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The Effect of Nutritional Supplements on Fat- Soluble Vitamins and Fatty acids in The Milk of Breastfeeding Mothers during the Period of Breastfeeding

ABSTRACT

The study included a group of breastfeeding mothers from Salah al-Din Governorate and the surrounding villages, and the nursing mothers were divided into two groups and the number of breastfeeding mothers in each group was 6 mothers, three mothers in the city and three mothers in the village, and they were given nutritional supplements for vitamins and fatty acids, both according to his group. Results for breastfeeding mothers' milk before and after giving them nutritional supplements, there are differences in the levels of vitamins and fatty acids. It was noticed that the level of vitamins in the milk after nursing mothers took the nutritional supplement differed, so it was retinol (242-268) µg / L for mothers in the city and (213-260). g / L for mothers in the village and β--carotene (320-367) µg / L for mothers in town and (315-361) µg / L for mothers in the village and α-tocopherol (182-279) g / L for mothers in town and (120-225) µg / L for mothers in the village and calciferol (309-382) µg / L for mothers in the city and (258-269) µg / L for mothers in the village. As for the omega group for breastfeeding mothers, the levels of fatty acids in their milk were after Breastfeeding mothers take a nutritional supplement only and Mega (3,6,9) all fatty acids in the milk of breastfeeding mothers increased, so it was for lauric acid (18.02-20.01) mg / L for mothers in the city and (18.02-20.11) mg / L for mothers in the village and for palmitic acid (18.07-24.25) mg / L for mothers in the city and (24.25-26.15) mg / L for mothers in the village and for oleic acid (14.09-29.93) mg / L for mothers in the city and (29.43-29.13) mg / L for mothers in the village and for linoleic acid (22.13-28.16) mg / L for mothers in the city and (22.11-22.14) mg / L for mothers in the village, and for linoleic acid (22.26-26.59) mg / L for mothers in the city and (26.15-26.54) mg / L for mothers in the village and for Arachidonic acid (12.94-18.15) mg / L for mothers in the city and (12.94-18.15) mg / L for mothers in the village, and this explains that breast milk is directly affected by the nutritional intake and nutritional supplements taken by breastfeeding mothers during the breastfeeding period

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INTRODUCTION

Mother's milk is the ideal food for a nursing baby in the first six months , as it contains water (87%), fats (3.8%), proteins (1.0%), lactose (7%), and minerals such as (calcium, sodium, potassium, iodine, Zinc , etc.) and fat-soluble vitamins and water, enzymes and hormones, and fats and lactose provide 50-40% of the energy that the infant needs, and that breast milk changes over time and adapts to the changing needs of the infant (Butts et al, (2018 .

The World Health Organization indicated in one of its reports (2018) that breast milk differs greatly in composition between breastfeeding mothers and even in the same mother from time to

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time. And some studies have shown that there are differences in the milk of individual breastfeeding women as a result of cultural differences and differences in diet, lifestyle and environmental factors, Such as the mineral content of the food intake influenced by the soil in which it was planted, in addition to the human genetic differences of each nursing mother (WHO, 2018). Breast milk has a unique chemical formula compared to cow's milk, as it contains a higher level of lactose and a much lower content of protein. It also does not contain β -Lactoglobulin and α -s1-casien, and the amino acid Lysine in breast milk is 0.9%, which is less than that of cows. As for fats, it contains higher unsaturated fatty acids, which helps in developing brain cells faster. Its components change as lactation progresses in line with the needs of the infant (TMR International Hospital, 2019). And the importance of the fats and vitamins dissolved in them for the baby during the first six months, Some studies have shown that the predominant fatty acid in the milk of breastfeeding mothers was oleic acid, which constitutes 33% of the total fatty acids present in breast milk, followed by palmitic fatty acid 26%, linoleic fatty acid 10%, and linolenic acid 0.4% (Khor et al., 2021). The proportion of fat-soluble vitamins in the milk of breastfeeding mothers in China and Korea was lower, especially retinol, than for breastfeeding mothers in Vietnam, and this is what causes vitamin A deficiency in infants (Nguyen et al., 2020). The aim of the study is to study the effect of nutritional supplements on fat-soluble vitamins and fatty acids present in the milk of breastfeeding mothers.

Material and Methods

Samples were collected from lactating mothers who live in the city and the villages in Salah al-Din Governorate and its suburbs, and the sample collection period was in the morning, and the mothers were divided into groups, and each group contained 6 nursing mothers, 3 mothers living in the city and 3 mothers living in the village, and the comparison was between mothers In the city and the village, before and after they were given nutritional supplements, Figure (1) shows the division of breastfeeding mothers under study.

Table (1) Dietary supplement used in the study and given to nursing mothers

Materials	the manufacture company	Country of Origin
Dietary supplement for the vitamin group	Hansal vital A-Z Vitamins	U.S.A
Omega (3,6,9)	Lomeva (1000) g	Australia

The data for the selected mothers were summarized in questionnaire

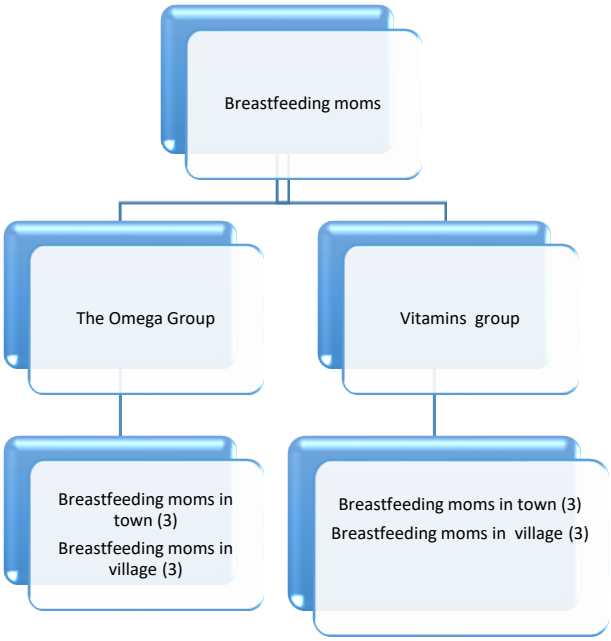


Figure (1) the division of breastfeeding mothers into groups and the number of mothers in each group

Vitamins Diagnosis (A, D, E)

It was assessed in the milk of mothers who live in the city and the village before and after administering the American nutritional supplement using a high-efficiency liquid chromatography (HPLC) device located in the Al-Yaqeen Laboratory for Chemical, Clinical and Biological Analysis in Nineveh Governorate. By adopting the standard separation conditions and using the C-18 separation column (3.9 mm × 150mm), standard vitamins have been prepared (A, D, E) from Sigma (USA), the vitamin A from the Japanese company Shimadzu, and the mobile phase acetonitrile in water, and the reading is done along the way. Moji of 275 nm. (Nollet, 2000).

Milk fatty acid diagnosis by HPLC device

Fatty acids were determined and quantified in mothers' milk before and after consuming the

The influencing factor	the number	
Age	25-35 year	
The gender of the newborn		
Female	8	
male	4	
The level of education		
Educated	6	
Uneducated	6	
The age of the newborn	2-6 month	
Family income		
Medium	6	
Good	6	
Geographical location		
The city	*	
the village	*	
The type of food consumed by breastfeeding mothers before giving them nutritional supplements	Village gm/ day	City gm /day
A- Meat	5	50
Legumes	3	11
Vegetables	20	201
Fruits	20	150
Milk and its derivatives	20	55
eggs	10	50

supplement (Omega 3,6,9) using a high-efficiency liquid chromatography (HPLC) instrument located in the Al-Yaqeen Laboratory for Chemical, Clinical and Biological Analysis in Nineveh Governorate. By adopting standard separation conditions and using a C-18 (50 × 2.5 mm, ID) separation column and a carrier phase 70: 30 (ethanol: water) V / V at a wavelength of 254 nm. Using standard samples from the Japanese company Shimadzu (Nollet, 2000).

Results and discussion

Fat Soluble Vitamins

The results in Table (2) and Pictures (1-4) show the type and quantity of precursor vitamins dissolved in fat in the milk of lactating mothers for a group of vitamins who live in the city and the village before and after taking the nutritional supplement, and Table (2) in the studied milk samples shows the proportion of retinol (Vitamin A) for mothers in the city and its percentage in their milk before taking the nutritional supplement ranged between 170 - 210µg/L, and this corresponds to what Nguyen et al. (2020) mentioned that the proportion of retinol in mothers' milk decreases with the continuation of the lactation stages, which reach 200 µg/L to compensate for this deficiency in taking nutritional supplements until the age of the first six months of breastfeeding.

After they took the nutritional supplement, the percentage in the samples of breastfeeding mothers' milk increased, and it ranged between 268- 242 µg/L, since infants are born with little reserves of vitamin A, the sufficient amount of retinol in the milk of breastfeeding mothers is critical to ensure that the nursing infant grows well, as retinol is the ready form of vitamin A in the milk of breastfeeding mothers and it is bound to granules Fat because it is one of the vitamins that are soluble in fat. The World Health Organization (2018) clarified that the needs of a nursing child from birth to the first six months of retinol are 250 µg/ day, Dror & Allen (2018) indicated that the percentage of retinol in colostrum is higher than that of mature milk and that the percentage Retinol varies according to the percentage of fat in breast milk and the percentage of fat in the milk of breastfeeding mothers is affected depending on the nutritional intake. They also explained that the percentage of retinol in mature milk ranges between 134 - 349 µg/L, and that breastfeeding mothers consumed an appropriate amount of vitamin A supplement showed an increase. Its percentage in their milk within 24 hours, and mothers who depend on plants for their food permanently.

The proportion of retinol in their milk was 105 µg/L, and this did not provide the nursing child the amount he needed. And in the same table (1) shows the percentage of retinol in the milk of breastfeeding mothers who live in the countryside, so its percentage before taking the food supplement ranged between 243-619 µg/L, and after they took the nutritional supplement, it decreased significantly in two breastfeeding mothers, The dependence of the mothers in the village on animal fats significantly, and after consuming the nutritional supplement, the nursing mothers were adopted to a specific diet to show the effect of the food supplement on their milk. So its percentage ranged from between 213 - 243 µg/L, and one of the breastfeeding mothers in the countryside, the percentage of breastfeeding mothers increased to 260 µg/L, and that the decrease in mothers' milk in the countryside was a result of avoiding foods containing a high percentage of fats, especially milk and free fat. Which is used continuously in their food and their dependence on taking a nutritional supplement to see the extent to which their milk is affected by nutritional supplements without relying on food.

This is in agreement with what Deminice et al. (2018) stated that food affects the amount of fat in breastfeeding mothers and the more lactating mothers eat foods rich in fat, the higher the proportion of retinol in their milk, and that the proportion of retinol in breast milk is affected as a result of nutritional and environmental factors, as well as the mother's intake. Fat in their diet increases the percentage in milk, and taking supplements for breastfeeding mothers significantly increases the percentage of Retinol in their milk. Haskell et al. (2021) stated that the highest percentage of retinol is in colostrum, as it begins to decrease with the increase in the period of breastfeeding, and that mothers' intake of nutritional supplements during the period of breastfeeding increases the rate, and that the lack of retinol causes poor eyesight of the infant and an imbalance in growth.

It is noted from Table (2) and Pictures (1-2) the percentage of beta-carotene (vitamin A) in the milk of lactating mothers who live in the city and the village before and after they took the nutritional supplement, and its percentage in the milk of lactating mothers in the city before taking the nutritional supplement ranged from 300 - 385 µg/L, while one of the mothers in the city had a beta-carotene ratio in her milk that reached141 µg/L. After breastfeeding mothers who lived in the city consumed the nutritional supplement, the percentage of beta-carotene in their milk increased and reached 336,367 µg/L, while one of the treatments for breastfeeding mothers in the city decreased its percentage from what it was and reached 320 µg/L.

The body of a nursing baby needs to convert beta-carotene into retinol for ease of use and converting it into vitamin A. Lima et al. (2020) stated that the percentage of B-carotene in mature milk is low compared with colostrum, and its percentage in their milk ranges from 494 - 649 µg/L, as well. The food intake affects its percentage, as eating vegetables and fruits on a daily basis and the dietary habits followed in preparing vegetables leads to an increase or decrease in the milk content of breastfeeding mothers, as the cooking process greatly affects beta-carotene.

For the same table (2), it shows the percentage of β-carotene in the milk of breastfeeding mothers who live in the village, and when analyzing the samples before taking the nutritional supplement, Differences in beta-carotene levels are due to the foods that breastfeeding mothers eat during the breastfeeding period, it was noticed that two of the mothers did not give any indication of its presence in their milk, while the milk of one of the mothers in the countryside reached its percentage 346 µg/L and after taking the nutritional supplement, the percentage in their milk increased, and ranged between 315 – 361 µg/L, and the high percentage of beta-carotene in the milk of breastfeeding mothers, especially those who did not show an indication of its presence in their milk, indicates that the nutritional supplement they took Increase its percentage in their milk.

This is shown by Gay et al (2018) that increasing the proportion of beta-carotene through eating vegetables and fruits that help in its availability in milk and the rate between (602 - 807) µg/L in mothers who consume fruits and vegetables continuously, even if there is no A diet that supports beta-carotene, it is possible to use nutritional supplements that increase its level in breast milk, and that beta-carotene percentage decreases with the increase in the stages of lactation, as well as the lack of beta-carotene in the blood plasma, the percentage in the milk of breastfeeding mothers is low.

It is noted from Table (2) and the Pictures (1- 4) the percentage of α -tocopherol (vitamin E) in the milk samples of breastfeeding mothers who lived in the city before they took the nutritional supplement 107- 121 µg/L and one sample of breastfeeding mothers was high and reached (257) µg/L. After the breastfeeding mothers in the city consumed the nutritional supplement, the results showed a remarkable increase in the percentage of α -tocopherol, reaching (182, 256, 279) µg/L, respectively. Xue et al. (2017) showed that dietary intake significantly affects the α -tocopherol ratio, and when breastfeeding mothers were given a nutritional supplement and reduced the proportion of foods containing α -tocopherol, the percentage was lower than that of mothers who consumed foods rich in α -tocopherol and the nutritional supplement together. . This is in line with what happened to mothers in the village whose percentage has decreased from what it is, and the World Health Organization (2018) indicated that a nursing child needs 400 µg/ day, of α-tocopherol and that the amount present in the milk of breastfeeding mothers reaches 240 µg/ day. This is what Mata et al. (2020) agrees, as it showed that giving mothers a nutritional supplement increases the α -tocopherol percentage in the milk of breastfeeding mothers, and that the diet affects its percentage.

In the same table (2), it shows the percentage of α -tocopherol in the milk of breastfeeding mothers who live in the village before taking the nutritional supplement. The countryside was less than that as it reached 125 µg/L, and when nursing mothers in the countryside consumed the nutritional supplement, a difference in its percentage was observed. It was low in two breastfeeding mothers and reached 225 & 120 µg/L, respectively. As for one of the nursing mothers in the village, its percentage increased after taking the food supplement, and it reached 159 µg/L.

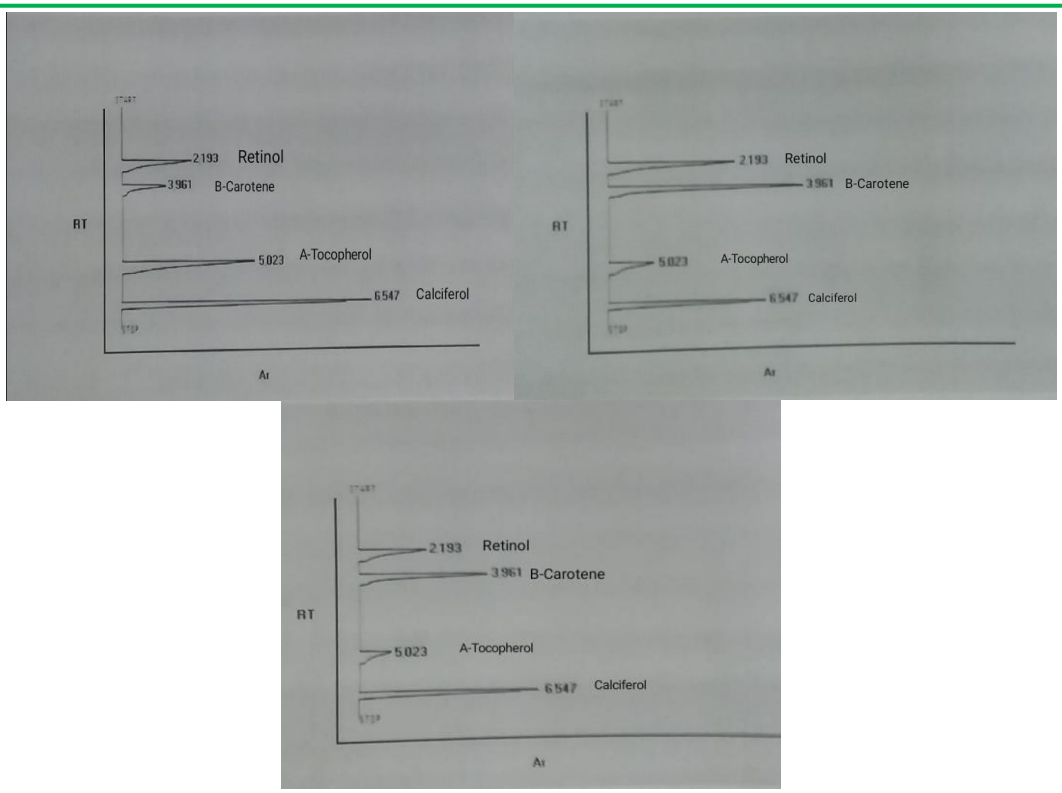
Lima et al (2020) stated that the percentage of α -tocopherol in the milk of breastfeeding mothers ranges between 112-115 µg/L. As for the mothers who decreased the percentage of alpha-tocopherol in their milk, it was lost between Gianni et al (2020) that the percentage decreases when the mother's body needs Alpha-tocopherol, When breastfeeding mothers were given the nutritional supplement, she compensates for the lack of her body from the nutritional supplement given to her and thus reduces its percentage in her milk until the deficiency in her body is filled.

As for the percentage of calciferol (vitamin D), it is shown in Table (2) in the milk of breastfeeding mothers in the city before they took the nutritional supplement, as the results of the studied milk samples showed that its percentage was 359, 270, 415 µg/L, respectively, and after eating them The nutritional supplement was higher in two of the milk of breastfeeding mothers who live in the city and reached 359,309 µg/L, while one of the breastfeeding mothers in the city decreased its percentage to 382 µg/L. The reason for the decrease in calciferol in mothers is the result of the inefficiency of the metabolism in the body of lactating mothers, and the determination of the foods that the mother consumes during the study period and its complete dependence on the nutritional supplement given to her, which gave a low percentage of the vitamin to the milk of nursing mothers in the city and the village, and this is agree with what Copp et al (2018), who stated that the nutritional supplement increases the proportion of vitamin D and that the vitamin is important for the growth of the bones of the infant, and that cases of rickets that the child is exposed to as a result of the deficiency in the mother's milk.

Lee et al (2018) also showed that mothers who depend on dairy foods have a good percentage of Calciferol in their milk, and that the continuation of the breastfeeding period causes a decrease in its percentage, and this calls for the use of a nutritional supplement to fill the deficiency in their milk of micronutrients.

The World Health Organization (2019) stated that breastfeeding mothers 'milk is not sufficient to meet the needs of a nursing child, and that nursing mothers take 10-50 micrograms / day, and this equates to 400 – 2000 international units, while the infant's need for the vitamin reaches 4000 International Units , and recent research has shown that the high rate of rickets in infants due to the low level of the vitamin in the milk of breastfeeding mothers and the lack of exposure of the infant to sunlight directly increases the chances of the infant being exposed to rickets. When breastfeeding mothers take nutritional supplements during the first six months, the amount of vitamin in their milk increases, which provides the nursing child with an adequate amount of the vitamin, and this corresponds to what Keikha et al. (2021) stated.

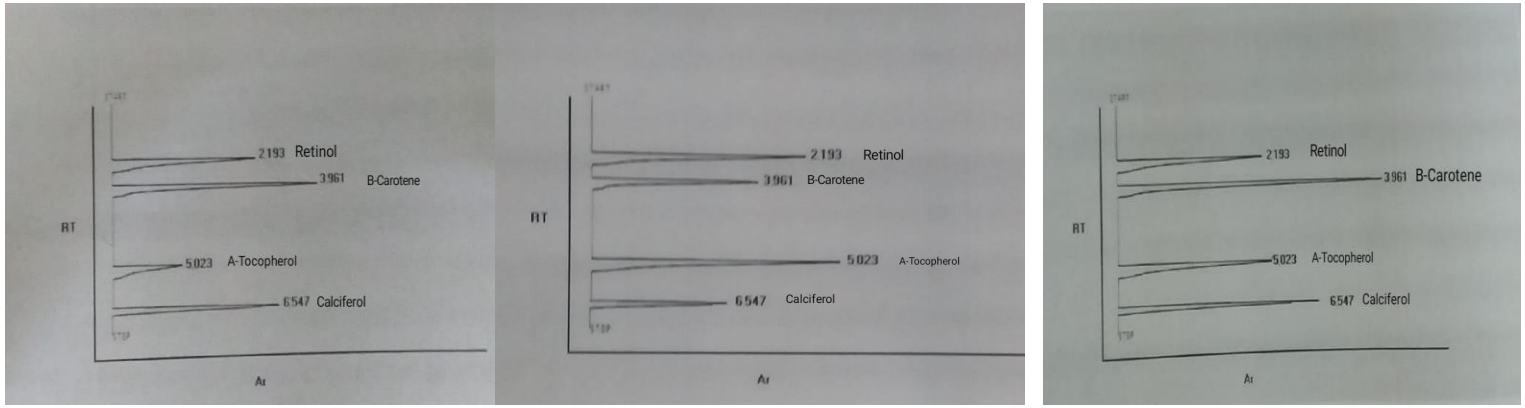
The results in the same table (2) show the percentage of calciferol (vitamin D) in the milk of breastfeeding mothers who live in the village. Two of the studied milk samples did not show an indicator, while one of the mothers had a percentage in her milk 269 µg/L, And after nursing mothers take the nutritional supplement Breastfeeding mothers in the village, the nutritional supplement, it was noticed that mothers who had not previously shown an indication of its existence had reached 258 & 269 µg/L, respectively, while one of the breastfeeding mothers in the village did not change almost as it reached (263) µg/L. One of the mothers in the village used to depend on milk for her food and its products, which showed an indication of its presence in her milk. As for the other mothers, the amount of milk and its products consumed was low, which leads to the satisfaction of the mother's body only, Wagner & Hollis (2020) explained that breastfeeding mothers when they take nutritional supplements during pregnancy and provide an adequate amount of the vitamin in their blood serum helps to increase the proportion of the vitamin during the breastfeeding period, and this is what was observed through our study that some of the nursing mothers did not show any indication of its presence Their milk and when they took the nutritional supplement, its percentage appeared clear upon analysis, and the exposure of nursing mothers during the period of breastfeeding to an adequate amount of sunlight provides a good proportion of the vitamin in their milk. This agrees with what Tareke et al. (2020) reported.



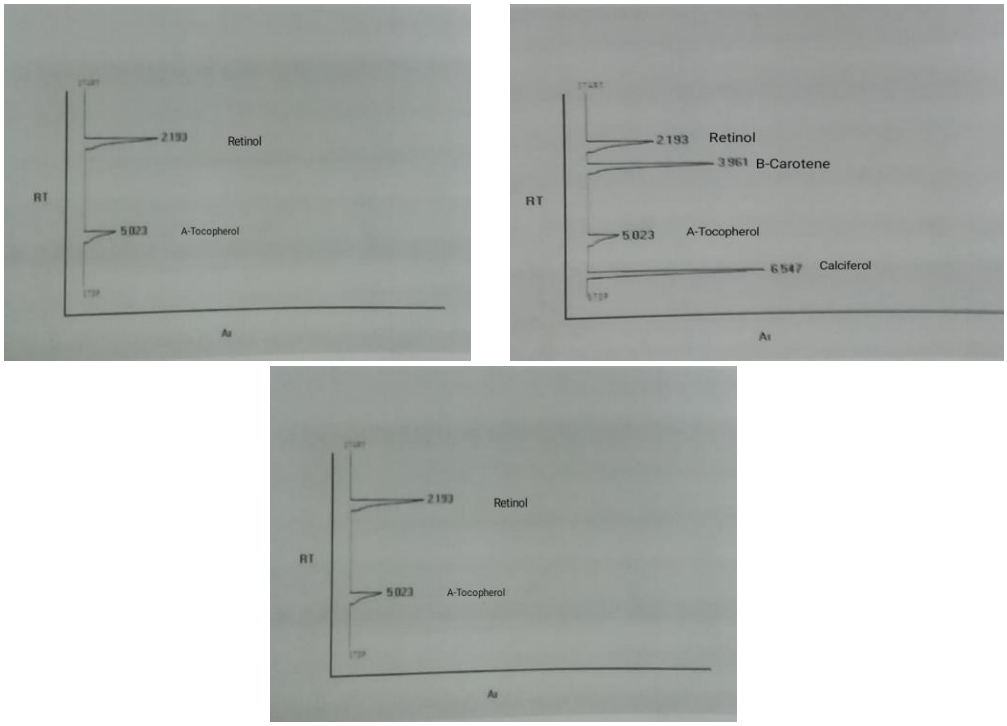
Pictures (1) Fat-soluble vitamins for nursing mothers in town before they take the nutritional supplement

Table (2) Vitamins (fat soluble) for urban and rural breastfeeding mothers before and after

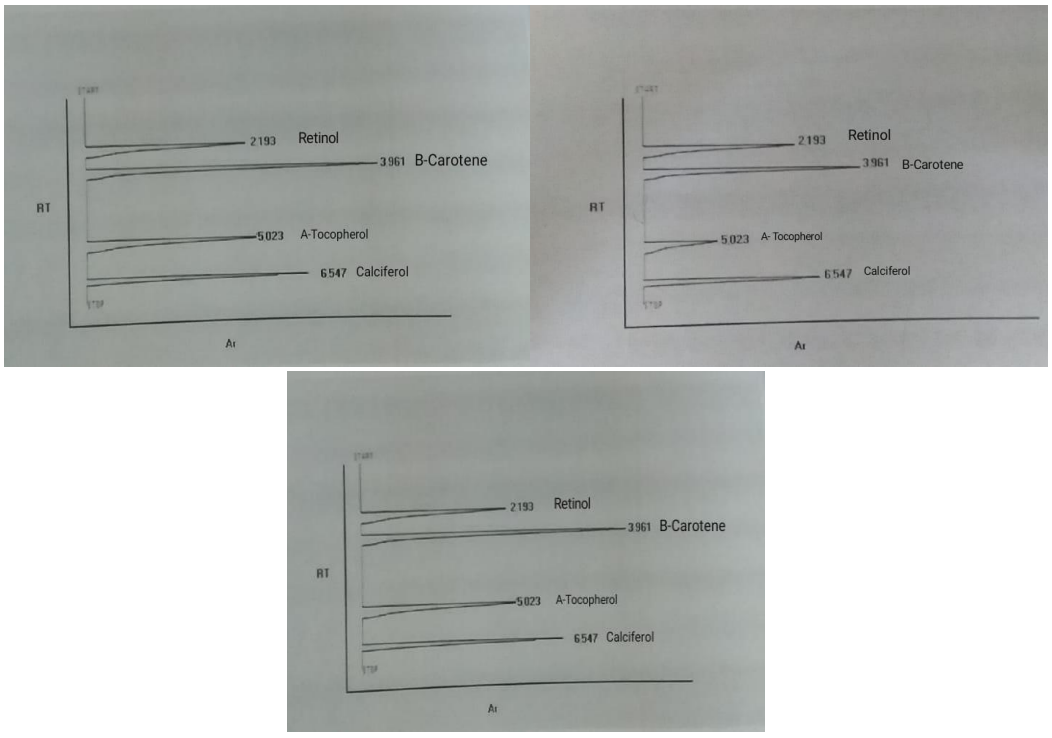
S	The name of the vitamin	Mothers in the Town (µg/L)						Mothers in the Village (µg/L)					
		Before	After	Before	After	Before	After	Before	After	Before	After	Before	After
1	Retinol	170	268	210	261	178	242	619	213	609	243	243	260
2	β-Carotene	300	336	385	320	141	367	-	315	-	346	346	361
3	α-Tocopherol	121	182	107	256	257	279	381	225	393	120	125	159
4	Calciferol	35 9	35 9	27 0	30 9	41 5	38 2	-	25 8	-	26 9	26 9	26 3



Pictures (2) Fat-soluble vitamins for nursing mothers in town after taking the nutritional supplement



Pictures (3) Fat-soluble vitamins for nursing mothers in the village before they take the supplement



Pictures (4) Fat-soluble vitamins for nursing mothers in the village after they took the nutritional supplement

Fatty acids of Omega group (3,6,9)

The results from Table (3) and the Pictures (5-8) show the quantity and quality of the fatty acids present in the milk samples of lactating mothers before and after taking the omega nutritional supplement, as it was observed through the analysis of the milk samples of lactating mothers in the city before they took the nutritional supplement that the percentage of lauric acid It ranges between (9.07 - 12.52) mg / L, while its percentage in the milk of lactating mothers in the countryside before taking the nutritional supplement was higher than it was in the lactating mothers in the city, as it ranged between 12.51 - 12.54 mg / L. This difference is due to the fact that rural mothers depend on animal fats in their food more than vegetable fats and oils, and most rural mothers consume milk and its products on a daily basis because they raise these animals and depend on them for their food, and this is shown by the questionnaire conducted for breastfeeding mothers in the city and thevillage before Give them nutritional supplements.

Fats provide the energy that a nursing child needs. Mother's milk gives a nursing child the equivalent of 21.42 mg / day, and this amount is for breastfed children only, and the nutritional intake of breastfeeding mothers plays an important role in providing an adequate amount of fat Bobinski & Bobinska (2020).

This is in agreement with what Moossavi et al (2019) mentioned, when I studied the nutritional intake of breastfeeding mothers within three days and the effect of dietary intake on the fatty acids in their milk, and found that mothers who eat foods that contain a high percentage of animal fats or foods that contain omega increases the percentage of acids. Significantly, the fatty acids in their milk ranged between 18.32 - 28.56 mg / L, while for lactating mothers who depend on plant foods mainly, the percentage in their milk ranged between 4.53 - 7.20 mg / L.

In the same table (3) the results show the percentage of lauric acid in the milk of lactating mothers after breastfeeding mothers in the city consumed the nutritional supplement, the percentage of lauric acid increased in their milk, and it ranged from18.02 - 20.10 mg / L. As for the milk samples of breastfeeding mothers in the countryside, the percentage of lauric acid also increased, as it was observed that it ranged between 18.02 - 20.11 mg / L, and this percentage is close to the milk samples of breastfeeding mothers in the city after eating them. Dietary supplement. The increase in the percentage of lauric fatty acid as a result of breastfeeding mothers in the city and the countryside consuming the omega nutritional supplement, and the lactating mothers who were under consideration followed a specific diet as animal fats were reduced in the countryside and vegetable fats and oils were added to the meals consumed, as well as the fats and oils that were identified. It enters the body of breastfeeding mothers in general until the effect of the nutritional supplement on the milk of breastfeeding mothers is demonstrated and this is consistent with what, The follow-up of nursing mothers under study to specific instructions about what is consumed during the period of taking the food supplement in order to clarify the importance of the nutritional supplement and its effect on the milk of breastfeeding mothers Chen et al. (2020) stated that breastfeeding mothers when taking omega nutritional supplements increases the percentage of fatty acids in their milk and this increase in fatty acids depends on the amount The nutritional supplement and how long breastfeeding mothers take it.

It is noted from Table (3) the percentage of palmitic fatty acid in the milk of lactating mothers before and after taking the nutritional supplement, as the results in the table indicated that the percentage of palmitic acid in the milk of lactating mothers in the city before they take the nutritional supplement ranges between (17.95-20.15) mg / L.

In the milk of lactating mothers in the countryside, before they took the nutritional supplement, its percentage ranged between (17.93-17.98) mg / L. Palmitic fatty acid is a saturated fatty acid and its percentage in the milk of breastfeeding mothers ranges between (19.22-22.65) mg / L.

And that foods affect its percentage in breast milk, foods containing a good percentage of fatty acids that breastfeeding mothers enter into their daily diets increase the percentage in their milk, Zeng et al (2020) indicated that the highest percentage of fatty acid in the milk of

breastfeeding mothers is in colostrum. It was (23.75) mg / day, and in mature milk, it decreased to (18.13) mg / day.

After giving nutritional supplement to nursing mothers, its percentage in the milk of nursing mothers in the city increased, as it ranged between (18.07 - 24.25) mg / L, while its percentage in the milk of lactating mothers in the countryside after they were given the nutritional supplement ranged between (24.25 - 26.15)) mg / L. This is in agreement with what Giuffrida et al. (2019) stated that the differences in fatty acids in breast milk are the result of high-fat foods that mothers eat, as well as the omega nutritional supplements that were given to mothers for a certain period which increased the percentage of fatty acids in the milk of breastfeeding mothers. Table (3) shows the percentage of oleic fatty acid in the milk samples of lactating mothers before they took the omega nutritional supplement. The results were in the percentage of oleic fatty acid in the milk of lactating mothers in the city ranging between (13.02 - 13.13) mg / L, while one of the mothers was the percentage of It is higher than that, as it reached (28.93) mg / L, and the percentage of oleic fatty acid in the milk of breastfeeding mothers in the countryside before taking the dietary supplement ranged between (28.93-28.99) mg / L, some research reported that the proportion of oleic acid in mothers' milk Breastfeeding mothers are affected by the nutritional intake of breastfeeding mothers, and the dietary habits followed by some nursing mothers show us the extent of their effect on the fatty acids in their milk, and that the highest percentage of it in the milk of nursing mothers reaches(47.96) mg / day(Sun et al., 2020).

In the same table (3), an increase in the percentage of oleic fatty acid was observed in all samples of breastfeeding mothers' milk in the city and the countryside after they took the nutritional supplement, so its percentage in the milk of lactating mothers in the city was (14.09, 16.13, 29.42) mg / L, respectively. While its percentage in the milk of lactating mothers in the countryside ranged between (29.13 - 29.43) mg / L, and the results showed in Table (3) the percentage of linoleic fatty acid in the milk of lactating mothers in the city before the lactating mothers took the nutritional supplement. Its percentage in milk from lactating mothers in the city was (25.21, 25.30 and 15.11) mg / L respectively, and after breastfeeding mothers in the city consumed the omega nutritional supplement, its percentage increased, as it reached (28.16, 26.11, 22.13) mg / L, respectively. .

Table (3) showed the percentage of linoleic fatty acid in the milk of lactating mothers in the village, before they took the food supplement, the rate ranged between (15.11 - 15.12) mg / L, and after the lactating mothers in the countryside consumed the nutritional supplement, its percentage increased and ranged between (22.11 - 22.14)) Mg / L.

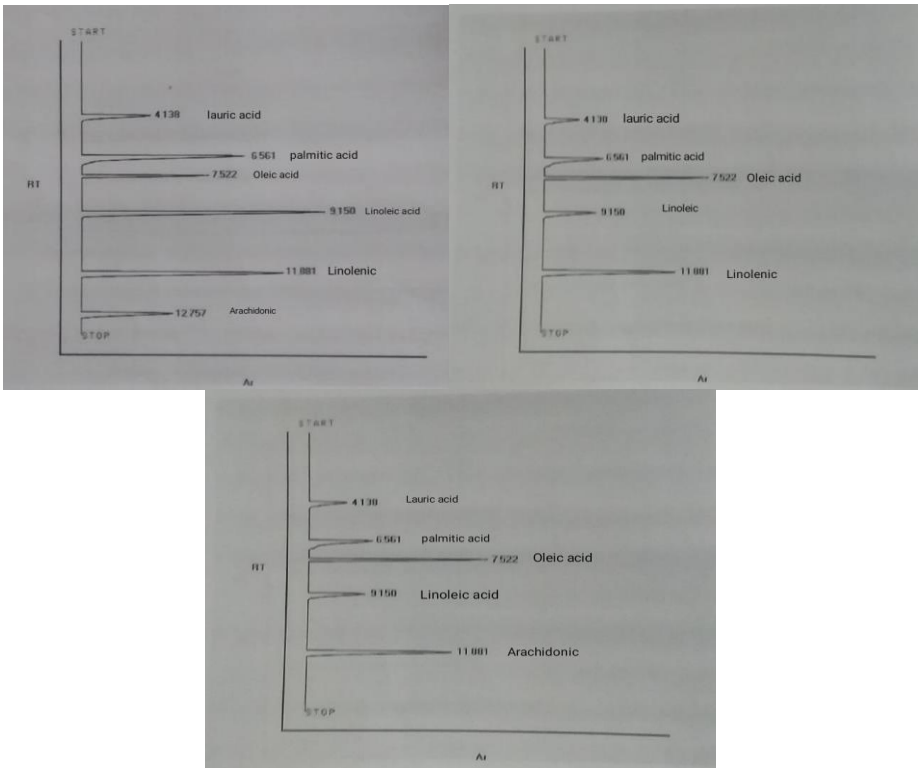
Table (3) shows the percentage of linolenic acid in the milk samples of breastfeeding mothers in the city before breastfeeding mothers in the city took the nutritional supplement, as the results showed that the percentage of linolenic acid in the milk samples of lactating mothers ranged between (22.10 - 25.54) mg / L. Zhang et al (2020) The foods that breastfeeding mothers eat greatly affect the composition of the milk, and this is what is observed from the varying ratios of linolenic fatty acid in the milk of breastfeeding mothers, as the diversity in the food intake of breastfeeding mothers can increase The percentage of fatty acids in their milk, and this provides the baby with an appropriate amount of fat. When breastfeeding mothers in the city consumed the nutritional supplement, its percentage in one of the mothers increased slightly, reaching (22.26) mg / L, while the rest of the breastfeeding mothers in the city, the percentage in their milk increased, and it ranged between (26.15-26.54) mg / L.

In the same table, the results showed in the milk of lactating mothers in the countryside the percentage of linolenic fatty acid before the lactating mothers in the countryside took the nutritional supplement, and it ranged between (25.54 - 25.56) mg / L, and after the lactating mothers in the countryside were given the nutritional supplement, the percentage increased in Their milk, as it ranged between (26.15-26.54) mg / L. This is in agreement with what Dai et al (2020) stated that taking an omega nutritional supplement by breastfeeding mothers during the breastfeeding period increases the percentage of fatty acids in their milk by up to 10 times what it is.

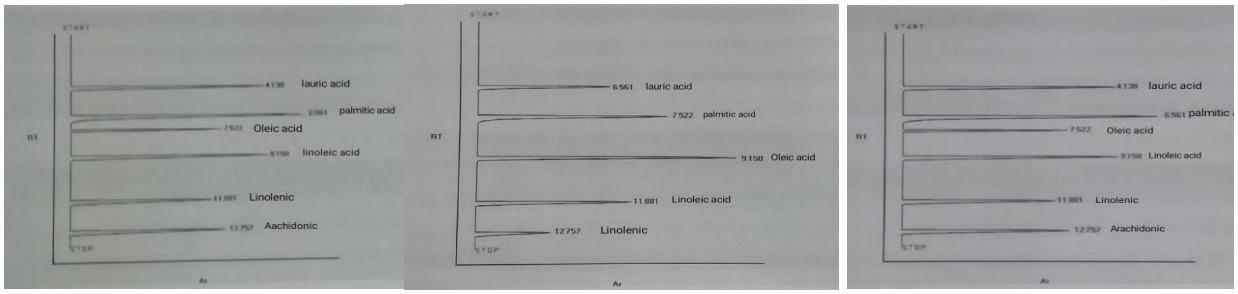
The results in Table (3) showed the percentage of Arachidonic fatty acid in the milk of lactating mothers before they took the nutritional supplement, so its percentage in the milk of

lactating mothers in the city ranged between (11.05-11.12) mg / L, as for one of the mothers in the city before taking the nutritional supplement. It did not show any indication of its presence in her milk, and in the milk samples of lactating mothers in the countryside before taking the nutritional supplement, there was no indication in their milk.

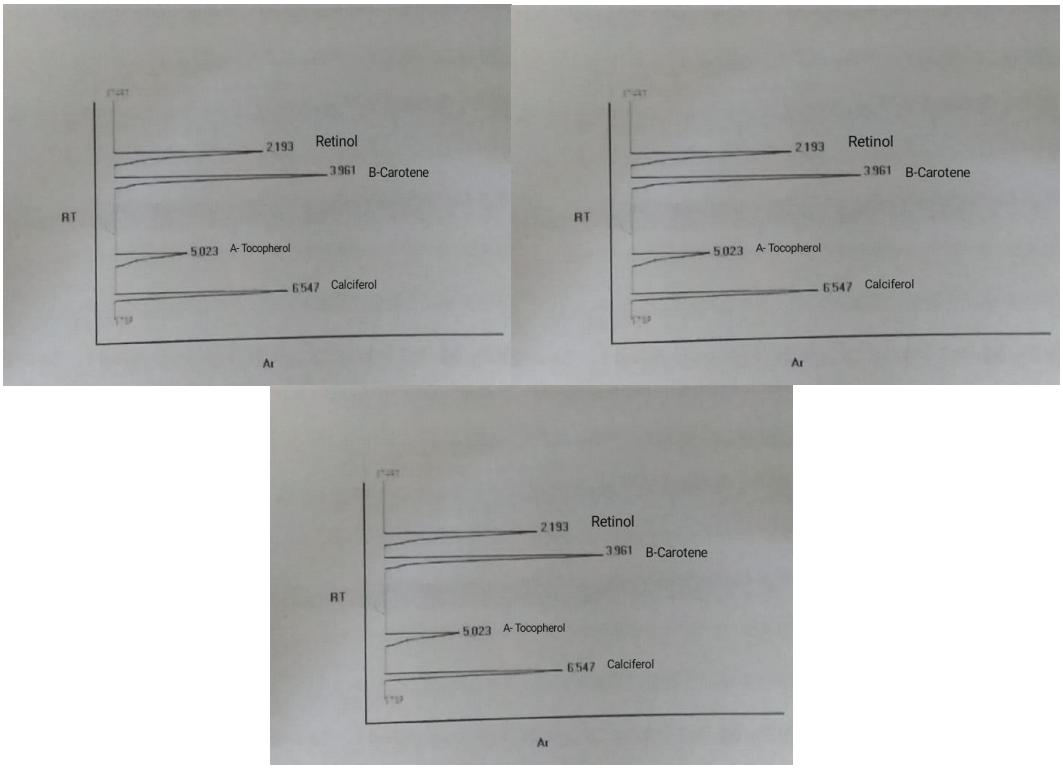
After consuming nursing mothers in the city, the results showed an increase in the percentage of it in their milk, as it reached (14.14, 12.94, 18.15) mg / L, respectively, while its percentage in the milk of lactating mothers in the countryside after taking the nutritional supplement increased to range between (12.94-18.15) mg / L. And Bobinski & Bobinska (2020) showed that the standard of living of breastfeeding mothers affects the fat in their milk, and fatty acids are important for the growth of the nursing child, and that nursing mothers taking nutritional supplements during the breastfeeding period increases its percentage by about 20% of the percentage in their milk, and the period of time in which the sample is taken is important in the composition of the milk of breastfeeding mothers.



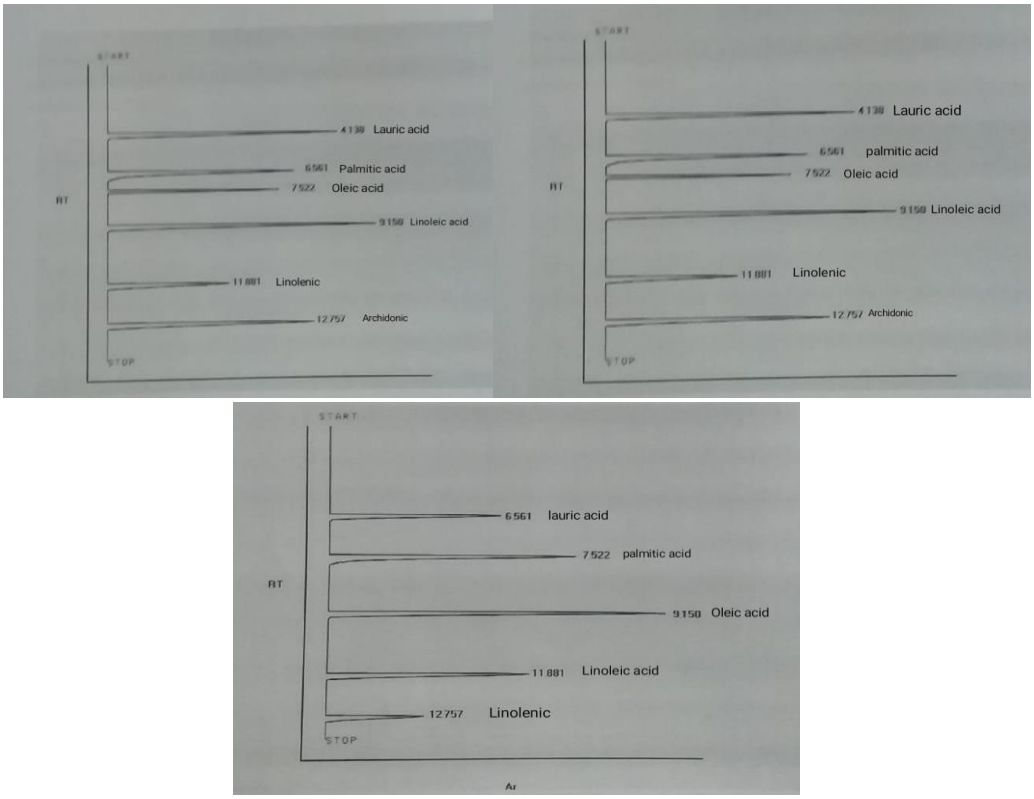
Pictures (5) Fatty acids for mothers in town before taking nutritional supplements



Pictures (6) Fatty acids for mothers in town after taking nutritional supplements



Pictures (7) Fatty acids for mothers in the village before they take the food supplement



Pictures (8) Fatty acids for mothers in the village before they take the food supplement

Table (3) Fatty acids of Omega group (3,6,9) for urban and rural breastfeeding mothers before and after taking the nutritional

S	Fatty acids	Mothers in the Town (mg/L)						Mothers in the Village (mg/L)					
		Before	After	Before	After	Before	After	Before	After	Before	After	Before	After
1	Lauric acid	9.07	18.15	9.16	18.02	12.52	20.10	12.54	18.02	12.51	20.11	12.53	20.11
2	Palmitic acid	20.03	24.25	20.15	24.25	17.95	18.07	17.98	24.25	17.93	26.15	17.95	26.14
3	Oleic acid	13.02	14.09	13.13	16.13	28.93	29.42	28.99	29.13	28.94	29.43	28.93	29.43
4	Linoleic acid	25.21	28.16	25.30	26.11	15.11	22.13	15.11	22.11	15.12	22.13	15.11	22.14
5	Linolenic	22.10	22.26	22.12	26.54	25.54	26.15	25.54	26.54	25.54	26.15	25.56	26.15
6	Arachidonic	11.05	14.14	11.12	12.94	-	18.15	-	12.94	-	18.15	-	18.15

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تأثير المكملات الغذائية على الفيتامينات الذائبة في الدهون والأحماض الدهنية في حليب الأمهات المرضعات خلال فترة الرضاعة

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حليب الانسان ، الفيتامينات ، الاحماض الدهنية ، المكملات الغذائية

الخلاصة

تضمنت الدراسة مجموعة من الامهات المرضعات من محافظة صلاح الدين والقرى المجاورة لها ، وتم تقسيم الامهات المرضعات الى مجموعتين وكان عدد الامهات المرضعات في كل مجموعة 6 امهات ثلاث امهات في المدينة وثلاث امهات في القرية ، وتم اعطائهن المكملات الغذائية للفيتامينات والاحماض الدهنية كلا حسب مجموعته ، وبينت النتائج لحليب الامهات المرضعات قبل وبعد اعطائهن المكملات الغذائية فروقات في مستويات الفيتامينات والاحماض الدهنية ، فقد لوحظ ان نسبة الفيتامينات في الحليب بعد تناول الامهات المرضعات للمكمل الغذائية قد اختلفت فكانت للريتنول (242-268) µg / L للأمهات في المدينة و(213-260) µg / L للأمهات في القرية و البيتا – كاروتين (320-367) µg / L للأمهات في المدينة و (315-361) µg / L للأمهات في القرية و الفا- توكوفيرول (182- 279) µ g/L للأمهات في المدينة و (120- 225) µg / L للأمهات في القرية و الكالسيفيرول (309-382) µg / L للأمهات في المدينة و (258- 269) µg / L للأمهات في القرية ، اما مجموعة الاوميغا للأمهات المرضعات فكانت نسب الاحماض الدهنية في حليبهن بعد تناول الامهات المرضعات للمكمل الغذائي الاوميغا (3،6،9) قد ارتفعت جميع نسب الاحماض الدهنية في حليب الامهات المرضعات فكانت لحامض اللوريك (18.02- 20.01) mg/ L للأمهات في المدينة و (18.02- 20.11) mg/ L للأمهات في القرية ولحامض البالمتيك (18.07- 24.25) mg/ L للأمهات في المدينة و (24.25- 26.15) mg/ L للأمهات في القرية ولحامض الاوليك (14.09- 29.93) mg/ L للأمهات في المدينة و (29.13- 29.43) mg/ L للأمهات في القرية ولحامض اللينوليك (22.13-28.16) mg/ L للأمهات في المدينة و (22.11- 22.14) mg/ L للأمهات في القرية ولحامض اللينوليك (22.26- 26.59) mg/ L للأمهات في المدينة و (26.15- 26.54) mg/ L للأمهات في القرية ولحامض الاراكيدونيك (12.94- 18.15) mg/ L للأمهات في المدينة و (12.94- 18.15) mg/ L للأمهات في القرية ، ، وهذا يفسر ان حليب الام يتأثر بشكل مباشر بالمدخول الغذائي والمكملات الغذائية المتناولة من قبل الامهات المرضعات اثناء فترة الرضاعة.