Influence of Paternal Education and Occupation on the Nutrition State of Children in Upper Egypt

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Abstract

Background and aims: Nutritional disorders in the pediatric age group are a critical health issue andit ranks among the world's major causes of morbidity and mortality especially in developing countries. The current study's goal was to assess the prevalence of malnutrition in a group of Egyptian pre-schoolers, to identify associated risk factors, and identify the effect of paternal education and occupation on this nutritional state.

Subjects and methods:A cross-sectional study including 500 Egyptian children with age range from 6 months to 59 months. The mother/caregiver of the children was questionedand a structured questionnaire had been conducted among the studied children with complete clinical evaluation and assessment for association with malnutrition. Anthropometric measures were measured precisely.

Result: The overall results revealed that 27% of the studied children had stunting, 10% were underweight, and 4 % had wasted. Females were statistically more affected by malnutrition than males. A significant increase in malnutrition state among children of non-skilled worker fathers and lower-educated levels mothers. A negative correlation was detected between weight and height of the studied group with the frequency of attacks of diarrhea and respiratory tract infection. Multivariate logistic regression analysis revealed that the significant predictors for occurrence of malnutrition were a younger age, female sex, and lower levels of maternal education.

Conclusion: Lack of parental education, employed mothers, and father occupation are important risk factors among malnourished children.

Keywords: Epidemiology, Malnutrition, Children.

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1. Introduction:

Malnutrition is “a nutrition disorders in which a deficiency/ or excess of energy, protein, and micronutrients causes measurable adverse effects on the body shape, size, composition, function, and clinical outcome”**(Chapman, 2011)**. Adequate nutrition is required in early childhood to achieve normal growth, good immune response, and adequate intellectual development **(Liu et al., 2012).**Childhood malnutritionis a major contributor of morbidity and death worldwide especially in developing countries **(Amsalu et al., 2008)**. The common anthropometric indicatorsused inmalnutrition assessment in young age under five years oldinvolvingunderweight, stunting, and wasting **(Zemenu et al., 2017)**. Malnutrition is a complex issue with multiple interacting factors

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(Bantamen et al., 2014). A major contributing factors as low family socioeconomic status, level of parental, household health index, health knowledge levels, nutrition culture, maternal features nutrition during pregnancy, and the number of births, as well as frequent infectious diseases. **(Asgaryet al,.2015).**

The prevalence of under five stunting in Egypt in comparison to developing countries was(22.3% versus 25%)respectively.Conversely,The prevalence of under fivewasting in Egypt in comparison to developing countries was(9.5% versus 8.9%)respectively **(UNICEF, 2019).**

Acute malnutrition has been linked in studies to a variety of comorbid conditions that may increase the risk of death **(Talbert et al 2012)**. Children suffering from malnutrition are more likely to get pneumonia and diarrhoea **(Schlaudecker et al., 2011 and Hooli et al 2016)**.Loss of micronutrients and dehydration caused by diarrhea increase the risk of acute respiratory infection also diarrhea weaken the immune system which protect the body against any infection.**(Fenn et al., 2005).**The current study aimed to estimate the problem size of malnutrition by assessment of its prevalence, to early identify some of its associated risk factors, and to identify the relation between paternal educations and occupations on the nutritional state of the preschool aged children in order to improve their nutritional state and for a better prognosis.

Patients and Methods

Study design:

The current cross-sectional, community-based study involved 500 Egyptian infants and kids residing in the Qena province in Egypt with age range from 6 months to 59 monthsduring the study period from 1st of January 2021 to the end of December 2021. We changed the sample size to have 80% power and 5% confidence in significance (type 1 error). Before the experiment received approval from the Ethics committee of the Faculty of Medicine at South Valley University in Qena, Egypt, all of the children's parents or legal guardians were informed of the goal of the study and given the chance to provide their written informed consent. We used the cluster sampling method with equal numbers of children in each cluster. We started randomly in each area then from door to door taking every family that has preschool children and agreed to be recruited for the study.

Clinical evaluation of the participants:

A structured interview with the children´s mother/caregiver was done and a structured questionnaire had been conducted among the studied children including the socio-demographic data characteristics of the family, prenatal, postnatal data, and parenteral socio-demographic data and their education levels, and occupation. Also, a detailed medical history including the nutritional history, history suggestive of delayed physical development associated with rickets, history of recurrent attacks of gastroenteritis, and recurrent chest infection in the year prior to the study was inquired about. Exams were conducted using a methodical, all-encompassing approach. Anthropometric measurements of children were performed in accordance with the recommendations in the measurement guide produced by the Food and Nutrition Technical Assistance (FANTA) project. Weight was measured using a weighing scale on a brand-new calibrated portable scale. Children’s height

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was assessed in Frankfurt's positionusing a portable stadiometer. Length was measured to Infants between the ages of 6 and 24 months in their recumbent position. All anthropometric data were recorded, and the body mass index (BMI), which is computed as (weight, kg/height m2), was compared with the Egyptian growth curves. **(Egyptian growth curves, 2012).**

The standard deviation scores (Z scores);which express the anthropometric value as a Z score below or above the reference mean or median value, were then used to express all anthropometric measures. Underweight, stunting, and wasting are defined by the World Health Organization (WHO) as having Z-scores of less than 2 standard deviations of weight for height, height for age, and weight for age, respectively**(World Health Organization and UNICEF, 2012)**.Children with chronic illnesses (cardiac, respiratory, gastrointestinal, or neurological disorders) and infants younger than 6 months old were all disqualified from the study.

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2. Data management and statistical analysis:

The Statistical Package for Social Science, IBM SPSS version 20, was used to enter, review, and code the collected data. Numbers and percentages were used to represent the quantitative data with a parametric distribution, while means, standard deviations, and ranges were used to represent the quantitative data with a non-parametric distribution and median with interquartile range (IQR) was used to represent the latter. Using the Chi-square test, the comparison and association between two qualitative variables was examined (2 test). To determine the correlations between the quantitative variables, Pearson correlation was used. The independent risk factors connected to the occurrence of malnutrition were assessed using multivariate logistic regression analysis. P-values were considered statistically significant when $P < 0.05$.

3. Results:

Demographic and Clinical Data:

The current study included 500 infants and children's age range from 6 to 59 months old, the majority of cases 49% were in the toddler age group(1-3 years), followed by Preschool age (32%), and lastly Infant ≤1 year (19%). Females represented the major percentage (52%) of the studied group. Stunting was detected in 27.0% of the studied group, Wasted in 4.0%, Underweight in 10.0%, and Overweight in 2.0% (Table 1). There is an increase in the prevalence of underweight, wasting, and stunting in females than in males (figure 1).

Evaluating the levels of the studied group's parenteral education revealed that there are multiple levels of education with 37% of the fathers having received secondary education, 28% were illiterate and only 8% having higher level university education. We detected that 41% of the children's fathers were farmers, and 22.0% were employers (Table 2). Mothers' education evaluation revealed that illiteracy was reported in 33% of the mothers, while institute and university education represented 16% and 15% respectively. Most of the mothers 59% of them were working outside their homes either as employees or in professional jobs, and 41% were housewives (Table 2).

Impact of parenteral education and occupation on the prevalence of malnutrition:

The children whose mothers were illiterate, read and write, and those who received basic education primary or preparatory education were detected to have a higher prevalence of children with stunting (33.3%, 10%, 40%, and 50% respectively). Also, the children with

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mothers who were illiterate, or received a primary level of education had children with a higher prevalence of being underweight (12.1%, 20%), and a higher prevalence of wasting (6.1%, 20% respectively) (Table 3).

Children whose father's jobs were workers (skilled or non-skilled) had the highest prevalence of stunting(36.4%, and 34.6% respectively), a higher prevalence of underweight(18.2%, and 15.4% respectively), and the highest prevalence of wasting (9.1%, and 11.5% respectively) (Table 4). Regarding the impact of mother occupation on the prevalence of malnutrition, our results indicated a significant increase in normal weight per age in children among the housewife and a significant increase in overweight and obese children among employee and professional mothers (P value=0.002).

Other risk factors of malnutrition:

Infants had the highest prevalence of diarrhea as well as respiratory infection in the last year prior to the interview (84.2% and 73.7% respectively) (Table 5).

(Table 6).

In the current study; it was found that there is a statistical significance difference between different educational levels of the mothers and their occupation state with the prevalence of diarrhea and respiratory tract infection with the highest prevalence among illiterate and employers mothers (Table 6).

There was a negative correlation between diarrhea with weight and height among the studied group, and between respiratory infection with weight and height (P-value <0.001). (figure 2A,2B, and figure 3A, and 3B).

The multivariate logistic regression analysis showed that toddlers had the highest odds of developing stunting than other age groups (with an odds ratio of 2.353, CI: 4.351- 1.272), while the preschool age group had a higher risk to be underweight and wasting (odds 2.345, and 1.0 respectively). Females had the highest odds of risk of had underweight and stunting. Lower mothers' educational levels also had a higher risk to have children with underweight, stunting, and wasting than higher educated mothers

Table (1): Demographic and clinical data of studied children

		No (n=500)	%
Sex	Male	240	48.0%
	Female	260	52.0%
Age group	Infant ≤1 year	95	19%
	Toddler (1-3 years)	245	49%
	Pre school>3 years	160	32%
Height\ age using z score(HAZ)	Normal median±range	360 1.099(.551-3.507)	72.0%
	Above normal	5	1.0%
	Stunting median±range	135 -2.802(-3.582—2.596)	27.0%
Weight\age using z score (WAZ)	Normal median±range	430 -.17(-1.72--.03)	86.0%

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	Overweight median±range	10 1.43(1.32-1.74)	2.0%
	Underweight median±range	50 -2.658(-3.037—2.466)	10.0%
	Obese median±range	10 2.445(2.338-3.557)	2.0%
BMI\ age using z score (WHZ)	Normal median±range	480 1.547(.645-1.985)	96.0%
	Above normal	0	0.0%
	Wasted median±range	20 -2.657(-3.054—2.547)	4.0%

Table (2): Socio- demographic characteristics of the studied children parents .

		No (n=500)	**%**
Father education	Illiterate	140	28.0%
	Read and write	65	13.0%
	Primary	30	6.0%
	Preparatory	20	4.0%
	Secondary	185	37.0%
	Institute	20	4.0%
	University	40	8.0%
Mother education	Illiterate	165	33.0%
	Read and write	100	20.0%
	Primary	25	5.0%
	Preparatory	20	4.0%
	Secondary	35	7.0%
	Institute	80	16.0%
	University	75	15.0%
Father occupation	Farmer	205	41.0%
	Employee	110	22.0%
	Skilled worker	55	11.0%
	Non skilled worker	130	26.0%
Mother occupation	House wife	205	41.0%
	Employee	195	39.0%
	Professional	100	20.0%

Table (3) Impact of mother education on the prevalence of malnutrition of the studied children

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		Mother education														Chi square test	
		Illiterate (165 cases)		Read and write (100 cases)		Primary (25 cases)		Preparatory (20 cases)		Secondary (35 cases)		Institute (80 cases)		University (75 cases)			
		No	%	No	%	No	%	No	%	No	%	No	%	No	%	x2	p value
Height\age	Normal	110	66.7%	90	90.0%	15	60.0%	10	50.0%	25	71.4%	55.0	68.8%	55	73.3%	56.034	<0.001
	Above normal	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0.0	0.0%	5	6.7%		
	Stunting	55	33.3%	10	10.0%	10	40.0%	10	50.0%	10	28.6%	25.0	31.2%	15	20.0%		
Weight\age	Normal	145	87.9%	100	100.0%	20	80.0%	20	100.0%	25	71.4%	60.0	75.0%	60	80.0%	78.441	<0.001
	Overweight	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%	5.0	6.2%	5	6.7%		
	Underweight	20	12.1%	0	0.0%	5	20.0%	0	0.0%	10	28.6%	10.0	12.5%	5	6.7%		
	Obese	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%	5.0	6.2%	5	6.7%		
BMI\age	Normal	155	93.9%	100	100.0%	20	80.0%	20	100.0%	35	100.0%	75.0	93.8%	75	100.0%	29.129	<0.001
	Wasted	10	6.1%	0	0.0%	5	20.0%	0	0.0%	0	0.0%	5.0	6.2%	0	0.0%		

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Table (4): Impact of paternal occupation on the prevalence of malnutrition:

		Father occupation								Chi square test	
		Farmer (205 cases)		Employee (110 cases)		Skilled worker (55 cases)		Non skilled worker (130 cases)			
		No	%	No	%	No	%	No	%	x^2	p value
Height\age	Normal	150	73.2 %	90	81.8%	35	63.6%	85	65.4 %	18.295	0.006
	Above normal	5	2.4%	0	0.0%	0	0.0%	0	0.0%		
	Stunting	50	24.4 %	20	18.2%	20	36.4%	45	34.6 %		
Weight \age	Normal	190	92.7 %	85	77.3%	45	81.8%	110	84.6 %	58.015	<0.001
	Overweight	0	0.0%	10	9.1%	0	0.0%	0	0.0%		
	Underweight	10	4.9%	10	9.1%	10	18.2%	20	15.4 %		
	Obese	5	2.4%	5	4.5%	0	0.0%	0	0.0%		
BMI\age	Normal	205	100.0%	110	100.0 %	50	90.9%	115	88.5 %	36.076	<0.001
	Above normal	0	0.0%	0	0.0%	0	0.0%	0	0.0%		
	Wasted	0	0.0%	0	0.0%	5	9.1%	15	11.5 %		

		Mother occupation						Chi square test	
		House wife (205 cases)		Employee (195 cases)		Professional (100 cases)			
		No	%	No	%	No	%	x2	p value
Height	Normal	150	73.2%	135	69.2%	75	75.0%	8.447	0.076

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\age	Above normal	0	0.0%	5	2.6%	0	0.0%		
	Stunting	55	26.8%	55	28.2%	25	25.0%		
Weight\age	Normal	180	87.8%	165	84.6%	85	85.0%	21.454	0.002
	Overweight and obese	0	0.0%	10	5.2%	10	10.0%		
	Underweight	25	12.2%	20	10.3%	5	5.0%		
BMI\age	Normal	195	95.1%	185	94.9%	100	100.0%	5.225	0.073
	Above normal	10	4.9%	10	5.1%	0	0.0%		
	Wasted	150	73.2%	135	69.2%	75	75.0%		

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Table (5): The prevalence of gastrointestinal and respiratory morbidity in the last year by age among the studied children

		Age group						Chi square test	
		Infant (95 cases)		Toddler - (245 cases)		preschool- (160 cases)			
		No	%	No	%	No	%	x2	p value
Diarrhea	No	15	15.8%	130	53.1%	130	81.3%	20.786	<0.001
	Yes	80	84.2%	115	46.9%	30	18.8%		
Respiratory infection	No	25	26.3%	135	55.1%	140	60.0%	19.556	<0.001
	Yes	70	73.7%	110	44.9%	20	40.0%		

Table (6): Relation between maternal education and occupation on the prevalence of diarrhea and respiratory tract infection among studied children:

		Diarrhea				**Respiratory infection**			
		No (275 cases)		Yes (225 cases)		No (300 cases)		Yes (200 cases)	
		No	%	No	%	No	%	No	%
Mother education	Illiterate	80	29.1%	85	37.8%	90	30.0%	75	37.5%
	read and write	55	20.0%	45	20.0%	60	20.0%	40	20.0%
	Primary	5	1.8%	20	8.9%	15	5.0%	10	5.0%

	Preparatory	5	1.8%	15	6.7%	5	1.7%	15	7.5%
	Secondary	20	7.3%	15	6.7%	20	6.7%	15	7.5%
	Institute	40	14.5%	40	17.8%	60	20.0%	20	10.0%
	University	70	25.5%	5	2.2%	50	16.7%	25	12.5%
	X2	67.878				21.262			
	P value	.0001				.0002			
Mother occupation	house wife	125	45.5%	80	35.6%	145	48.3%	60	30.0%
	employee	80	29.1%	115	51.1%	95	31.7%	100	50.0%
	professional	70	25.5%	30	13.3%	60	20.0%	40	20.0%
	X2	27.434				20.179			
	P value	0.001				0.001			

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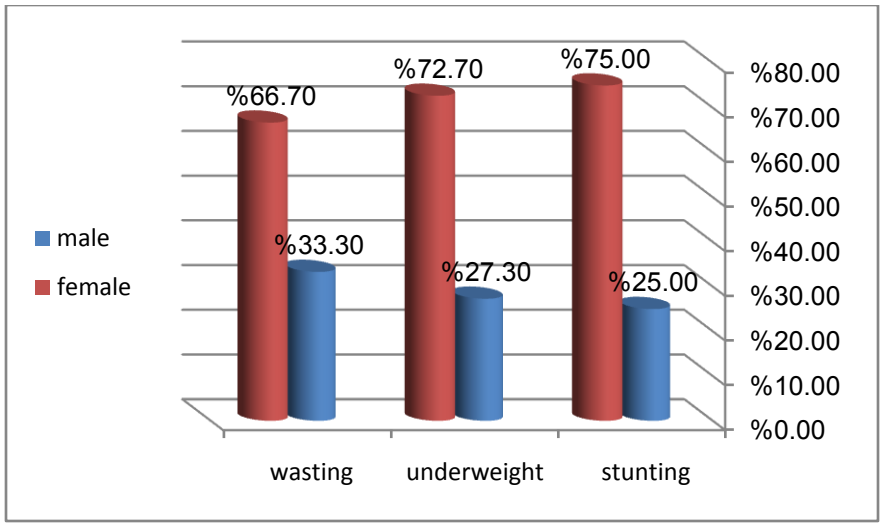
Table (7): Logistic regression analysis of stunting, underweight, and wasting among the studied group:

Variable		**P value**	**Odds ratio**	**95% C.I.**	
				Upper	**lower**
Stunting	Age group(toddler)	.006	2.353	1.272	4.351
	Sex (female)	.001	2.249	1.518	3.466
	Mother education(basic education primary and preparatory)	.002	1.983	0.46	3.53
Underweight	Age (preschool)	.001	2.345	1.982	2.562
	Sex (female)	.002	0.367	0.197	0.683
	Mother education(basic education primary and preparatory)	.005	2.983	1.978	2.983
Wasting	Age (preschool)	.02	1.0	0.087	2.763
	Sex (female)	.04	0.348	0.124	0.971
	Mother education(basic education preparatory)	.03	2.978	0.970	1.983



Fig(1): Prevalence of stunting, under- weight And wasting in the studied children

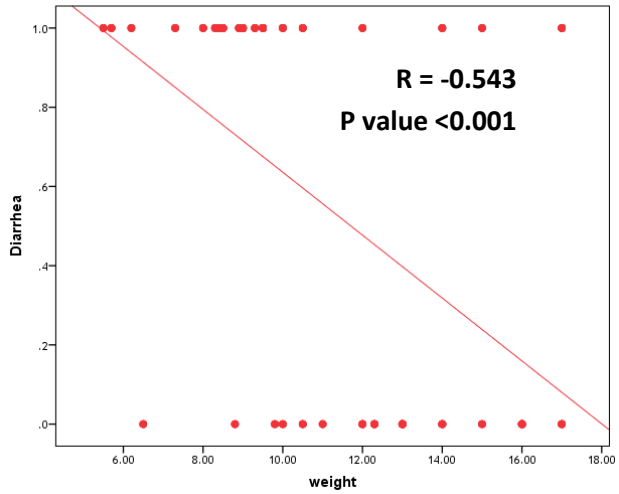
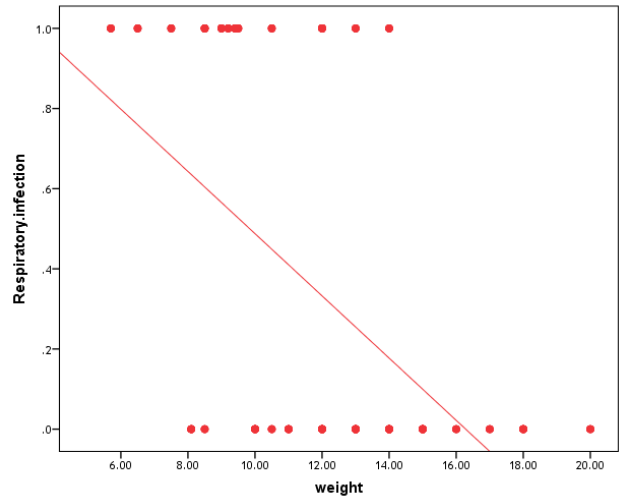


Figure (2): Correlation between diarrhea and weight among the studied children



R= -.579

P value<0.001

Figure (3): Correlation between respiratory infection and weight among the studied children

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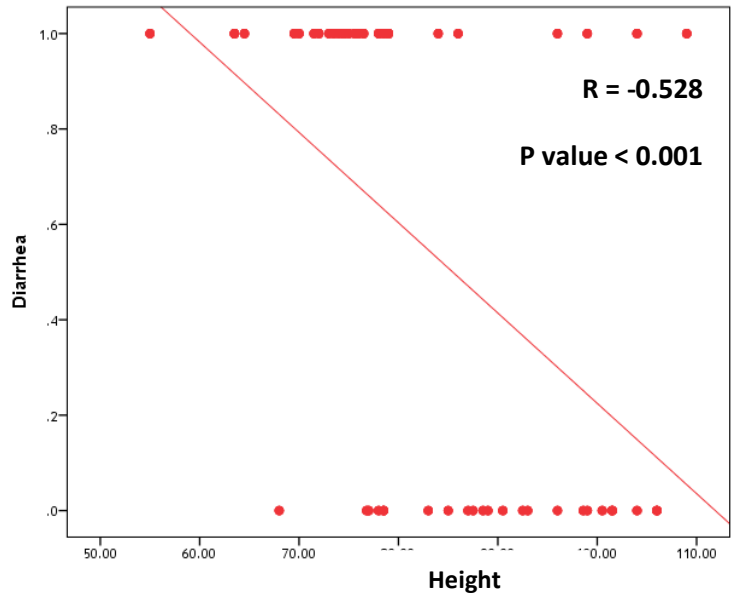

Figure (4): Correlation between diarrhea and height among the studied children

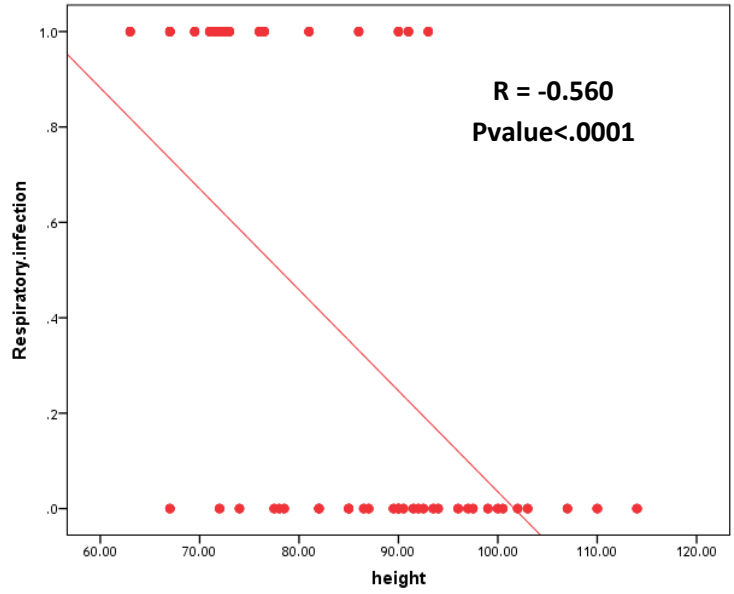

Figure (5): Correlation between respiratory infection and height among the studied children.

4. Discussion:

Preschool age is a special period in human ontogenesis in which all the organs and systems develop and improve their functioning **(Polevikova and Shvets, 2019)**. The nutritional status of children is seen as a crucial indicator of the health and standard living of a population.**(Pereira et al., 2017)**.

In the current study, stunting was detected in 27.0% of the studied group, Wasted in 4.0%, Underweight in 10.0%, and Overweight in 2.0% with the female gender being more statistically

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affected than males in all nutrition disorders and females had a higher odds risk factor to develop malnutrition 2.9 times more than males. Prevalence rates were different in various studies; **Hassan et al. (2018)** study conducted in EL Fayoum in Egypt found that prevalence of stunting (34.2%,), underweight (3.4%), and wasting (0.8%) respectively and that stunting was higher in females (36.2% versus 32.9% in males) though not significant, while a study in Pakistan by **Khan et al. (2019)**found that 10.7% of children under the age of five were wasted, 29.4% were underweight, and 44.4% had stunted growth., and no statistically significant differences were determined between males and females. **Rahman et al. (2021)** A study done in Bangladesh found that among children under the age of five, the frequency of stunting, wasting, and underweight was 35.4%, 15.4%, and 32.8%, respectively. A study conducted by **Karim et al. (2021)** also discovered that preschool-aged girls were more likely than boys to experience acute malnutrition. In the current study, moms with only preparatory school education and children in the first grade who were illiterate experienced considerably higher stunting rates. Such findings are in keeping with a survey study by **Berhane et al. (2020)** that found that low maternal educational levels was associated with an increased risk of stunting, limited food diversity, and reduced likelihood of being overweight among pre-schoolers. An earlier study by **Yunitasari et al (2020)** showed that the longer the mother attends education it will significantly reduce the possibility of 2.9% of children under-five suffering from malnutrition.**Khattak et al.,(2017)** documented that higher maternal and father educational statuses were also discovered to be highly linked with normal child nutritional status .

Parent's occupations had a major influence on the prevalence of malnutrition with a significant increase in normal weight per age in children among the housewife and a significant increase in overweight and obese children among the employee and professional mothers. While a significant increase in stunting, wasting, and underweight children among non-skilled worker's fathers. **Rashad and Sharaf, (2019)**on a large sample size (12,888 Egyptian children) aged from birth to 5 years old, revealed a stronger and more significant link between mothers' job and their children's under nutrition. Compared to children born to stay-at-home mothers, working moms' children are more likely to experience malnutrition, according to **Mesfin et al. (2015)**. According to **Mohseni et al. (2018)**, there is a substantial relationship between father employment status and household income level in terms of stunting. The father's occupation and the mother's employment status were found to be major risk factors for several forms of severe child malnutrition (**Chowdhury et al. 2020)**. Additionally, a community-based cross-sectional study conducted in India by **Pal et al. (2021)** revealed a correlation between parental educational and occupational status and child malnutrition as well as a higher likelihood of malnutrition in children from economically disadvantaged homes.In the current study, we documented that diarrhea and respiratory tract infection were higher in the younger age group with a negative correlation detected between them and the anthropometric data of the studied children and infants, also; In the current study; it was found that there is a statistical significance difference between different educational levels of the mothers and their occupation state with the prevalence of diarrhea and respiratory tract infection with the

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highest prevalence among illiterate and employers mothers.

Our results were consistent with those of **AboElfotoh et al. (2020)**, who found a negative link between children's nutritional status and the incidence of respiratory infections in children aged 1 to 5 years, which was substantially associated with lower weight gain.**Nayak et al. (2018)** indicated that underweight was significantly associated with recurrent diarrhea and recurrent cold and cough. **Mulatya and Mutuku, (2020)**indicated that infants with caregivers who had not completed their primary school had an increased risk of developing diarrhoea and an acute respiratory infection at the same time. According to **Bbaale (2011);** a mother's education, particularly at the postsecondary level, decreased the likelihood of diarrhoea. Additionally, **Gebertsadik et al. (2015)**According to a study, acute respiratory infections are more common in malnourished children from lower socioeconomic groups than they are in children from homes where the father has a degree and the mother works in a profession.

Conclusion:

Malnutrition is a significant health issue, particularly in underdeveloped nations. With more bouts of diarrhoea and respiratory tract infections and an increased risk of malnutrition, females had the highest risks of being underweight and stunted. Parents' levels of education and occupation had a significant impact on the prevalence of malnutrition in their children with lower mothers' educational levels having a higher risk to have children underweight, stunting, and wasting than higher educated mothers. Children whose father's jobs were workers had the highest prevalence of stunting underweight and wasting.

5. List of abbreviation:

BMI:Body Mass Index.

FANTA: Food and Nutrition Technical Assistance.

HAZ:Height –for-age Z score.

UNICEF: United Nations Children's Fund.

WAZ: Weight –for-age Z score.

WHO: World Health Organization.

WHZ: Weight –for-Height Z score.

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