

Assessment of maternal nutritional knowledge and its predictors among mothers attending an urban primary health care unit in Giza

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Abstract

Background: Global evidence that the first 1000 days of a child's life found to be the most precious period of child's nutrition status development, where the impact of malnutrition during this critical period are likely to have a long term consequences which might be irreversible. Considering Mothers are mainly the caregiver of their children, sufficient maternal nutrition knowledge is essential for a healthy child with normal nutrition status and free of malnutrition. The study aimed to assess the level of nutritional knowledge and its predictors for mothers with children aged 0-24 months.

Methods: A cross-sectional study was conducted on 288 conveniently recruited mothers- having children aged between 0-24 months- attending an urban primary health care center in Giza. Maternal nutrition literacy was assessed using an interview guided questionnaire. Maternal total nutrition knowledge score was calculated for each participant, out of 20. Mann-Whitney, Kruskal-Wallis and spearman's correlation non-parametric tests were used to delineate associations between different variables and the total Knowledge score.

Results: The mean and standard deviation of maternal total knowledge score was 13.31 ± 2.29 . There was a significant statistical relation ($P \leq 0.05$) between each of the following; mothers' education, mothers' occupation, mothers' residence and maternal nutritional knowledge score. A weak negative statistical significant correlation between number of mothers' children and their nutritional knowledge score was found, whereas no statistical significant correlation between mothers' age and their nutritional knowledge level was detected. A significant multiple regression model was found with adjusted R square =27.1% & p value of 0.001. Selected variables by the model were: *University level* of mother's education in relation to non- university level with (standardized $\beta = 0.48$, p -value = 0.000), maternal occupation whether working in relation to non- working mothers (standardized $\beta = 0.40$, p -value = 0.000) and *Number of children* with (standardized $\beta = -0.11$, p -value = 0.039).

Conclusion : The participating mothers possessed a reasonable level of knowledge regarding different aspects of child healthy nutrition. Maternal nutrition knowledge scores were higher among university graduate mothers, among mothers living in higher socio-economic class and amongst mothers having less number of children.

Keywords: Maternal nutrition knowledge; Child nutrition status; Child feeding patterns; Child malnutrition; Nutrition education.

Introduction

Children's and adults' health hazards may be determined by their nutritional status during the first 1000 days of their lives as infants; from conception to early childhood [Agosti et al., 2017]. Undesirable malnutrition consequences occur during this period can have a long-term overall health risks during adolescence and adulthood [Dewey, 2001]. Adding the facts that globally, malnutrition contributing for nearly 35% of deaths of under five years children and that approximately 186 million and 55 million of under five years children are stunted and wasted respectively in developing countries [World Health Organization, 2010], It is crucial all through the first two years of life that the child should be provided with diet rich in all needed nutrients to support their growth and development [Ruel & Hodinott, 2008]. Therefore, this age is a critical window of opportunity for prevention of malnutrition which is common cause of child morbidity and mortality in this age [UNICEF, 2011].

Since mostly the mother is the main care provider for her child, maternal nutrition literacy is essential to ensure good child health and optimum diet quality especially when resources are inadequate as in developing countries [Food and Agricultural Organization, 2011]. Several factors can influence the mother's nutritional knowledge level such as maternal age, parity, receiving antenatal care, maternal education level and socioeconomic living standard [UNICEF, 2001-Sanusi & Gbadamosi, 2009- Yahya et al., 2012- Nguyen et al., 2017].

According to a study that was conducted in Egypt in 2016, aiming to identify practices related to breast feeding, nutrition and weaning in five governorates; concluded that one of the main gaps in maternal nutrition attitudes and knowledge that needs future intervention, is the need for better maternal nutrition awareness to improve their feeding practices; especially in weaning period [UNICEF, 2016]. As WHO recommends that breast milk has to be complemented by other nutrients at the age of six months to fulfill the nutritional requirement of the child [WHO, 2009].

Hence, the ultimate aim of this study is to assess the level of nutritional knowledge and its predictors for mothers with children aged 0-24 months. The finding of this study will guide policymakers to set plans for further interventions.

Materials and Methods

Study design & setting:

An analytical cross-sectional study was conducted on 288 conveniently recruited mothers- having children aged between 0-24 months- attending an urban primary health care center in Dokki, Giza governorate. Participants who agreed to participate in the study were recruited voluntarily after explaining the goal and objectives of the study.

Sample size:

Sample size was calculated by software program "Sample size calculator by Raosoft, Inc". Assuming precision 5%, the confidence level 95%, and the total population 800 [Raosoft, Inc 2004]. Expecting that 800 mothers were supposed to attend the center during the period of two months -while data was collected- through visiting the center for 8 consecutive weeks on three days weekly basis. Accordingly the sample size was calculated to include 240 participants and after addition of 20% due to expected

drop-out, the sample size increased to be 288 participants who were recruited to the study by meeting each visit about 10 to 15 mothers conveniently until the predetermined sample size was reached.

Data collection tool:

A specially designed close ended Arabic questionnaire was used to collect data via a face-to-face interview with each participating mother. The questionnaire included three sections: A section for the socio-demographic characteristics, another section for the pattern of feeding and weight for age growth of the infant. The third section was for the assessment of maternal nutrition literacy [Yehya et al, 2012], including A total of 20 statements asked to determine the mothers' nutritional knowledge level, and each correct answer was scored "1", while each "wrong" or "I don't know" answer was scored "0". The maximum score that can be obtained by correctly answering all the knowledge questions was "20".

Pilot study:

The questionnaire was tested on 10 participants beyond the included participants through two visits to the primary health care center in order to check its validity, clarity and to estimate the time needed to complete it.

Data analysis:

All collected questionnaires were revised for completeness and consistency. Pre coded data was entered on Microsoft office excel program for windows, 2010. Data cleaning and coding was done followed by its transferring to the statistical package for social science version 21 (SPSS- V 21) for data analysis.

Descriptive analysis was done. Quantitative variables were presented using mean \pm SD and median (IQR), and qualitative variables were described using numbers and percent. Appropriate tables and figures were used. Total knowledge scores, out of 20, and the percent scores were calculated for each participant. Mann-Whitney, Kruskal-Wallis and spearman's correlation non-parametric tests were used to delineate associations between different variables and the Knowledge score. P value \leq 0.05 was considered statistically significant. Results were presented as graphs for clarity.

A multiple regression model was built to predict maternal nutritional knowledge using stepwise method. Variables entered were: maternal education, maternal occupation, maternal age and number of children.

Socio-demographic data was analyzed in accordance with the social scoring system suggested by Fahmy & Sherbini (1983). This system illustrated and developed social scores of different variables to determine the social standards approximately representing the Egyptian community. Leveling depends on the overall score of the sum of several determinants including: Education and work of father and mother, Wealth Index, Family size, Crowding index and Sanitation (Appendix). The social standard is based on the classification of the overall score into four levels: [Fahmy and Sherbini, 1983]

- 1- High social level if the overall score ranged from 38-46.
- 2- High middle level if the overall score ranged from 34.5 to < 38
- 3- Low middle level if the overall score ranged from 23 to < 34.5
- 4- Low social level if overall score is < 23

Ethical consideration:

Informed consent was obtained from all participants before being recruited in the study after explaining the objectives of the work. Confidentiality was guaranteed on handling the data base and questionnaire forms according to revised Helsinki declaration of biomedical ethics [*World Medical Association, 2001*].

Results

Baseline population characteristics

Among the study participants; the mean age of the mothers was (26.9 ± 3.9) years while the mean age of their infants was (10.3 ± 4) months. Most of the mothers were urban residents and the median number of their children was 2. More than two thirds (69.8%) of participating mothers were university graduates and around one fifth of them stopped after secondary level of education, almost the same figures were observed among the fathers. Nearly half (52.1%) of the mothers were house wives and nearly half (49.3%) of the fathers worked as professionals. More than half (56.9%) of the infants' families were classified as middle socio-economic level while the others (42.7%) were classified into high socioeconomic level (*Table1*).

Table (1)
Distribution of parents according to their socio-demographic characteristics:

Socio-demographic characteristics		Frequency		Total	
		No.	%	No.	%
Residence:	Urban	253	(87.8)	288	100
	Rural	35	(12.2)		
Social status:	Married	283	(98.3)	288	100
	Divorced	3	(1)		
	Widow	2	(0.7)		
Mother's education:	Read & write	4	(1.4)	288	100
	Primary	5	(1.7)		
	Preparatory	10	(3.5)		
	Secondary	68	(23.6)		
	University	201	(69.8)		
Mother's occupation:	House wife	150	(52.2)	288	100
	Non skilled workers	7	(2.4)		
	Skilled workers	1	(0.3)		
	Semiprofessional	64	(22.2)		
	Professional	66	(22.9)		
Father's education:	Read & write	2	(0.7)	288	100
	Primary	3	(1)		
	Preparatory	2	(0.7)		
	Secondary	60	(20.8)		
	University	221	(76.7)		
Father's occupation:	Non skilled workers	12	(4.2)	288	100
	Skilled workers	21	(7.3)		
	Semiprofessional	113	(39.2)		
	Professional	142	(49.3)		
Social level:	Low	1	(0.3)	288	100
	Low Middle	64	(22.2)		
	High Middle	100	(34.7)		
	High	123	(42.8)		

Pattern of feeding and growth rate of the infants.(Table 2)

Nearly two thirds (60.8%) of the infants were breast fed since birth. Among the infants who were ever breast fed (n=251), around three quarters of them started breast feeding within the first 24 hours after delivery with the majority of their mothers reported that they were being colostrum fed.

Approximately two thirds (62.2%) of the mothers started weaning their infants -with mean age was 10.3 ±4 months- before 6 months. The infants' mean weight was (9.78± 2.65) Kg and their mean length was (71.6±6.3) cm with almost all of them had a normal weight for age (within 5th& 95th percentile). Almost all of them were reported to be adherent to their vaccination schedule (**Table 2**).

Table (2)
Distribution of infants according to their pattern of feeding & growth rate:

Pattern of feeding and Growth rate		Frequency		Total	
		No.	(%)	No.	(%)
Type of feeding since birth	- Breast feeding (BF)	175	(60.8)	288	100
	- Artificial formula (Art.)	37	(12.8)		
	- BF or Art. And Complementary feeding	76	(26.4)		
Onset of breast feeding	- ≤ 24 h after delivery	191	(76.1)	251	100
	- > 24 h after delivery	60	(23.9)		
Colostrum Fed	- Yes	233	(92.8)	251	100
	- No	18	(7.2)		
Onset of weaning	- ≤ 6 months	179	(62.2)	288	100
	- > 6 months	109	(37.8)		
Growth Rate (Weight for age)	- Normal	282	(97.9)	288	100
	- less than 5 th percentile	1	(0.3)		
	- More than 95 th percentile	5	(1.7)		

Assessment of maternal nutrition literacy

Table 3 shows distribution of mothers according to their nutritional knowledge level. With the mean and standard deviation of the total knowledge score is (13.31 ± 2.293) and the median of the total knowledge score is (14). There was a significant statistical relation (P ≤ 0.05) between each of the mothers' education (A), occupation (B), residence (C) and maternal nutritional knowledge score (**Fig 1**) . A weak negative statistical significant correlation between number of mothers' children (E) and their nutritional knowledge score was found, while there was no statistical significant correlation between mothers' age (D) and their nutritional knowledge level (**Fig 2**).

Table (3)
Distribution of mothers according to their nutritional knowledge:

Maternal nutritional knowledge statements		Frequency		Total		
		No.	(%)	No.	(%)	
1.	The baby should be first given sugary water after birth	Yes	62	(21.5)	288	100
		No*	226	(78.5)		
2.	Breast milk alone is sufficient in the first 6 months	Yes*	208	(72.2)	288	100
		No	80	(27.8)		
3.	Tea and biscuits are beneficial for the child	Yes	92	(31.9)	288	100
		No*	196	(68.1)		
4.	Milk pudding cooked with water and starch is beneficial for the child	Yes	236	(81.9)	288	100
		No*	52	(18.1)		
5.	There is no harm in giving salt to child until 1 year of age	Yes	27	(9.4)	288	100
		No*	261	(90.6)		
6.	Regardless of first month, cow milk should be given without being watered down	Yes	19	(6.6)	288	100
		No*	269	(93.4)		
7.	Children with diarrhea should not be breast fed	Yes	52	(18.1)	288	100
		No*	236	(81.9)		
8.	Children with diarrhea should not be given water	Yes	51	(17.7)	288	100
		No*	237	(82.3)		
9.	Colostrum is very beneficial for the child	Yes*	99	(34.4)	288	100
		No	189	(65.6)		
10.	Child should be given hard- boiled egg	Yes*	279	(96.9)	288	100
		No	9	(3.1)		
11.	The pot liquor is more nutritious than the meal itself	Yes	199	(69.1)	288	100
		No*	89	(30.9)		
12.	Meals made of legume can be given to children of two months	Yes	2	(0.7)	288	100
		No*	286	(99.3)		
13.	The milk watered down should be added fat and sugar	Yes*	3	(1)	288	100
		No	285	(99)		
14.	The new born baby should be breast fed anytime he/ she cries	Yes*	228	(79.2)	288	100
		No	60	(20.8)		
15.	A fat child is a healthy child	Yes	107	(37.2)	288	100
		No*	181	(62.8)		
16.	Child on breast milk should not be given water	Yes*	126	(43.8)	288	100
		No	162	(56.3)		
17.	Breast milk is more beneficial than formula feeding	Yes*	254	(88.2)	288	100
		No	34	(11.8)		
18.	Breast milk is the ideal nutrition for a baby	Yes*	274	(95.1)	288	100
		No	14	(4.9)		
19.	Children nourished with breast milk are fatter than the children nourished with formula feeding	Yes	30	(10.4)	288	100
		No*	257	(89.2)		
20.	Honey is more nutritious than molasses for children between 0-1 year of age	Yes	32	(11.1)	288	100
		No*	256	(88.9)		

*Correct Answer.

Table 4:
Stepwise multiple regression analysis predicting maternal nutritional knowledge among participants.

Independent variables (predictors)		Standardized coefficients - Beta	Significance P-value
constant	59.6		
Level of mother education - university		0.48	0.000
working mother–non working		0.40	0.000
Number of children		-0.11	0.039

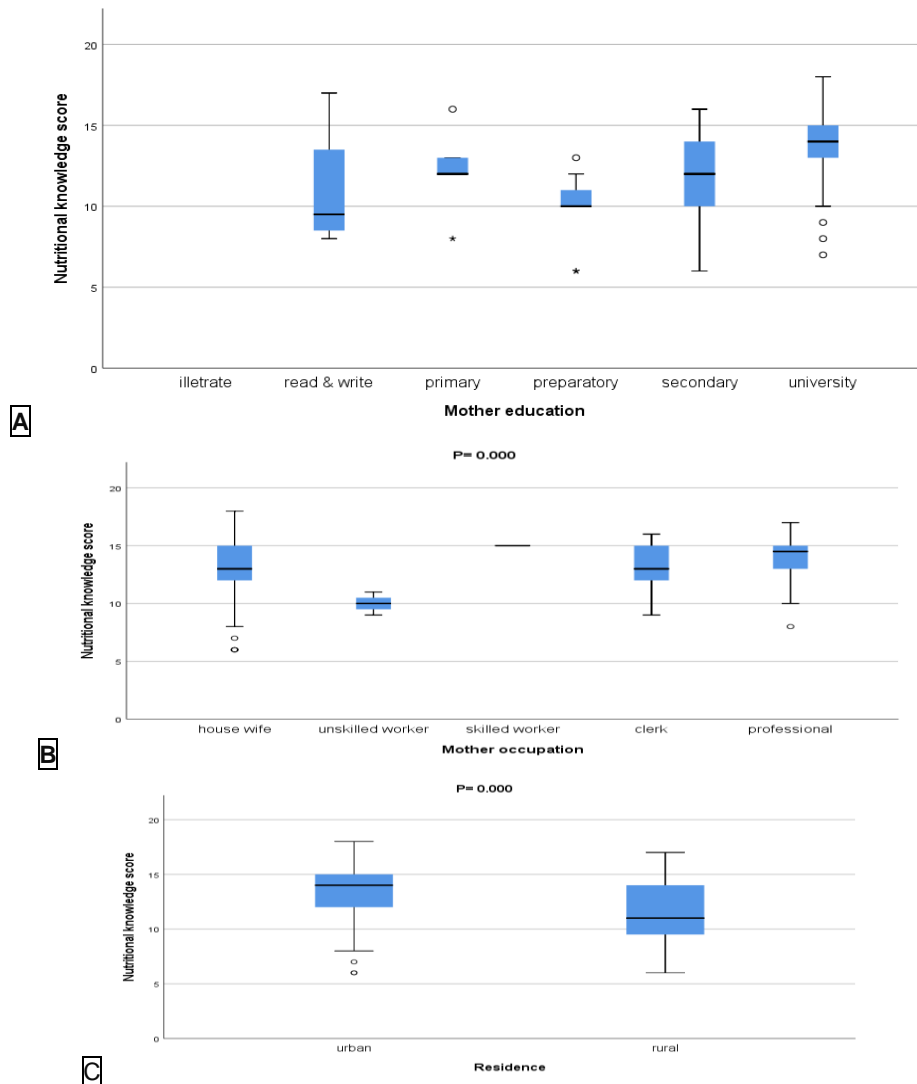


Figure (1)
The relation between maternal nutritional knowledge score and level of mother education (A), occupation (B) and residence (C)

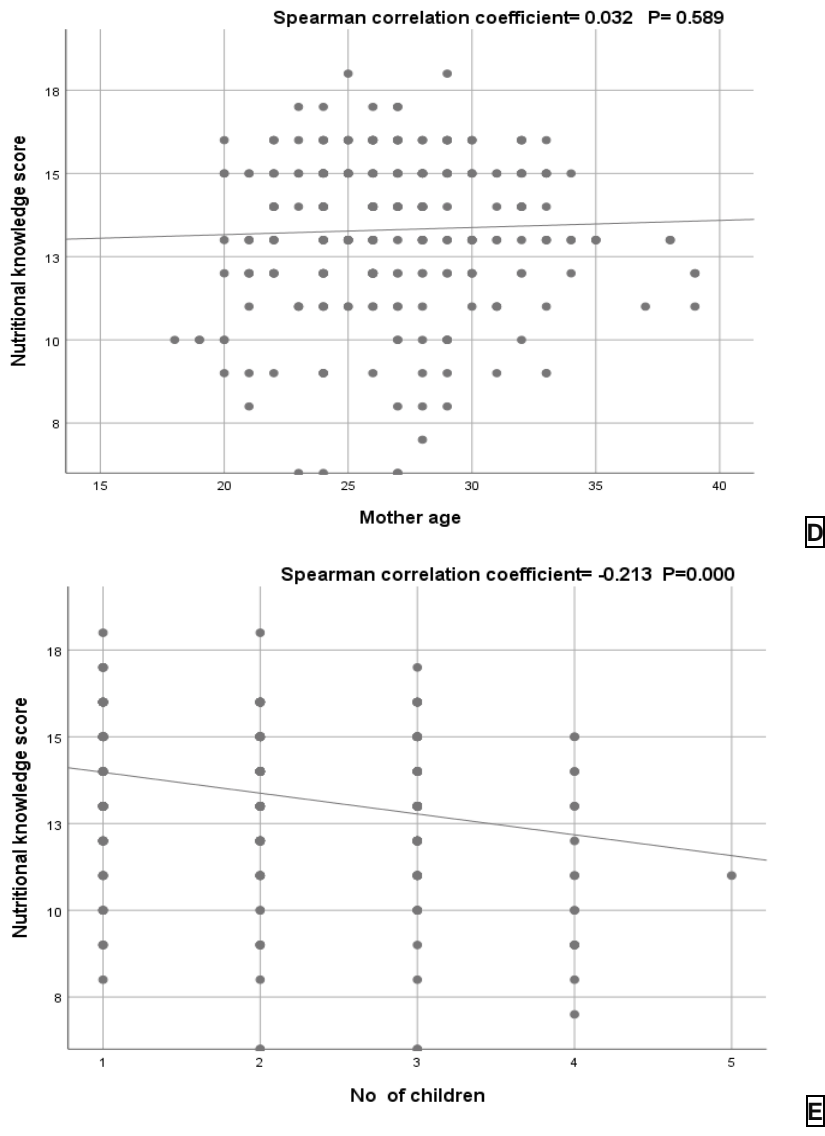


Figure (2)
The relation between mothers age (D), number of children (E)
and maternal nutritional knowledge score.

A multiple regression model was built to predict maternal nutritional knowledge using stepwise method. Variables entered were; maternal education, maternal occupation, maternal age and number of children.

A significant model was found with adjusted R square =27.1% & p value of 0.001. Selected variables by the model were: university level of mother's education in relation non university level with (standardized $\beta = 0.48$, p -value = 0.000), maternal occupation whether working in relation to non-working with (standardized $\beta = 0.40$, p -value = 0.000) and *Number of children* with (standardized $\beta = -0.11$, p -value = 0.039) (Table4).

Discussion

Infant malnutrition is an essential public health concern worldwide especially in developing countries [Fadareet al., 2019]. All interventions dedicated to improve the nutritional status of under-five children should be concerned not only with malnourished children but also to be concerned with improving mothers' nutrition knowledge and about feeding patterns and weaning practices [Appohet al., 2005-Al-Shookriet al., 2011]. Therefore it was necessary to assess the level of nutritional knowledge of mothers- with children aged 0-24 months- and its predictors.

Researchers long ago have confirmed that practicing exclusive breast feeding followed by starting introducing nutritious complementary foods on the proper time to infants is one of the cornerstone strategies to prevent and combat against childhood malnutrition [Martorellet al., 1975-Cohen et al., 1995- Stephensen et al., 1999- Maleta et al., 2003]. Also, Dhanalakshmi S et al. stated that the prevalence of acute and chronic malnutrition was more prevalent among infants not given colostrum feeding. They recommended that, feeding practices should be improved to prevent malnutrition among children [Dhanalakshmi et al., 2019]. Among the present study participants, 61% of the infants were exclusively breast fed and 26% of the infants were offered breast feeding combined with either bottle-milk or early introducing complementary food. Most of ever breast fed infants started breast feeding within the first 24 hours after delivery and were being colostrum fed. The mean and standard deviation of the total knowledge score of the mothers is 13.31 ± 2.29 with the median of their total knowledge score is 14. Maternal nutrition knowledge level is considered to be fair to good compared to the scores' reported by Ayat F. Manzour, et al., who conducted their study to evaluate the influence of mothers' knowledge on their children's nutritional status and those reported by [Yahya et al., 2012- Ayat et al., 2019]

On the other hand, almost all of the infants included in the current study (98%) had a normal weight for age growth rate lying within 5th & 95th percentiles, and according to the UNICEF Nutrition Conceptual Framework for multidimensional etiology of malnutrition, maternal nutritional knowledge is considered one of the underlying causes affecting child's nutritional status [UNICEF, 2015].

Results showed that there was no statistical significant correlation between maternal nutritional knowledge score and the age of the mothers ($P \geq 0.5$). This was not the case in the study conducted by Vereecken & Maes in Belgium who reported that there was a reverse relation between age of the mothers and nutritional knowledge and attitude [Vereecken & Maes, 2010]. Other studies observed a higher prevalence of under nutrition among children belonging to teenager mothers in relation to those of adult women in Bangladesh and Ghana [Quarshie, 2014 - Nguyen et al., 2017- Wemakor, 2018]. These results may differ from the present study due to larger samples size recruited and/or different children and mothers' age groups included. Moreover, this variation may be owed to the effect of other factors such as the larger percentage of the participating mothers who were well educated and university graduates (70%) in the current study.

On the other hand the study revealed that there was a statistically significant relation between the educational level of the mothers and their nutritional knowledge score with ($P \leq 0.5$). This finding is in agreement with many studies which highlights the significant association between a mother's level of education and her nutrition literacy which in turn will lead to a better nutrition outcomes for children [Ekambaram et al., 2010 - Amanuelet al., 2013- Fadare et al., 2019]

In continuation to the aforementioned, the study revealed a statistically significant relation between the occupation and the residence of mothers with their nutritional knowledge score ($P \leq 0.05$), this could be attributed to the fact that working mothers has higher economic level which was observed in the present study that approximately all the participants are classified to be in middle or high socio-economic living standard. This is in accordance with the results stated by several researchers as it is widely agreed on that the higher the socio-economic status (Education, income or professional status), the healthier the lifestyle, including diet and nutrition for the family [Dorneret et al., 2013-Lê et al., 2013-Vlismas et al., 2009 - Sanchez-Villegas et al., 2003 - Darmon et al., 2008 – McGill et al., 2015].

On the contrary, Lack of association between mother's socio-economic level and her child nutrition status was reported by Maleta *etal.* in their study conducted at Malawi, south-east Africa in 2003, whereas their explanation was due to the fact that there was relatively little heterogeneity in the socio-economic backgrounds between for the participants [Maleta et al., 2003]

The current study also revealed that there was a statistically significant negative correlation between number of children in the family and the maternal nutritional knowledge score ($P \leq 0.5$) which is in agreement with the study conducted by [Yehya et al., 2012], who reported that nutritional knowledge of mothers decreased with increasing the number of children they have. This association could be explained by the fact that the attention of a mother decreases by increasing the number of her children. Another explanation was presented by Downey and Hatton et al. that the more number of siblings in the same family the less resources for them to share and hence the poorer the nutritional status of children especially the youngest [Downey, 2001 and Hatton et al., 2010].

Conclusion

The study has revealed that participating mothers possessed a reasonable level of knowledge regarding different aspects of child healthy nutrition. The majority of their infants had normal weight-for-age values. Together maternal education level, maternal occupation and maternal residence were found to be positively and significantly associated with maternal nutrition knowledge, However, the number of mother's children was negatively and significantly associated with maternal nutrition knowledge. Maternal nutrition knowledge scores were higher among university graduate mothers, among mothers living in higher socio-economic class and amongst mothers having less number of children.

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Shereen Esmat et al

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تقييم المعلومات التغذوية وتنبؤاتها لدى الأمهات اللاتي يحضرن مركز رعاية صحية أولية حضرى بالجيزة

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الملخص العربى

الخلفية :

هناك دليل عالمى على أن الألف يوم الأولى من حياة الطفل هي أثنى فترة لتطور حالة تغذية الطفل، حيث من المحتمل أن يكون لتأثير سوء التغذية خلال هذه الفترة الحرجة عواقب طويلة الأمد قد لا رجعة فيها . بالنظر إلى الأمهات وجد أنهم فى الأساس مقدمات الرعاية لأطفالهن ، فإن المعرفة الكافية بالتغذية لدى الأم ضرورية لطفل يتمتع بصحة جيدة و حالة تغذية طبيعية دون الإصابة بسوء التغذية . هدفت الدراسة إلى تقييم مستوى المعرفة التغذوية وتنبؤاتها للأمهات اللاتي لديهن أطفال تتراوح أعمارهم بين 0- 24 شهرا .

الطريقة :

أجريت دراسة مقطعية على 288 من الأمهات اللاتي لديهن أطفال تتراوح أعمارهم بين 24 شهراً وأقل و يترددن على مركز رعاية صحية أولية حضرى فى الجيزة. تم تقييم مستوى المعرفة التغذوية لدى الامهات باستخدام استبيان باللغة العربية. وتم حساب مجموعة نقاط المعرفة التغذوية للأم لكل مشارك من أصل 20 نقطة . ثم تم استخدام اختبارات Mann- whitney ، Kruskal Wallis ، Spearman للارتباط غير المعيارى لتحديد الارتباطات بين المتغيرات المختلفة ودرجة المعرفة الإجمالية .

النتائج :

وكان المتوسط و الانحراف المعياري لمجموع مدى المعرفة التغذوية لدى الأمهات 2.29 ± 13.31 . كانت هناك علاقة ذات دلالة إحصائية ($P \leq 0.05$) بين كل مما يلي (تعليم الأمهات ، مهنة الأمهات ، محل الإقامة) ودرجة المعرفة التغذوية للأم . بينما أظهرت الدراسة على ارتباط ضعيف ذو دلالة إحصائية سالبة بين عدد أطفال الأمهات و درجة معرفة الأمهات التغذوية ، بينما لم يتم الكشف عن ارتباط ذو دلالة إحصائية بين عمر الأمهات ومستوى معرفتهم التغذوية . كما أظهرت الدراسة على نموذج انحدار متعدد كبير مع تعديل ($P \text{ value } 0.001 \text{ \& } R \text{ square } 27.1$) ($b = 0.48$ ، $\text{value } p=0.000$) ، وظيفة الأم التي تعمل مقارنة بالأمهات الغير عاملات ($b = 0.40$ ، $\text{value } p=0.000$ ، $\text{standardized } b = -0.11$) و عدد الأطفال مع ($\text{value } p=0.000$ ، $\text{standardized } b = -0.039$) .

الخلاصة :

امتلكت الأمهات المشاركات فى الدراسة لديهن مستوى معقول من المعرفة التغذوية فيما يتعلق بالجوانب المختلفة للتغذية الصحية للأطفال. كانت درجات المعرفة المتعلقة بتغذية الأطفال أعلى بين الأمهات ذى التعليم الجامعى وبين الأمهات اللاتي يتمتعن بطبقة اجتماعية واقتصادية أعلى وبين الأمهات اللاتي لديهن عدد أقل من الأطفال .

الكلمات المفتاحية :

معرفة تغذية الأم ، حالة تغذية الطفل ، أنماط تغذية الطفل ، سوء تغذية الطفل ، تعليم الأم