# *COMPARATIVE STUDY OF NUTRITIONAL STATUS BETWEEN URBAN AND RURAL PRESCHOOL CHILDREN IN AL-BEHAIRA GOVERNORATE, EGYPT*

**By**

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## *ABSTRACT*

***Background:*** *Preschool age is the most vital stage where in good nutrition is essential for growth and development. Assessing nutritional status is an integral part of monitoring the community health. In developing countries, there is strong evidence that urban areas have better health outcomes than rural areas.*

***Aim of work:*** *This study aimed to compare nutritional status between urban and rural preschool children in Al-Behaira governorate, describing factors associated with child malnutrition.*

***Patients and methods:*** *This was comparative study involving 200 children attending the pediatric outpatient clinic of Al-Behaira hospitals (Damanhor and Shubrakhet), during the period from September 2021 to November 2021, children were selected by simple random method.*

***Results:*** *In urban group underweight was associated with poorest SES, eating <3 meals/day and history of diarrhea. Stunting associated with >3rd order children, mother's occupation, poorest SES, low protein intake and history of hospitalization. Wasting associated with nuclear family and history of diarrhea. Overweight associated with nuclear family and daily protein intake.*

*In rural group underweight was associated with poorest SES, twins, LBW, mothers married <20 years, illiterate mothers and supplemental feeding >6 months. Stunting associated with prematurity, LBW, illiterate mothers, formula feeding, low protein intake, history of diarrhea, hospitalization and anemia. Wasting associated with LBW, mothers married <20 years, and history of diarrhea. Overweight associated with mothers married >25 years and eating >3 meals/day.*

***Conclusion:*** *There is no difference between the two groups regarding anthropometric measurements (P > 0.05).*

***Key words:*** *Nutritional status; Urban; Rural; Preschool.*

## INTRODUCTION

Malnutrition in children results from combination of inappropriate or insufficient food intake as well as recurrent child infections, lack of knowledge of mothers about child nutrition, feeding practices, hygiene and sanitation **(Black et al., 2016)**.

Preschool age is the most vital stage wherein good nutrition is essential for the growth and development of a child. Chronic malnutrition can impair cognitive development, memory and cause serious health impairments later in life that reduce the quality of life **(Waghode et al., 2017)**.

In developing countries, on average, there is strong evidence that urban areas have better health outcomes than rural areas. Understanding the nature and the underlying factors behind the urban and rural health inequalities can help in designing effective interventions to improve the health outcomes of the population. Egypt has the highest number of children under the age of five who are stunted in the Middle East and North Africa, and the twelfth worldwide **(Sharaf and Rashad, 2016)**.

Nutritional assessment is a comprehensive evaluation of food intake of a person. This is a collective term for any method used in diet surveys. Diet history, food frequency questionnaire, 24 hour dietary recall, record methods etc. are the techniques used for dietary evaluation **(Gibson, 2015)**.

Indicators of nutritional status are used to identify the nutritional imbalance that leads to malnutrition (wasting, stunting, underweight and overweight) **(Galgamuwa et al., 2017)**.

## AIM OF THE STUDY

The present study was intended to compare the nutritional status between urban and rural preschool children in Al-Behaira governorate, describing the factors which were significantly associated with child malnutrition.

## PATIENTS AND METHODS

### Study design:

This was a comparative study involving 200 preschool children attending the pediatric outpatient clinic of Al-Behaira hospitals (100 children from Damanhour Teaching hospital and 100 children from Central Shubrakhet hospital), during the period from

September 2021 to November 2021, they were selected by simple random method, and were divided into 2 groups (urban group 65 children and rural group 135 children).

**Sample size:**

**The sample size was calculated using the following formula:**

Sample size (n) = $z^2 \times P (1-P)/m^2$

**Where:**

n = sample size

Z=1.96 (The critical value that divides the central 95% of the Z distribution from the 5% in the tail)

P= estimated prevalence of malnutrition= 15.1 (which was calculated by the summation of prevalence of (underweight, stunting, wasting, and obesity) in Lower Egypt found in EDHS, (2016) divided by 4)

m= margin of error (5%)

So, by calculation, the sample size will be equal to 200 children in total.

**Ethical considerations:**

1. The study was done after approval of ethical committees of Pediatrics department & faculty of medicine for Al-Azhar University.
2. An informed consent was taken from all parents before getting involved in study.
3. Confidentiality of all data was ensured.
4. The authors declared no potential conflicts of interest with respect to the research, authorship, and/or publication of this article.
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**Inclusion criteria:** children within the age group of 2-6 years.

**Exclusion criteria:** children not including in age criteria 2-6 years, children with chronic diseases or taking medications that may affect their dietary intake and children with congenital anomalies.

**Tools of Assessment:** All eligible children attending to outpatient clinic were submitted to:

1. Anthropometric measurement of preschool children.
2. Socio-economic and demographic variables: occupation, education, type, size and the annual income of the family and the household characteristics.
3. Child characteristics: age, sex, birth order, birth weight, NICU

admission, number of siblings, breast, formula, and supplemental feeding history.

4. Maternal characteristics: age, age at marriage, education, and occupation.
5. Dietary evaluation: Food frequency questionnaire.
6. History of diarrhea, hospital admission (in the last year) or anemia.

**Data collection:**

An interview was conducted with parents/caretakers of the children to fill the questionnaire. Food frequency questionnaire: Data were collected on the usual intake of commonly consumed foods. The intake of various foods was assessed using the short answer question, "How often do you eat each food in a week?" Food frequency categories ranged from never, occasionally to every day **(Ramsey et al., 2011)**.

Socio-economic status (SES): was calculated according to **El-Gilany et al., (2012)**, a modification of the old scoring system of **Fahmy and El-Sherbini, (1983)**. The scale has seven domains with a total score of 84. SES was classified to poorest, poorer, middle and richest depending on the quartiles of the calculated score rather than a fixed point.

**Anthropometric measurements: were taken for the children included:**

**Height:** The height of children was measured using a stadiometer placed on a hard flat surface with a line of sight perpendicular to the horizontal surface. Children were made to stand barefoot with feet joined together and with heels, buttock and back of head touching stadiometer. The height measurement reading was taken to the nearest 1 mm.

**Weight:** The child was weighed in light clothing without footwear.

**Body mass index (BMI):** this is the simplest parameter to assess nutritional status. BMI values were calculated as follows: BMI ($Kg/m^2$) = Weight / $Height^2$

**Data analysis:**

Descriptive analysis was done to describe the percentages and numbers of socio-demographic characteristics and other variables in the study. The data were presented in a different table. Z score growth references for Egyptian children **(ElShafie et al., 2021)** were used to assess nutritional status.

## *RESULTS*

**Table (1): Demographic characteristic of the study children (n= 200)**

| | | Urban (n=65) | Rural (n=135) | P value |
|---|---|---|---|---|
| | | N (%) | N (%) | |
| **Sex** | **Male** | 35 (53.8) | 71 (52.6) | P=0.867 |
| | **Female** | 30 (46.2) | 64 (47.4) | |
| **Age group (in years)** | **2-** | 39 (60) | 73 (54.1) | P=0.429 |
| | **4-6** | 26 (40) | 62 (45.9) | |
| **Informant** | **Mother** | 59 (90.8) | 116 (85.9) | P=0.315 |
| | **Father** | 4 (6.1) | 7 (5.2) | |
| | **Other relative** | 2 (3.1) | 12 (8.9) | |
| p value for comparing between the two studied groups<br>*: Statistically significant at P <0.05 | | | | |

**(Table 1)** shows that male more than female, age group 2- years more than 4-6 years, and most informants are the mother in both groups with insignificant difference.

**Table (2): Anthropometric measurments of the study children (n= 200)**

| | | Urban (n=65) | Rural (n=135) | P-value |
|---|---|---|---|---|
| | | n (%) | n (%) | |
| **Wt./age Z-score** | **Normal** | 61 (93.8) | 127 (94.1) | P = 1.0 |
| | **Underweight** | 4 (6.2) | 8 (5.9) | |
| **Ht./age Z-score** | **Normal** | 57 (87.7) | 121 (89.6) | P = 0.844 |
| | **Stunted** | 7 (10.8) | 11 (8.1) | |
| | **Severely stunted** | 1 (1.5) | 3 (2.2) | |
| **Wt./Ht. and BMI/age Z-score** | **Normal** | 49 (75.4) | 114 (84.4) | P = 0.359 |
| | **Wasted** | 2 (3.1) | 3 (2.2) | |
| | **Overweight** | 9 (13.8) | 14 (10.4) | |
| | **Obese** | 5 (7.7) | 4 (3) | |

**(Table 2)** shows that no statistical significant difference between the two groups regarding anthropometric measurements (P > 0.05).

**Table (3): Relation between weight for age and different parameters of the study children (n= 200)**

| | | Wt./age Z-score among urban | | P-value | | Wt./age Z-score among rural | | P-value |
|---|---|---|---|---|---|---|---|---|
| | | Normal | Underweight < -2SD | | | Normal | Underweight < -2SD | |
| | | n (%) | n (%) | | | n (%) | n (%) | |
| **Twin pregnancy** | Single (n=61) | 58 (95.1) | 3 (4.9) | P= 0.229 | Single (n=129) | 123 (95.3) | 6 (4.7) | P=0.041* |
| | Twin (n=4) | 3 (75.0) | 1 (25.0) | | Twin (n=6) | 4 (66.7) | 2 (33.3) | |
| **Birth weight** | Low (n=7) | 6 (85.7) | 1 (14.3) | P = 0.585 | Low (n=24) | 17 (81.0) | 4 (19.0) | P= 0.017* |
| | Average (n=50) | 47 (94.0) | 3 (6.0) | | Average (n=90) | 86 (97.7) | 2 (2.3) | |
| | Large (n=5) | 5 (100.0) | 0 (0.0) | | Large (n=10) | 10 (100.0) | 0 (0.0) | |
| **Age of mother at marriage (in years)** | <20 (n=11) | 10 (90.9) | 1 (9.1) | P = 1.0 | <20 (n=46) | 40 (87.0) | 6 (13.0) | P= 0.033* |
| | 20-25 (n=33) | 31 (93.9) | 2 (6.1) | | 20-25 (n=60) | 58 (96.7) | 2 (3.3) | |
| | >25 (n=21) | 20 (95.2) | 1 (4.8) | | >25 (n=29) | 29 (100.0) | 0 (0.0) | |
| **Education of the mother** | Illiterate (n=0) | 0 (0.0) | 0 (0.0) | P= 0.211 | Illiterate (n=14) | 9 (64.3) | 5 (35.7) | P= 0.001* |
| | Primary or Preparatory (n=37) | 33 (89.2) | 4 (10.8) | | Primary or Preparatory (n=90) | 87 (96.7) | 3 (3.3) | |
| | Secondary (n=23) | 23 (100.0) | 0 (0.0) | | Secondary (n=26) | 26 (100.0) | 0 (0.0) | |
| | Higher (n=5) | 5 (100.0) | 0 (0.0) | | Higher (n=5) | 5 (100.0) | 0 (0.0) | |
| **Social class** | Poorest (n=10) | 7 (70.0) | 3 (30.0) | P = 0.01* | Poorest (n=42) | 36 (85.7) | 6 (14.3) | P = 0.037* |
| | Poorer (n=12) | 12 (100.0) | 0 (0.0) | | Poorer (n=52) | 52 (98.1) | 1 (1.9) | |
| | Middle (n=12) | 12 (100.0) | 0 (0.0) | | Middle (n=29) | 29 (100.0) | 0 (0.0) | |
| | Richest (n=31) | 30 (96.8) | 1 (3.2) | | Richest (n=11) | 10 (90.9) | 1 (9.1) | |
| **Time of introduction of semisolid foods (in months)** | <4 (n=2) | 1 (50.0) | 1 (50.0) | P = 0.128 | <4 (n=2) | 1 (50.0) | 1 (50.0) | P = 0.008* |
| | 4-6 (n=45) | 43 (95.6) | 2 (4.4) | | 4-6 (n=105) | 102 (97.1) | 3 (2.9) | |
| | >6 (n=18) | 17 (94.4) | 1 (5.6) | | >6 (n=28) | 24 (85.7) | 4 (14.3) | |
| **No. of meals/ day** | <3 meals (n=7) | 5 (71.4) | 2 (28.6) | P = 0.013* | <3 meals (n=14) | 13 (92.9) | 1 (7.1) | P = 0.873 |
| | 3 meals (n=33) | 33 (100.0) | 0 (0.0) | | 3 meals (n=81) | 77 (95.1) | 4 (4.9) | |
| | >3 meals (n=25) | 23 (92.0) | 2 (8.0) | | >3 meals (n=40) | 37 (92.5) | 3 (7.5) | |
| **History of diarrhea** | No (n=58) | 57 (98.3) | 1 (1.7) | P = 0.003* | No (n=122) | 116 (95.1) | 6 (4.9) | P = 0.172 |
| | Yes (n=7) | 4 (57.1) | 3 (42.9) | | Yes (n=13) | 11 (84.6) | 2 (15.4) | |

**(Table 3)** Shows that in urban group, underweight was significantly associated with poorest SES, less than 3 meals/day, and history of diarrhea ($P < 0.05$).

In rural group, underweight was significantly associated with twin pregnancy, low birth

weight, mother's age less than 20 years at marriage, illiterate mothers, poorest SES, weaning delayed more than 6 months ($P < 0.05$).

**Table (4): Relation between height for age and different parameters of the study children (n= 200)**

| | **Ht./age Z-score among urban** | | | | **Ht./age Z-score among rural** | | | |
|---|---|---|---|---|---|---|---|---|
| | | **Normal** | **Stunted <-2SD** | **P-value** | | **Normal** | **Stunted <-2SD** | **P-value** |
| | | **n (%)** | **n (%)** | | | **n (%)** | **n (%)** | |
| **Gestational age** | Preterm (n=7) | 5 (71.4) | 2 (28.6) | P = 0.203 | Preterm (n=18) | 13 (72.2) | 5 (27.8) | P = 0.022* |
| | Full term (n=58) | 52 (89.7) | 6 (10.3) | | Full term (n=117) | 108 (92.3) | 9 (7.7) | |
| **Birth weight** | Low (n=7) | 6 (85.7) | 1 (14.3) | P = 0.856 | Low (n=21) | 14 (66.7) | 7 (33.3) | P = 0.006* |
| | Average (n=50) | 44 (88.0) | 6 (12.0) | | Average (n=88) | 82 (93.2) | 6 (6.8) | |
| | Large (n=5) | 5 (100.0) | 0 (0.0) | | Large (n=10) | 9 (90.0) | 1 (10.0) | |
| **Birth order** | 1st (n=18) | 16 (88.9) | 2 (11.1) | P = 0.005* | 1st (n=29) | 28 (96.6) | 1 (3.4) | P = 0.113 |
| | 2nd (n=34) | 33 (97.1) | 1 (2.9) | | 2nd (n=61) | 56 (91.8) | 5 (8.2) | |
| | ≥3rd (n=13) | 8 (61.5) | 5 (38.5) | | ≥3rd (n=45) | 37 (82.2) | 8 (17.8) | |
| **Education** | Illiterate (n=0) | 0 (0.0) | 0 (0.0) | P = 0.06 | Illiterate (n=14) | 7 (50.0) | 7 (50.0) | P < 0.001* |
| | Primary or Preparatory (n=37) | 35 (94.6) | 2 (5.4) | | Primary or Preparatory (n=90) | 84 (93.3) | 6 (6.7) | |
| | Secondary (n=23) | 19 (82.6) | 4 (17.4) | | Secondary (n=26) | 25 (96.2) | 1 (3.8) | |
| | Higher (n=5) | 3 (60.0) | 2 (40.0) | | Higher (n=5) | 5 (100.0) | 0 (0.0) | |
| **Occupation** | No (n=51) | 48 (94.1) | 3 (5.9) | P = 0.009* | No (n=123) | 110 (89.4) | 13 (10.6) | P = 1.0 |
| | Yes (n=14) | 9 (64.3) | 5 (35.7) | | Yes (n=12) | 11 (91.7) | 1 (8.3) | |
| **Social class** | Poorest (n=10) | 6 (60.0) | 4 (40.0) | P = 0.022* | Poorest (n=42) | 35 ( 83.3) | 7 (16.7) | P = 0.322 |
| | Poorer (n=12) | 10 (8.3) | 2 (16.7) | | Poorer (n=53) | 48 (90.6) | 5 (9.4) | |
| | Middle (n=12) | 11 (91.7) | 1 (8.3) | | Middle (n=29) | 27 (93.1) | 2 (6.9) | |
| | Richest (n=31) | 30 (96.8) | 1 (3.2) | | Richest (n=11) | 11 (100.0) | 0 (0.0) | |
| **Feeding** | Exclusive BF (n=15) | 14 (93.3) | 1 (6.7) | P = 0.262 | Exclusive BF (n=25) | 24 (96.0) | 1 (4.0) | P < 0.001* |
| | BF & formula (n=19) | 18 (94.7) | 1 (5.3) | | BF & formula (n=96) | 90 (93.8) | 6 (6.3) | |
| | Only formula (n=31) | 25 (80.6) | 6 (19.4) | | Only formula (n=14) | 7 (50.0) | 7 (50.0) | |
| **Protein intake** | No (n=11) | 7 (63.6) | 4 (36.4) | P = 0.014* | No (n=19) | 12 (63.2) | 7 (36.8) | P < 0.001* |
| | Occasionally (n=41) | 39 (95.1) | 2 (4.9) | | Occasionally (n=101) | 97 (96.0) | 4 (4.0) | |
| | Daily (n=13) | 11 (84.6) | 2 (15.4) | | Daily (n=15) | 12 (80.0) | 3 (20.0) | |
| **Diarrhea** | No (n=58) | 50 (86.2) | 8 (13.8) | P = 0.583 | No (n=122) | 117 (95.9) | 5 (4.1) | P < 0.001* |
| | Yes (n=7) | 7 (100.0) | 0 (0.0) | | Yes (n=13) | 4 (30.8) | 9 (69.2) | |
| **Hospital admission** | No (n=61) | 56 (91.8) | 5 (8.2) | P = 0.005* | No (n=126) | 119 (94.4) | 7 (5.6) | P < 0.001* |
| | Yes (n=4) | 1 (25.0) | 3 (75.0) | | Yes (n=9) | 2 (22.2) | 7 (77.8) | |
| **Anemia** | No (n=53) | 47 (88.7) | 6 (11.3) | P = 0.634 | No (n=101) | 95 (94.1) | 6 (5.9) | P = 0.007* |
| | Yes (n=12) | 10 (83.3) | 2 (16.7) | | Yes (n=34) | 26 (76.5) | 8 (23.5) | |

**(Table 4)** shows that in urban group, stunting was significantly associated with birth order (3rd or more), working mothers, poorest SES, no protein intake, and history of hospital admission ($P < 0.05$).

In rural group, stunting was significantly associated with prematurity, low birth weight,

illiterate mothers, twin pregnancy, only formula feeding, no protein intake, and history of diarrhea, hospital admission, and anemia ($P < 0.05$).

**Table (5): Relation between weight for height and body mass index for age and different parameters among urban group (n= 65)**

| | **Wt./Ht. and BMI/age Z-score among urban** | | | | **P-value** |
|---|---|---|---|---|---|
| | **Normal** | **Wasted <-2SD** | **Overweight >+2SD** | **Obese >+3SD** | |
| | **N (%)** | **N (%)** | **N (%)** | **N (%)** | |
| **NICU admission** | | | | | P = 0.029* |
| No | 47 (78.3) | 1 (1.7) | 7 (11.7) | 5 (8.3) | |
| Yes | 2 (40.0) | 1 (20.0) | 2 (40.0) | 0 (0.0) | |
| **Birth weight** | | | | | P = 0.014* |
| Low | 5 (71.4) | 1 (14.3) | 1 (14.3) | 0 (0.0) | |
| Average | 41 (82.0) | 1 (2.0) | 4 (8.0) | (8.0) | |
| Large | 1 (20.0) | 0 (0.0) | 3 (60.0) | 1 (20.0) | |
| **Family type** | | | | | P = 0.004* |
| Joint | 26 (89.7) | 0 (0.0) | 0 (0.0) | 3 (10.3) | |
| Nuclear | 23 (63.9) | 2 (5.6) | 9 (25.0) | 2 (5.6) | |
| **Protein intake** | | | | | P < 0.001* |
| Never | 8 (72.7) | 0 (0.0) | 1 (9.1) | 2 (18.2) | |
| Occasionally | 37 (90.2) | 2 (4.9) | 1 (2.4) | 1 (2.4) | |
| Daily | 4 (30.8) | 0 (0.0) | 7 (53.8) | 2 (15.4) | |
| **Diarrhea** | | | | | P = 0.03* |
| No | 46 (79.3) | 1 (1.7) | 6 (10.3) | 5 (8.6) | |
| Yes | 3 (42.9) | 3 (42.9) | 1 (14.3) | 0 (0.0) | |

**(Table 5)** shows that in the urban group wasting was significantly associated with NICU admission, and history of diarrhea ($P < 0.05$).

Overweight and obesity was significantly associated with large birth weight, nuclear family type, and daily protein intake ($P < 0.05$).

**Table (6): Relation between weight for height and body mass index for age and different parameters among rural group (n= 135)**

| | Wt./Ht. and BMI/age Z-score among rural | | | | P-value |
|---|---|---|---|---|---|
| | Normal | Wasted <-2SD | Overweight >+2SD | Obese >+3SD | |
| | N (%) | N (%) | N (%) | N (%) | |
| **Birth weight** | | | | | |
| Low | 15 (71.4) | 2 (9.5) | 3 (14.3) | 1 (4.8) | Fisher's Exact = 14.515 P = 0.037* |
| Average | 77 (87.5) | 0 (0.0) | 10 (11.4) | 1 (1.1) | |
| Large | 9 (90.0) | 0 (0.0) | 0 (0.0) | 1 (10.0) | |
| **Age of marriage** | | | | | |
| <20 | 35 (76.1) | 2 (4.3) | 8 (17.4) | 1 (2.2) | Fisher's Exact = 13.248 P = 0.037* |
| 20-25 | 54 (90.0) | 1 (1.7) | 5 (8.3) | 0 (0.0) | |
| >25 | 25 (86.2) | 0 (0.0) | 1 (3.4) | 3 (10.3) | |
| **No. of meals** | | | | | |
| <3 meals | 13 (92.9) | 1 (7.1) | 0 (0.0) | 0 (0.0) | Fisher's Exact = 51.563 P < 0.001* |
| 3 meals | 80 (98.8) | 1 (1.2) | 0 (0.0) | 0 (0.0) | |
| >3 meals | 21 (52.5) | 1 (2.5) | 14 (35.0) | 4 (10.0) | |
| **Diarrhea** | | | | | Fisher's Exact = 10.39 P = 0.008* |
| No | 107 (87.7) | 2 (1.6) | 10 (8.2) | 3 (2.5) | |
| Yes | 7 (53.8) | 1 (7.7) | 4 (30.8) | 1 (7.7) | |

**Table (6)** shows that in the rural group wasting was significantly associated with low birth weight, eating <3 meals/day ($P < 0.05$). Overweight and obesity was significantly associated with mother less than 20 years at marriage, eating more than 3 meals/day ($P < 0.05$).

## *DISCUSSION*

Nutritional status in early childhood may greatly affect health, and subsequently impact not only a child's own growth and development, but also economic development in the country **(Hurley et al., 2016)**.

The present study was an attempt to throw some light on the nutritional status in Al-Behaira Governorate, Egypt, in a group of preschool children describing their nutritional status and factors that affect it.

A total of 200 children were examined over a period of 3 months, 100 children from Damanhor hospital and 100 children from Shubrakhet hospital.

In our study the rural attendance to the pediatric

outpatient clinic was more than urban (67.5%) vs. (32.5%). This may be due to low socioeconomic level in rural group as a result of it being low cost services. Another reason may be due to the majority of people from urban areas that depend mainly on private clinics. This is in accordance with rates described in **(Zottarelli et al., 2007)**.

Our study has demonstrated that boys attendance were higher than girls, (53.8%) in urban group and (52.6%) in rural group. It is may be due to percent of boys are more than girls in Egypt according to population census 2017. This is in accordance with rates described in **(Farahat et al., 2017)**.

The study showed that age group 2- years was more in both urban and rural groups (60%) vs. (54.1%). It is may be due to the other age group 4-6 years which is the age of kindergarden and most of children are attending it at the morning time. This is in accordance with rates described in **(Zottarelli et al., 2007)**.

Our study sited that most children attending to the pediatric outpatient clinic with their mothers (90.8%) in urban and (85.9%) in rural areas, and this is may be due to the time of pediatric outpatient clinic is in the morning which is the time for father's work and most of the mothers attending the pediatric outpatient clinic were housewives. This is in accordance with rates described in **(Elmougi et al., 2020)**.

The study showed that low birth weight (< 2.5 kg) is more in rural group (15.5%) than urban group (10.8%). This is comparable to (16.4%) in urban and (18.1%) in rural of **(EDHS, 2016)**. And the study showed that the preterm are more in rural (13.3%) than urban (10.8%) group. This may be due to lower level of antenatal care in rural group, in according to **(EDHS, 2016)**, (86.3%) of women in rural lower Egypt have antenatal care visits vs. (90.1%) urban lower Egypt.

The study displayed that no difference between the two groups regarding twin pregnancy (6.2%) in urban vs. (4.4%) in rural, and no difference between the two groups regarding NICU admission (7.7%) in urban vs. (7.4%) in rural. And this occurred because the short period of our study and small volume of children sample. This is in accordance with the (4.5%) twin pregnancy and rates described in **(Gani, 2004)**.

Our study demonstrated that exclusive breast feeding to 6 months is more in urban group (23.1%) vs. rural group (18.5%). This may be due to the mothers of

urban group are more educated. This is in comparison to (23.7%) in urban vs. (24.2%) in rural of **(Salama et al., 2021)**. Breast and formula feeding is more in rural group (71.1%) vs. (47.7%) in urban group. This may be due to the mothers of rural group are less educated and the availability of formula in the primary health centres. This is in comparison to (46.0%) in urban vs. (60.6%) in rural of **(Salama et al., 2021)**. Formula feeding only is more in urban group (29.2%) vs. rural group (10.4%), this may be due to high socioeconomic level in urban group. This is in comparison to (30.3%) in urban vs. (15.2%) in rural of **(Salama et al., 2021)**. Starting semisolid foods at age 4-6 months is more in both groups (69.2%) in urban vs. (77.8%) in rural. This is in comparison to (61.0%) in urban vs. (73.3%) in rural of **(Elsayed and Hussein, 2019)**.

The study reported that age of the mother at marriage <20 years is more in rural group (34.1%) vs. urban group (16.9%), this may be due to to ensure their daughter's financial security and to relieve the financial burden daughters place on the family. This is in accordance with (28.7%) in rural vs. (16.3%) in urban described in **(Dalia, 2020)**. Illiterate mothers are (10.4%) in rural group vs. (0.0%) in urban group, this may be due to low socioeconomic state in rural group. This is in accordance with rates described in **(Kamel et al., 2020)**. Working mothers are more in urban group (21.5%) vs. (8.9%) in rural group; this may be due to high level of education in urban group. This is slightly higher than (17.2%) in urban vs. (6.6%) in rural described in **(Kamel et al., 2020)**.

The study showed that nuclear family is more in urban group (45.3%) vs. (65.0%) in rural group. This is in comparison to (22.6%) in urban vs. (15.3%) in rural of **(Koirala, 2019)**. Family size <5 members is more in urban group (67.7%) vs. (54.8%) in rural group. This is in comparison to (22.6%) in urban vs. (15.3%) in rural of **(Koirala, 2019)**. Poorest social class (15.4%) in urban vs. (31.1%) in rural group, poorer social class (18.5%) in urban vs. (39.3%) in rural group, middle social class (18.5%) in urban vs. (21.5%) in rural group, while richest social class is more in urban group (47.7%) vs. (8.1%) in rural group. This is in accordance with rates described in **(EDHS, 2016)**.

Our study demonstrated that no. of children eating >3 meals/day is more in urban group (38.5%) vs. (29.6%) in rural

group. Eating 3 meals/day (50.7%) in urban group (60.0%) in rural group. This is in comparison to (22.5%) eating < 4 meals/day and (77.5%) eating >3 meals/day described in **(Fatima et al., 2020)**.

Providing animal milk (86.2%) in urban vs. (80.7%) in rural group. This is in accordance with rates described in **(Koirala, 2019)**. Daily protein intake is more in urban group (20.0%) vs. (11.1%) in rural group. This is in comparison to (5.8%) in urban vs. (8.8%) in rural of **(Koirala, 2019)**. Daily eating fruits, vegetables is more in urban group (26.2%) vs. (18.5%) in rural group. This is in accordance with rates described in **(Koirala, 2019)**.

Our study reported that attacks of diarrhea in the last year is (10.8%) in urban group and (9.6%) in rural group. This is in accordance with rates described in **(Elmougi et al., 2020)**. Hospital admission in the last year is (6.2%) in urban group and (6.7%) in rural group. This is comparable to the (21%) of **(Elmougi et al., 2020)**. The prevalence of anemia is more in rural group (25.2%) vs. (18.5%) in urban group. This is comparable to (25.1%) in urban vs. (28.1%) in rural described in **(EDHS, 2016)**.

The study showed that underweight is (10.8%) in urban group and (9.6%) in rural group. This is comparable to 4% described in **(EDHS, 2016)**. In urban group underweight was significantly associated with poorest social class (p=0.01), eating <3 meals/day (p=0.013), history of diarrhea (p=0.003). In rural group underweight was significantly associated with poorest social class (p=0.01), twin pregnancy (p=0.041), low birth weight (p=0.017), age of mother at marriage <20 years (p=0.033), illiterate mothers (p=0.001), poorest social class (p=0.037), introduction of semisold foods >6 months (p=0.008). This is comparable to the age of children, drinking water purification practices, growth monitoring, and mother's perception of size at birth were significantly associated with childhood underweight described in **(Adhikari et al., 2017)**.

The study showed that stunting in urban group is (10.8%) vs. (8.1%) rural group. This is comparable to (19.3%) in urban group vs. (17.6%) in rural group described in **(EDHS, 2016)**. Severe stunting is (1.5%) in urban group vs. (2.2%) in rural group. This is comparable to (9.0%) in urban group vs. (8.1%) in rural group described in **(EDHS, 2016)**. In urban group stunting was significantly associated with >3rd

order children (p=0.005), working mothers (p=0.009), poorest social class (p=0.022), children not eating Meat, fish, poultry, egg (p=0.014), and history of hospital admission (p=0.005). In rural group stunting was significantly associated with preterm (p=0.022), low birth weight (p=0.006), illiterate mothers (p=0.001), only formula feeding (p=0.001), children with no protein intake (p=0.001), history of diarrhea (p=0.001), history of hospital admission (p=0.001), and history of anemia, (p=0.007). This is comparable to male gender, joint family system, low literacy level in mothers, unvaccinated status and history of bottle feeding described in **(Fatima et al., 2020)**.

The study showed that wasting was more in urban group (3.1%) vs. rural group (2.2%). This is comparable to (8.3%) in urban group vs. (8.3%) in rural group described in **(EDHS, 2016)**. In urban group wasting was significantly associated with nuclear family (p=0.004) and history of diarrhea (p=0.03). In rural group wasting was significantly associated with low birth weight (p=0.037), age of mother at marriage <20 years (p=0.037), and history of diarrhea (p=0.008). This is comparable to low maternal BMI, male gender, poorest wealth quintile described in **(Harding et al., 2018)**.

The study showed that overweight was (13.8%) in urban group vs. (10.4%) rural group. Obesity (7.7%) in urban group vs. (3.0%) in rural group. This is comparable to (17.3%) in urban group vs. (16.3%) in rural group described in **(EDHS, 2016)**. In urban group overweight and obesity was significantly associated with nuclear family (p=0.004) and children with daily protein intake (p=0.001). In rural group overweight and obesity was significantly associated with age of mother at marriage >25 years (p=0.037), and eating >3 meals/day (p=0.001). This is comparable to feeding formula in early life, bad dietary habits (fast food consumption and missed breakfast) and lack of physical activity described in **(Hamed et al., 2019)**.

## *CONCLUSION*

1. Underweight in urban group it was significantly associated with poorest social class, eating <3 meals/day and history of diarrhea. In rural group it was significantly associated with poorest social class, twin pregnancy, low birth weight, age of mother at marriage <20 years, illiterate

mothers, poorest social class, delayed weaning >6 months.

2. Stunting in urban group stunting is significantly associated with >3rd order children, working mothers, poorest social class, low protein intake and history of hospital admission. In rural group stunting is significantly associated with preterms, low birth weight, illiterate mothers, only formula feeding, history, low protein intake, history of diarrhea, hospital admission and anemia.
3. Wasting in urban group is significantly associated with nuclear family and history of diarrhea. In rural group it is significantly associated with low birth weight, age of mother at marriage <20 years, and history of diarrhea.
4. Overweight and obesity in urban group overweight and obesity are significantly associated with nuclear family and higher protein intake. In rural group overweight and obesity are significantly associated with age of mother at marriage >25 years and eating >3 meals/day.

## *RECOMMENDATIONS*

1. Media awareness for parents about malnutrition and attention to ways to prevent it.
2. Parents should learn more about the healthy diet and its constituents and should be advised to monitor the dietary habits of their children and correct any bad habits of their children as early as possible.
3. A health education programs should be directed towards mothers for education of proper nutrition during pregnancy, the importance of exclusively breastfeeding for the first 6 months, weaning and adequate supplemental nutrition, and the importance of variety and how to prepare food for the preschool children.

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# دراسة مقارنة للوضع التغذوى لأطفال ما قبل السن المدرسى فى الحضر والريف بمحافظة البحيرة - مصر

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ينتج سوء التغذية عند الأطفال عن مزيج من التغذية غير الكافية أو غير المناسبة بالإضافة إلى عدوى الأطفال المتكررة ونقص معرفة الأمهات فيما يتعلق بتغذية الأطفال وفيما يتعلق ممارسات التغذية والنظافة الصحية.

إن سن ما قبل المدرسة هو المرحلة الأكثر أهمية حيث التغذية الجيدة ضرورية لنمو وتطور الطفل. يمكن لسوء التغذية المزمن أن يضعف النمو المعرفي والذاكرة ويسبب إعاقات صحية خطيرة في وقت لاحق من الحياة تقلل من جودة الحياة.

هناك أدلة قوية على أن المناطق الحضرية، في المتوسط، لديها نتائج صحية أفضل من المناطق الريفية في البلدان النامية. إن فهم الطبيعة والعوامل الكامنة وراء التفاوتات الصحية بين المناطق الحضرية والريفية من شأنه

أن يساعد في تصميم تدابير تدخل فعالة لتحسين نتائج صحة السكان. يوجد في مصر أكبر عدد من الأطفال دون سن الخامسة الذين يعانون من التقزم في منطقة الشرق الأوسط وشمال إفريقيا، وتعتبر الثانية عشر على مستوى العالم.

وتهدف هذه الدراسة إلى: مقارنة الحالة التغذوية بين أطفال ما قبل المدرسة في المناطق الحضرية والريفية في محافظة البحيرة، ووصف العوامل التي ترتبط بشكل كبير بسوء تغذية الأطفال.

وقد أجريت هذه الدراسة المقارنة على 200 طفل من المترددين على العيادة الخارجية للأطفال بمستشفيات البحيرة، (100 طفل من مستشفى دمنهور التعليمي و 100 طفل من مستشفى شبراخيت المركزي)، تم اختيار الأطفال ضمن الفئة العمرية من 2-6 سنوات، وتم استبعاد الأطفال الذين يعانون من أمراض مزمنة أو الذين يتناولون الأدوية قد تؤثر على نظامهم الغذائى والأطفال الذين يعانون من تشوهات خلقية.

## وقد خضعت حالات البحث إلى:

القياسات الأنثروبومترية، المتغيرات الاجتماعية، الاقتصادية والديموغرافية، خصائص الطفل، خصائص

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## وقد أسفرت نتائج الدراسة عن:

نقص الوزن في المجموعة الحضرية كان مرتبطا بشكل كبير مع الطبقات الاجتماعية الفقيرة، وتناول الطفل أقل من ثلاث وجبات في اليوم والتاريخ المرضى للإسهال. في المجموعة الريفية ارتبط بشكل كبير مع الطبقات الاجتماعية الفقيرة، الحمل بتوأم، انخفاض الوزن عند الولادة، عمر الأم عند الزواج أقل من 20 عاما، الأمية عند الأمهات، تأخر الفطام أكثر من عمر 6 أشهر.

يرتبط التقزم بشكل كبير في المجموعة الحضرية فى الطفل الثالث فأكثر، والأمهات العاملات، الطبقات الاجتماعية الفقيرة، وانخفاض تناول البروتين، وتاريخ مرضى بدخول المستشفى. في المجموعة الريفية يرتبط التقزم بشكل كبير بالأطفال ناقصة النمو عند الولادة، وانخفاض وزن الولادة، والأمهات الأميات، ورضاعة الطفل صناعيا فقط، وانخفاض تناول البروتين، وتاريخ مرضى للإسهال، وتاريخ مرضى بدخول المستشفى والأنيميا.

## ومن خلال البحث نستنتج ما يلي:

نقص الوزن حوالي 6٪ في كلا المجموعتين. التقزم أكثر في المجموعة الحضرية منه في المجموعة الريفية 7 (10.8٪) مقابل 11 (8.1٪)، والتقزم الحاد يكون أكثر في المجموعة الريفية منه في المجموعة الحضرية 3 (2.2٪) مقابل 1 (1.5٪). الهزال أكثر في المجموعة الحضرية 2 (3.1٪) مقابل 3 (2.2٪) في المجموعة الريفية. زيادة الوزن هي الأكثر في المجموعة الحضرية 9 (13.8٪) مقابل 14 (10.4٪) في المجموعة الريفية. السمنة أكثر في المجموعة الحضرية 5 (7.7٪) مقابل 4 (3.0٪) في المجموعة الريفية.

## ومن خلال البحث نوصي بما يلي:

1. توعية إعلامية للآباء حول سوء التغذية والاهتمام بطرق الوقاية منه.

2. يجب على الآباء معرفة المزيد عن النظام الغذائي الصحي ومكوناته ويجب نصحهم بمراقبة العادات الغذائية لأطفالهم وتصحيح أي عادات سيئة لأطفالهم في أقرب وقت ممكن.

3. يجب توجيه برامج التثقيف الصحي للأمهات من أجل تعليم التغذية السليمة أثناء الحمل، وأهمية الرضاعة

الطبيعية الحصرية خلال الأشهر الستة الأولى، والفطام والتغذية التكميلية الكافية، وأهمية التنوع وكيفية تحضير الطعام لمرحلة ما قبل المدرسة.