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## Nutritional Status Compared with Nutritional History of Preschool Aged Children in Gaza Strip: Cross Sectional Study

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**Abstract:** Breast Feeding (BF) is critical for sustaining new born and infant health. Complementary Feeding (CF) is the introduction of foods other than breast milk or infant formula into the infants diets where their primary role is to increase dietary diversity, not to reduce breast milk intake. Weaning is the term used to describe the process of cessation of BF after a time period of its successful feeding. The study aims to compare anthropometric nutritional indicators of Preschool Children (PSC) aged 5-6 years in Gaza Strip (GS) with their nutritional history during in fanthood that included: Exclusive Breast feeding (EBF), CF and Weaning Practices (WP). The study design was a cross sectional. The study sample consisted of 571 cases aged 5-6 years old. Data were collected through face to face interviews with the children's mothers. The questionnaire contained issues about anthropometric measures, history of feeding and weaning processes of PSC during early childhood. Anthropometric measures were carried out in order to measure Body Mass Index (BMI) and categorize nutritional indicators of PSC. Descriptive statistics and Chi-square test were used to analyze obtained data. According to the BMI categorization, the prevalence of thinness, stunting and overweight among PSC were 4.2%, 11.9% and 10.3%, respectively. There were no statistical significant relationships between weaning periods and any of these nutritional indicators among PSC. It was also observed that the prevalence of stunting was 39.7% among children that received EBF for six months and more. About sixty percent (58.3%) of thinned children received EBF for less than six months. Moreover, it was recorded that 44.1% of the overweight children received EBF for six months and more. The prevalence of thinness was generally lower among children who received CF after six months. With the exception of milled rice or family food, no statistical significant relations were observed between other types of CF and thinness among PSC. In addition, it was also found that higher percentage of overweight children usually receive CF after four months of age. None of different types of CF were associated with stunting and overweight. The study emphasized that some foods that introduced early to the child had a risk of thinness where most of thin children received CF before six months. Moreover, after six months of child age, CF also was found strongly correlated with EBF.

**Key words:** Nutritional status, nutritional history, preschool children, cross sectional study, Gaza strip

### INTRODUCTION

Feeding Practices (FP) and adequate nutrition impact on many aspects of pediatrics health and considered as important determinants of future physical and mental well-being (Ahmed *et al.*, 1996). They also determine growth, alter an infant's susceptibility to disease and provide the opportunity for interaction between the child and their parent or family (Al-Sarheed, 2006).

Breast Feeding (BF) is critical for sustaining new born and infant health as well as being where it provides better growth, less sickness and lower death rate than other non breast fed baby. Exclusive Breast Feeding (EBF) is still recommended until six months of age of an infant according to the WHO/UNICEF recommendations. Complementary Feeding (CF) is the introduction of foods other than breast milk or infant formula into the infants diets where their primary role is to increase

dietary diversity, not to reduce breast milk intake. Weaning is the term used to describe the process of cessation of BF after a time period of its successful feeding.

According to the WHO/UNICEF recommendations, CF should be introduced after six months of age where introducing too early will undesirably increase renal solute load, increase the risk of infection, compromise the maintenance of lactation amenorrhea and possibly expose the infant to dietary antigen. On the other hand, leaving CF too late may impair growth because the nutrients density of liquid diet is low (Gibney *et al.*, 2006). There are strong correlations between EBF, CF and WP during infancy in relation to the nutritional status in the future. One study suggested that BF can protect against overweight and obesity in pre-school age children (Simon *et al.*, 2009).

Gaza Strip (GS) is considered one of the most populated areas in the world with a poverty level reaching 70% and high percentage of children reaching about 50% of the population (PCBS, 2007). Crowdedness, poverty, sociocultural, demographical, environmental and political problems usually characterize the Palestinian population in GS. All these factors are considered as determinants and images affecting nutritional status where thinness, stunting, wasting, anemia, overweight and obesity were reported in GS (Palestinian Ministry of Health, 2005; Kanao *et al.*, 2008; State of Nutrition West Bank and GS, 2005; Kanao, 2009).

In GS there is little available data regarding nutrition. In 2002, nutrition survey was carried out through technical and financial cooperation between Palestinian Central Bureau of Statistics (PCBS), Ministry of Health (MOH), institute of public health at Bier Zeit University and United Nation Children's Funds (UNICEF) on the hemoglobin levels, state of nutrition and growth parameters for children aged 6-59 months. The survey revealed that a small percentage of these children were thin (2.9%) or wasted (2.0%), while 10.6% were stunted in the GS (Kanao *et al.*, 2008; PCBS, 2002). In 2008, a rapid assessment survey for assessing the nutritional status of children aged 6-59 months in three governorates of GS were done by Terre des Hommes and supported by UNICEF. The study revealed that 10.3% of the study sample were stunted, 2.5% underweight and 2.4% wasted. The same study concluded that a current economic crisis in GS has resulted in severe impacts on child's nutrition (Abdeljwad and Humeid, 2008).

Although the prevalence and determinants of nutritional status of children in the GS have been studied before, there are limited information about relation of nutritional status with nutritional history of PSC during infancy. The present study, therefore, aims to correlate nutritional status of PSC aged 5-6 years old with their EBF, CF and WP during infancy in GS.

## **MATERIALS AND METHODS**

**Study design:** The study design was a cross sectional.

**Target population:** The study population was PSC aged 5-6 years old that were chosen from eligible Kindergartens (KG). The total number of children aged 5-6 years old in GS was 44322 children of both refugees and citizens (Ministry of education, 2008). The number of eligible KGs was 280 and distributed in the five governorate in GS as following: 56 in North Governorate (NG), 98 in the Gaza City (GC), 37 KG in Middle Governorate (MG), 49 KG in Khanyounis Governorate (KG) and 40 KG in Rafah Governorate (RG).

**Sample Size and sampling method:** The sample size needed to conduct the study was calculated by using the formula of WHO/WFP/UNHCR/IFRC where it was found to be 512.

It was selected through the following stages: First, determination of number KGs and PSC in at each of the five governorates. Second, simple random selection of the KG to match the required number of children in each governorate in a proportional basis. Third, Simple random selection (if the number of children needed in the selected KG exceeded required number of PSC from that Governorate) of the children through the selection of one class out of every single KG regardless of its total size.

**Tools of the study:** The questionnaire was designed to include some information of the PSC about the socio-demographic factors, health and nutritional history, anthropometric measures and feeding history (EBF, CF and WP). Face to face interviews were directly conducted between the researcher and children's mothers. Questionnaire validity was also tested after circulating the questionnaire to six experts in the field of nutrition and health and working on all the comments and advices. During the study, 571 questionnaires were filled.

**Anthropometric measures:** Weights of PSC were determined without shoes and with minimum clothes to the nearest 100 gm by using professional calibrated weighing scale (SECA type). Heights of PSC to the nearest 0.1 cm were measured by using a stadiometer (SECA type). All measurements were recorded in the special part in the questionnaire.

**Operational definitions:** 1- BMI = Weight in kg/Height in square meter. 2- Cut-off values that were used for classification of anthropometric indicators of the children (WHO, 2007) is shown in the following table:

Indicators	Anthropometric variables	Cut-off values (z-score)
Stunting	Low height for age	< 3 <sup>rd</sup> percentile
Overweight	High BMI for age	+1 SD ≤ BMI < + 2 SD
Obesity	High BMI for age	≥ + 2 SD
Thinness	Low BMI for age	< 5 <sup>th</sup> percentile

**Pilot study:** Before data collection processes, the tools of the project were piloted in one KG of GC. The research tools in terms of acceptability, applicability and the time frame as well as data analysis were all examined.

**Ethical consideration:** Official approvals to conduct the research study were obtained from the Ministry of Education and Higher Education, children's parents and Helsinki committee.

**Data collection:** Data were collected from PSC and their mothers in early of 2009 after the last Israeli aggression on GS. Nutritional indicators (Overweight, obesity, thinness and stunting) of the study sample were calculated according to the above operational definitions.

**Data analysis:** Obtained data were analyzed using SPSS WIN (Version 13). The cross tabulations and the Chi-square tests at a significance level of 5% were used to investigate the statistical association between the nutritional indicators and feeding history of PSC.

## RESULTS

**Sociodemographic description and nutritional indicators of the study sample:** The study sample consisted of 52.4% boys and 47.6% girls (Table 1). About two third (67.4%) of the sample were refugees, while 32.6% were local citizens. It was also found that 42.0% of the study sample was living in GC, 14.0% in NG, 16.2% in the MG, 13.1% in KG, 14.5% in RG. Moreover, 51.3% of children's mother had a secondary level of education, while 24.5% had a preparatory education. Of these women, 20.0% had university

education and less than 1% were illiterate. About sixty percent (60.1%) of surveyed children, had fathers with secondary or preparatory school education. Of those men, 28.9% had university education and less than 1% were also illiterate.

Regarding children's parents occupation, it was found that 7.0% of the surveyed mothers were employees, while 93.0% of them had no working activity outside their home. On the other hand, 41.3% of the surveyed children had employed fathers, while 26.1% of their fathers were unemployed. Only 2.0% of the total PSC, their fathers were farmers. About half (48.9%) of the surveyed children's family had monthly income less than 1000 NIS and 19.0% had a family income more than 2000 NIS. Moreover, 43.8% of the surveyed children, their mothers did not have enough income to secure food for daily life.

Table 1: Sociodemographic variability versus residence distribution of the study sample

Socio-demographic variables	NG	GC	MG	KG	RG	Total	p-value
----- N % -----							
<b>Sex</b>							0.490
Male	38 (12.7)	132 (44.1)	52 (17.4)	34 (0.0)	43 (14.4)	299 (52.4)	
Female	42 (15.4)	108 (40.0)	41 (15.1)	41 (15.0)	40 (15.0)	272 (47.6)	
Total	80 (14.0)	240 (42.0)	93 (16.2)	75 (13.1)	83 (14.5)	571 (0.0)	
<b>Residential status</b>							0.001
Refugees	75 (19.5)	147 (38.2)	55 (14.3)	32 (8.3)	76 (19.7)	385 (67.4)	
Citizen	5 (2.7)	93 (50.0)	38 (20.4)	43 (23.1)	7 (3.8)	186 (32.6)	
Total	80 (14.0)	240 (42.0)	93 (16.2)	75 (13.1)	83 (14.5)	571 (0.0)	
<b>Mother education</b>							0.001
Illiterate	0 (0.0)	2 (50.0)	0 (0.0)	1 (25.0)	1 (25.0)	4 (0.7)	
Primary	7 (35.0)	7 (35.0)	5 (25.0)	0 (0.0)	1 (5.0)	20 (3.5)	
Preparatory	18 (12.9)	71 (50.7)	21 (15.0)	9 (6.4)	21 (15.0)	140 (24.5)	
Secondary	35 (11.9)	130 (44.4)	44 (15.0)	37 (12.6)	47 (16.0)	293 (51.3)	
University	20 (17.5)	30 (26.3)	23 (20.2)	28 (24.6)	13 (11.4)	114 (20.0)	
Total	80 (14.0)	240 (42.0)	93 (16.2)	75 (13.1)	83 (14.5)	571 (0.0)	
<b>Father's education</b>							0.001
Illiterate	0 (0.0)	1 (20.0)	3 (60.0)	1 (20.0)	0 (0.0)	5 (0.9)	
Primary	7 (12.1)	35 (60.3)	7 (12.1)	4 (6.9)	5 (8.6)	58 (10.2)	
Preparatory	26 (17.6)	71 (48.0)	25 (16.9)	8 (5.4)	18 (12.2)	148 (26.0)	
Secondary	25 (12.8)	73 (37.4)	34 (17.4)	32 (16.4)	31 (15.9)	195 (34.2)	
University	22 (13.8)	60 (36.4)	24 (14.5)	30 (18.2)	29 (17.6)	165 (28.9)	
Total	80 (14.0)	240 (42.0)	93 (16.2)	75 (13.1)	83 (14.5)	571 (0.0)	
<b>Mother occupation</b>							0.09
Home care	75 (14.2)	227 (42.8)	88 (16.6)	64 (12.1)	76 (14.3)	530 (93.0)	
Employee	5 (12.2)	13 (31.7)	5 (12.2)	11 (26.8)	7 (17.1)	41 (7.0)	
Total	80 (14.0)	240 (42.0)	93 (16.2)	75 (13.1)	83 (14.5)	571 (0.0)	
<b>Father occupation</b>							0.001
Employee	27 (11.4)	84 (35.6)	41 (17.4)	40 (16.9)	44 (18.6)	236 (41.3)	
Worker	23 (14.0)	94 (57.3)	15 (9.1)	14 (8.5)	18 (11.0)	164 (28.7)	
Farmers	0 (0.0)	1 (9.1)	7 (63.3)	1 (9.1)	2 (18.2)	11 (2.0)	
Unemployed	29 (19.5)	57 (38.3)	30 (20.1)	15 (10.1)	18 (12.1)	149 (26.1)	
Death	1 (9.1)	4 (36.4)	0 (0.0)	5 (45.5)	1 (9.1)	11 (2.0)	
Total	80 (14.0)	240 (42.0)	93 (16.2)	75 (13.1)	83 (14.5)	571 (0.0)	
<b>Family income</b>							0.001
Less than 1000 (NIS)	48 (17.2)	130 (46.6)	44 (15.8)	25 (9.0)	32 (11.5)	279 (48.9)	
From 1000 to 2000 (NIS)	17 (9.3)	79 (43.2)	32 (17.5)	22 (12.0)	33 (18.0)	183 (32.1)	
More than 2000 (NIS)	15 (13.8)	31 (28.4)	17 (15.6)	28 (25.7)	18 (16.5)	109 (19.0)	
Total	80 (14.0)	240 (42.0)	93 (16.2)	75 (13.1)	83 (14.5)	571 (0.0)	
<b>Food supply</b>							0.01
Sufficient	41 (12.8)	127 (39.6)	49 (15.3)	56 (17.4)	48 (15.0)	321 (56.2)	
Insufficient	39 (15.6)	113 (0.0)	44 (17.6)	19 (7.6)	35 (14.0)	250 (43.8)	
Total	80 (14.0)	240 (42.0)	93 (16.2)	75 (13.1)	83 (14.5)	571 (0.0)	

NG: North Governorate, GC: The Gaza City, MG: Middle Governorate, KG: Khanyounis Governorate, RG: Rafah Governorate, NIS: New Israeli Shekels

Moreover, 78.5 and 21.5% of surveyed children had a family members ranged from 4-9 and  $\geq 10$ , respectively. The large family members ( $\geq 10$ ) were more evident in GC. Also, 90.6% of the surveyed PSC families lived in their owned houses and 9.4% lived in rented houses (Data are not shown). Nevertheless, the findings also showed that the differences among all these sociodemographic parameters versus residence distribution of PSC were significant ( $p < 0.05$ ) or highly significant ( $p < 0.01$ ) except gender difference ( $p > 0.05$ ) (Table 1). According to BMI categorization (WHO, 2007), the prevalence of thinness, stunting and overweight among PSC were 4.2%, 11.9% and 10.3%, respectively. Nevertheless, none of these sociodemographic parameters were significantly associated with these nutritional indicators among PSC as shown in the full study (Kanao, 2009).

**Nutritional history of the children**

**Weaning and complementary feeding:** The distribution of weaning period and CF of plant sources and animal sources among PSC are illustrated in Table 2 and 3, respectively. The results indicated that the prevalence of CF after six month increased with increasing the period of weaning. All types of CF were significantly associated with the period of weaning ( $p < 0.05$ ).

**Weaning periods and nutritional indicators:** Table 4 shows the distribution of weaning periods versus anthropometric malnutrition indicators among PSC. The findings showed no statistical significant relationships between weaning periods and any of these nutritional indicators among PSC ( $p > 0.05$ ).

**Exclusive Breast feeding and complementary feeding:**

Table 5 and 6 show the distribution of EBF versus distribution of complementary feeding from plant and animal sources, respectively. It was found that all types of CF were highly significantly associated with EBF ( $p < 0.01$ ). However, the highest prevalence of PSC received CF was recorded after 6<sup>th</sup> months of age.

**Nutritional indicators and exclusive breast feeding:**

The prevalence of EBF versus anthropometric nutritional indicators is illustrated in Table 7. It was observed that the prevalence of stunting was 39.7% among PSC that received EBF for six months and more. About sixty percent (58.3%) of thinned children received EBF for less than six months. It was also recorded that 44.1% of the overweight children received EBF for six months and more. However, no statistical significance association was recorded between EBF and these nutritional indicators ( $p > 0.05$ ).

**Nutritional indicators and history of complementary feeding:**

Nutritional indicators of PSC versus CF are shown in Table 8. No statistical significant relation was observed between stunting versus any type of CF. The prevalence of thinness was generally lower among children who received CF after six months. With the exception of milled rice or family food ( $p = 0.03, 0.005$ ), no statistical significant relations were observed between other CF and thinness among PSC. In contrast to thinness, it was also found that higher percentage of overweight children received CF after four months of age. However, none of the type of CF was significantly associated with overweight ( $p > 0.05$ ).

Table 2: The distribution of weaning periods versus the distribution of complementary plant food sources of the children

CF	Weaning periods				p-value
	No breast fed	$\leq 6$ months	$> 6-12$ months	$> One$ year	
<b>Milled rice</b>					0.001
Not eaten	2 (2.0)	14 (13.7)	14 (13.7)	72 (70.6)	
Before four month	6 (17.1)	4 (11.4)	5 (14.3)	20 (57.1)	
Between 4-6 month	5 (3.4)	17 (11.6)	18 (12.3)	106 (72.6)	
After 6 month	5 (1.7)	20 (6.9)	47 (16.3)	216 (75.0)	
Total	18 (3.2)	55 (9.6)	84 (14.7)	414 (72.5)	
<b>Fruits</b>					0.001
Not eaten	0 (0.0)	1 (50.0)	0 (0.0)	1 (50.0)	
Before four month	5 (17.2)	6 (20.7)	6 (20.7)	12 (41.4)	
Between 4-6 month	6 (3.1)	20 (10.4)	27 (14.1)	139 (72.4)	
After 6 month	7 (2.0)	28 (8.0)	51 (14.7)	262 (75.3)	
Total	18 (3.2)	55 (9.6)	84 (14.7)	414 (72.5)	
<b>Vegetables</b>					0.021
Not eaten	0 (0.0)	1 (50.0)	0 (0.0)	1 (50.0)	
Before four month	3 (14.3)	4 (19.0)	5 (23.8)	9 (42.9)	
Between 4-6 month	6 (3.2)	19 (10.1)	30 (15.9)	134 (70.9)	
After 6 month	9 (2.5)	31 (8.6)	49 (13.6)	270 (75.2)	
Total	18 (3.2)	55 (9.6)	84 (14.7)	414 (72.5)	

CF: Complementary Feeding, EBF: Exclusive Breast Feeding

Table 3: The distribution of weaning periods versus the distribution of complementary animal food sources of the children

CF	Weaning periods				p-value
	No breast fed	≤6 months	>6-12 months	>One year	
<b>Meat and fish and chicken</b>					0.001
Not eaten	0 (0.0)	1 (100.0)	0 (0.0)	0 (0.0)	
Before four month	2 (33.3)	0 (0.0)	1 (16.6)	3 (50.0)	
Between 4-6 month	4 (7.1)	8 (14.3)	7 (12.5)	37 (66.1)	
After 6 month	12 (2.4)	46 (9.1)	76 (15.0)	374 (73.6)	
Total	18 (3.2)	55 (9.6)	84 (14.7)	414 (72.5)	
<b>Eggs</b>					0.001
Not eaten	0 (0.0)	2 (40.0)	0 (0.0)	3 (60.0)	
Before four month	3 (20.0)	1 (6.7)	2 (13.3)	9 (60.0)	
Between 4-6 month	7 (5.7)	16 (13.1)	19 (15.6)	80 (65.6)	
After 6 month	8 (1.9)	36 (8.4)	63 (14.7)	322 (75.1)	
Total	18 (3.2)	55 (9.6)	84 (14.7)	414 (72.5)	
<b>Milk and its derivatives</b>					0.001
Not eaten	0 (0.0)	1 (16.7)	0 (0.0)	5 (83.3)	
Before four month	17 (13.0)	24 (18.3)	18 (13.7)	72 (55.0)	
Between 4-6 month	1 (0.7)	18 (13.1)	26 (19.0)	92 (67.2)	
After 6 month	0 (0.0)	12 (4.0)	40 (13.5)	245 (82.5)	
Total	18 (3.2)	55 (9.6)	84 (14.7)	414 (72.5)	
<b>Family foods*</b>					0.04
Not eaten	0 (0.0)	0 (0.0)	1 (33.3)	2 (66.6)	
Before four month	2 (20.0)	0 (0.0)	2 (20.0)	6 (60.0)	
Between 4-6 month	3 (6.4)	8 (17.0)	7 (14.9)	29 (61.7)	
After 6 month	13 (2.5)	47 (9.2)	74 (14.5)	377 (73.8)	
Total	18 (3.2)	55 (9.6)	84 (14.7)	414 (72.5)	

CF: Complementary feeding, EBF: Exclusive Breast Feeding, Family foods\*: Homemade cooked foods from animal and plant sources that normally used to feed whole family in Gaza strip

Table 4: The distribution of weaning periods versus malnutrition indicators among the study sample

Variables	No breast fed	≤6 months	From 6-12 month	≥ One year	p-value
<b>Malnutrition indicators</b>					
<b>Thinness</b>					0.24
No	18 (3.3)	50 (9.1)	81 (14.8)	398 (72.8)	
Yes	0 (0.0)	5 (20.8)	3 (12.5)	16 (66.7)	
Total	18 (3.2)	55 (9.6)	84 (14.7)	414 (72.5)	
<b>Overweight</b>					0.50
No	15 (2.9)	52 (10.2)	76 (14.8)	369 (72.1)	
Yes	3 (5.1)	3 (5.1)	8 (13.6)	45 (76.3)	
Total	18 (3.2)	55 (9.6)	84 (14.7)	414 (72.5)	
<b>Stunting</b>					0.44
No	16 (3.2)	52 (10.3)	72 (14.3)	363 (72.2)	
Yes	2 (2.9)	3 (4.4)	12 (17.6)	51 (75.0)	
Total	18 (3.2)	55 (9.6)	84 (14.7)	414 (72.5)	

## DISCUSSION

The present study aimed to determine nutritional status of PSC aged 5-6 years old in the five governorates of GS and investigate its relation to their nutritional history practices. The findings showed the Palestinian community has almost equal percentages of males and females and that reflected the actual distribution of refugees and citizens in GS (PCBS, 2007). About forty percent (38.2%) of the refugee children lived in the GC governorate. This finding might be due to that GC contains a very large refugee camp (Al-shatee camp). Twenty percent of the children's mothers had university degree while, 51.3% of them had secondary educational level and 24.5% had a preparatory educational level. These findings might reflect the perceived importance of

higher educational among Palestinian. Moreover, these also reflected social phenomenon that Palestinian families had a tendency to marry their daughters after the basic level of education. In contrast, 28.9% of the children's fathers had university degree and 60.1% of them had either secondary or preparatory educational level. These findings indicated that in GS population males had higher percentage of university education than females.

It was also found that 41.3% of the fathers were employed and 26.1% were not employed. Lower percentage of employment were recorded in Ng (11.4%) and Kh (16.9%) compared with GC. This might be attributed to the higher work options in the GC in comparison with other governorates.

Table 5: The distribution of exclusive breast feeding versus type of complementary plant food sources

CF type	Exclusive breast feeding			p-value
	Non	EBF<6	EBF>6	
<b>Milled rice</b>				0.001
Not eaten	28 (27.5)	59 (57.8)	15 (14.7)	
Before 4th month	20 (57.1)	13 (37.1)	2 (5.7)	
4th-6th month	39 (26.7)	105 (71.9)	2 (1.4)	
After 6th month	33 (11.5)	71 (24.7)	184 (63.9)	
Total	120 (21.0)	248(43.4)	203 (35.6)	
<b>Fruits</b>				0.001
Not eaten	0 (0.0)	1 (50.0)	1 (50.0)	
Before 4th month	17 (58.6)	12 (41.4)	0 (0.0)	
4th-6th month	53 (27.6)	138 (71.9)	1(0.5)	
After 6th month	50 (14.4)	97 (27.9)	201 (57.8)	
Total	120 (21.0)	248 (43.4)	203 (35.6)	
<b>Vegetables</b>				0.001
Not eaten	0 (0.0)	1 (50.0)	1 (50.0)	
before 4th month	11 (52.4)	10 (47.6)	0 (0.0)	
4th-6th month	54 (28.6)	134 (70.9)	1 (0.5)	
After 6th month	55 (15.3)	103 (28.7)	201 (56.0)	
Total	120 (21.0)	248 (43.4)	203 (35.6)	

CF: Complementary Feeding, EBF: Exclusive Breast Feeding

Table 6: Distribution of exclusive breast feeding versus distribution of complementary animal food sources

CF type	Non EBF	EBF<6 Mth	EBF>6 Mth	p-value
<b>Meats</b>				0.001
Not eaten	0 (0.0)	1 (100.0)	0 (0.0)	
Before 4th month	5 (83.3)	1 (16.7)	0 (0.0)	
4th-6th month	26 (46.4)	29 (51.8)	1 (1.8)	
After 6th month	89 (17.5)	217 (42.7)	202 (39.8)	
Total	120 (21.0)	248 (43.4)	203 (35.6)	
<b>Eggs</b>				0.001
Not eaten	0 (0.0)	4 (80.0)	1 (20.0)	
Before 4th month	10 (66.7)	5 (33.3)	0 (0.0)	
4th-6th month	41 (33.6)	80 (65.6)	1 (0.8)	
After 6th month	69 (16.1)	159 (37.1)	201 (46.9)	
Total	120 (21.0)	248 (43.4)	203 (35.6)	
<b>Meats</b>				0.001
Not eaten	0 (0.0)	2 (33.3)	4 (66.7)	
Before 4th month	89 (67.9)	41 (31.3)	1 (0.8)	
4th-6th month	18 (13.1)	116 (84.7)	3 (2.2)	
After 6th month	13 (4.4)	89 (30.0)	195 (65.7)	
Total	120 (21.0)	248 (43.4)	203 (35.6)	
<b>Family foods*</b>				0.001
Not eaten	0 (0.0)	2 (66.7)	1 (33.3)	
Before 4th month	2 (20.0)	7 (70.0)	1 (10.0)	
4th-6th month	17 (36.2)	29 (61.7)	1 (2.1)	
After 6th month	101 (19.8)	210 (41.1)	200 (39.1)	
Total	120 (21.0)	248 (43.4)	203 (35.6)	

CF: Complementary Feeding, EBF: Exclusive Breast Feeding, Mth: Months, Family foods\*: Homemade cooked foods from animal and plant sources that normally used to feed whole family in Gaza strip

Table 7: Prevalence of EBF versus nutritional indicators of PSC

Nutritional indicators	Non exclusive breast feeding	EBF for less than 6 months	EBF for 6 months and more	p-value
<b>Stunting</b>				0.497
Yes	16 (23.5)	25 (36.8)	27 (39.7)	
No	104 (20.7)	223 (44.3)	176 (35.0)	
Total	120 (21.0)	248 (43.4)	203 (35.5)	
<b>Thinness</b>				0.318
Yes	4 (16.7)	14 (58.3)	6 (25.0)	
No	116 (21.2)	234 (42.8)	197 (36.0)	
Total	120 (21.0)	248 (43.4)	203 (35.5)	
<b>Overweight</b>				0.287
Yes	9 (15.3)	24 (40.7)	26 (44.1)	
No	111 (21.7)	224 (43.8)	177 (34.6)	
Total	120 (21.0)	248 (43.4)	203 (35.5)	

Table 8: Nutritional indicators versus types and periods of complementary feeding

CF	Stunted			Thinness			Overweight		
	Yes No (%)	No No (%)	p- value	Yes No (%)	No No (%)	p- value	Yes No (%)	No No (%)	p- value
<b>Milled rice</b>			0.71			0.03			0.4
Not taken	9 (8.8)	93 (91.2)		4 (3.9)	98 (96.1)		12 (11.8)	90 (88.2)	
Before 4th month	4 (11.4)	31 (88.6)		2 (5.7)	33 (94.3)		1 (2.9)	34 (97.1)	
4th to 6th month	17 (11.6)	129 (88.4)		12 (8.2)	134 (91.8)		13 (8.9)	133 (91.1)	
After 6th months	38 (13.2)	250 (86.8)		6 (2.1)	282 (97.9)		33 (11.9)	255 (88.5)	
Total	68 (11.9)	503 (88.1)		24 (4.2)	547 (95.8)		59 (10.3)	512 (89.7)	
<b>Fruits</b>			0.35			0.19			0.50
Not taken	0 (0.0)	2 (100.0)		0 (0.0)	2 (100.0)		0 (0.0)	2 (100.0)	
Before 4th month	2 (6.9)	27 (93.1)		1 (3.4)	28 (96.6)		4 (13.8)	25 (86.2)	
4th to 6th month	18 (9.4)	174 (90.6)		13 (6.8)	179 (93.2)		15 (7.8)	177 (92.2)	
After 6th months	48 (13.8)	300 (86.2)		10 (2.9)	338 (97.1)		40 (11.5)	308 (88.5)	
Total	68 (11.9)	503 (88.1)		24 (4.2)	547 (95.8)		59 (10.3)	512 (89.7)	
<b>Vegetables</b>			0.1			0.15			0.40
Not taken	0 (0.0)	2 (100.0)		0 (0.0)	2 (100.0)		0 (0.0)	2 (100.0)	
Before 4th month	0 (0.0)	21 (100.0)		1 (4.8)	20 (95.2)		3 (14.3)	18 (85.7)	
4th to 6th month	17 (9.0)	172 (91.0)		13 (6.9)	176 (93.1)		14 (7.4)	175 (92.6)	
After 6th months	51 (14.2)	308 (85.8)		10 (2.8)	349 (97.2)		42 (11.7)	317 (88.3)	
Total	68 (11.9)	503 (88.1)		24 (4.2)	547 (95.8)		59 (10.3)	512 (89.7)	
<b>Meat and fish and chicken</b>			0.10			0.3			0.80
Not taken	0 (0.0)	1 (100.0)		0 (0.0)	1 (100.0)		0 (0.0)	1 (100.0)	
Before 4th month	0 (0.0)	6 (100.0)		0 (0.0)	6 (100.0)		0 (0.0)	6 (100.0)	
4th to 6th month	2 (3.6)	54 (96.4)		5 (8.9)	51 (91.1)		5 (8.9)	51 (91.1)	
After 6th months	66 (13.0)	442 (87.0)		19 (3.7)	489 (96.3)		54 (10.6)	454 (89.4)	
Total	68 (11.9)	503 (88.1)		24 (4.2)	547 (95.8)		59 (10.3)	512 (89.7)	
<b>Eggs</b>			0.42			0.19			0.7
Not taken	0 (0.0)	5 (100.0)		1 (20.0)	4 (80.0)		0 (0.0)	5 (100.0)	
Before 4th month	0 (0.0)	15 (100.0)		0 (0.0)	15 (100.0)		2 (13.3)	13 (86.7)	
4th to 6th month	15 (12.3)	107 (87.7)		7 (5.7)	115 (94.3)		10 (8.2)	112 (91.8)	
After 6th months	53 (12.4)	376 (87.6)		16 (3.7)	489 (96.3)		47 (11.0)	382 (89.0)	
Total	68 (11.9)	503 (88.1)		24 (4.2)	547 (95.8)		59 (10.3)	512 (89.7)	
<b>Milk and milk derivatives</b>			0.31			0.15			0.31
Not taken	0 (0.0)	6 (100.0)		1 (16.7)	5 (83.3)		1 (16.7)	5 (83.3)	
Before 4th month	17 (13.0)	114 (87.0)		5 (3.8)	126 (96.2)		11 (8.4)	120 (91.6)	
4th to 6th month	11 (8.0)	126 (92.0)		9 (6.6)	128 (93.4)		10 (7.3)	127 (92.7)	
after 6th months	40 (13.5)	257 (86.5)		9 (3.0)	288 (97.0)		37 (12.5)	260 (87.5)	
Total	68 (11.9)	503 (88.1)		24 (4.2)	547 (95.8)		59 (10.3)	512 (89.7)	
<b>Family foods*</b>			0.71			0.005			0.15
Not taken	1 (33.3)	2 (66.7)		1 (33.3)	2 (66.7)		1 (33.3)	2 (66.7)	
Before 4th month	1 (10.0)	9 (90.0)		2 (20.0)	8 (80.0)		1 (10.0)	9 (90.0)	
4th to 6th month	6 (12.8)	41 (87.2)		2 (4.3)	45 (95.7)		1 (2.1)	46 (97.9)	
After 6th months	60 (11.7)	451 (88.3)		19 (3.7)	492 (96.3)		56 (11.0)	455 (89.0)	
Total	68 (11.9)	503 (88.1)		24 (4.2)	547 (95.8)		59 (10.3)	512 (89.7)	

CF: Complementary Feeding, EBF: Exclusive Breast Feeding, Family foods\*: Homemade cooked foods from animal and plant sources that normally used to feed whole family in Gaza strip

Moreover, 48.9% of the children's family had monthly income less than 1000NIS that reflected the state of poverty in the Palestinian community (UNRWA, 2008). UNDP (2009) reported that the Israeli siege and closure had a devastating impact on the economic situation of the Palestinians in general and the refugees in particular. The ability of Palestinian families to secure adequate nutrition for their families, in general and to their children in particular is threatened and the poverty rate reach to 65%.

On the other hand, 43.8% the children's mothers perceived that their family income was insufficient to secure food for their family. Nevertheless, this higher perception was due to low family income and increase in costs of the basic goods in the closed GS.

It is also found that 90.3% of the children's families owned their households and 9.6% of PSC lived in rented houses. In GS people preferred, however, to live in their owned houses and abstained from renting ones, unless they would not have any other choice.



The study results found that 72.5% of the children weaned after one year of age. Nutrition assessment of children under five that was carried out by Ard El-Insan (2003) showed that the percentage of weaning at 12 months and more was 83.7%. This difference might reflect progress in knowledge and attitudes of nursing mothers in GS. Cessation of BF occurs among children in Bangladesh when only the mothers become pregnant (Isherwood *et al.*, 1988). In India, about 47% of children aged 2-4 years are weaned at age  $\geq 6$  months (Padmadas *et al.*, 2002).

Moreover, 8.6% of the mothers of the surveyed children weaned their children at age of 2 years, while 63.9% weaned their children between one to two years (Data not shown). Extensive efforts, therefore, should be used to encourage nursing mothers in GS to continue BF until the age of two years. According to global infant feeding recommendations [WHO, 2002], starting of appropriate CF after six month and to continue BF to two years of age. Nevertheless, according to the study, it was found that Children's women that perform a proper CF after six months of age tended to wean their children after one year of age. Moreover, statistical significant relationships were recorded between all types of CF and weaning periods. These findings encourages all nursing mothers in GS to introduce CF for their children after six months of age. Adequate feeding practices around the weaning period are thus crucial to achieve optimal child growth (Becquet *et al.*, 2006).

The results also showed no statistical significant relationship between weaning period and any of mal nutritional indicators among PSC. In contrast, weaning was found to be one of the contributing factors that influence the nutritional status among PSC in Sirlanka (Department of Census and Statistics-Sirlanka, 2002). Weaning at age of two years was found to be protective against overweight and obesity (Simon *et al.*, 2007). Time of weaning is significantly associated with stunting among children in India (Padmadas *et al.*, 2002). Improper weaning are a risk factor for under nutrition among children under five (Kumar *et al.*, 2006). These contradictive differences between t h e present study and these ones might be related to that weaning practices among Palestinian nursing mothers after one year of age is almost socially and culturally influenced.

According to WHO/UNICEF recommendation, EBF should continue through the first six months of life. In this study, it was found that only 26.5% of the surveyed children received EBF for six months. The prevalence of EBF for six months and more was equal to 35.5%. This means that 9% of the surveyed children received EBF for more than six months (Data are not shown). EBF is still beneficial only up to 6 months of age after which, it loses its advantages and also the children above one year of age exclusively fed on breast had a high prevalence of malnutrition (Chirmulay and Nisa, 1993).

The prevalence of EBF increased up to about 40% after mothers reported that their children were EBF for six months, but with adding some herbs like thymus, caraway, peppermint and water for the purpose of treatment. This is a cultural phenomenon that tends to use herbs in the first days of life especially for treatment of infants spasm, colic and some respiratory illnesses. The previous study showed that the prevalence of EBF among infant children in GS was 38% (Kariri and Kanoa, 2007). This difference in the prevalence of EBF between the two studies may be due to different age groups. However, in the last five years, there was an improvement in health education programmes about infant nutrition targeting women and encouraging them to practice EBF.

Regarding EBF and malnutritional indicators among PSC, it was found that no statistical significant relationship was recorded between EBF and nutritional indicators. About forty percent (39.7%) of stunted children received EBF for six months or more. In addition, 58.3% of thinned children received EBF for less than six months. In Kenya, it was recorded that malnutrition is related to BF and CF. Children, for instance, who were introduced to feed early had an increased risk of being underweight (Bloss *et al.*, 2004). Breast feeding was protective against stunting and wasting among children less than five years in Dar Esalam, Tanzania (Matee *et al.*, 1997). On the other hands, CF was found to be strongly correlated with EBF among PSC. Higher percentage of children that received EBF for six months or more, their mothers introduced CF after six months of age. Statistical significant relationships were also observed between EBF and different types of CF.

The present study also proved that introduction of CF early to the children had a risk of thinness in the future. Most of the thin children in this study, however, received CF before six months of age. In Abidjan, it was recorded that inadequate CF at age 6 months was associated with impaired growth during the next 12 months, with a 37% increased probability of stunting (Becquet *et al.*, 2006). Accordingly, most of stunted children received CF after six month of age. Complementary feeding was found to be strongly correlated with EBF among PSC. Higher percentage of children that received EBF for six months or more, their mothers introduced CF after six months of age.

#### Conclusion:

- The differences among the studied socio-demographic parameters were not significantly associated with the nutritional indicators among PSC.
- All types of CF were significantly associated with the period of weaning.
- The highest prevalence of PSC received CF was recorded after 6<sup>th</sup> months of age.

- The study emphasized that some foods that introduced early to the child had a risk of thinness where in this study, most of thin children received CF before six months.
- After six months of child age, CF also was found strongly correlated with EBF.

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