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**Abstract :**

**Back Ground:** Breast feeding and human milk has been regarded as the best and complete nourishment for young neonate. Nature has not produced any food as unique in its composition as human milk.

**Aim of study:** To assess the relation of the nutrient in human milk with the obesity of the mother. Asses the influence of gender of the baby, order, age, type of delivery, parity, spacing between pregnancy and other factor with human milk content.

**Method and materials:** A cross sectional study done in Babylon hospital for maternity and pediatric in Hilla city from 29 february-29 may, 2015.included 75 nursing mothers 18-45 years age, in 6 week postpartum Breast milk collected and kept freeze till analysis(using mature milk) Questionnaire include demographic factor for mother and baby, measurement include weight, height, BMI. Obesity define as BMI more than 30. measuring concentration of breast milk content(fat, protein, sugar)by milk analyzer and detect some vitamin (A,C,B2) using HPLC instrument.

**Result:** Seventy five nursing mothers two were under weight, 32 normal wt,53 obese The overall mean age of nursing women was (26.31±4.57) years old. The overall mean age of babies was (8.93±4.88) months. The overall mean BMI was (29.61±6.16) kg/m<sup>2</sup>The mean milk fat was (3.38± 1.29) (gm), (2.94± 0.78) (gm) for protein and (2.33±1.40) (gm) for sugar. the mean of vitamins milk composition were (0.35± 0.18), (0.70± 0.62) and (0.35± 0.22) (ug) for vitamin A, C and B2, respectively There were positive relation of mothers BMI with composition so in mother with high BMI has higher concentration of fat and inverse with sugar, vitamin A and B2.

**Conclusion:** Maternal obesity has effect on milk content specially fat and sugar.

**Keyword:** Milk, breast feeding, composition, obesity.

**Introduction:**

Human milk is regarding as unique, optimum and best complete source for neonate nourishment and supplied all infant needs and supporting their growth and development gave defenses against various infections also providing bonding between baby and his mother <sup>[1]</sup>.

For optimal development WHO encouraged exclusive breast feeding for first six months of age from first half hour after mother delivery <sup>[2]</sup>. Over the world rates detect only 35% of children from birth and their fifth month of age were breastfed exclusively<sup>[3]</sup>. According to WHO, breast feeding classified as: **Exclusive breast-feeding** : means that nothing gave to baby but only breast milk. **Predominant breast-feeding** : in addition to breastfeeding, the infant may be given water and based drinks including water, tea, and soft drink.

**Full breast-feeding:** breast-feeding given either in exclusive manner or predominantly. **Any breast-feeding:** breast-feeding either exclusively or predominantly and any other supplements given, including milk and even solids<sup>[4]</sup>. Human milk is essential source for nutrient it contain all macronutrient as(protein ,lipid, carbohydrate).also contain trace element ,vitamin and enzyme. Breast milk fat and energy content varies from the beginning to the end of single feeding, and follows a diurnal form in both term and preterm milk <sup>[5,6]</sup> The composition of milk changes with time and with frequent feeding<sup>[7]</sup> . Protein content decreases within several weeks afterbirth <sup>[8]</sup>.Some studies results detect direct relation between breast feeding and weight change of lactating mothers <sup>[9]</sup>.Both obesity before pregnancy and weight gain which occur during pregnancy have a negative effect on breast-feeding so weight gain in one pregnancy has

been increased in further pregnancy and more risk for obesity<sup>[10]</sup>. Obesity is often defined in simple definition as a condition of abnormal or excessive fat to be collected in adipose tissue, to the range that health may be effected<sup>[11-12]</sup>.Because of importance of breast milk as complete nutrient for infant and due to the pandemic and complication of obesity in child bearing age mothers, we should know its effect on milk composition. Whether decreased or increase and its hazard on infant health even in their future life. So the objective of this study are:

- 1- Assess the effect of nursing mothers obesity on the macronutrient content in human milk.
- 2- Asses the influence of gender of the baby, type of delivery, presence of any abnormalities, using of contraception ,baby age, parity ,Poor nutrition mothers and other factors on macronutrient of human milk.

**Material and method:**

**Study location:** study carried out in pediatrics department in Babylon hospital for pediatric and gynecology in Hila city **study design:** Cross sectional study to get the objective of study.

**Study population:** Included 75 lactating mothers from 29,February, 2015 till 29 May,2015.

**Inclusion criteria:** Lactating mothers after post partum period from 6 week up to 24 week of lactation with different type of breast feeding [exclusive, predominant, full, any ..]age from 18-45years.

**Ethical issues:** Approval of scientific committee of the/ community medicine Department/ in Babylon Medical College (University of Babylon, Iraq).

. The objectives and methodology of this study were explained to all participant to gain their verbal agreement.

**Study instrument: Questionnaire:** Feature for both mother and infant were taken **Part I:** Scio demographic feature of mother and partum feature **Part II** :infant feature(age, sex, order). **Part III:** factors related to breast feeding.

**Sample and instruments used:**10 cc of mature breast milk collected by manual breast expression in plastic tube asking mothers to lactate her baby for 3 minute to get mature milk. then giving other breast to baby and collection from first one time was between 8,30-10,30 A.M. best time for single sample estimation. milk preserved in cool box and traversed to refrigerator to be kept at 4c for not more than 48 hour .till analysis. Analysis done in Feeding Department in Scientific College for Feeding in ALQASSIM GREEN UNIVERCITY using special analyzer for milk{FUNK GERBER} made in Germany .plus special washing solution. Each sample take 15 minute for analysis then wash for machine using ringer solution. Result appears on screen in the instrument. in form of percent concentration for (fat, protein, lactose.).

Weight. using Breuer scale made in Germany wearing light clothes in kilogram, Height.. measured by fixed board in meter and person without shoes, heal together and head, in horizontal plane.BMI measured by formula weight in kg/height inm2.**VITAMINE DETECTION** in breast milk taken and analyzed using HPLC{high performance chromatography}.instrument ShimadzuModelLC20A made in Japan System Pump(A and B)2 LC-10ATDetectorSPD-20A Colum OvenCTO-20AColum Shim-pack VP-ODS(150mm x 4.6mm i.d5µm )ControllerCBM-20AliteSoftware .**Data analysis:** Statistical analysis was carried out using SPSS version 17. were presented as. Pearson’s chi square (X2) test and fisher exact used to find the relation between the categorical variables. A p-value of ≤ 0.05 was significant

**Results:**

The overall mean age of nursing women was (26.31±4.57) years old. The overall mean age of babies was (8.93±4.88) months. The overall mean BMI was (29.61±6.16) kg/m2. The mean body fat percentage was (25).there were no significant relation of BMI classes with socio-demographic characteristics of nursing women table[1].

**Anthropometric measurement:**

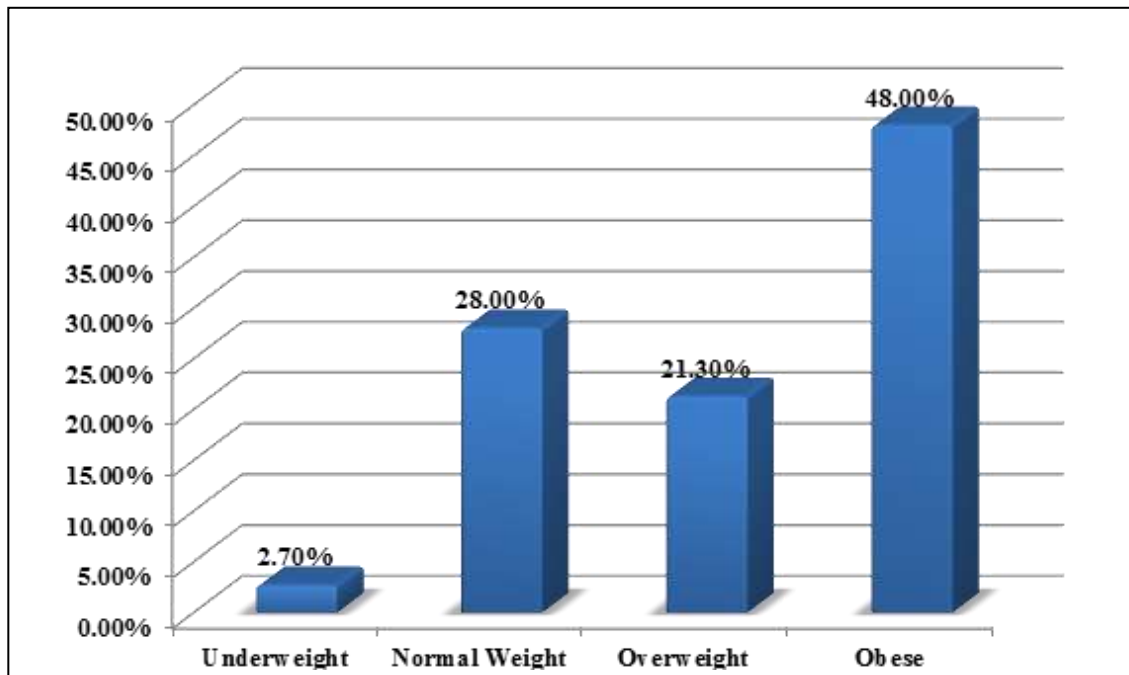


Figure 1: Distribution of nursing women BMI

**Table 1: Association of BMI Classes with Socio-Demographic Characteristics of Nursing Women**

Variable	BMI		Total	$\chi^2$	df	P-Values
	Normal weight(%)	Overweight/obese(%)				
<b>Mother age</b> < 25 years ≥ 25 years	8 (36.4) 14 (63.6)	17 (32.1) 36 (67.9)	25 (18.5) 50 (81.5)	0.129	1	0.720
<b>Occupational status</b> Employed Housewife	3 (13.6) 19 (86.4)	11 (20.8) 42 (79.2)	14 (18.6) 61 (81.4)	0.519	1	0.471
<b>Residence</b> Urban area Rural area	15(68.2) 7 (31.8)	39 (73.6) 14 (26.4)	54 (70.0) 21 (30.0)	0.225	1	0.635
<b>Educational level</b> Illiterate	0(0.0)	6(10.9)	6 (10.5)			
<b>Primary School</b>	9 (37.5)	20 (42.3)	29 (22.7)			
<b>Secondary School</b>	4 (16.7)	8 (17.4)	12 (08.8)	0.64	3	0.95
<b>Higher Education</b>	9(29.2)	15 (30.4)	24 (18.0)			

\*p value  $\leq 0.05$  is significant

table [2] show significant associations of BMI classes with mode of delivery, using of contraception. (66.7%) of nursing women underwent C/S, (73.5%) of nursing women did not resume their menstruations and (62.7%) were taking contraceptive pills. Table [3] show (66.7%) of nursing women had female infants and (45.3%) of infants was ordered third and more There were significant relation between BMI class of nursing

mothers and baby age.(34.7%) of nursing women had predominant breast feeding table[5]. table[4] show The mean duration of single breast feed was (14.04 $\pm$ 5.57) min. The mean age of starting complementary food was (6.80 $\pm$ 2.86) months .not significant with mothers BMI. in table[6]. there were significant relation of BMI with breast milk fat, protein, glucose, vitamin A, C and B2

**Table 2: Association of BMI Classes with Nursing Women's Partum and Post-Partum History**

Variable	BMI		Total	$\chi^2$	Df	P-Values
	Normal weight(%)	Overweight/Obese(%)				
<b>Mode of delivery</b> NVD C/S	13 (59.1) 9 (40.9)	12 (22.6) 41 (77.4)	25 (33.3) 50 (66.7)	<b>9.295</b>	<b>1</b>	<b>0.002*</b>
<b>Resume menstruation</b> Yes No	12 (40.0) 18 (60.0)	10 (18.9) 43 (81.1)	22 (29.3) 61 (70.7)	<b>4.391</b>	<b>1</b>	<b>0.036*</b>
<b>Parity</b> Primi-gravidus Multigravida	3 (13.6) 19 (86.4)	1 (1.9) 52 (98.1)	4 (5.=4) 71 (94.6)	<b>4.136</b>	3	0.215
<b>Contraception</b> Hormonal Non h.	10 (45.5) 12 (54.5)	37 (69.8) 16 (30.2)	47 (62.6) 28 (37.4)	<b>3.942</b>	<b>1</b>	<b>0.047*</b>
<b>Spacing between pregnancy</b> Yes No	17 (77.3) 5 (22.7)	44 (83.0) 9 (17.0)	61 (81.3) 14 (18.7)	<b>0.338</b>	1	0.561

\*p value  $\leq 0.05$  is significant

**Table 3: Association of BMI Classes with Babies' Socio-Demographic Characteristics**

Variable	BMI		Total	$\chi^2$	df	P-Values
	Normal weight(%)	Overweight/obese(%)				
Baby's age 6week-6month 7month-24month	3 (13.6) 19 (86.4)	23 (43.4) 30 (56.6)	26 (34.6) 49 (65.3)	6.079	1	<b>0.014*</b>
Baby's sex Male Female	16 (72.7) 6 (27.3)	34 (64.2) 19 (35.8)	50 (33.3) 25 (66.7)	0.515	1	0.473
Baby's order 1 <sup>st</sup> order 2 <sup>nd</sup> order ≥ 3 <sup>rd</sup> order	5 (22.7) 9 (40.9) 8 (36.4)	8 (15.1) 19 (35.8) 26 (49.1)	13 (17.3) 28 (37.3) 34 (45.4)	1.182	2	0.554

\*p value ≤ 0.05 is significant

**Table 4: Association of BMI Classes with Breast Feeding-Related Factors**

Variable	BMI			$\chi^2$	Df	PValues
	Normal weight (%)	Overweight/Obese(%)	Total			
Feeding duration < 10 minute ≥ 10 minute	6 (27.3) 16 (72.7)	24 (45.3) 29 (54.7)	30 (40.0) 45 (60.0)	2.101	1	0.147
Space between feeding Upon demand On need	20 (90.9) 2 (9.1)	42 (79.2) 11 (20.8)	62 (56.0) 13 (44.0)	1.476	1	0.224
Feeding frequency < 8 times/day ≥ 8 times/day	9 (40.9) 13 (59.1)	17 (32.1) 36 (67.9)	31 (41.3) 44 (58.7)	0.536	1	0.464
Age of complementary food < 6 months ≥ 6 months	21 (95.5) 1(4.5)	3 (5.7) 50 (94.3)	4 (5.3) 71 (94.7)	0.038	1	0.845

**Table.5: Association of BMI with Type of Breastfeeding**

Variable	BMI		Total	$\chi^2$	Df	Pvalues
	Normal weight(%)	Overweight/Obese(%)				
Type of reastfeeding Exclusive Predominant Full Any	1(4.5) 9 (40.9) 6 (27.3) 6 (27.3)	16(30.2) 17 (32.1) 9 (17.0) 11 (20.7)	17 (22.6) 26 (34.6) 15 (20.1) 17 (22.6)	<b>6.975</b>	<b>3</b>	<b>0.031*<sup>a</sup></b>

\*p value ≤ 0.05 is significant. fisher exact test

**Table 6: Association of BMI with Breast Milk Composition:**

Variable	BMI		Total	$\chi^2$	df	P-Values
	Normal weight(%)	Overweight/ Obese(%)				
Breast fat <sup>gm</sup> /100ml*						
< 3	14 (63.6)	20 (37.7)	34 (45.3)	<b>4.208</b>	<b>1</b>	<b>0.040*</b>
≥ 3	8 (36.4)	33 (62.3)	41 (54.6)			
Breast protein gm/100ml						
< 0.8	4 (18.2)	1 (1.9)	5 (6.6)	<b>4.251</b>	<b>1</b>	<b>0.024**a</b>
≥ 0.8	18 (81.8)	52 (98.1)	70 (93.3)			
Breast glucose gm/100ml						
< 7	17 (77.3)	51 (96.2)	68 (90.6)	<b>6.600</b>	<b>1</b>	<b>0.020**a</b>
≥ 7	5 (22.7)	2 (3.8)	7 (9.3)			
Breast vitamin A						
<0.5 ug	12 (54.5)	44 (83.0)	56 (74.6)	<b>6.663</b>	<b>1</b>	<b>0.010*</b>
>0.5 ug	10 (45.5)	9 (17.0)	19 (25.3)			
Breast vitamin C						
< 30 mg/ml	15 (68.2)	20 (37.7)	35 (46.6)	<b>5.790</b>	<b>1</b>	<b>0.016*</b>
≥ 30 mg	7 (31.8)	33 (62.3)	40 (53.3)			
Breast vitamin B2						
< 0.27 ug/ml	12 (54.5)	44 (83.0)	56 (74.6)	<b>6.663</b>	<b>1</b>	<b>0.010*</b>
≥ 0.27 ug/ml	10 (45.5)	9 (17.0)	19 (25.3)			

\*p value ≤ 0.05 is significant <sup>a</sup>: Fisher Exact Test normal value fat(3-5)gm/100ml, protein(0.8-0.9)gm, suger(7gm), vitA(0.5-.8ug), b2(0.27-0.58), v.C(30-100mg).

### Discussion:

Since the begging of civilization, human milk has been regarded as the best and fev ednourishment for a neonate, it is a form of nutrition that supplies all human need<sup>[13]</sup>69.3% of nursing mothers were overweight and obese compare with 28%, 2.7% were normal weight and under respectively this result agree with study which consist of , 50 nursing mothers 40% obese, 40% normal weight and 20% obese under dietary program .taken their BMI and some content of breast milk. Breastfeeding is also associated with lower postpartum weight retention, some study show that if obese women followed the recommended rules for breastfeeding duration (6 months exclusive breast feeding they would get rid postpartum weight retention, even if gestational weight gain was about 17 kg (37 pounds)<sup>[14]</sup>. the current study agree with study done in Philippine nursing mothers taking 102 mothers with BMI and body fat %<sup>[15]</sup>. Which agree with our study in inverse association with sugar and disagree with our study as it has significances with milk fat and proteins in obese nursing mothers. because with increasing natal age fat increased and in single fed fat increased at the end(hind milk)and also due to increased cell permeability with lactation. Our study found that the overall mean of age of nursing mother were(26.31+-4.57)the majority of nursing mothers were >25 years old and the higher % were obese 81.3% were housewife, medium education level and the highest were obese, urban resident. this due to sedentary life. style, fast food, cars availability and servant so .had low breast feeding rate this is agree with multiple study in Arabian gulf area ex: in emirate and Kuwait. but this

disagree with developed area were breast feeding rate is higher in working mothers, non-obese and higher education level as in industrialized countries, for example Denmark <sup>[16]</sup>. Low education in mothers is associated with the stopping of exclusive breastfeeding for infants up to 6 months in southern Brazil.<sup>[17]</sup>. working was always act as strong cause for nursing mothers to depend on in stop their feeding. **Spacing between pregnancy** The WHO recommends couples should be waited at least for two years after birth to get pregnant again. This is because there were negative sequel's for both mothers and babies <sup>[18]</sup>. Study agrees with WHO rules. Study found that the majority of baby were >7 month of age with their mothers of normal weight 86.4% mothers this explained and agree with fact that obese mothers breast fed less . Regarding frequency of breast feeding per day in our study was within a mean of (9.41±2.44) bout/day which constituents to WHO guidelines. Regarding duration of feeding 67% of nursing mothers fed >10 minute were normal weight which mean that longer duration better if nursing mother was not obese, Spacing between feeding our result found 82.6% nursing mothers breast fed on demand. which is normally every 2 hours according to WHO recommendation 34.7% of nursing women had predominant breast feeding. **Condition of breast milk collection:** As we take mature milk in this study in compares with study differentiate composition in term and pre term baby our result agree with their s as higher concentrations of fat less for protein with advanced age as we take baby from 6 week-24 month,( mature milk). About way of taking milk sample we depend on Rule way by taken expressed milk by hand and wait 2-

3 minutes after baby fed to get mature milk at time from 6.30-10 a.m. Suitable one for sampling. About milk storage our sample stored at 4°C and 48 hours which is ideal for no change in composition.<sup>[19]</sup> The fat in breast milk is the most different component in milk. Total fat ranges from 30 to 50 g/L. Lactose accounts for most of the carbohydrate in breast milk. Lactose levels are relatively constant in mature breast milk at 7.0 gm/dL. Breast milk supplies high quality protein to provide the energy needs of infants. The protein content of mature breast milk is about 0.8 to 0.9 g/dL.<sup>[20]</sup> Compositional study and analysis of micronutrient content in breast milk found in the present review compared with values found by WHO and the EC-SCF.[1990-2000] for vitamin A 5.1 µg, B2 2.7-5.8 µg, C 30-100 mg/l<sup>[20]</sup>. The mean of vitamins milk composition were (0.35 ± 0.18), (0.70 ± 0.62) and (0.35 ± 0.22) (µg) for vitamin A, C and B2, respectively.

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