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Assessment of Mothers' Awareness regarding Risk of Iron Deficiency Anemia among School Age Children

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ABSTRACT

Background: All across the world, children often suffer from this anemia. Recognized to be a significant difficulty, anemia is caused by a deficiency of necessary iron in the body. This will allow us to identify the mothers' areas of weakness in terms of understanding iron deficiency anemia. **Aim of the study:** To assess of mothers' awareness regarding risk of iron deficiency anemia among school age children. **Design:** A descriptive design was utilized in this study. **Setting:** This study was conducted at the outpatient pediatric clinic and pediatric department at Beni-Suef University Hospital affiliated to Ministry of Higher Education. **Sample:** A purposive sample comprised of 150 mothers having children with iron deficiency anemia was selected to conduct this study. **Tools:** Two tools. The first tool was a structured interviewing questionnaire to assess mothers' knowledge regarding iron deficiency anemia; the second tool was attitude scale to assess mothers' attitude toward iron deficiency anemia. **Results:** The study findings revealed that 49.4%of studied mothers their age group was between 25 >32 years with mean age (29.77±6.02). And ٢٤.00% of the studied mothers had satisfactory level of total knowledge regarding iron deficiency anemia among school age children **Conclusion:** it can be concluded that, there was positive correlation between total knowledge and total attitude. **Recommendation:** Educational programs for mothers about iron deficiency anemia among school age children are required to increase their awareness and performance regarding care of their children with iron deficiency anemia

Key words: Mothers' Awareness, Iron Deficiency Anemia, School Age Student.

INTRODUCTION

World Health Organization (WHO) defines school age children as individuals aged 6 to 12 years. This age group is crucial for physical, social, mental, and emotional development, with UNESCO categorizing six to eleven years as primary school age and twelve to seventeen years as secondary school age. School-age represents a critical phase of growth and development, emphasizing the importance of good health for effective learning **(World Health Organization, 2024).**

Worldwide, iron deficiency (ID) affects a large number of people. At least 25% of the global population suffers from it, with the highest rates seen in young children and reproductive-aged women. When the body does not have enough iron to maintain normal red blood cell formation, a condition known as ID anemia (IDA) can develop over time **(O'Sullivan et al.,2023).**

In red blood cells (RBCs), iron is essential for hemoglobin to carry oxygen. A shortage of iron occurs when the body's overall iron content drops. Iron deficiency anemia (IDA), a condition characterized by low hemoglobin levels, impaired red blood cell production, and other symptoms, can occur in cases of severe iron insufficiency **(Kumar et al.,2022).**

In nearly every nation on Earth, people suffer from iron deficiency and the resulting illness known as iron deficiency anemia [IDA]. Almost 40% of school-aged children in developing countries have iron deficiency anemia. Anemia due to iron deficiency affects 35.3% of Egyptian schoolchildren, making it a serious public health concern **(Gamal et al.,2021).**

Iron deficiency anemia can be caused by either insufficient iron intake, chronic blood loss, or both. Because of their rapid physical development, students are at an increased risk of developing IDA. The main factors that lead to an elevated risk of IDA are a poor quality diet and reduced dietary iron bioavailability **(Zuraida et al.,2020).**

When iron isn't getting into the body, hemoglobin levels drop, which means less oxygen for the brain and the rest of the body. This, in turn, causes metabolic abnormalities in the brain. Alterations to the brain's metabolism can impact cellular composition and activity, leading to abnormalities in brain function (**Umami et al.,2021).**

School-age children are more likely to suffer from anemia, especially iron deficiency. Children with anemia in school experience impaired psychomotor development, negative long-term effects on the central nervous system, low IQ, poor academic achievement, reduced work capabilities, and a low standard of living. **(Bassam et al.,2021).**

Permanent and long-lasting effects might result from an iron deficit. The most significant ones at a young age include cognitive impairment and a lag in psychomotor development. Such children struggle academically and experience an increase in behavioral issues during adolescence. Memory loss is a clear and significant symptom of iron deficiency, which can also cause sexual development delays, chronic fatigue syndrome, immune system problems, an increased risk of infectious diseases, and problems with gland function in older children and adults **(Mukhamadeevich.,2023).**

promoting safety, maintaining enough iron intake and educating the family are the three main goals of the following intervention that a pediatric nurse might use in the treatment of iron deficiency anemia in children. Encouraging safety measures, a kid suffering from anemia may have shifts in neurologic function as a result of a reduction in oxygen delivery to the brain. fatigue and an inability to eat adequately may result from this. As part of a dietary intervention, encourage the consumption of iron-rich foods such as beef and pork, the fish, dried legumes, dried fruits, dark-colored vegetables while limiting fast food intake. **(Ibrahim et al.,2022).**

Significance of the study

The Egyptian government has conducted a study and discovered that 33% of elementary school-aged children suffer from anemia, while 13.5 percent are overweight, and 5% are dwarfs **(Abdel-Ghaffar,2023).**

Over 40% are impacted by IDA. Qena governorate has a reported frequency of IDA of 12% among children aged 6–12, Beni-suef of 26.6%, and Elmenofya of 29%. Among schoolchildren in Lower Egypt, 55.7% had anemia, according to another study **(Mokhtar et al.,2023).**

Many children, particularly in underdeveloped nations, suffer from iron deficiency, which is one of the numerous dietary disorders that can impair a person's cognitive and behavioral abilities. Decreased emotional responsiveness and attention span are two of the most concerning behavioral changes that can occur as a result of iron deficiency anemia in children. In addition, the academic performance of affected youngsters is negatively impacted since their intelligence quotient (IQ) and learning abilities are diminished **(Ayed et al.,2021)**. So, this study aimed to assess mothers' awareness regarding risk of iron deficiency anemia among school age children.

AIM OF THE STUDY

This study aimed to assess of mothers' awareness regarding risk of iron deficiency anemia among school age children.

Research questions:

The present study was intended to answer the following questions:

1- What is the mothers' knowledge regarding iron deficiency anemia?

2- What is the mothers' attitude regarding risk of iron deficiency anemia?

SUBJECT AND METHODS

The subject and methods for this study were portrayed under the four main designs as follows:

I-Technical design

II- Operational design.

III- Administrative design.

IV-Statistical design.

I- Technical design:

The technical design included research design, setting, subject and tools for data collection.

Research design:

A descriptive research design was used to achieve the aim of the study.

Research setting:

The study was conducted at pediatric department and outpatient pediatric clinic at Beni-Suef University Hospital. pediatric department was located in the fourth floor and consisted of three rooms: the first room contained 11 beds, the second room contained 6 beds, and the third room contained 4 beds. The total number of beds in Pediatric department (21) beds. outpatient pediatric clinic was located on the ground floor include one room. The selection of this hospital was based on several reasons: it is a big hospital that educates all levels of the medical field and provides medical services for free to all patients.

Research subject:

A purposive sample was used to achieve the aim of this study. The study sample consists of 150 mothers having children suffering from iron deficiency anemia who attended to the previously mentioned setting during the period for 6 months, after fulfilling the following criteria:

Inclusion criteria:

- Mothers having children diagnosed with iron deficiency anemia aged from 6:12 years.

- Agreed to participate in the research study.

Exclusion criteria:

- Refused to participate in the research study.

- Mothers had children aged less than 6- more than 12 years old.

- Mothers had children having hereditary anemia (such as sickle cell anemia or thalassemia).

Sample size calculated using the following formula:

N= t2×p(1-p)m2*)*.

Description: N = required sample size

t = confidence level at 95 % (standard value of 1.960)

p = total no. of admitted mothers in the previous mentioned clinics

m = margin of error at 5 % (standard value of 0.050).

Thus N= (1.960)×1195 (1-1195) (0.050) = 150 mother

According to the previous equation the sample size was 150 mothers.

Tools for data collection:

The data were collected by using the following tools:

Tool(I): A structured interviewing questionnaire:

It was developed by the researcher based on **Ibrahim *et al., (2022).*** It was written in Arabic language after reviewing the recent and related literature in the form of closed ended questions and multiple choices to collect the required data. It consisted of 2 parts:

Part (1): - Studied children characteristics which included; age and gender.

- Mothers' characteristics which included; age, educational level, job, social status, type of family.

Part (2): Mothers' knowledge regarding risk of iron deficiency anemia among school age children it contained 34 questions divided, as the following:

- 16 questions about mother's knowledge regarding iron deficiency anemia.
- 10 questions about mothers' knowledge regarding prevention and treatment of iron deficiency anemia.
- 8 questions about mothers' knowledge regarding seriousness complications of iron deficiency anemia on children.

Scoring system to knowledge:

The mothers who were part of the study had their iron deficiency anemia knowledge evaluated using a grading system based on their responses. There was a one-point gain when answering a question right and a zero-point penalty for getting it wrong. The total degree was **(34)** and then converted into percentage as the following:

-Satisfactory knowledge (60<100%).

- Unsatisfactory knowledge (<60 %).

Tool (II): Mothers' attitudes Likert scale: It was adapted from **(Macias and Glasauer 2014)** and modified by the researcher to assess mothers' attitudes regarding iron deficiency anemia. It contained several issues related to anemia. It included such questions as "you think checking Hb every six months is necessary. Anemia is a health problem. IDA is a serious problem. anemia can be corrected. And you like the taste of iron-rich foods.

Scoring system to attitude:

The items were evaluated using a Likert scale with three points. It went from 0 (strongly disagree) to 2 (strongly agree). A positive attitude is indicated by a weight of 60% or above, a neutral attitude by a weight of 50% to 60%, and a negative attitude by a weight of less than 50%. The responses' weights were then converted into percentages.

II- Operational design:

Preparatory phase:

Using books, articles, journals, and the internet, the investigator reviewed current and past literature, as well as theoretical knowledge of various aspects of the study, from both local and international perspectives. This was done in order to prepare the data collection tools.

Tool Validity:

Three experts from the nursing faculty reviewed the tools and implemented revisions based on their clarity, relevance, comprehensiveness, comprehension, and applicability, according to minor modification were done. The opinion was elicited regarding the paraphrase, adding and removing some items, the layout and format of the questions, and all of their remarks were taken into consideration, and the tools were regarded as valid from the experts point of view.

Tool reliability:

The degree to which the questionnaire items connected to one another was assessed by testing the reliability of the instruments. To find out how reliable the tool was inside, researchers employed Cronbach's Alpha. Attitude was at (0.711) while knowledge was at (0.668).

Pilot study:

A pilot study was carried out on ten percent of the mothers who were the subject of the investigation in order to evaluate the practicability of the study, as well as the clarity and objectivity of the tools used. There was no alteration made, and as a result, the individuals who participated in the pilot study were included in the sample size.

Field work:

The actual work in the field was carried out over the course of a period of six months, beginning in February (2024) and ending in July (2024). To obtain the necessary information, each mother was interviewed and evaluated on an individual basis utilizing the research tools. The researcher began by presenting herself to the mothers who were present at the study location, which was open every Monday and Saturday from nine in the morning until two in the afternoon. In order to gain the mothers' cooperation, the researcher provided a straightforward explanation of the purpose of the study, as well as guidance on how to fill out the knowledge questionnaire.

Additionally, the researcher reassured the mothers that their responses would remain anonymous, and that the information would be used solely for the purpose of scientific research and would be kept strictly confidential. In the following step, the researcher handed out the questionnaire to the mothers who were being researched. The questions were read aloud to mothers who were unable to read or write, and the researcher helped them understand what was being asked. This was followed by the researcher selecting the response that the mother would provide. The time required to finish filling out the questionnaire format was approximately fifteen to twenty minutes. When it came to the mothers' attitudes, the amount of time that was spent addressing their reported attitudes ranged from ten to twenty minutes.

III- Administrative design:

The Dean of the Faculty of Nursing at Beni-Suef University provided a letter of written approval that was received in order to successfully carry out this study. The purpose of the letter was to request collaboration and authorization to carry out this investigation, and it was addressed to the general manager of Beni-Suef University Hospitals. Following an explanation of the purpose of the study, an official clearance was acquired from the Dean of the Faculty of Nursing as well as the General Manager of Beni-Suef University Hospitals. Obtaining consent from moms ensured that their privacy was protected and that there was no breach of confidentiality.

Ethical considerations:

Ethical approval was requested from the Research Ethical Committee of the Faculty of Medicine Beni-Suef University before the pilot study could begin. The relevant hospital authorities were also consulted, and all mothers were asked to provide their written or oral consent after being informed about the study's purpose and nature before the interview. Coding the data ensured the investigators' privacy, and the investigator could remove it whenever they wanted.

IV-Statistical design:

A personal computer running the Statistical Package for the Social Sciences (SPSS) program version 22 was used to determine the scores, tabulate the data, and conduct the analysis. The P value was determined to be 0.05. For the purpose of describing the results, descriptive statistical tests such as numbers, percentages, mean, and standard deviation (Mean ± SD) were utilized throughout the analysis. The appropriate inferential statistics, such as the "F" test or the "t" test, were also utilized in this study. When the p-value was less than 0.05, it was regarded that the statistical significance was determined, and when the p-value was less than 0.001, it was thought that the statistical significance was extremely high.

RESULTS

Table (1): shows that, 49.4% of the studied mothers their age group was 25 > 32 years with mean age 29.77±6.02 years, 94.7% of them were married and 68% of them were from rural area. Additionally, 54% of the studied mothers had secondary education, 70% of them were housewives, 68% of them had not enough monthly income, 42.7% of them had 2 children and 71.3% of them had extended family.

Figure (1): Illustrates that, 24.00% of the studied mothers had satisfactory knowledge level and 76.00% of them had unsatisfactory knowledge level regarding risk of iron deficiency anemia among school age children.

Figure (2): shows that, 14.6% of the studied mothers had positive attitude regarding risk of iron deficiency anemia among school age children. While, 28.7% and 56.7% of them had negative and neutral attitude regarding risk of iron deficiency anemia among school age children.

Table (2): shows that, there was positive correlation between total knowledge and total attitude.

Table (1): Number and Percentage distribution of the studied mothers regarding their personal characteristics (n=150).

Items	No.	%
Mothers' age		
18 > 25 yrs	23	15.3
25 > 32 yrs	74	**49.4**
≥32 yrs	53	35.3
Mean±SD	29.77±6.02	
Marital status		
Married	142	**94.7**
Divorced	8	5.3
Residence		
Rural area	102	**68.0**
Urban area	48	32.0
Educational level		
Illiterate	6	4.0
Read & write	17	11.3

Secondary education	81	**54.0**
High education	46	30.7
Occupation		
Employed	45	30.0
House wife	105	**70.0**
Monthly income		
Enough	48	32.0
Not enough	102	**68.0**
How many children in the family?		
One child	13	8.7
2 children	64	**42.7**
3 children	50	33.3
≥ 4 children	23	15.3
Type of family		
Extended Family	107	**71.3**
Family Nucleus	43	28.7

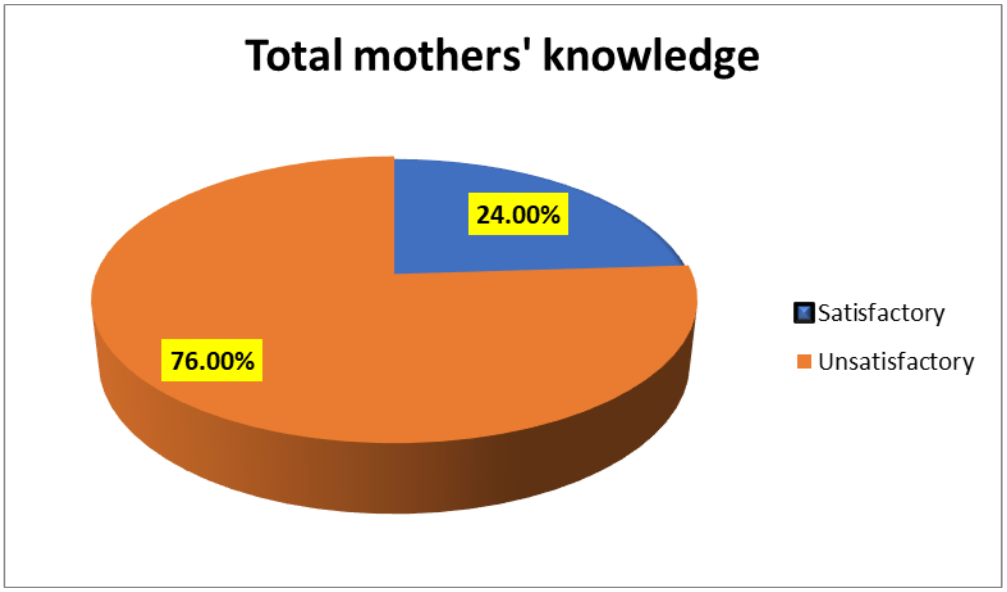

Figure (1): Percentage distribution of the studied mothers' total knowledge regarding risk of iron deficiency anemia among school age children (n=150).

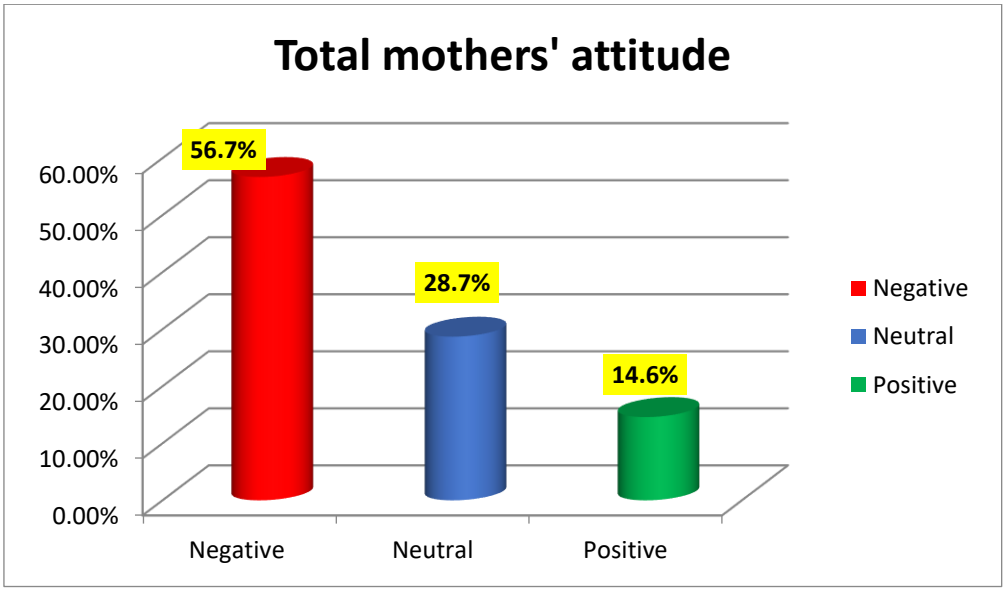

Figure (2): Percentage distribution of the studied mothers' total attitude regarding risk of iron deficiency anemia among school age children (n=150).

Correlation between mothers' total knowledge and total attitude levels

		Total attitude
Total knowledge	r	.269
	p	0.001**

* Negative correlation at p≤0.05
**Positive correlation at p≤0.01

Table (2): Correlation between mothers' total knowledge and total attitude levels.

DISCUSSION

In the world, iron deficiency, and more especially iron deficiency anemia (IDA), is one of the most common and serious dietary deficiencies. People of various ages and types might suffer from iron deficiency anemia. From birth to puberty, children's cognitive development is hampered by iron deficiency. It is linked to higher rates of morbidity and negatively impacts the immune system. Age, geography, and gender all had an impact on the prevalence of IDA, one of the most serious health issues **(Shehata et al., 2021).**

Deficiency of iron is a common cause of anemia, which affects people globally. It is common for children of school age to develop this form of anemia. Children in elementary school have a high dietary iron requirement; pupils who are iron deficient are weaker and more susceptible to microbial infections. Although iron replacement treatment alleviates some symptoms of iron deficiency anemia, the condition is accompanied with a host of others **(Camaschella, 2021).**

The fast growth rates and variable eating habits of primary school children make them particularly susceptible to nutritional anemia, particularly iron deficiency anemia, during this time in the human life cycle. A balanced diet that includes all food categories is something that elementary school students are expected to emphasize. Preventing health concerns at this age requires adequate diet **(Flora et al.,2022).** So, the current study aimed to assess mothers' awareness regarding risk of iron deficiency anemia among school age children.

Part I: Socio-Demographic data of the studied mothers and children

In the present study, as regard Socio-Demographic data of the studied mothers **,** the current study revealed that, about half of the studied mothers' age group was 25 > 32 years with mean age 29.77±6.02 years ,most of the studied mothers were married, more than half of them had secondary education, less than three quarter of the studied mothers were house wives and more than two thirds of them had not enough monthly income and less than three quarters of the studied mothers family members had extended family.

Concerning the characteristics of the studied children, the present study represented that, more than one half of the studied children age group was 6 < 8 years with mean ±SD 8.02±2.03 years and more than half of the studied children were males.

Regarding Studied mothers' knowledge regarding risk of iron deficiency anemia among school age children, the present study represented that, less than two third of the studied mothers had correct knowledge regarding causes and main complications of iron deficiency anemia and the most risk people to iron deficiency anemia. While, more than half of the studied mothers had incorrect knowledge regarding foods that impede iron absorption if consumed during meals and common side effects of taking iron supplements.

This result was supported by **Ibrahim et al**., (**2022)** who reported that, less than two third of the studied mothers had correct knowledge regarding causes of iron deficiency anemia and more than half had correct knowledge regarding main complications of iron deficiency anemia. While, more than half of the studied mothers had incorrect knowledge regarding foods that impede iron absorption if consumed during meals and common side effects of taking iron supplements. Meanwhile, this finding was in disagreement with **Ismail et al**., (**2022))** who mentioned that, more than three quarters of the studied mothers had incorrect knowledge regarding causes of iron deficiency anemia, less than two third of them had incorrect knowledge regarding main complications and the majority of them had incorrect knowledge regarding the most prone people to iron deficiency anemia. The researcher believes that adequate mothers' knowledge come from reading in health care topics and good experience.

In relation to total mothers' knowledge level, the present study reported that, almost three quarters of the studied mothers had unsatisfactory knowledge level. While, about less than nearly one quarter of them had satisfactory level of knowledge regarding risk of iron deficiency anemia among school age

children. From the researcher point of view, this could be related to that fact that less than three quarter of the studied mothers reported that hadn't have information about iron deficiency anemia and more than two thirds were having intermediate degree of education.

This finding was supported by **Elsbay et al**., **(2021)** who mentioned that less than half of studied student's parents had satisfactory total knowledge and around two third of them had unsatisfactory total knowledge about iron deficiency anemia. This is contrary to the research conducted by **Mari (2019)**. who concluded that three quarter of parents have good knowledge about anemia. From the research point of view this difference may could be due to change of culture between countries.

Concerning studied mother's total attitude regarding risk of iron deficiency anemia among school age children, the present study reported that, more than one half of the studied mothers had negative attitude regarding risk of iron deficiency anemia among school age children.

This finding was supported by **Anjani et al**., **(2021)** who mentioned that more than one half of the studied mothers had negative attitude. Meanwhile, this finding was in disagreement with **Akpaki et al**., **(2021)** who stated that more than two third of the studied mothers had positive attitude. This may be due to cultural beliefs, the use of certain food combinations or household food-distribution patterns could affect iron intake.

Concerning correlation between mothers' total knowledge and total attitude, the current study revealed that, there was positive correlation between total knowledge and total attitude. This result similar to **Abdulhussein et al**., **(2021)** who reported that, there was positive correlation between total knowledge and total attitude. From the researcher point of view, this might be related to the fact that good knowledge lead to good attitude and vice versa.

CONCLUSION

Based on findings of the present study, it can be concluded that ;

Almost three quarters of the studied mothers had unsatisfactory total level of knowledge and more than the half of them had negative attitude regarding risk of iron deficiency anemia among school age children. Also, there was a statistically significant relation between the studied mothers' total level of knowledge and their educational level and occupation, while there. was statistically significant relation between the studied mothers' total attitude and their educational level and there was a highly statistically significant relation between the studied mothers' total attitude and their occupation. And there was positive correlation between total knowledge and total attitude.

RECOMMENDATIONS

Based on the finding of the current study, these points are recommended:

Increase awareness of mothers' about risk of iron deficiency anemia and health nutritional requirement in children.

- Conducting educational programs periodically and regularly to improve mothers' knowledge and changing attitude about iron deficiency anemia and follow-up through mass media and social networks.
- Further study include larger sample to generalize the results in Egypt.
- Publishing a brochure about children iron deficiency anemia and it's risk factors in hospitals, primary health care centers, schools and universities.
- Including nutrition education in health organizations to raise moms' awareness

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