Infants' Obesity and Overweight in Relation to Type of Feeding

بدانة الأطفال الرضع وزيادة الوزن وعلاقتها بنوع الرضاعه

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المستخلص:

الهدف: لمعرفة شيوع البدانة و زيادة الوزن لدى الأطفال الرضع دون السنة الثانية من العمر وعلاقتها بين نوع الرضاعة لدى عينة من الأطفال المراجعين مركز الرعاية الصحية الأولية في الكاظمية.

المنهجية: دراسة وصفية اجريت في مركز الرعاية الصحية الأولية في الكاظمية ببغداد للفترة بين الخامس من تموز ٢٠٠٩ ولغاية الأول من آيار ٢٠١٠. اختيرت العينة بالطريقة الغير احتمالية وشملت ٧٤٤ رضيع وطفل. جمعت المعلومات بواسطة استبيان اضافة الى قياس وزن الطفل و طوله. حللت النتائج بواسطة نظامSPSS واعتمد اختبار مربع كاي لتحديداهمية النتائج.

النتائج: اشتملت العينة على(٤٣,٢%) رضيع بعمر اقل من ستة اشهر و (٤٠%) من الفئة العمرية ما بين ٦-١٢ شهر و ٢٠,٨% بين ١٣-٢٤ شهرا. بلغ معدل عمر الأمهات ٢٧عاما. استنادا الى مؤشر العمر مع الوزن كان (٣٠,٤%)من العينة ضمن النسبة المئيئة الخمسين، اما باستخدام مؤشر الطول مع العمر فكان معظم العينة (٥٠,١%) ضمن النسبة المئيئة الخامسة وعند استخدام مؤشر الطول مع الوزن ومؤشر كتلة الجسم كانت معظم العينة (73.5%) ضمن النسبة المئية ال ٨٥-٩٥ % . وكانت تغذية الأطفال والرضع منالذين هم من ضمن النسبة المئية ال ٨٥-٩٥% اما رضاعة صناعية او مختلطة.

التوصيات:القيام بدراسات ومسوحات مستقبلية لغرض استخلاص نسب ومؤشرات نمو قياسية (الطول والوزن) لاطفالنا لتقييم النمو بصورة صحيحة وتوعية الأمهات لغرض تشجيعهم على ممارسة الرضاعة الطبيعية وتطوير عادات غذائية جيدة لمنع السمنة في المستقبل.

Abstract

Objective (s): To identify the prevalence of obesity and overweight in infants and children less than 2 years of age and its relationship with type of feeding in a sample of children attending Al- Kadhymia primary health care center.

Methodology: This study was a descriptive survey carried out in, the primary health care centre of Al-Kadhymia town in Baghdad during the period from 5th of July 2009-1st of May 2010. Sample was chosen by non probability convenience sampling and it included 744 infant and children. Data were gathered by a combination of a structured questionnaire and measurements of length (or height), and weight. Data analyzed by SPSS package and x^2 test was used for significance.

Results: The sample was consisted of (43.2%) infants below 6 months of age, (40%) in the group of 6 - 12 months and (20.8%) in the 13 - 24 months age group; mean age of mothers was 27 years. According to the weight for age index, 30.4% of infants and children were within the 50th percentile, 50.1% of the sample within the 5th percentile of length for age, as for weight/length and BMI the highest rate (73.5%) were within the 85-95% percentile. Infants and children who were within the 85-95% percentile were mostly those who had either bottle or mixed feeding.

Recommendations: Studies and surveys can be conducted to obtain new growth standards for our children to be able to monitor their growth correctly and health education of mothers to encourage breast feeding and develop good eating habits in her child to prevent future obesity.

Keywords: obesity, overweight, feeding, Body Mass Index (BMI)

Introduction:

Obesity has become an epidemic in many parts of the world. The World Health Organization has warned of an epidemic of obesity that could put the population in many countries at risk of developing non-communicable diseases (NCD). Available studies in Eastern Mediterranean countries indicate that obesity has reached at an alarming level among both children and adults. Consequently, the incidence of NCD is also very high and represents more than 50% of total causes of death in the Eastern Mediterranean Region [(1)].

And while the influence may be genetic[(2)], parents should be mindful of this when considering their child's diet[(3)] and other environmental factors like exercise, to ensure they're not placed at even greater risk[(4)]. Thus obesity prevention efforts should begin before age two, when children reach a "tipping point" in a progression that leads to obesity later in life[(5)]. Overweight and obese children are facing adult onset disease type risk factors such as cardiovascular heart disease, elevated blood pressure and type II diabetes[(6)]. Early identification of risk factors for increased adiposity (fat) can be instrumental in the prevention of obesity in young children and young adults [(7)] .Breastfed infants at the age of one year have leaner bodies. Data indicates that breastfed infants have more activity of their upper limbs which could contribute to their leaner body structures [(8)]. The higher protein/nitrogen content of infant formula compared with breast milk may cause a metabolic response of increased insulin and insulin-like growth factor-1 secretion leading to excessive weight gain in formula-fed infants [(9)].In many parts of the world, the concern is for malnutrition and under-nutrition, while in western countries, a growing concern relates to obesity and the associated increase in type 2 diabetes. The World Health Organization recommends that a system of classifying overweight and obesity based on BMI, an index combining weight and height with age and sexual maturity should be adopted internation-ally[(10).]

It was concluded by the WHO that breast feeding affects body weight by duration of feeding [(11)] a fact further emphasized by American researchers as they found out that breast feeding for six months will reduce the risk for childhood obesity [(12)].

In Iraq the problem of obesity had been addressed by researchers and studies had shown that in central part of Iraq the rate of overweight among primary school children was 6% and obesity 1.3%[(13)], therefore we need to take some action to prevent obesity in young children in order to safeguard long-term good health for the population. So the aim of this study is to identify the prevalence of overweight and obesity among a sample of children under 2 years and its relationship with type of feeding.

Methodology:

This study was a cross-sectional descriptive study carried out in, the primary health center of Al-Kadhymiain Baghdad during the period from 5th of July 2009 to the 1st of May 2010. Sample was chosen by non-probability convenience sampling and it included 744 infant. Inclusion criteria: any child or infant between ages of 1-24 months. Data were gathered by a combination of a structured questionnaire and the collection of anthropometric data through measurements of length (or height), and weight. The children were measured with light-weight clothing. Standardized 25 kg Seca scales measuring to the nearest 0.1 kg were used to measure weight. Measurement of recumbent length was taken to the nearest of 0.1 cm, using

the adjustable child height measuring board.

CDC growth charts [14] were used for determination of the growth percentiles of each infant or child. Growth percentiles obtained were the age/weight, age/height and weight/height and BMI which was computed by using the following formula: weight / height [2]. Analysis of data was done by the SPSS statistical system version 16 to extract frequency tables and cross tabulation for different variable. P-value of less than 0.05 was considered significant.

Results:

Table 1. Distribution of the Sample According to Age Group and Gender

Age group (month)	Gender		Total %
	Male%	Female%	
<6 months	162 45.6%%	163 41.8%	322 43.2%
6-12	144 40.8%	167 42.8%	313 40%
13-24	48 13.6%	60 15.4%	109 20.8%
Total	354 100%	390 100%	744 100%

<: less than, %: percent

Table 2. Characteristics of Mothers and Infants

Variable	Mean	Minimum	Maximum	Standard deviation
Mothers age (year)	27	14	48	6.5
Parity	2.3	1	8	1.3
Age of baby (month)	7.5	.25	24	5.9
Weight of infant at birth (Kg)	3.2	1.25	5.5	0.53

Table 3. Distribution of Sample According to type of Feeding

Type of feeding	Frequency	Percent
Breast	399	53.6
Bottle	201	27
Mixed	144	19.4
Total	744	100

Epidemiologic findings

Table (1) shows that 744 infants were recruited in this study, 354 (47.58%) were males and 390 (52.42%) females. There were 322 (43.2%) infants below 6 months of age, 313 (40%) in the 6 to 12 months age group and 109 (20.8%) in the 13 to 24 months age group. Mean age of mothers was 27 years, the mean parity was 2.3 ranging from1-8, mean age of babies was 7.5 months and mean weight of infants at birth was 3.2Kg as shown in table (2). Breast feeding was the most frequently used method for feeding infants in a rate of 53% as shown in table (3); this is followed by bottle milk in a rate of 27%.

Table 4. Relationship of Weight for Age Percentile with type of Feeding

Type of feeding	Percentile					Total
	≤5th	≤25th	50th	≤75th	≤85-95th	
Breast	21 5.3%	116 29.1%	125 31.3%	74 18.5%	63 15.8%	399 100%
Bottle	5 2.4%	54 26.9%	56 27.9%	32 15.9%	54 26.9%	201 100%
Mixed	4 2.8%	37 25.7%	45 31.3%	22 15.3%	36 25%	144 100%
Total	30 0.4%	207 27.9%	226 30.4%	128 17.2%	153 20.6%	744 100%
X^2=18.12 P = 0.05 S						

≤: less than or equal to; %: percent; X^2: chi squared test; P: probability

Table 5. Relationship of Weight for Height Percentile with type of Feeding

Type of feeding	Weight / height percentile					Total
	≤5th	≤25th	50th	≤75th	≤85-95th	
Breast	3 0.8%	28 7%	40 10%	50 12.5%	278 69.7%	399 100%
Bottle	0 0%	9 4.5%	8 4%	27 13.4%	157 78.1%	201 100%
Mixed	0 0%	7 4.9%	13 9%	12 8.3%	112 77.8%	144 100%
Total	3 0.4%	44 5.9%	61 8.2%	89 12%	547 73.5%	744 100%
X^2=18.95 P = 0.041						

≤: less than or equal to; %: percent; X^2: chi squared test; P: probability

Table 6. Relationship of Height for Age Percentile with Type of Feeding

Type of feeding	Height / age percentile					Total
	≤5th	≤25th	50th	≤75th	≤85-95th	
Breast	191 47.9%	132 33.1%	55 13.1%	15 3.8%	6 1.5%	399 100%
Bottle	119 59.2%	47 23.4%	11 5.5%	9 4.5%	15 7.5%	201 100%
Mixed	63 43.8%	54 37.5%	22 15.3%	5 3.5%	0 0%	144 100%
Total	373 50.1%	233 31.3%	88 11.8%	29 3.8%	21 2.8%	744 100%
X^2= 42.79 P = 0.000						

≤: less than or equal to; %: percent; X^2: chi squared test; P: probability

Weight for age percentiles

Table (4) shows that infants who were breast fed had lower rate of overweight as only 15.8% of them were within the 85th -95th percentile in comparison to infants fed with bottle who had a rate of 26.9%, and infants fed both breast and bottle milk (25%). The result is statistically significant as P value was 0.05.

Weight for Height percentiles:

Table (5) shows that the weight for height percentiles of the three groups of infants was highest within the 85-95thbeing higher in bottle fed infants (78.1%), followed by infants with mixed feeding in a rate of 77.8% and breast fed infants in a rate of69.7%.The result is statistically significant as P value was < 0.05.

Height for age percentile:

Table (6) shows that infants in the study sample were mainly below the median of height for age percentiles as most of them were within the 5th percentile (46.9% of breast fed infants, 59.2% of bottle fed, and 43.8% of infants who had mixed feeding). Infants whose percentile was within the 50th percentile were in a rate of 13.1% for breast fed infants, 5.5% for bottle fed infants and 15.3% for infants with mixed feeding. Results are statistically significant as P value was < 0.05.

Table 7. Relationship of Body Mass Index (BMI) with type of Feeding

Type of feeding	BMI					Total
	≤5th	≤25th	50th	≤75th	≤85-95th	
Breast	15 3.8%	37 9.3%	30 7.5%	42 10.5%	275 68.9%	399 100%
Bottle	10 5%	7 3,5%	7 3.5%	13 6.5%	164 81.6%	201 100%
Mixed	1 0.7%	6 4.2%	13 9%	15 10.4%	109 75.7%	144 100%
Total	26 3.5%	50 6.7%	50 6.7%	70 9.4%	547 73.5%	744 100%
X^2= 25.67 P = 0.004						

≤: less than or equal to; %: percent; X^2: chi squared test; P: probability

Table 8. Distribution of Sample According to Standard Growth percentiles

Variable	Percentile						P value
	≤5th	≤25th	50th	≤75th	≤85-95th	Standard Deviation	
Weight/age	4%	27.8%	30.4%	17.2%	20.6%	1.56	0.000
length/age	50.1%	31.3%	11.8%	3.9%	2.8%	1.33	0.000
Weight/length	0.4%	5.9%	8.2%	12%	73.5%	1.09	0.000
BMI	3.5%	6.7%	6.7%	9.4%	73.6%	1.36	0.000

≤: less than or equal to; %: percent; P: probability; BMI: Body Mass Index

BMI percentiles:

Table (7) shows that most of infants were within the 85-95th percentile; the rate being higher among bottle fed infants (81.6%), followed by infants with mixed feeding in a rate of 75.7% and Breast fed infants had a rate of 65.9%.The second highest rate among BMI percentiles id the 75th (10.5%, 6.5% and 10.4%) for breast, bottle and mixed feeding respectively. Results are statistically significant as P value was < 0.05.

Table (8) shows that for weight/age percentiles the highest rate of infants were within the 50thpercentile (30.4±1.56%). For length/age percentile the highest rate was in the 5th percentile

(50.1±1.33%). For weight/length percentile the highest rate was in the 85-95th percentile (73.5±1.09%). For BMI the highest rate was in the 85-95th percentile (73.6±1.36%). Results are highly significant as P value was< 0.05.

Discussion:

One of the most common deviations from normal growth patterns is an abnormal increase in weight [15]. Results of this study had shown a tendency towards overweight and obesity when referring to BMI or weight/height indices, while weight / age index revealed a growth pattern within the median of the index. This difference is due to the fact that BMI and weight /length indices depend on the height as a variable and the height /age index in the study sample had indicated a high prevalence of short stature. Height/age index reflects the past nutritional history of the infants or children and so it indicates chronic malnutrition; but as the weight/age index had revealed a good nutritional status then the short stature here have genetic or constitutional background rather than malnutrition Accordingly the overweight in this study is due to short stature rather than real tendency towards obesity and this can be ascertained further more by doing a longitudinal study that compare an individual child's height with that of a large population of a similar genetic background and, more particularly, using the mid-parental target height[16].

Breast fed infants had lower rate of overweight than bottle fed an infant who was evident by the results of BMI and age for height percentiles. The higher protein/nitrogen content of infant formula compared with breast milk may cause a metabolic response of increased insulin and insulin-like growth factor-1 secretion leading to excessive weight gain in formula-fed infants [17]. Several studies have highlighted differences in the rate of growth, particularly in the second 6 months after birth between breastfed and bottle-fed infants, with bottle-fed infants gaining more weight than breastfed infants [9, 18].

Obesity in early infancy may lead to obesity later in life as scientists had found out, but infants who were fed formula are 20 times more likely to be overweight than infants who were breastfed for six months[19].

So as a conclusion, the high rate of overweight seen in the study sample is most probably due to short stature rather than obesity and that the breast fed infants had the lowest rate of overweight among the studied sample.

Recommendations:

- Perform longitudinal studies to follow up the length of infants and compare that with WHO standards to ascertain if there is a problem of stunting in our infants and deal with the results accordingly.
- Deal with the problem of overweight when detected as soon as possible during monitoring infants' growth in the primary health centers to prevent future obesity.
- Encourage mothers to:

1. Breastfeed her child, since it is a proven fact that breastfed babies will weigh less than formula fed babies.
2. Feed the baby only when he is hungry.
3. To develop good eating habits in her child even when he is an infant. These habits will stand him in good stead when he grows older, and help him keep a check on his weight.

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