile for the same population.

When we used the Z-score system, we found that there was 0.6 of cases under-2SD in the age group 6-11months, which is appropriate evidence of the importance of breastfeeding and its impact on the health and nutritional status of children. The rates had been increased more and more in advanced age group and reached up to 3.6 in the age group 12-23 months. As a result of faulty weaning for the children and increasing the rates of Gastroenteritis and chest infections in this age. The patterns of the rates above the +2 SD drew our attention as we found these rates which reflect the nutritional status of children. It means that the increase reflects the adoption of most families to poor dietary habits at the stage of weaning with increase in carbohydrates and fats that cause overweight.

In relation to head circumference for age, our population showed a normal distribution across the centiles of the WHO standard and also the Egyptian reference curves.

We found that W/A by using WHO-CGS "percentile system" for the under five population of males, females, rural areas, urban areas, educated mothers and non educated mothers (illiterate, average, above average and higher qualifications),the rates were 0, 3.05, 0.67, 2.71, 1.96,1.40,1.60 and 1.46 below 3rd centile respectively. Also, the rates were 0.98, 0, 0.17, 0.99, 0, 0, 0.64 and 1.46 above 97th centile respectively. By using EgGS, the rates were 2.17, 1.63, 1.52, 2.46, 1.96,2.33, 2.24 and 0.49 below 3rd centile respectively and 0, 1.02, 0.34, 0.74, 0, 0.47, 0.64 and 0.49 above 97th centile respectively.

We found that L/A by using WHO-CGS "percentile system" for the under five population of males, females, rural areas, urban areas, educated mothers and non educated mothers (illiterate, average, above average and higher qualifications), the rates were 2.71 , 0.62, 1.35, 2.22, 1.96,1.63,1.92 and 1.46 below 3rd centile. Also, the rates were none above 97th centile. By using EgGS, the results were none at all below 3rd centile and above 97th centile.

We found that W/H by using WHO-CGS "percentile system" for the under five population of males, females, rural areas, urban areas, educated mothers and non educated mothers (illiterate, average, above average and higher qualifications), the rates were 0.93, 1.45, 0.59, 2.07, 0, 1.10,1.12 and 1.69 below 3rdcentile respectively. Also, the rates were 6.25, 2.41, 2.55, 7.10, 2.56, 3.59, 5.20 and 5.08 above 97th centile respectively. By using EgGS, the rates were 0.23, 0.96, 0.39, 0.89, 0, 0.55, 0.74 and 0.56 below 3rd centile and 7.41, 4.82, 5.11, 8.58, 5.13, 5.52, 6.96 and 6.78 above 97th centile respectively.

We found that BMI by using WHO-CGS "percentile system" for the under five population of males, females, rural areas, urban areas, educated mothers and non educated mothers, the rates were 12.27, 6.71,7.87,11.94,14.29,8.82,5.32 and 16.39 above 97th centile respectively. By using EgGS, the results were none above 97th centile.

As the previously mentioned results, we found that all anthropometric indices either W/A, L/A, W/H or BMI tended to shift to higher centiles in population of educated mothers, urban areas and males than population of non-educated mothers, rural areas and females.

We conclude that Growth charts should be revised and evaluated repeatedly and the new standards are recommended for application to all children independently of type of feeding. More cases of underweight, stunting and wasting were detected by the WHO-CGS for the children who were below two years of age. However the study identified more cases of underweight, stunting and wasting by using the EgGS for the older children aged 3-5 years. Overweight and obesity among the entire population of the under five were detected more by using the WHO-CGS. The mothers should start breastfeeding as soon as possible. They should know how to prepare a well balanced diet. They should prevent fasting foods practicing.