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THE PERSISTING OBESITY AND OVERWEIGHT IN CHILDREN; UNDERSTANDING THE CAREGIVER FACTOR IN KENYA

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ABSTRACT

Obesity in children is counted as one of the upcoming challenges in health in the 21st century. The alarming increasing rate has been noted as a common nutritional problem in both developed and developing countries and is associated with increase in morbidity and mortality. The prevalence and factors associated with overweight and obesity are not well documented in developing countries including Kenya especially in a health care setting. This study was carried out to determine care giver factors associated with obesity in a national referral hospital which is at the apex of health care in Kenya. The study adopted a descriptive design. Study population comprised of 298 under five-year old children who visited paediatric emergency unit and child welfare clinic Systematic random sampling was used to select the 298 children. Data analysis was done using SPSS version 22. General descriptive statistics was applied to determine means, ranges, standard deviations and variances for the heights, weights and socio-demographic characteristics. Inferential statistics involved seeking of associations using chi square with a P-value of < 0.05 considered to be statistically significant. Charts, tables and graphs were used to present the results. The study recommends further studies to be conducted in private and county hospitals to asses' factors influencing obesity in under fives

KEYWORDS: Obesity, overweight, noncomunicable diseases, mortality.

INTRODCUTION

Being obese is defined as having unnecessary or irregular fat accrual that may damage health. A Body Mass Index (BIM) above the 95th percentile in children and teenagers categorizes them to be obese according to World Health Organization's (WHO) child growth reference (WHO, 2014). Obesity in children is a serious public health problem globally in the twenty first century according to world health organization. Obese children and adolescents have high risk of developing other health problems and are likely to be obese when they become adults (Mikkila et al., 2005; (Telama et al., 2005). (Mikkila at. al., 2005), (Telama at. al., 2005). Pre-school age group is a primary focus for obesity prevention because at this age there is opportunity to influence behavior change of parents who have control over feeding and activity of children (Mikkala et al., 2005). Great impact is noted when positive life style is initiated at a young age as noted in primary care setting

Counseling on appropriate feeding practices and preventive interventions should be accorded to families with obese infants (WHO, 2008), (Bruce & Hanson, 2010).

Obesity in children is estimated to reach 70 million in the next 10 years Hospitals in the course of offering their services to children do take height and weight measurements using stadiometers and precision scales therefore this data can provide accurate estimates of obesity in children (Gilliland et al, 2015).

Kenyatta National Hospital (KNH) is a national referral hospital which is mandated to formulate national polices and is at the apex of health care and therefore a Centre which receives children from all levels of socio-economic status Overweight and obesity, as well as their related diseases, are largely preventable. Prevention of childhood obesity therefore needs high priority. This study seeks to determine factors associated with

overweight and obesity among under-five-year old children seeking Maternal Child Health services at Kenyatta National Hospital.

METHODOLOGY

This was a cross-sectional descriptive study conducted at Kenyatta National Hospital (KNH) pediatric emergency unit and routine Child Welfare Clinic (CWC). The Child Welfare Clinic is one of the pediatric clinics in Kenyatta National Hospital in Nairobi which monitors children's growth pattern and offers immunization services. The study population comprised of 63,055 under-five year old children, seeking Maternal Child Health services at the facility. The children were aged below 59 months. A total of 298 caregivers with children aged below 59 monthsa were sampled using Fisher*et al*, (1998) to participate in the study. A list of all the booked patients scheduled for visit in the child welfare clinic was used as the sampling frame and children meeting sampling creteria were selected. Data was collected using questionnaires. Further anthropometric measurements were taken. Height was determined using length board. A digital weighing machine was used to determine the weight and a bath room weighing scale for the once who were not able to stand. The body mass index (BMI) was calculated using the recorded weight and height for each

child according to the WHO growth standard median. Data collected was entered using epidata and analysis according to variables was done using statistical package for social sciences (SPSS) program version 22. Analytic statistics was applied to obtain tests of statistical significance using Chi-square, regression and correlation to test the association of variables. Results were presented in form of tables, graphs and charts.

RESULTS

Indexed child characteristics

The majority of the participants were males 147 (50.5), 12(8.2%) were overweight and 3 (2.0%) obese while the females were 144 (49.5%) with 15 (10.4%) overweightand 5 (3.4%) obese. Most 291 (99.3% were born in a health facility 26 (8.9%) were overweight and 8(2.7%) obese. Three quarters 211 (73%) were of the 1st or 2nd birth order, and the least 1(0.3%) over 6th born while the majority of overweight were of the 3rd and 4th birth order as shown in table 4.2 below. Most were breastfeeding which formed the majority of overweight and obese children as illustrated in table 1 below.

Table 1: Index child characteristics.

Parameter	Freq. (n)	Percent (%)	Overweight n (%)	Obese n (%)
Sex				
Male	147	50.5	12(8.2)	3(2.0)
Female	144	49.5	15(10.4)	5(3.4)
Area born				
Home	2	0.7	1(50)	-
Health facility	291	99.3	26(8.9)	8(2.7)
Birth order				
1st to 2nd	211	73.0	6(2.8)	3(1.4)
3rd to 4th	70	24.2	9(12.9)	1(1.4)
5th to 6th	7	2.4	6(85.7)	2(28.6)
Over 6th	1	0.3	-	1(100)
Is the child currently breastfeeding				
Yes	216	73.2	23(10.6)	7(3.2)
No	79	26.8	3(3.8)	1(1.3)

Prevalence of overweight and obesity

The proportion of overweight in this study was 28 (9.8%) and obese 8 (2.8%) of which 53.57% were girls while 46.42% were boys. Majority of the children 250 (87.41%) had normal weight and females were heavier than males as illustrated in table 4.4 below.

Table 2: A table showing Z-Score ranges.

Parameter	Z-Score			
	<2 (Normal)	Positive (+) 2 to 3 (Over weight	>+3 (Obese)	Total
Female (141)	121(48.4%)	15(53.57%)	5(62.5%)	141(49.3%)
Male (144)	129(51.6%)	13(46.42%)	3(37.5%)	145(50.7%)
Total	250(87.41%)	28(9.8%)	8(2.8%)	286(100%)

Anthropometric measures- (age, weight and height)
Most of the participants 143 (48.1%) were aged below twelve months, 9 (13.2%) overweight and 4 (5.9%) obese aged between five and ten months. Females were noted to be heavier than males as shown in table 4.4

below. Most of the participants 143 (48.1%),of the index child's age was less than 12 months, while the least 8 (2.7%) were over 48 months as illustrated in figure 1 below.
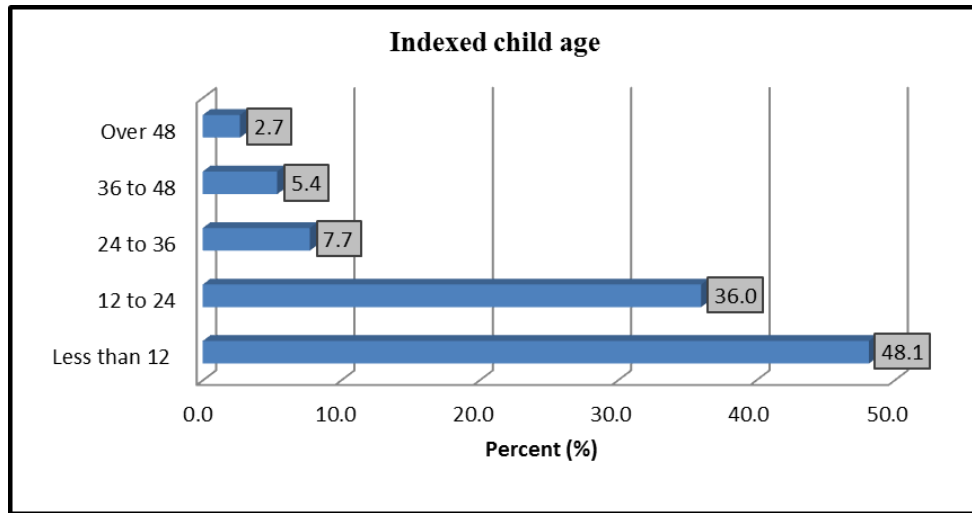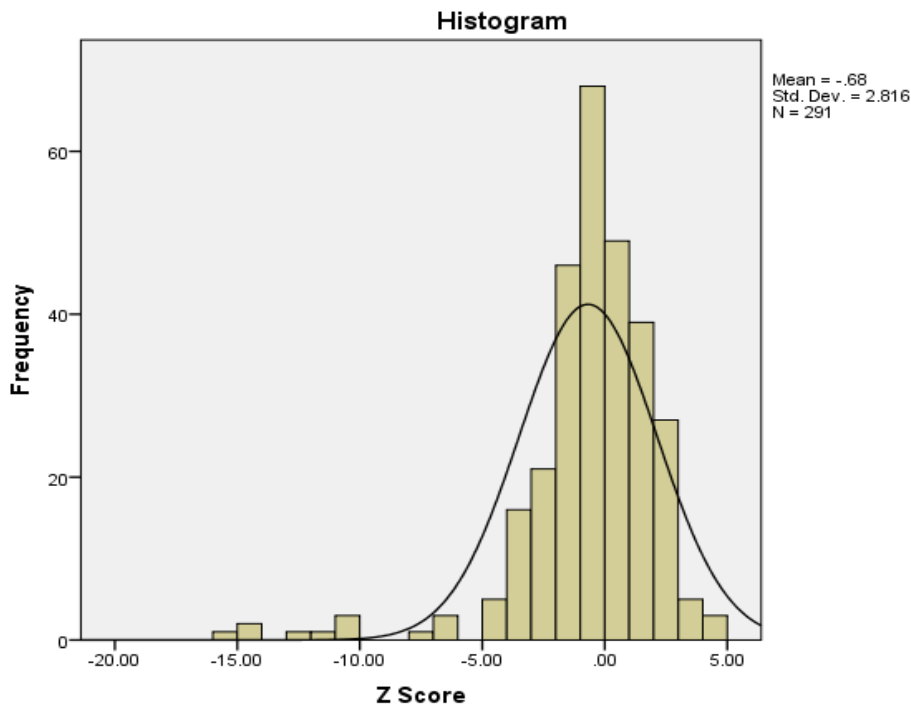

Figure 1: A graph showing the age of Index child.

Z-Scores
The overall respondent Z-Scores were reported as Mean (SD) of -0.68(2.82) with a Median (IQR) of -0.3(-1.7 to 1) ranging from -15.9 to 1.00. Female Z-score was

reported as Mean of -0.38 ranging from -15 to 4.9 with a range of 19.9. Male Z-score was reported as Mean of -0.98 ranging from -15.9 to 4.2 as illustrated on Figure 2 below.

Care giver factors associated with overweight and obesity
Caregiver demographics
Inorder to ascertain the relationship between the variables under investigation, frequencies obtained on

obesity and overweight were summated into a signle variable. This was then crosstabulated with the demographic factors and chi squared tests condcuted. Table 3 below presents the findings.

Table 3 : Tests of significance.

	Underweight	Normal	Overweight/Obese	OR(95%CL)	P-value
Gender					
Male	0	8	3	1	0.524189
Female	27	121	29	0.6(0.16-2.56)	
Marital status					
Married	42	171	30	1	0.00
Divorced	0	4	1	1.4(0.15-13.19)	
Separated	0	116	1	0.1(0.02-0.42)	
Single	9	1	2	11.4(1.0-129.71)	
Number of children					
None	16	59	29	1	0.021498
One	25	67	10	0.3(0.14-0.68)	
Two	6	36	10	0.6(0.25-1.30)	
Three and above	6	18	4	0.5(0.14-1.46)	
Level education					
Primary	4	22	8	1	0.140829
Secondary	24	75	10	0.4(0.13-1.04)	
College/university	23	95	16	0.5(0.18-1.22)	
Income					
10,000 or less	0	6	1	1	0.008688
10, 000 to 50,000	18	54	8	0.9(0.09-8.38)	
50,0000 to 100,000	3	25	6	1.4(0.14-14.32)	
Over 100,000	1	3	5	10.0(0.78-128.78)	
Breastfeeding nature of child					
Yes	44	136	30	1	0.014845
No	10	65	4	0.3(0.09-0.83)	

P-Value < 0.05 statistically significant.

Significant relationship was found between marital, status, number of children, income and feeding nature of the child and obesity/ overweight (p>0.05). Children born of single mothers were 11.4 times more likely to develop obesity/overweight as compared to their counterparts who were married. Children whose caregivers were separated had the least likelihood of developing obesity/ overweight (OR=0.1, CL= 0.02-0.42). The finidngs also revealed that odds of having an obsess/overweight child reduced with the number of children one had. The risk of obese/overweight children also increased with income quartile. Those who earned over Ksh. 100,000 were 10 times more likely to have obese/overweight children (CL=0.78-128.78). Caregivers who were breastfeeding their children were more likely to have obese/overweight children. Table 3 above summarizes the findings.

Regression analysis was conducted to ascertain the relationship between caregiver's demographic characteristics and the BMI of the children. In the regression equation, y=normal weight, x=obese/overweight. Table 4 below presents the findings.

Table 4: Relationship between caregiver's demographic factors and child BMI.

ANOVA							
	df	R Square	Adjusted R Square	*F*	*Significance F*	*t Stat*	*P-value*
Regression	1	0.547866	0.521269	20.59944	0.000291	1.537986	0.142456
Residual	17						
Total	18						

As indicated in Table 4 above, caregiver's demographic and Child BMI status were not significantly related. The udjusted R value was however positive indicating positive relationship between caregiver's demographic factors and child BMI.

Feeding habbits
The study also considered the feeding habbits of the caregivers. Table 5 below presents the findings.

Table 5: Feeding habbits of the baby.

	Underweight	Normal	Obese/Overweight	OR(95% CL)	(P-Value)
Type of energy foods					
Rice	1	14	2	1	
Cooked bananas	3	11	2	1.3(0.15-10.53)	
Mashed Potatoes	2	18	4	1.6(0.25-9.75)	0.00032
Ugali (Maize meal)	16	51	1	0.1(0.01-1.63)	
Chips	19	46	24	3.7(0.77-17.41)	
Others	1	5	1	1.4(0.10-19.01)	
Type of vegetables					
Sukuma (kales)	12	43	6	1	
Spinach	9	34	6	1.3(0.37-4.27)	0.450459
Cabbage	16	62	7	0.8(0.25-2.58)	
Others	4	15	0	0.5(0.05-4.30)	
Protein foods					
Meat	7	24	2	1	
Chicken	4	3	23	>90	
Fish	6	23	3	1.6(0.24-10.24)	0.00
Eggs	17	62	6	1.2(0.22-6.16)	
Sausage	4	6	1	2.0(0.15-25.92)	
Others	7	24	2	1.0(0.13-7.69)	
Fruits mostly fed					
Mango	2	11	1	1	
Oranges	3	14	2	1.6(0.13-19.67)	
Banana	7	20	3	1.7(0.15-17.82)	0.896465
Apple	7	19	1	0.6(0.03-10.21)	
Pineapple	17	71	10	1.5(0.18-13.32)	
Others	6	20	1	0.6(0.03-9.68)	
Snacks					
Bread	12	33	5	1	
Cakes	5	33	0	0.2(0.02-1.81)	0.110625
Crisps	6	20	4	1.3(0.32-5.50)	
Nuts	5	27	2	0.5(0.09-2.72)	
Most given drinks					
Soda	8	34	3	1	
Juice	21	70	7	1.1(0.28-4.66)	0.00
Yoghurt	5	24	3	1.4(0.26-7.63)	
Milk	7	25	4	1.8(0.37-8.83)	
P-Value < 0.05 statistically significant.					

As indicated in Table 5, type of energy food given, protein foods, and most food given were significantly associated with child BMI status (p>0.05). Children fed on chips were 3.7 times more likely to develop obesity/overweight (0.77-17.41). Those Who were fed on Mashed Potatoes1.6 more likely to develop obesity/ overweight (CL= 0.25-9.75). Children fed on chicken were more than 90 times likely to present with obesity/overweight. Children fed on sousages were 2 times more likely to present with obesity/overweight. On drinks given, those given milk were 1.8 times likely to present with obesity/overweight. Table 5 above presents a summary of the findgings. Regression anlysis revealed a significant relationship between feeding habbits and obesity/overweight. Table 6 below presents the findings.

Table 6: Relationship between feeding habbits and obesity/overweight.

ANOVA							
	df	R Square	Adjusted R Square	*F*	*Significance F*	*t Stat*	*P-value*
Regression	1	0.32726	0.304836	14.59377	0.000624	4.345193	0.000147
Residual	30						
Total	31						

As indicated in Table 6 above, there was a significant relationship between feeding habbits and obesity/overweignt (p=0.000147). This was at t=4.345193. The Adjusted R Square=0.304836 indicating a positive realitionship in the regression equation. Table 6 above prsesnts a summary of the findings.

DISCUSSION

The study established that most of the children had normal weight. There were 9.8% overweight and 2.8% obese. Demographic factors associated with obesity/overweight include marital status, number of children, income and breast feeding nature of the children. Children born of single mothers were more likely to present with obesity/overweight. In another study conducted by Augustine and Kimbro (2013), overweight/obesity was more prevalent among children of divorced parents compared with children of married parents. Also, breastfeeding status influenced obesity/overweight in children. Children who were not breastfed were more likely to develop obesity/overweight. Similar findings have been presented by Wang *et al.,*(2017) who established that children who were never breastfed were more likely to be obese than those who had been breastfed. In a WHO publication, breasfeeding has been identified as a measure towards reducing childhood obesity (WHO, 2020). The study findings also indicate that number of childre influenced obesity/overweight. Caregivers with few number of children were more likely to have obese/overweight children.

The current study reveals that obesity/overweight increased with the number of children the mother has. Other studies have also liknked childhood obesity with parity and gravidity. For instance, Gaillard *et al* (2014). Established that children from multiparous mothers had lower rates of accelerated infant growth and lower levels of childhood body mass index, total fat mass percentage, and total and low-density lipoprotein cholesterol than children of nulliparous mothers. It is possible to conclude that child care practices are influenced by expereince such that mothers who have had experiences in child bearing could be reasoned to be more mature and experienced and thus good new-born care practices.

Obesity/overweight also increased with earnings. Diferent studies reveal different results on the relationship between economic status of the parents and obesity/overweight. For instance, in a study conducted by Rogers *et al* (2015), low-income was highly associated with overweight/obese status. Another study condcuted by Nghiem and Khanam (2016) established that lower household income was strongly correlated with a higher incidence of childhood obesity. In contrast, and in agreement with the current study, rates of overweight and obesity were significantly higher in high economic status households. Perhaps the difference could be explained by the findings of a study conducted by Assari (2018) established that family income reduced obesity for the white but not black children. This therefore implies that certain eating habits occur across economic status and cultures.

Feeding habbits

Mother's have a large influence on the eating behaviors of their children as they control the energy density and portion sizes of the foods that are consumed. Parental involvement has been shown to be critical in efforts to reduce childhood overweight/obesity. However, other factors influence the choices of food given by the parents. In this study, Children fed on chips were more likely to develop obesity/overweight. This was also true of children fed on Mashed bananas. Feeding children on chicken and sousages also increased chances of obesity/overweight. On drinks given, feeding children on milk increased likelihood of obesity/overweight. The findings of this study reveal significant association between feeding habbits and obesity/ overweight.

The findings of this study can relate with those of Chakraborty, Almathhur, Suh and Chakraborty (2019) which found out that eating high-calorie foods, such as fast foods, baked foods and vending machine snacks, are associated with obesity/overweight in children. According to Mason et al., (2016) eating candy and desserts also increased obesity among children. The findings of this study relating milk consuption with obesity/overweight could be explained by findings of studies such as those of Beck, Heyman, Chao and Wojcicki (2017) which established that whole milk consumption lower likelihood of childhood obesity as opposed to processed milk.

Conclusion and Recommendations

The study condcludes that feeding habbits employed by the mothers greatly influenced obesity/overweight in children. Milk, yoghurt, potatoes and chicken were related with obesity/overweight in children. Also, certain demographic factors of the mother such as marital status, number of children and economic status influenced obesity/ overweight in children. Based on these findings, the study recoomends programs meant for routine growth monitoring of all under five-year-old children to be a standard clinical practice. This will enable early detection in deviation of the child's weight.

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