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Factors associated with health and nutritional status of children under two years old in a rural Area in Al Mahmoudia district, AL Beheira governorate

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Abstract

Background: Egypt is well known as one of the thirty-six countries where most of the global burden of malnutrition is present. The aim of this work was to reveal the important socio-economic, environmental, and family behavioral factors accompanied by health as well as nutritional condition of children aged < 2y in a rural area in Al-Mahmoudia district and to suggest appropriate interventions for improvement.

Methods: The current cross-sectional study was conducted on 40 children with age < two years who attend the selected primary health care units with their mothers or home caregivers, were seeking vaccination during the period of the study. Readiness of mothers or home caregivers approval to participate in the study was essential.

Results: Significant differences have been determined between age groups 0-6 months, 6-12 months and 1-2 y as per use of health services after labour and as per family income. There were significant differences between the included female and male children as per parent/Family behaviour also, there was a significant relation between mother marital status and weight for age.

Conclusion: Age groups had significant relation with health services after labour and, family income. The included female and male children had significant relation as regard to per parent/Family behaviour. Mother occupation had significant relation with weight for age.

Keywords: Children, nutritional status, rural area, AL-Beheira governorate

Introduction

The well-balanced nutrition during "the 1st one thousand days," The duration from conception (The 18th day) till the age of 2 y, is completely pivotal for 2 principal causes. Firstly, the nutritive requirements are higher because of the rapid physiological growth along with the functional development. Secondly, this duration is characterized by marked vulnerability to external stimuli as insufficient mother's and infant's nutritional condition that they can interfere with the various stages of the developmental process resulting in short as well as long-term sequences for health^[1].

Currently, one of the essential health problems the children face in developing countries is under-nutrition. Nutritional status refers to the balance between the nutrients the subject receives and the utilization of such nutrients in the growth, developmental and health maintaining processes^[2].

Children under two years are markedly based on their parents/carers in the nutrition and if mismatching occurs between the intake and utilization of the nutrition components in the body, malnutrition will appear. Malnutrition includes both under and over nutrition. It may result from deficiency, excess, imbalance in a subject's consumption of nutritional elements^[3].

Considering the nutritional status is one of the crucial factors that can affect the child health. There are numerous factors that might affect the nutritional condition of the child. Several studies have revealed that such factors include maternal literacy, household incomes and utilization of health care service to economic equality, efficient decision-making, and migration^[4]. In addition, other factors such as consuming micronutrients was proved to be an essential factor that can improve the child health. Iron deficiency anaemia as well as Vit A deficiency are crucial nutritional problems in developing nations, leading to stunting, wasting in addition to underweight^[5].

The WHO documented that malnutrition is responsible for 54% of child mortality all over the world, whereas for children < 2 y, childhood underweight is responsible for 35 percent of all deaths globally. In developing countries, 52 percent of the school-age children are stunted and 34–62 percent of them are underweight [6].

The aim of this work was to exhibit the important socio-economic, environmental and family behavioral factors accompanied by health and nutritional status of children aged < 2y in a rural area in Al-Mahmoudia district and to suggest appropriate interventions for improvement.

Patients and Methods

This cross-sectional study was conducted on forty children under two years who attend the selected primary health care units with their mothers or home caregivers, were seeking vaccination during the period of the study. Readiness of mothers or home caregivers accepted to be enrolled in the study was essential.

The study was done from the end of April 2019 to the end of July 2022 after approval from the Ethical Committee Tanta University Hospitals. An informed written consent was obtained from the relatives of the patients.

Exclusion criteria were children suffering from tumors, chronic or immune deficiency diseases, live outside the study area.

A systematic random technique was used to select the study subjects; every 5th child after receiving the immunization service.

Pilot study

Following the analysis of the pilot study results, some items of the questionnaire were changed or simplified to be readily understood by the study subjects. Such as simplified questions of eating habits of family and modify the way to ask family about their income and lifestyle.

The needed data was collected through culturally sensitive interviews with the selected child's mother or home caregiver using a structured questionnaire. The questionnaire was validated according to results of the pilot study in addition to the opinions of a jury of expertise (three experts in the field of the study), included: Personal Data: Age, sex, residence, child order in the family, history of breast and complementary feeding of the child by asking mother about beginning of breast feeding and nature of feeding and time of beginning with bottle feeding and weaning practices, type of food introduced to infant. History of major illnesses that the child was exposed to in the past: Major illnesses are defined according to the following two conditions: Diarrhea, acute respiratory infection (ARI) asked about number of attacks and time between two attacks.

History of vaccination (Expanded Program of Immunization - EPI vaccines), socio-economic status of the family: e.g. father educational status & job, mother educational status & job, type of family, family income, family size, number of rooms, family behavioral factors related to females regarding their child care. We obtained data concerning all the above mentioned variables from direct answers of the mothers or home caregivers.

Anthropometric examinations of all children were done to assess the child nutritional growth, based upon the WHO guidelines for field evaluation. Nutritional status will be evaluated via nutritional indicators according to age, weight, and length/height because of their sensitivity to the full spectrum of malnutrition.

These indicators include length/height-for-age: Z scores <

-2SD reflects past or chronic malnutrition. It indicates stunting, weight-for-age: Z scores < -2SD denotes previous (chronic) and/or recent (acute) malnutrition yet doesn't differentiate between both. It denotes underweight. Weight for Length/height < -2SD is a sign of acute malnutrition and reflects wasting. Weight and Length/height were taken for each child who had completed the questionnaire. Weight was assessed to the nearest 0.1kg. While the child donned light clothing and without shoes. Child Length/height were measured to the nearest 0.1cm using NET Height Measuring Scale placed on a flat surface.

Calculation of the Sample Size

Sample size calculation was carried out utilizing EPI-INFO software statistical package version 7, documented by WHO and center for disease control and prevention. Criteria used for sample size calculation were: - 50% expected frequency, 95% confidence level, and 5% as acceptable margin of error. According to these characters, the sample size was determined as 369 children from Fesha and 366 from Besentowai. The number of children was increased to 400 children from each village for better accuracy.

Statistical analysis

Data were statistically analyzed using SPSS v25 (IBM Inc., Chicago, IL, USA). Descriptive statistical approaches were utilized for numerical parametric data as mean \pm SD and minimum & maximum of the range and for numerical non parametric data as median and first and third inter-quartile range, whereas categorical data were analyzed as number and percentage. Inferential analysis was carried out for qualitative data via the use of Chi square test for independent groups. A 2 tailed P value of less than 0.05 was considered significant.

Results

Table (1) reveals that within the studied group there are 430 (53.75%) male and 370 (46.25%) female. The age distribution of the studied group is 274 (34.25%) are within the age group (0-6 months), 159 (19.88%) are within the age group (6-12 months), and 367 (45.87%) are within the age group (1- 2 years). As per residence, 400 (50.00%) live in Besantaway and 400 (50.00%) live in Fisha.

Table 1: Criteria of the studied children

Variables	Studied infants (N= 800)	
	N	%
Sex		
Male	430	53.75%
Female	370	46.25%
Age		
0- 6 months	274	34.25%
6- 12 months	159	19.88%
1- 2 years	367	45.87%
Residence		
Besantaway	400	50.00%
Fisha	400	50.00%
Birth weight		
< 2.5 Kg	428	53.5%
\geq 2.5 Kg	372	46.5%
Feeding type		
Breast feeding	314	39.25%
Artificial feeding	311	38.88%
Mixed	175	21.87%

Data are presented as frequency (%).

There were highly statistically significant differences among age groups 0-6 & 6-12 months and 1-2 y as per use health services after labour with P value 0.001.

Table 2: Maternal healthcare services per age of the child

Maternal Healthcare Services		0- 6 months (n.= 274)		6- 12 months (n.= 159)		1- 2 years (n.= 367)		p-value
		No.	%	No.	%	No.	%	
Use of health services during pregnancy & labour	No	12	4.38%	4	2.52%	7	1.91%	>0.05
	Yes	262	95.62%	155	97.48%	360	98.09%	
Use of health services after labour	No	74	27.01%	25	15.72%	57	15.53%	0.001**
	Yes	200	72.99%	134	84.28%	310	84.47%	
Regular vaccination intake	No	3	1.09%	0	0.00%	5	1.36%	>0.05
	Yes	271	98.91%	159	100.0%	362	98.64%	
Mode of delivery	Vaginal	71	25.91%	48	30.19%	86	23.43%	>0.05
	CS	203	74.09%	111	69.81%	281	76.57%	
Problems during delivery	No	232	84.67%	140	88.05%	330	89.92%	>0.05
	Yes	42	15.33%	19	11.95%	37	10.08%	

Data are presented as frequency (%). CS: cesarean section. * Significantly, There was significant relation between marital statuses among the parenting factors with age (p of less than 0.005). Table 3

Table 3: Parenting Factors per age of the child

Parenting Factors		0- 6 months (n.= 274)		6- 12 months (n.= 159)		1- 2 years (n.= 367)		P-value
		No.	%	No.	%	No.	%	
Marital status	Single	0	0.00%	0	0.00%	8	2.18%	<0.05*
	Married	268	97.81%	157	98.74%	347	94.55%	
	Divorced	5	1.82%	2	1.26%	7	1.91%	
	Widow	1	0.36%	0	0.00%	5	1.36%	
Mother age	<30 years	245	89.42%	140	88.05%	335	91.28%	>0.05
	>30 years	29	10.58%	19	11.95%	32	8.72%	
Father age	<30 years	138	50.36%	83	52.20%	207	56.40%	>0.05
	>30 years	136	49.64%	76	47.80%	160	43.60%	
Mother education	Illiterate	13	4.74%	3	1.89%	10	2.72%	>0.05
	Read & write	20	7.30%	17	10.69%	18	4.90%	
	Primary education	10	3.65%	5	3.14%	5	1.36%	
	Preparatory education	43	15.69%	22	13.84%	66	17.98%	
	Secondary education	150	54.74%	93	58.49%	217	59.13%	
	Middle education	28	10.22%	14	8.81%	33	8.99%	
	University	10	3.65%	5	3.14%	17	4.63%	
Father education	Postgraduate	0	0.00%	0	0.00%	1	0.27%	>0.05
	Illiterate	21	7.66%	9	5.66%	18	4.90%	
	read & write	29	10.58%	20	12.58%	23	6.27%	
	Primary education	4	1.46%	3	1.89%	8	2.18%	
	Preparatory education	7	2.55%	4	2.52%	12	3.27%	
	Secondary education	162	59.12%	92	57.86%	225	61.31%	
	Middle education	35	12.77%	27	16.98%	65	17.71%	
Mother occupation	University	16	5.84%	4	2.52%	15	4.09%	>0.05
	Postgraduate	0	0.00%	0	0.00%	1	0.27%	
	Not working	255	93.07%	150	94.34%	346	94.28%	
	Worker	8	2.92%	1	0.63%	8	2.18%	
	Manual worker or farmer	1	0.36%	1	0.63%	0	0.00%	
Father occupation	Businesswoman	2	0.73%	0	0.00%	0	0.00%	>0.05
	Employee	8	2.92%	7	4.40%	13	3.54%	
	Not working	47	17.15%	22	13.84%	49	13.35%	
	Worker	128	46.72%	91	57.23%	204	55.59%	
	Manual worker or farmer	80	29.20%	37	23.27%	81	22.07%	
Employee	Businessman	4	1.46%	2	1.26%	13	3.54%	>0.05
	Employee	15	5.47%	7	4.40%	20	5.45%	

Data are presented as frequency (%). * Significantly.

There are non-significant differences between the included female and male children as per parent/Family behavior. Table 4

Table 4: Parent/Family behavior per sex of the child

Parent/Family behavior		Male (n.= 430)		Female (n.= 370)		P-value
		No.	%	No.	%	
Mother independency	No	57	13.26%	62	16.76%	>0.05
	Yes	373	86.74%	308	83.24%	

Pregnancy spacing	First pregnancy	148	34.42%	154	41.62%	>0.05
	<5 years	266	61.86%	202	54.59%	
	>5 years	16	3.72%	14	3.78%	
Preference of female doctors	No	368	85.58%	316	85.41%	>0.05
	Yes	62	14.42%	54	14.59%	
Smoking	No	164	38.14%	124	33.51%	>0.05
	Yes	266	61.86%	246	66.49%	

Data are presented as frequency (%).

There were significant differences between the included age children as per family income with P value of less than 0.05. Table 5

Table 5: Socio-Cultural Factors per age of the child

Socio-Cultural Factors		0- 6 months (n.= 274)		6- 12 months (n.= 159)		1- 2 years (n.= 367)		P-value
		No.	%	No.	%	No.	%	
Birth order	1	97	35.40%	71	44.65%	153	41.69%	>0.05
	2	106	38.69%	47	29.56%	133	36.24%	
	3	48	17.52%	32	20.13%	60	16.35%	
	4	23	8.39%	9	5.66%	21	5.72%	
Family income	Insufficient	74	27.01%	40	25.16%	62	16.89%	<0.05*
	Sufficient for daily requirements	191	69.71%	109	68.55%	281	76.57%	
	Sufficient for daily requirements and emergencies	9	3.28%	10	6.29%	23	6.27%	
	Sufficient and can save	0	0.00%	0	0.00%	1	0.27%	
Sufficiency of food	Yes	269	98.18%	156	98.11%	366	99.73%	>0.05
	No	5	1.82%	3	1.89%	1	0.27%	

Data are presented as frequency (%).

Discussion

In the current study the studied group there is 430 (53.75%) male and 370 (46.25%) female. Age distribution of the studied group are 274 (34.25%) are within the age group (0-6 months), 159 (19.88%) are within the age group (6-12 months), and 367 (45.87%) are within the age group (1-2 years). As per residence, 400 (50.00%) live in Besant away and 400 (50.00%) live in Fisha, the majority in current study in the age group (1-2 years) with no difference in number between two areas.

The maternal health and childcare of the studied children as per age showed the mother healthcare services as per age of the child. 95.62%, 97.48% and 98.09% of children in age groups 0-6 months, 6-12 months and 1-2 y respectively reported use health services during pregnancy & labour. 72.99%, 84.28% and 84.47% of children in age groups 0-6 months, 6-12 months and 1-2 y respectively reported use health services after labour. In addition, 98.91%, 100% and 98.64% of children in age groups 0-6 months, 6-12 months and 1-2 y respectively reported regular mother vaccination intake. 74.09%, 69.81% and 76.57% of mothers in age groups 0-6 & 6-12 months and 1-2 y respectively were delivered by CS and 15.33%, 11.95% and 10.08% of them in age groups 0-6 & 6-12 months and 1-2 y respectively reported problem during delivery. There are highly statistically significant differences between age groups 0-6 months, 6-12 months and 1-2 years as per use health services after labour these reflect excellent usage of health care services and increase in C.S labour in these areas of study and there was a significant relation between use of health services after labour with weight for age among the studied groups.

In contrary to these results underweight among children < 5y was non-significantly accompanied by antenatal care, place of delivery, health facility, and postnatal care in Aryastami *et al.*, [7] study that aimed at identifying the socio-demographic, environmental, as well as MCH factors accompanied by objectively evaluated underweight in

children aged <5 y in Nepal.

The parenting factors of the studied children as per age showed that parenting factors among the studied children as per age. High percentage of married cases in underweight, normal and overweight groups (96.72%, 96.3% and 97.8% respectively). Also, high percentage of mother age less than 30 years were found in the three studied groups while near half cases had father age less than 30 years. High percentage of children whose mother had secondary education in underweight, normal and overweight groups (47.54%, 57.56% and 63.74% respectively). Also, high percentage of children whose fathers had secondary education in underweight, normal and overweight groups (65.57%, 57.87% and 70.33% respectively). Most mothers of children in the three groups were not working while near half of fathers of those children were workers.

In the present study, there were non-significant relations between parenting factors with weight for age among the studied groups except for mother occupation where a significant correlation with weight for age was determined due to mother awareness about correct feeding. In contrary to these results, no significant correlation was determined between the recruitment state of mothers and children's weight for age in Aluko *et al.*, [8] study.

In Shrestha *et al.*, [9] study, educational status of the father, educational status of the mother, and the mother's career were significantly associated with underweight. Mother's employment status was risk factor for children's low weight-for-age condition in Khan *et al.*, [10] study.

The socio-cultural factors of the studied children as per for age showed that 35.4%, 44.65% and 41.69% of children in age groups 0-6, 6-12 months and 1-2 y respectively were the first child in their family. 69.71%, 86.55% and 76.57% of them in the three groups respectively reported enough income for daily requirements. Meanwhile, 98.18%, 98.11% and 99.73% of them in the three groups respectively had sufficient food.

There are significant differences between the included age

children as per family income. However, children who had a birth order of 3rd and 4th had higher chances of being underweight in comparison with to 1st and 2nd child; in addition, the low educational levels of the fathers and the mothers were significantly accompanied by underweight in Tariq *et al.*,^[11] study.

It is recommended to carry out further studies on bigger sample size as well as on large geographical scale in order to assert our conclusion, encourage healthy eating to children, avoid snacks and highly sugar food to avoid overweight, guide mothers and care givers in social media to healthy diet, continue to encourage mothers to seek medical advice when needed. We also recommend for increasing and enhancing health education session during antenatal care about importance of breast feeding and importance of its early onset on the nutritional condition of the offspring.

Conclusions

Age groups had significant relation with health services after labour and, family income. The included female and male children had significant relation as regard to per parent/Family behaviour. Mother occupation had significant relation with weight for age.

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