Evaluate of Healthy Food Choices and Dietary Habits Among Preschool Children in Zagazig City

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Abstract:

Background: Healthy food choices are important during the whole life course, it is especially important during the first years of life, since these are the most crucial years for normal physical and mental development. The **aim** of the present study was to evaluate the healthy food choices and dietary habits among preschool children in Zagazig city. **Subjects and methods:** descriptive study design was used to conduct the present study where 70 child were selected by using multistage cluster sampling technique from three governmental nursery schools in Zagazig city. **Data** were collected by using an interview questionnaire developed by the researcher in the light of the current related literature and composed of demographic data, child dietary habits, and a standardized healthy food choices pictorial scale for kindergarten child. The study **results** showed that about two thirds of preschool children had unsatisfactory knowledge about heart nutrients, energy food, musculoskeletal nutrients, snacks, oral and hand hygiene. The study **concluded** that, the majority of the study sample had normal dietary habits, they were having unsatisfactory knowledge concerning the healthy food choices. Therefore, it is **recommended** that further researches should be developed based on the predictors affecting of healthy food choices to tailor more effective intervention for preschool children.

Keywords: Healthy food choices, dietary habits, and preschool children.

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Introduction

A balanced diet in childhood is vital to ensure optimum growth and development at a time of rapid growth. Preschool age (3-6 years) is identified as the critical period in the formation of food choices that has been shown to track into adulthood. Furthermore, preschool children are consuming more sugar/fat added snacks and beverages exceeding the recommended amounts of dietary sodium and energy from solid fat and added sugar **(Welker et al., 2018).** The establishment of a healthy diet in the preschool years is crucial for the short- and long-term health of an individual. Across the world, a good quality diet tends to consist of frequent consumption of fruits, vegetables, whole grains and lean sources of protein and dairy, as well as infrequent consumption of foods high in sugar, salt and/or fat with low nutrient density. In the

short term, better quality diets of preschool children have been associated with better cognitive development and lower risk of overweight and obesity **(Nasreddine et al., 2019).**

Elrahman et al., (2019) showed that the food choice practices typically viewed as patterns of human activity or as a dynamic process that integrated within the social structures of these patterns. In addition, food choice is defined as; the selection of foods for consumption, which results from the competing, reinforcing and interacting influences of a variety of factors. These range from the sensory, physiological and psychological responses of children consumers to the interactions between social, environmental and economic influences, and include the variety of foods available and the activities of the food industry to promote them **(Karanja et al., 2022).**

Although healthy food choices are an important in childhood as this is a critical period of growth and development. Furthermore, food choices are shaped from an early age with many of them forming even below the age of 5 years and these choices subsequently become more difficult to change after the age of 11-18 years **(Suha, 2020).** Improving the health of preschool children is one of the substantial objectives of health care services in most developing countries. United Nations Children's Emergency Fund (UNICEF) estimates that approximately half of all deaths in children fewer than five years are attributable to under-nutrition. Nutrition is one of many elements that stimulus a child's development **(Bassuoni et al., 2021).**

Community nurses are guarantee of direct increase of the children's and community's well-being through education designed to help maintain health. Through the functions they can perform, community nurses are a pillar for community development. Also, community nurses are providing a comprehensive plan to improve the quality of health care **(Sumpter et al., 2022).** They have always endeavored to support the health and wellbeing of children across settings; home, school, neighborhoods and community **(National Institutes of Health, 2021).** Moreover, community health nurses are in a unique position to offer multilevel approaches to the development of healthy food choices among preschool children **(Henry et al., 2017).**

Significance of the study

Good food is important during the whole life course, it is especially important during the first years of life, since these are the most crucial years for normal physical and mental development**.** Additionally, proper food choices in kindergarten is also crucial for shaping the correct eating habits of children and can prevent the later development of many diet-related diseases **(Orkusz, 2022).** Establishing healthy behaviors in early childhood can lay the foundation for a lifetime of healthy nutrition and may have greater impact on long-term health than attempting to change entrenched adult behaviors (**Baker et al., 2019).** Hence, the present study was to evaluate the healthy food choices and dietary habits among preschool children in Zagazig city.

Aim of the study

The aim of this study was to:

Evaluate the healthy food choices and dietary habits among preschool children in Zagazig city.

This aim was fulfilled through the following objectives:

1. Identify the healthy food choices among preschool children.
2. Determine the dietary habits among preschool children.

Research questions:

1. What are the healthy food choices among preschool children?
2. What are the dietary habits among preschool children?

Subjects and Methods

The methodology of the current study was presented under the following four designs: Technical, operational, administrative and statistical design.

I. Technical design: The technical design of this study involves a description of the research design used, the study setting, subjects and tools of data collection.

A. Research design: Descriptive design was used to achieve the aim of the present study.

B. Setting: The present study was conducted at three governmental nursery schools affiliated to the Ministry of Education and randomly selected from two educational zones available in Zagazig city. These nursery schools were namely: El-Shahid Tayar "Ibrhim Ali Al-Hadad "nursery school in Shibah village, Al-Nakaria Al-Hadetha nursery school, and Sfita 2 nursery school.

Setting description: A study setting composed of the above mentioned nursery schools, where consists of one floor containing 3-4 classrooms where each classroom contains 20 children (one-two classroom for KG1 and two classes for KG2), the library room, manager's office, play garden, and computer labs.

C. Subjects: The existing study enrolled 70 preschool child, who were recruited from the above mentioned nursery schools according to the following inclusion criteria: Age ranged from 5 to 6 years, Free from mentally challenged or any cognitive problems, Free from behavioral problems (e.g. aggression, and attention deficit hyperactivity disorder), Parents agreements regarding participation of their children in the program were obtained.

Sample size: The sample size is calculated to test for the difference between the expected rates of healthy food before and after implementation of the intervention with a moderate effect size (Cohen H = 0.30). Using the G Power software program for sample size calculation for a difference between two proportions at 95% level of confidence and 80% power, the required sample size is 58 child. It was increased to 70 to compensate for an expected dropout rate of around 15%. In addition to, 7 children including pilot study.

Sampling technique: A multistage random sampling technique was used in the recruitment of children in the study sample as follows:

✓ **Phase 1**

This phase involved random selection of three nursery schools from two educational zones:

- The first zone (East administration) includes 34 nursery schools. one nursery school was randomly selected namely Sfita 2 nursery schools.
- The second zone (West administration) includes 48 nursery schools. Two nursery schools were randomly selected namely Al-Shahid Tayar "Ibrhim Ali Al-Hadad "and Al-Nakaria Al-Hadetha nursery schools.

✓ **Phase 2:** This phase involved selection of two classes from each school.

✓ **Phase 3:** This phase involved purposive sample of children from nursery schools according to the above-mentioned criteria. They were as follows:

- Al-Shahid Tayar "Ibrhim Ali Al-Hadad "nursery school (30 children out of 40 child).
- Al-Nakaria Al-Hadetha nursery school (25 children out of 40 child).
- Sfita B nursery school (15 children out of 40 child).

D. Tools of data collection: Three tools used to carry out the present study, included:

Tool I:

An interview questionnaire developed by the researcher in the light of the current related literature and composed of demographic data.

➢ **Demographic data:** Involved two parts;

- **Child data:** Such as child's age, sex, number of siblings, and birth order of child between siblings. Questions were in the form of open ended questions (Questions 1 & 3) and closed ended questions (Questions 2 & 4).

- **Family data:** Such as parents' age, educational level, occupation, family size, family income, and residence. Questions were in the form of open ended questions(Questions 5, 8 & 12) and closed ended questions (Questions 6, 7, 9, 10,11 &13 to 15).

Tool II:

➢ **Child dietary habits:** Such taking breakfast, taking 3 meals/day, taking fast food, eating while watching TV, good mastication, forced to eat…etc. (Questions 16 to 27).

Scoring system:

Knowledge: For the knowledge items, a correct response was scored 1 and the incorrect zero. For each area of knowledge and for the total questionnaire the scores of the items were summed-up and the total divided by the number of the items, giving mean scores. These scores were converted into percentage score and means and standard deviations and medians were computed. Knowledge was considered healthy if the percent score was 60% or more and unhealthy if less than 60%.

Tool III:

➢ **A standardized healthy food choices pictorial scale for kindergarten child.**

This scale was developed by **Ibrahim (2023).** It was used to evaluate healthy food choices

among children aged 5-6 years. This scale includes 35 pictures covered seven domains regarding heart, energy, musculoskeletal, immunity nutrients, snacks, oral and hand hygiene. It took around 15-20 minutes to complete and was easily understood by the preschool children.

Scoring system:

Knowledge: For the knowledge items, a correct response was scored 1 and the incorrect zero. For each area of knowledge and for the total questionnaire the scores of the items were summed-up and the total divided by the number of the items, giving mean scores. These scores were converted into percentage score and means and standard deviations and medians were computed. Knowledge was considered satisfactory if the percent score was 60% or more and unsatisfactory if less than 60%.

II. Operational design:

The operational design includes description of the preparatory phase, validity, reliability, pilot study, field work, and ethical consideration.

A. The preparatory phase: A comprehensive review of the present and previous studies, national and international references linked to the study title were conducted using textbooks, articles, internet periodicals and magazines in order to get a clear picture of all aspects related to the study. This helped in the design of the data collection tools, and game-based learning.

B. Validity: The tool was revised by a panel of three experts in the field of community health nursing, community medicine who conducted content validity of all the items of the tool for relevance, clarity, comprehensiveness and understandability.

C. Reliability:

Internal consistency of the tool was assessed and reliability proved to be satisfactory by calculating Cronbach Alpha Coefficient, (0,841).

Pilot study: The pilot study was carried out on a sample of 7 children representing 10% of the calculated total sample size. The aim was to test clarity of the questions, the format of the questionnaire, comprehensiveness of the items and to estimate the exact time required for filling the questionnaire sheet. The children involved in the pilot study were excluded from the main study sample, since there was no modification in the tools of data collection.

D. Field work: The researcher sought formal approval from the Under-Secretary of the Ministry of Education and the West and the East Zagazig administration director before starting field work. After that, the researcher received the final approval letter and met with the directors of nursery schools to schedule the data collection process. Field work of this study was conducted over a two months span, beginning from November and ending to December 2022. After securing all official permissions, the researcher first introduced herself and explained the purpose of the study briefly to the directors and teachers of nursery schools to gain their cooperation and get the needed data from the preschool children files. The parents of the preschool children were met and verbal consent for participation were obtained from them and they were assured that the obtained information used only for the purpose of the study.

After that, the researcher spent some time with each child to fill out food choices questionnaire sheet at the nursery school class or play garden. The needed time for tool of data

collection for each child was about 15-20 minutes. At the end of the day, at leaving time, the researcher met with the children's parents to fill out the demographic questionnaire. The researcher stayed with the parents to answer any specific questions that arose during completing the data. It required 20 to 25 minutes. But some parents requested from the researcher to complete the questionnaire at home; so, those parents were asked to return completed questionnaire to the child's school bag. Three-four days of work per week (from 8.5 AM to 12 PM) persisted.

E. Ethical consideration: The study protocol was approved by the pertinent committees at the faculty of Nursing, Zagazig University. Then, the agreement of participants was taken from parents after full explanation of the aim and objectives of the study. Participants were given the opportunity to refuse participation and they were notified that they could withdraw at any time of the data collection interviews; also, they were assured that the information would be confidential and used for the research purpose only. The researcher assured maintaining anonymity and confidentiality of the subject's data.

III. Administrative design:

The official permission was obtained from the Education Directorate at Zagazig city based on letters issued from the postgraduate's department at Faculty of Nursing, Zagazig University explaining the aim and procedures of the study. Then, the director of West and East administration referred the researcher to the directors of the selected nursery schools with approval letters. Then the researcher met with each of them and explained the aim of the study and the nature of tool used for data collection. The researcher gave the director of each nursery school a copy of the tool and formal letters.

IV. Statistical analysis

Data entry and statistical analysis were done using SPSS 20.0 statistical software package. Data were presented using descriptive statistics in the form of frequencies and percentages for qualitative variables, and means and standard deviations for quantitative variables. Quantitative continuous data were compared using Student t-test in case of comparisons between two independent groups and paired t-test for dependent groups. When normal distribution of the data could not be assumed, the non-parametric Kruskal-Wallis or Mann-Whitney tests were used. Qualitative categorical variables were compared using chi-square test. Whenever the expected values in one or more of the cells in a 2x2 tables was less than 5, Fisher exact test was used instead. In larger than 2x2 cross-tables, no test could be applied whenever the expected value in 10% or more of the cells was less than 5. Spearman rank correlation was used for the assessment of the inter-relationships among quantitative variables and ranked ones. In order to identify the independent predictors of the knowledge scores, multiple linear regression analysis was used. Statistical significance was considered at p-value <0.05.

Results:

Table 1: Demographic characteristics of preschool children in the study sample (n=70)

Characteristics	Frequency	Percent
Age:		
5.0-<5.5	29	41.4
5.5-6.0	41	58.6
Mean±SD	5.6±0.5	
Gender:		
Male	34	48.6
Female	36	51.4
No. of siblings:		
0-1	32	45.7
2-5	38	54.3
Mean±SD	2.0±0.9	
Birth order:		
1	3	4.3
2-3	46	65.7
4+	21	30.0
Firstborn:		
No	3	4.3
Yes	67	95.7
Mean±SD	2.9±0.9	

Table 1 explains that 58.6 % of the study sample was at age group 5.5-6.0 years, with Mean±SD equal 5.6±0.5. As for gender,51.4% of them were female. More than half of study sample (54.3%) had about 2-5 siblings, with Mean±SD equal2.0±0.9.More than two thirds (65.7) of children were the second to third child, and 95.7%of children were first born, with Mean±SD equal2.9±0.9.

Table 2: Demographic characteristics of parents of preschool children in the study sample (n=70)

Characteristics	Frequency	Percent
Father age:		
<35	35	50.0
35+	35	50.0
Mean±SD	34.4±5.6	
Father education:		
Illiterate	3	4.3
Read/write	4	5.7
Basic	5	7.1
Secondary	39	55.7
University	19	27.1
Father job:		
None	1	1.4
Manual	5	7.1
Professional	9	12.9
Employee	21	30.0
Freelancer	34	48.6
Mother age:		
<30	30	42.9
30+	40	57.1
Mean±SD	29.6±4.2	
Mother education:		
Illiterate	2	2.9
Read/write	0	0.0
Basic	11	15.7
Secondary	40	57.1

University	17	24.3
Mother job:		
Housewife	64	91.4
Working	6	8.6

Table 2 demonstrates that 50% of fathers of the study sample were at age group less than 35 years, with Mean±SD equal 34.4±5.6. More than half (55.7%) of fathers had secondary educational level, and 48.6% of them were freelancer. Whereas, 57.1% of mothers of the study sample were at age group more than 30 years, with Mean±SD equal 29.6±4.2. Also 57.1% of mothers had secondary educational level, and 91.4% of them were housewives.

Table 3: Family characteristics of preschool children in the study sample (n=70)

Characteristics	Frequency	Percent
Residence:		
Rural	70	100.0
Family size:		
2-4	34	48.6
5+	36	51.4
Range	3-6	
Mean±SD	4.6±0.8	
Family income:		
Sufficient	48	68.6
Insufficient	22	31.4
Living with:		
Both parents	61	87.1
One parent	8	11.4
Others	1	1.4

Table 3 shows that 100.0% of the study sample were residing in rural area, and family size was more than 5 members among 51.4% of them, with Mean±SD equal 4.6±0.8. More than two thirds of study sample (68.6%) had sufficient income. Most of children (87.1%) were living with both parents.

Table 4: Dietary habits of preschool children in the study sample (n=70)

Dietary habits	Frequency	Percent
Eat breakfast:		
No	29	41.4
Yes	41	58.6
Reason for not eating (n=29):[@]		
No time	3	10.3
Not used to	4	13.8
No appetite	14	48.3
Prefer eating with friends	14	48.3
Eat 3 meals/day:		
No	46	65.7
Yes	24	34.3
Eat fast food:		
Never	15	21.4
Sometimes	51	72.9
Often	4	5.7
Eat while watching TV:		
No	17	24.3
Yes	53	75.7
Appetite compared to peers:		
More	4	5.7
Same	27	38.6

Less	39	55.7
Good mastication:		
No	10	14.3
Yes	60	85.7
Forced to eat:		
No	28	40.0
Yes	42	60.0
No. of meals/day:		
1	1	1.4
2	44	62.9
3	25	35.7

Table 4 clarifies that41.4%of the study sample didn't take breakfast, and 65.7% of them didn't take3 meals/day. While, 72.9% of the study sample were take fast food, and 75.7%took while watching TV. More than half (55.7%) of children had less appetite compared to their peers, and most of children (85.7%) were good mastication. About two thirds (60.0%) of the study sample were forced to eat.

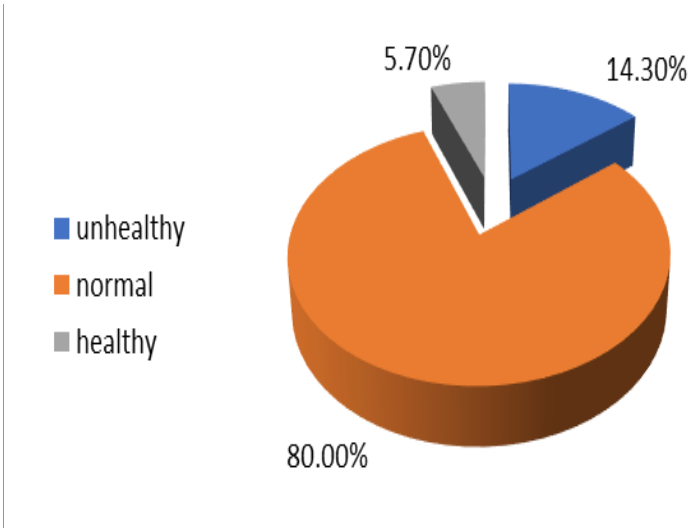

Figure 1: Overall view of dietary habits of the preschool children: The figure demonstrated that the majority of the preschool children (80.0%) had normal dietary habits.

Table 5: Frequency of food items intake by preschool children in the study sample (n=70)

Food items	No. of days during last week

Healthy food:	Mean±SD	Median
Fruits (2+/day)	3.26±1.64	3.00
Vegetables (2+/day)	3.24± 1.89	3.00
Dairies (1+/day)	2.44±2.02	2.00
Meat/fish/eggs/legumes (1+/day)	2.37±1.77	2.00
Cereals (2+/day)	1.41±1.66	1.00
All healthy foods	2.55±1.20	2.20
Unhealthy food:		
Fried food	4.99±1.81	5.00
Sweetened drinks	3.69±2.16	4.00
High sugar food	2.53±2.22	2.00
High salt food	2.14±2.34	2.00
High fat food	0.47±1.32	0.00
All unhealthy foods	2.76±1.28	2.50

Table 5 reveals the descending order of healthy food was as follow, fruits, vegetables, dairies, and meat/fish/eggs/legumes were (Mean±SD=3.26±1.64, 3.24± 1.89, 2.44±2.02, and 2.37±1.77). Concerning unhealthy food, fried food, sweetened drinks, high sugar food, and high salt food were (Mean±SD=4.99±1.81, 3.69±2.16, 2.53±2.22, and 2.14±2.34) respectively.

Table 6: Preschool children's knowledge of healthy food choices in the study sample (n=70)

knowledge of healthy food choices	Frequency	Percent
Heart nutrients:		
Satisfactory	33	47.1
Unsatisfactory	37	52.9
Energy food:		
Satisfactory	24	34.3
Unsatisfactory	46	65.7

Musculoskeletal nutrients:		
Satisfactory	29	41.4
Unsatisfactory	41	58.6
Immunity nutrients:		
Satisfactory	53	75.7
Unsatisfactory	17	24.3
Snacks:		
Satisfactory	3	4.3
Unsatisfactory	67	95.7
Oral hygiene:		
Satisfactory	0	0.0
Unsatisfactory	70	100.0
Hand hygiene:		
Satisfactory	15	21.4
Unsatisfactory	55	78.6
Total knowledge:		
Satisfactory	4	5.7
Unsatisfactory	66	94.3

Table 6 illustrates preschool children's knowledge of healthy food choices in the study sample. As the table displays, 94.3% of children were unsatisfactory knowledge about healthy food choices.

Table 7: Relations between preschool children's knowledge of healthy food choices and their personal characteristics

Personal characteristics	Mean	SD	F-test	p-value
Age:				
5.0-<5.5	15.4	3.0		
5.5-6.0	17.2	3.4	5.014	**0.028***

Gender:				
Male	16.9	3.3		
Female	16.1	3.4	0.876	0.353
No. of siblings:				
0-1	17.0	3.0		
2-5	16.0	3.6	1.72	0.194
Firstborn:				
Yes	19.1	0.2		
No	16.3	3.4	1.99	0.163

(*) Statistically significant at p<0.05

Table 7 displays relations between preschool children's knowledge of healthy food choices and their personal characteristics. Regarding age, there was a statistically significant relations between age and knowledge of healthy food choices(P=0.028). It was clear that mean scores of the knowledge of healthy food choices was higher with children age. No other statistically significant relations were found with other personal characteristics.

Table 8: Relations between preschool children's knowledge of healthy food choices and their parents' characteristics

Parents' characteristics	Mean	SD	F-test	p-value
Father age:				
<35	16.6	3.1		
35+	16.4	3.7	0.046	0.831
Father university education:				
No	16.5	3.4		
Yes	16.4	3.4	0.013	0.911
Father job:				
Employee	16.5	3.4		
Worker	16.5	3.4	0.000	0.996
Mother age:				

<35	16.4	2.9		
35+	16.5	3.8	0.034	0.855
Mother university education:				
No	16.6	3.5		
Yes	16.2	3.1	0.161	0.689
Mother job:				
Housewife	16.6	3.2		
Working	15.4	5.4	0.65	0.423
Family income:				
Sufficient	16.3	3.2		
Insufficient	16.8	3.7	0.265	0.608
Live with both parents:				
No	14.1	4.7		
Yes	16.8	3.0	5.452	0.023*

(*) Statistically significant at p<0.05

Table 8 displays relations between preschool children's knowledge of healthy food choices and their parents' characteristics. Regarding live with both parents, there was a statistically significant relation between live with both parents and knowledge of healthy food choices(P=0.023). It was evident that children who's live with both parents were had higher mean scores of the knowledge of healthy food choices. No other statistically significant relations were found with other parents' characteristics.

Table 9: Relations between preschool children's knowledge of healthy food choices and their dietary habits

Dietary habits	Mean	SD	F-test	p-value
Eat breakfast:				
No	16.6	3.9		
Yes	16.4	3.0	0.047	0.829
Eat 3 regular meals:				

No	16.5	3.1		
Yes	16.4	3.9	0.015	0.903
Eat fast food:				
Never	15.8	4.0		
Sometimes	16.6	3.3	0.357	0.701
Often	16.9	1.4		
Eat while watching TV/playing:				
No	17.1	3.3		
Yes	16.3	3.4	0.681	0.412
Child appetite compared to peers:				
More	15.0	2.5		
Same	15.9	3.7	1.355	0.265
Less	17.0	3.2		
Good mastication:				
No	15.5	4.0		
Yes	16.6	3.3	0.953	0.332
Forced to eat:				
No	16.8	3.8		
Yes	16.2	3.1	0.459	0.501
Overall view of dietary habits:				
Healthy	17.2	1.5		
Normal	16.7	3.2	1.631	0.203
Unhealthy	14.7	4.6		

Table 9 demonstrates that no statistically significant relations were found between preschool children's knowledge of healthy food choices and their dietary habits.

Table 10: Correlation between preschool children's knowledge scores of healthy food choices and their characteristics

Characteristics	Spearman's rank correlation coefficient Healthy food choices score (n=70)
Characteristics:	
Age	.309**
No. of siblings	-.166
Birth order	-.392**
Father age	-.080
Father education	-.151
Mother age	-.028
Mother education	-.122
Family size	-.080
Income	.069
No. of meals	.002
Mean healthy food intake	-.014
Mean unhealthy food intake	-.297*
Overall view of dietary habits	-.168

(*) Statistically significant at p<0.05

Table 10 represents correlation between preschool children's knowledge scores of healthy food choices and their characteristics. The table clarifies a statistically significant positive correlation between healthy food choices score and age (r=309). While, there were a statistically significant negative correlation between healthy food choices score and birth order (r=392), and mean unhealthy food intake (r=297).

Discussion

Establishing healthy eating behaviors in early life is an important health promotion goal with long-lasting impacts. Childhood is a critical period for the development of eating behaviors and habits that last into adulthood and play a vital role in growth and development, overall health, prevention of obesity and other lifelong diet-related chronic diseases **(Haines et al., 2019).** The aim of the present study was to evaluate children knowledge regarding healthy food choices.

Concerning dietary habits of preschool children, the current study results demonstrated that less than half of children did not take breakfast. These results might be attributed to that children had no enough time in the morning to take their breakfast, do not feel hungry in the morning, and always a hurry to go to nursery school, and prefer took breakfast with friends. This finding was on the same way with **Abd-El Aziz (2019)** in Egypt revealed that less than half of children didn't take breakfast. Similar findings have been found by **Youn Kim and Mi Cha (2021)** in Korea found that less than half of study sample refuse to take breakfast every day.

The existing study results clarified that less than three quarters of preschool children consumed fast food. This might be attributed to that these foods are readily available for consumption and relatively inexpensive. In addition to, fast food has high sodium salt, which is often used as a preservative to make the food more flavorful and satisfying. So, such food attracts children. Furthermore, the fact that most of the preschool children today do not like spending more time on eating and are always in a hurry.

In agreement with this finding, **Athavale et al. (2020)** in India revealed that over half of preschool children consumed fast food. As well, similar findings were found in a study carried out in Egypt by **Ali and Ahmed (2022)** demonstrated that less than three quarters of preschool children consumed fast food.

The results of the present study revealed that around three quarters of preschool children consumed meals while watching TV. This result might be attributed to some parents used TV to distract children to eat more food. This result is in agreement with **Arikan and Bekar (2017)** in Turkey reported that about two thirds of the children ate while watching TV. In the same vein, a study conducted in China by **Hu et al. (2019)** indicated that more than half of study sample watching TV at meals. Furthermore, **Fikry et al. (2019)** in Alexandria, Egypt found that about two thirds of study sample watching TV at meals.

The present study results showed that two thirds of the preschool children had forced to eat. This might be due to the fact that the children in the kindergarten stage prefer playing and running more than eating meals. In the same context, a study conducted by **Wu et al. (2019)** in China revealed that majority of children had forced to eat. Similar finding was reported by **Abd-El Aziz (2019)** in Egypt found that about two thirds of study sample had forced to eat.

Concerning frequency of food items intake by preschool children in the study sample, the existing study results clarified that higher mean scores of preschool children consumed vegetables and fruits than cereals, meat, fish, eggs, legumes, and dairies. This result might be attributed to the preschool children are attracted to foods that contain different colors, such as fruits and vegetables.

On the contrary, a study conducted by **Keyata et al. (2022)** in Ethiopia revealed that the majority of the preschool children had consumed cereals, fish, legumes, and eggs and the least consumed fruits and vegetables. This result reflects the differences of socio-economic status, and cultural discrepancies.

The current study results indicated that high percent of children consumed unhealthy food

such as fried food and sweetened drinks. This result might be due to the fried food and sweetened drinks are extremely palatable to most children because of good taste, comparatively lower price, and convenience.

In the same context, a study conducted by **Rysha et al. (2017)** in Kosovo found that the children consumed low in wholegrain products, high in soft drinks, sweet and salty foods. Similarity, **Hamner et al. (2023)** in United States found that many children are not eating fruits and vegetable daily and are regularly drinking sugar-sweetened beverages.

Regarding knowledge about healthy food choices in the study sample, the existing study results clarified that about two thirds of children in study sample had unsatisfactory knowledge about healthy food choices in domains of heart nutrients, energy food, musculoskeletal nutrients, snacks, oral and hand hygiene. This might be attributed to young children do not have a clear understanding about healthy food choices at this young age. In addition, lack of nutritional knowledge among parents promotes unhealthy food choices in preschool children. In agreement with the current study results, a study conducted in Sri Lankan by **Sahideen et al. (2020)** indicated that children had decreased healthy food choices knowledge due to lack nutritional knowledge among parents.

The current study findings illustrated that a statistically significant positive correlation between score of healthy food choices and age. This result might be due to the increasing age among children play an important role in promoting awareness and understanding regarding healthy food choices. This finding was in agreement with **DeJesus et al. (2020)** in Southeastern Michigan illustrated that children's food choices healthfulness accuracy scores were positively associated with age. Furthermore, similar result found by **Kerkez and Sakalli (2021)** in Turkey noted that nutritional recognition levels were generally high in 4 to 5-years old children and the nutritional recognition score increased with age.

According to the present study results, live with both parents was a statistically significant positive relation of the healthy food choices knowledge score. This result might be attributed to that parents are considered influential forces in the development of children's health and the best position for the provision of children's healthy food choices. Also, parents in-still positive attitudes toward healthy food among children early and increase their consumption of healthy diet during childhood. This finding was in the same way with **Sirasa et al. (2021)** in Sri Lanka found that live with both parents had significantly increased children's food knowledge and healthy food preferences scores. Additionally, a study conducted by **Brecic et al. (2022)** in Zagreb, Croatia stated that live with both parents was positive attitudes toward healthy food.

The current study results illustrated that a statistically significant negative correlation between knowledge score of healthy food choices and birth order i.e. children have younger age had less awareness concerning healthy food choices. In the same vein, a study conducted in Africa by **Howell et al. (2016)** indicated that last birth order children are significantly more likely to consumed unhealthy food choices. Moreover, similar result was found in a study carried out in Ethiopia by **Bras and Mandemakers (2022)** demonstrated that earlier born children had a better nutritional knowledge than later born children.

Conclusion: According to the findings of the present study, the following concluded:

Although the majority of the preschool children had normal dietary habits, more than two thirds of them had unsatisfactory knowledge about healthy food choices. Concerning predictors for healthy food choices indicated that, age, and live with both parents were a statistically significant positive predictors of children's knowledge score. Conversely, birth order was a statistically significant negative predictor of children's knowledge score.

Recommendations: On the basis of the current study findings, the following recommendations are suggested:

- Further researches should be developed to address the predictors affecting of healthy food choices to assist in building more effective and more tailored intervention for preschool children.
- Replicate the study on larger number of children in other settings to permit for generalization of results

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