Socioeconomic related potentials on Malnutrition among Children in Qena Governorate

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Abstract

Background: Childhood malnutrition is an increasing public health problem. Child growth is an important indicator of nutritional status and is a reflection of the socioeconomic status of the family and the social well-being of the community.

Objectives: The study aimed to assess the socioeconomic-related risk factors that contribute to the occurrence of malnutrition among the under-five children

Patients and methods: This was a community-based cross-sectional study conducted with under-five years' old children in the Qena governorate using the cluster sampling method with an equal number of children in each cluster during the study period of one year with a complete evaluation of socio-demographic data, socioeconomic levels, maternal factors and child factors that may be related to malnutrition.

Results: the current study revealed that malnutrition state was more common among the lower social class. Wasting was more common among children with family sizes>7 persons. Being Underweight was more common among children in rural areas and the multivariate logistic regression analysis showed that children residing in the rural area had a three-time risk of developing underweight than those living in the urban area and children who received artificial feeding had higher odds of developing wasting than children who received breast feeding.

Conclusion: Rural residency, lack of breastfeeding, large family size, and lower social class were risk factors for developing malnutrition in children.

Keywords: Epidemiologic; Malnutrition; Children.

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Introduction

Malnutrition is a state of either under or over-nutrition with an imbalance between nutrient requirements and intake causing deficiency in energy, protein, or micronutrients and affecting immunity, growth, and development **(Mehta et al., 2013).** Globally, malnutrition is considered one of the most risk factors for morbidity and mortality as it contributes to more than 3 million deaths annually among young children less than 5 years **(Fanzo et al.,2019).**

Multiple risk factors contribute to the increasing prevalence of malnutrition as low socioeconomic status of the family, household health index, health literacy, nutrition culture, maternal nutrition during pregnancy, number of childbirths, child's age, gender, and birth weight **(Asgary et al., 2015; Demissie et al., 2013)**, duration of breastfeeding and presence of infections **(Akombi et al .,2017).**

Exclusive breastfeeding during the first six months of a child's life was found to be crucial for optimal growth, development, and health of infants, breast milk contains all the nutrients needed for healthy growth as well as immune factors that protect against common childhood infections **(Kramer and Kakuma., 2012)**, risk of malnutrition could be caused by sub-optimal exclusive breastfeeding during the first half-year of life compounded by inappropriate complementary feeding **(Agunbiade and Ogunleye., 2012).**

Socioeconomic status (SES) is an economic and sociological combined total measure of a person's work experience and of an individual's or family's economic access to resources and social position in relation to others **(Palta et l., 2015)**. A consistent finding in child malnutrition studies is that children who reside in rural areas have higher rates of stunting and are underweight than those in urban areas **(Smith et al., 2004- Fotso., 2007- Omilola .,2010)**. Improving living conditions and socioeconomic status can improve the children's health status and cause catch-up growth **(Sharaf et al., 2016)**. Therefore, the objective of this study was to determine the sociodemographic factors, socioeconomic levels, child care practice-associated determinants, that may help to manage and improvement of child health status and decrease malnutrition among children aged 6–59 months.

Patient and methods

Participants and Study Design

A community-based cross-sectional study has been conducted with 500 infants and children aged from 6 months to 5 years old, during the study period from January to December 2021 in Qena Governorate. Informed written consent was taken from the caregivers and the study has been approved by the Ethics Committee of the Faculty of Medicine, South Valley University, Egypt. Children suffering from chronic renal, hepatic, gastrointestinal, cardiac, and neurological disorders or receiving chronic medications were excluded from the study.

Data Collections

Clinical Evaluation of the Included Patients: A detailed medical history was taken from the caregivers including the child's age, sex, residence, family size, living conditions (Water source, Sewage system), maternal-related factors (Spacing between births, receiving antenatal care, delivery events as regard type, place, and person attending delivery)

Complete nutritional history including the timing of Initiation of breastfeeding, type of feeding during first two years, the presence or absence of lactation problems, and the quantity and quality of food introduced.

Socioeconomic levels were determined using a modified Fahmy and El-sherbini social classification scale (**Fahmy et al., 2015)** for assessing Egyptian socioeconomic status. This score encompasses paternal education, paternal work, family size, housing condition, and per-capita income. A score of 33.6 to 48 is considered high social status, a score of 19.2 to <33.6 is considered medium social status, and a score of < 19.2 is considered low social status.

A complete general and systematic examination was performed. Anthropometric measurements such as the weight (Kg) and height (cm) of children were recorded. BMI was calculated (kg/m2) and all anthropometric data were compared with the Egyptian growth charts **(Egyptian growth curves .,2012)**

A stunted child has a low height-for-age (indicating chronic hunger), while a wasted child has a low weight-for-height (indicating acute weight loss). Underweight refers to a low weight-for-age (it is a summary indicator, as it can result from a child being stunted or wasted). according to **Best et al (2010),** stunting (Height-for-age): < 3rd percentile of WHO growth reference or CDC growth charts; Underweight (Weight-for-age): < 3rd percentile of WHO growth reference or CDC growth charts; Thinness (BMI-for-age): < 5th percentile of WHO growth reference or CDC growth charts

Statistical analysis

Statistical analysis was performed using the SPSS version 26. Quantitative data were presented as numbers and percentages, while qualitative data were presented as means ± SD. Analysis was done by descriptive statistics and logistic regressions. Descriptive statistics were used to generate frequencies and to describe the study variables. The present study performed bivariate analyses using chi-square analyses to test dichotomous variable. In the final stage, the study conducted a multivariate analysis using logistic regression to determine the variables affecting underweight, stunting and wasting .P-values were considered statistically significant when P < 0.05.The current study had been approved by the ethics committee of Faculty of Medicine ,SVU,Qena, Egypt. The ethical approval code :SVU-MED-COM009-2-20-12-103.

Results

Demographic and Clinical Data

The study was conducted with 500 infants and children with a mean age 28.31months ±16.06 SD; 240 males and 260 females. Most families had a family size of ≥7 persons (65%) and most of the studied cases had urban residence (61%) versus 39% in rural areas.

Child Spacing between births revealed that 28% were first child, 32% had <2 years spacing interval and 40% had ≥2 years of spacing interval. We detected that 48% of the mothers had received antenatal care while 52.0% didn't and 57.0% of the mothers had a normal vaginal delivery. Determination of socioeconomic class level revealed that 37% were of low social class with a mean score of 15.2 and range from 11-19, the medium social class represents 59% of the studied families with a mean score of 24.3 and range from 20-31, while 4% only were of high social class with a mean score of 37.3 and range from 35-40. mean of weight was 11.59 KG with range 5.5kg to 20kg , mean height was 84.63 cm with range 55 cm to 114 cm while mean BMI was 15.89 with range 10.5-19.55 **(Table. 1).**

Table 1. Socio-demographic and clinical data of the studied children

Variables		No (n=500)	%
Age/ months	Mean ± SD	28.31±16.06	
	Range	6- 59	
Sex	Male	240	48.0%
	Female	260	52.0%
Residence	Rural	195	39.0%
	Urban	305	61.0%
Family size	≤6	175	35.0%
	≥7	325	65.0%
Water source	Piped water in house	500	100%
Sewage system	No	160	32.0%
	Yes	340	68.0%
Spacing between births	First child	140	28.0%
	<2years	160	32.0%
	≥2 years	200	40.0%
Antenatal care	No	260	52.0%
	Yes	240	48.0%
Type of Delivery	Normal	285	57.0%
	Caesarian	215	43.0%
Type of Feeding	Breast	395	79.0%
	Artificial	105	21.0%
Time of Initiation breast feeding	<30 minutes after delivery	140	28.0%
	Hours after delivery	200	40.0%
	Few days after delivery	160	32.0%
Lactation problems	No	330	66.0%
	Yes	170	34.0%
Social class	Low	185	37.0%
	Medium	295	59.0%
	High	20	4.0%
Weight/kg	Mean ± SD	11.59±3.16	
	Range	5.5-20	
Height /cm	Mean ± SD	84.63± 12.70	
	Range	55-114	
BMI	Mean ± SD	16.02± 1.7	
	Range	9.7-20.8	

Effect of delivery events on the timing of initiation of breastfeeding

Mothers who had delivered at home with the help of midwives had started breastfeeding later than the mothers who had delivered in health care facilities under Physician observation where they had started breastfeeding in less than 30 minutes to hours after delivery. Also, mothers from urban areas started breastfeeding earlier than those from rural areas, and mothers that had normal vaginal delivery also started breastfeeding earlier than those who had a caesarian section **(Table. 2).**

Table 2. Effect of delivery events on the timing of initiation of breast feeding

Variables		Initiation breast feeding						Chi square test	
		<30 minutes after delivery (140 cases)		hours after delivery (200 cases)		days after delivery (160 cases)			
		No	%	No	%	No	%	x^2	p value
Place of delivery	Home	30	21.4%	80	40.0%	90	56.20%	37.723	<0.001*
	Health care facility	110	78.6%	120	60.0%	70	43.80%		
Person attended delivery	Midwife	25	17.9%	70	35.0%	90	56.20%	68.795	<0.001*
	Nurse	40	28.6%	55	27.5%	50	31.20%		
	Physician	75	53.6%	75	37.5%	20	12.50%		
Residence	Rural	35	25.0%	50	25.0%	110	68.80%	87.537	<0.001*
	Urban	105	75.0%	150	75.0%	50	31.20%		
Type of delivery	Normal	135	96.4%	125	62.5%	25	15.60%	203.018	<0.001*
	Caesarian	5	3.6%	75	37.5%	135	84.40%		

Malnutrition-related risk factors

A higher incidence of underweight (15.4%) in rural areas versus in urban areas (6.6%) with a statistically significant difference. The rural residency also had a higher stunting rate (30.8%) and wasting (5.5%) compared to urban (24.6% and 3.3% respectively but without statistically significant difference (p-value > 0.05) **(Table. 3).**

Table 3. Impact of residency on the prevalence of malnutrition on the studied children

Variables		Residence				Chi square test	
		Rural (195 cases)		Urban (305 cases)			
		No	%	No	%	x^2	p value
Height\age	Normal	135	69.2%	225	73.8%	5.219	0.074
	Above normal	0	0.0%	5	1.6%		
	Stunting	60	30.8%	75	24.6%		
Weight\age	Normal	155	79.5%	275	90.2%	11.863	0.008*
	Overweight	5	2.6%	5	1.6%		
	Obese	5	2.6%	5	1.6%		
	Underweight	30	15.4%	20	6.6%		
BMI\ age	Normal	185	94.9%	295	96.7%	1.06	0.303
	Above normal	0	0.0%	0	0.0%		
	Wasted	10	5.1%	10	3.3%		

A larger family size with ≥7 people in the family had a significantly higher percentage of wasting children than a family with a size of ≤ 6 persons **(Table. 4).**

Table 4. Impact of family size on the prevalence of malnutrition on the studied children

Variables		Family size				Chi square test	
		≤Six (175 cases)		≥Seven (325 cases)			
		No	%	No	%	x^2	p value
Height\age	Normal	120	68.6%	240	73.8%	1.994	0.369
	Above normal	5	2.9%	0	0.0%		
	Stunting	50	28.6%	85	26.2%		
Weight\age	Normal	155	88.6%	275	84.6%	7.13	0.068
	Overweight	0	0.0%	10	3.1%		
	Underweight	15	8.6%	35	10.8%		
	Obese	5	2.9%	5	1.5%		
BMI\age	Normal	175	100.0%	305	93.8%	11.218	0.001*
	Wasted	0	0.0%	20	6.2%		

Children from the high social class had no detected malnutrition state while children with low social class had a higher rate of underweight, stunting growth, and wasting than those from the medium social class with a statistically significant difference **(Table.5 and Fig.1).**

Table 5. Socioeconomic status impact on the prevalence of malnutrition on the studied children

Socioeconomic level	Stunting		Underweight		Wasting	
	Yes 135 cases	No 380 cases	Yes 55 cases	No 450 cases	Yes 20 cases	No 480 cases
Low	95(70.4%)	90(24.7%)	40(72.7%)	145(32.6%)	10(50%)	175(36.5%)
Medium	40(29.6%)	255(69.9%)	15(27.3%)	280(62.9%)	10(50%)	285(59.4%)
High	0(0%)	20(5.5%)	0(0%)	20(4.5%)	0(0%)	4(4.2%)
X2	18.019		6.867		0.414	
P value	0.000*		0.03*		0.8	

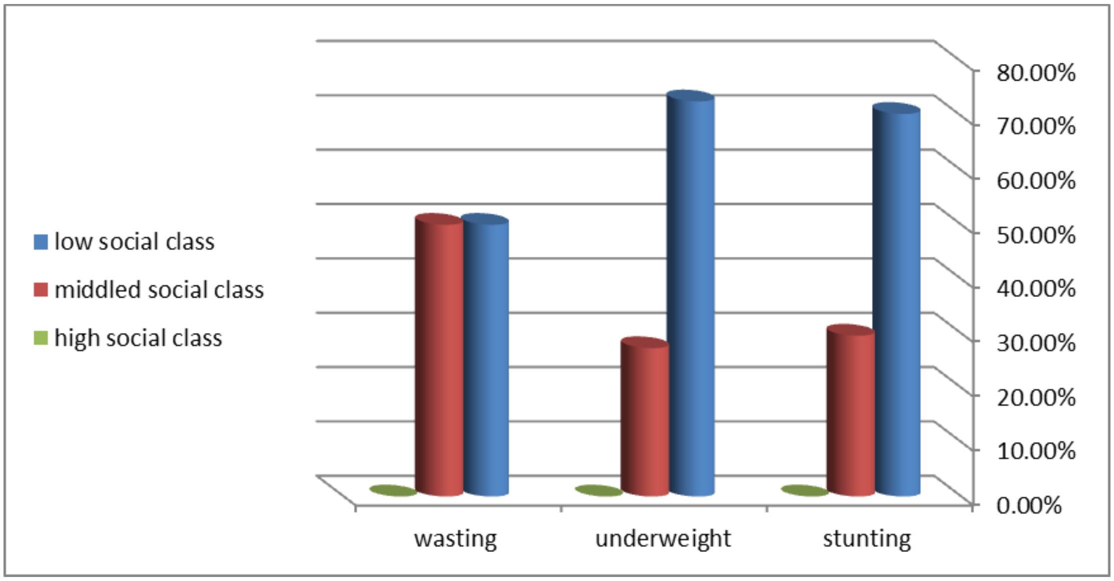

Fig.1.Prevalence of malnutrition state among socioeconomic state

The multivariate logistic regression analysis showed that children residing in the rural area had a three-time risk of developing underweight than those living in the urban area (odds ratio of 3.117, CI: 1.741- 5.581). Children who received artificial feeding had higher odds of developing wasting than children who received breast feeding **(Table. 6).**

Table 6. Logistic regression analysis of malnutrition state among the studied group

Variables		**P value**	**Odds ratio**	**95% C.I.**	
				Upper	**Lower**
Underweight	**Rural residence**	0.001	3.117	1.741	5.581
Wasting	**Artificial feeding**	0.001	2.345	1.982	2.562

Discussion

Children's nutritional status is considered an important tool in gauging a population's health conditions and quality of life. Considering its complex and multifactorial character, a child's nutritional status is determined by the population's living conditions, particularly regarding social and economic aspects **(Pereira et al., 2017).** Most the developing countries are confronting issues related to economic crises, such as poverty, social insecurities, unemployment, and food insecurity **(Ali .,2021).**

The current study results indicated a statistically significant increase in initiating breast feeding < 30 hours after delivery among mothers who were delivered vaginally, in healthcare facilities by physicians in urban residency (P value < 0.001). Such findings are in agreement with a previous study by(**Hobbs et al., 2016)** who found that more women who delivered by planned cesarean section had no intention to breastfeed or delay breastfeeding initiation when compared to women with vaginal births, additionally, **(Taha et al.,2019)** indicated that delays in breastfeeding initiation associated with cesarean section are linked with maternal/infant separation, reduced suckling ability, decreased infant receptivity, and insufficient milk supply, which are predictive of shortened breastfeeding duration.

Regarding the effect of the residence on the prevalence of malnutrition among the studied children, our results indicated a significant increase in underweight among rural residents in comparison with the urban residents, Such findings are in agreement with **(Farahat et al., 2017)** in a large study conducted with thousand and two hundred children under 5 years old in Qualyoubia governorate, Egypt, had found a high prevalence of stunted growth among children from the rural area, additionally, a previous study by **(Yunitasari et al.,2020)** indicated that underweight children are more common in rural than in urban areas and factors such as children's age (24-59 months) and the total number of children in one house (≥ 5 members) contribute to such condition. **(Pal et al.,2021)** also indicated that under nutrition was more common in children from rural regions than in children from urban areas and explained that the disparity could be related to a lack of health knowledge, medical service accessibility, and dietary awareness among rural women.

Regarding the impact of socioeconomic status on the prevalence of malnutrition among studied children, our result indicated children with low social class had a higher significant rate of being underweight, stunting growth, and wasting than those from the medium social class that in concordance with(**Pravana et al., 2017**) who found that poor socioeconomic status, lower level of parental education, younger age of mother at birth, short birth interval and initiation of complementary feeding are important determinants of undernutrition among under-five children. **(Asim et al.2018)** indicated that Higher vulnerability of food insecurity is associated with households' lower socioeconomic status because nutritious food affordability closely associated with purchasing power. Moreever **(Babar et al., 2010- UNICEF., 2018)** indicated that Households facing limitations in social and economic development are most probably face issues in physical growth due to consumption of poor food, illness scenario, sanitation insufficiency, pitiable hygienic practice and inadequate safe water access .

Our results indicated that bottle feeding was a risk factor for wasting , Such findings are in agreement with **(Meshram et al .,2018- Huey et al., 2019)** indicated that Risk of wasting was 2.55 times higher among children who were bottle fed than non bottle fed. Bottle feeding is identified as a vital factor in malnutrition-infection cycle and considered a major risk factor for infant and child mortality. Mothers need to be informed about the risks of bottle feeding.

Conclusion

Malnutrition is a major public health problem. Identifying the high-risk group liable to malnutrition is very important in the prevention and early intervention. Rural residency, lack of breast feeding, large family size, and lower social class were risk factors for developing malnutrition in children. Improving living conditions and good antenatal care by providing health facilities and educating mothers on the importance of good feeding practices is an important step in early dealing with malnutrition problems.

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