

Mothers' Knowledge and Reported Practices about Care Provided for their Children Having Favism

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Abstract

Background: Favism refers to a hemolytic reaction upon consuming fava beans, also known as broad beans. **The study aimed** to assess mothers' knowledge and reported practice regarding care provided for children having favism. **Research design:** The current study utilized a cross-sectional descriptive research design. **Setting:** The present study was carried out at the outpatient, oncology, and hematology unit of Minia University Hospital for Obstetrics and Pediatric (MUHOP), situated in Minia City. **Subjects:** A sample of 60 mothers of children diagnosed with favism willingly participated in the study, providing a convenient representation of the sample according to research. **Research tools:** Tool (I): A structured interview questionnaire includes socio-demographic data of the mothers, such as age, residence, occupation, children's medical history as family history, duration of disease, and mothers' knowledge regarding favism. Tool (II): Mothers' reported practices regarding favism **Results:** More than half of mothers had an unsatisfactory total score of knowledge and reported practices related to caring for children with favism. Also, a statistically significant relation was observed between the total score of mothers' knowledge, reported practice, and their socio-demographic characteristics except the residence and education. **Conclusion:** Mothers' knowledge and reported practices regarding favism were unsatisfactory. **Recommendation:** implement awareness campaigns and health education programs focused on favism to enhance mothers' knowledge regarding favism and promote effective prevention of the triggering factors associated with this condition.

Keywords: Children, favism, knowledge, Mothers, Practices.

Introduction:

Favism refers to a hemolytic reaction that occurs upon consumption of fava beans. It is also known as Glucose-6-phosphate dehydrogenase deficiency (G6PD), an inherited condition characterized by the destruction of red blood cells. This condition has the potential to result in moderate to severe hemolytic anemia. There is an overrepresentation of male cases in comparison to female cases. Male individuals exhibit hemizygoty for the G6PD gene. (Elgamal et al., 2020).

Various sources of oxidant injury that can potentially trigger an episode of acute hemolysis in an individual with G6PD encompass a range of medications, chemicals, foods, acute illnesses, and metabolic conditions. These include but are not limited to certain medications and chemicals, specific foods, and acute illnesses such as metabolic conditions like diabetic ketoacidosis, metabolic acidosis, hyperglycemia, hypoglycemia, and hypothermia. Hemolysis may arise due to free radicals and reactive oxygen species generated by various stressors. The three primary factors that can initiate a response are infections, specific medications, and particular types of food. Infection is frequently identified as the primary cause of acute hemolytic anemia in individuals with favism, particularly those with pronounced deficiency and concurrent conditions such as cytomegalovirus, hepatitis A and B, pneumonia, or typhoid fever. (Glader, 2019).

Certain medications may be used cautiously, but it may be necessary to administer lower doses, especially in patients with more severe forms of deficiency. Examples of

medications that are commonly prescribed but should be avoided or used with caution in individuals with favism include antibiotics such as Sulphonamides, Cotrimoxazole, Dapsone, Chloramphenicol, Nitrofurantoin, Nalidixic acid, Sulfamethoxazole, and Isoniazid. Antimalarials like Chloroquine, Hydroxychloroquine, Primaquine, and Mepacrine should also be used cautiously. Certain chemicals like MothBalls (naphthalene), Methylene blue, and analgesics like Aspirin and Acetaminophen should also be used with caution. Other drugs that should be avoided or used cautiously include Methyldopa, large doses of vitamin C, Quinidine, Glyburide, and Vitamin K (Devi et al., 2016 and Harcke et al., 2019)

The onset of acute hemolytic anemia resulting from consuming fava beans, also known as favism, can occur swiftly. A child may experience a mild increase in body temperature within 24-48 hours, accompanied by symptoms such as irritability, lethargy, and tachycardia. The three significant symptoms of acute hemolysis were pallor, icterus, and dark urine. Following the manifestation of these symptoms, there was an increased frequency of abdominal pain, vomiting, and drowsiness. Gastrointestinal symptoms, specifically diarrhea and constipation, were observed in 10% of the patient population. In significant severity, one may observe indications of hypovolemic shock, characterized by a substantial loss of blood and fluids to the extent that the heart cannot adequately circulate blood throughout the body. Alternatively, although less probable, heart failure may also

be observed (Honar et al., 2018 and National Organization for Rare Disorders, 2019).

Favism is commonly diagnosed in children who are below the age of five. The diagnosis can be established by conducting a thorough assessment of the patient's drug and food intake history and considering the presence of corresponding symptoms. It is also important to note any previous instances of such episodes that have been reported. Blood tests can indicate a decreased count of red blood cells and elevated bilirubin levels. Additionally, examining a stained blood film may reveal the presence of hemolytic red blood cells, Heinz bodies, and reticulocytes. When observing cells that exhibit an irregular appearance resembling a bitten piece they are called bite cells. The urine sample obtained during the episode exhibits a dark hue. I want to inquire about the availability of screening tests to detect low levels of glucose-6-phosphate dehydrogenase (G6PD). (Lakshmi Venkataraman, 2018 and Sintes et al., 2022).

The treatment of hemolytic anemia in a patient with glucose-6-phosphate dehydrogenase (G6PD) deficiency is contingent upon the severity of the anemia. In numerous instances, treatment may not be necessary beyond addressing an underlying infection or discontinuing the trigger, if applicable. Patients presenting with moderate cases may require short-term intravenous fluids to manage renal failure or as a preventive measure against hemodynamic shock. Patients presenting with severe disease and exhibiting rapid hemolysis rates may necessitate blood transfusions. This intervention is more commonly required in pediatric cases, particularly those associated with favism. In such instances, transfusion can potentially be a critical intervention that can save lives. (Harcke et al., 2019).

Nurses play a crucial role in identifying and preventing precipitating factors that can cause a hemolytic crisis in patients with G6PD deficiency. This is achieved by actively avoiding trigger factors, including specific medications. Conducting a comprehensive physical assessment and obtaining accurate baseline vital signs are crucial before initiating a blood transfusion. It is imperative to conduct a comprehensive assessment of the respiratory system, which involves meticulous auscultation of the lungs and observation of the patient's utilization of accessory muscles. The assessment of the cardiac system should encompass a thorough examination to identify any indications of cardiac failure, such as edema and jugular venous distention. It is important to thoroughly examine the skin to identify any presence of rashes, petechiae, or ecchymosis. (Shokr & El Kotb, 2022).

Managing a child with favism relies on the level of awareness and knowledge that mothers possess regarding the factors that can trigger the condition. The management of bean anemia can be effectively achieved by avoiding the consumption of prohibited substances. Therefore, it is advisable for the mother to carefully inspect any items given to her child and verify that they are free from such substances. It is advisable to seek medical consultation from a doctor if a child has been exposed to any disease. This will ensure that the child receives the necessary treatment. Additionally, engaging in a conversation with the child regarding their condition is important. (Gad et al., 2020).

Significance of the study:

Favism is a prevalent genetic enzyme deficiency, primarily associated with hemolytic anemia, which impacts over 500 million individuals globally. Nevertheless, it exhibits a distribution characterized by significant disparities in its prevalence, spanning from absence in the original Amerindian populations to a noteworthy 20% in certain regions of Africa and Asia. Approximately 500 million individuals carrying any of these mutations typically remain asymptomatic for their lives. However, there is a possibility that they may experience episodes of acute and occasionally severe hemolytic anemia. (Luzzatto et al., 2020)

A study was done on knowledge and practice in Al-Azhar University Hospital (New Damietta City) manager. The study was carried out from the beginning of July 2019 until December 2019 for data collection and program application has showed that there is poor level of knowledge was presented by 84.7% , fair level of knowledge was presented by 15.3% and good level of knowledge was presented by zero .The study has also presented that there is inadequate practice of mothers regarding disease was presented by 72.2% and adequate practice was presented by 27.8% (Gad El-Bastwese ,et al.,2020).

In 2019, the global population witnessed a significant number of individuals born with G6PD deficiency, reaching 8.96 million. Furthermore, the prevalence of G6PD deficiency among the global population was estimated to be 438 million individuals. G6PD deficiency accounted for 13,000 deaths across all age groups, with 367 fatalities in children under five years old (The Institute for Health Metrics and Evaluation (IHME), 2019).

The family, relatives, medical staff, or the media should provide advice and counseling regarding this disease, all of these have an essential role to play in preventing exposure to disease episodes. Regarding the main sources of information in a recent study's findings, stated that the family is the primary source of information concerning favism (Al Abedi ., et al., 2023).

From the researcher's point of view, family nutritional and consumption practices play an important role in early exposure to attacks of red blood cell breakdown. In Egypt, it is common for beans to be introduced to infants before they are two years old. Dried beans are consumed in various culinary preparations. Furthermore, cooked dried beans are a staple component of the Egyptian diet and are commonly included in the diet of infants. Including beans in baby formula may pose a potential health risk to children diagnosed with favism.

Aims of the Study

The current study aimed to assess mothers' knowledge and reported practice regarding care provided for children having favism

Research questions:

- What are the levels of mothers' knowledge and reported practices regarding care provided for children having favism?
- Is there relationship between mothers' knowledge / reported practices and their socio-demographic characteristics?

Subject & Method

Research Design: A cross-sectional descriptive research design was used for this study

Subjects: A convenient sample included all mothers having children with favism aged from (1 -10yrs) enrolling in pediatric hematology and outpatient clinics for six months at Minia University Hospital for Obstetric and pediatric (MUHOP).

- **Inclusion criteria:** Mothers of children with any classification of G6PD deficiency enzyme, Mothers of children aged one year and under ten years.

-**Exclusion criteria:** Mothers of children with genetic defects (Gigantism or dwarfism).

Setting

This study was conducted in the outpatient clinic, oncology unit, and hematology unit at Minia University Hospital for Obstetric and Pediatric (MUHOP).

Data collection tools

Two tools adapted from **Kasemy et al. (2020)** and **Gad et al. (2020)** and modified by the investigator were used to collect the required data for the study:

Tool I: A structured interview questionnaire designed by the researcher after an extensive review of related literature using books, periodicals, articles, and magazines; this was necessary for the researcher to be acquainted with and oriented. The questionnaire included three parts

Part (1): Socio-demographic data of the mothers, such as age, residence, occupation, educational level, and number of family members. Socio-demographic data of the children, such as gender and age category.

Part (2): Children's medical history as family history, duration of disease, history of hemolytic attack, causes of hemolytic attack, attack duration, history of blood transfusion, and any complaints from another chronic disease and family history.

Part (3): Mothers' knowledge regarding favism. It consisted of (28) questions (definition of disease, gender differences, reasons, manifestations, lab investigation, complications, foods that should be avoided, management, and prevention).

Scoring system of mothers' knowledge

Each correct knowledge took two scores, partially correct knowledge took one score, and wrong knowledge took no score (zero). Total scores of mothers' knowledge less than 50% were considered inadequate, while $\geq 50\%$ were considered adequate knowledge.

Knowledge scoring system

- Poor knowledge ($< 50\%$) (0: < 28)

- Fair knowledge ($\geq 50\% : < 75\%$) ($\geq 28 : < 42$)

- Good knowledge ($\geq 75\% : 100\%$) ($\geq 42 : 56$)

Tool (II): Mothers' reported practices regarding favism. It consisted of (15) questions such as being subjected to premarital counseling, subjected to genetic screening, seeking medical advice after delivery to be assured, avoiding food containing fava beans & legumes, providing a healthy

diet prescribed by the doctor, seeking medical advice as possible; compliance with treatment according to doctor orders; going to hospital during hemolytic crisis; avoid exposure to undesired infection; avoid drug administration without doctor order; and compliance with periodic checkup & follow-up of disease

Scoring system of mothers' reported practices

Each done practice took two scores, partially done practice took one score, and not done took no score (zero). Total scores of mothers' practice less than 50% will be considered inadequate, while $\geq 50\%$ will be considered adequate practice.

Reported practices scoring system.

- Malpractice ($< 50\%$) (0: < 15)

- Fair practice ($\geq 50\% : < 75\%$) ($\geq 15 : 22.5$)

- Good practice ($\geq 75\% : 100\%$) ($\geq 22.5 : 30$)

Tools Validity:

The content validity of the data collection tool was assessed by a panel of five experts affiliated with the Faculty of Nursing at Minia and Cairo University, specifically in the Pediatric Nursing Department. The tool was evaluated to assess its content coverage, clarity, relevance, applicability, and wording. In accordance with the feedback and suggestions provided by experts, slight revisions have been implemented, including the rephrasing and reordering certain sentences. The internal consistency measurement was conducted to assess the degree to which the items within the tools are measuring the same underlying concept and are correlated with one another.

Tools reliability:

The reliability of tool one was assessed to validate its consistency by utilizing Cronbach's alpha test. The obtained results indicated a Cronbach's alpha coefficient of 0.72 for assessing medical and family history, and 0.84 for utilizing WHO growth charts. Tool two demonstrates both validity and reliability.

Pilot study:

After developing the tools, a pilot study was undertaken on a subset comprising 10% of the sample, specifically ten mothers of children who satisfied the inclusion criteria for selection. This pilot study aimed to assess the clarity, completeness, adequacy, objectivity, applicability, content validity, and internal consistency of the study tools. Additionally, it aimed to identify any potential issues or problems with the tools. The pilot study results indicated that the necessary omissions and/or additions have been made. Revisions were implemented for certain questionnaire items that displayed inconsistencies with the study. The duration of the interview questionnaire did not exceed 30 minutes. Mothers whose children participated in the pilot study were excluded from the primary study sample. The utilization of pilot testing facilitated the researcher in strategizing for data collection.

Ethical Consideration:

Everyone has obtained the initial approval in writing from the Research Ethical Committee of the Faculty of

Nursing, Minia University with code (REC2022522A). All mothers of children who met the selection criteria were approached and given oral consent to participate in the study. The researcher provided a comprehensive explanation of the study's objectives and methodology to the participants through direct personal communication prior to their involvement. Additionally, informed consent was obtained from the participating mothers in accordance with the study protocol. Data confidentiality was ensured by implementing coding techniques. All assessment sheets were coded anonymously.

Data collection procedure:

The investigator conducted a comprehensive review of relevant literature and theoretical knowledge pertaining to various aspects of the study. This review encompassed current and past sources and materials from local and international sources. Before the implementation of the study, the necessary administrative approval was obtained from the dean of the Faculty of Nursing at Minia University. This approval was then forwarded to the manager of the hospitals. The researcher convened a meeting with the hospital's manager to articulate the study's objectives, intending to secure their cooperation and facilitate subsequent meetings with the mothers.

The data was collected over six months, from December 2022 to June 2023. The researcher was accessible

for three days per week. Each mother was interviewed individually after clearly explaining the interview's purpose and obtaining the mother's consent to participate in the research. The researcher guaranteed voluntary participation and confidentiality to every subject who consented to participate in the study. Efforts were being made to safeguard the ethical rights of mothers. The structured interview questionnaire was utilized to evaluate the knowledge and reported practices of mothers in relation to favism. The questionnaires were presented and elucidated to the participants in the study, with an average duration of 30 minutes.

Statistical analysis:

The process of data entry was carried out utilizing a compatible personal computer. The data collected underwent coding, categorization, tabulation, analysis, and summarization using the Statistical Package for Social Science (SPSS version 20). Additionally, figures were generated using Excel 2010. The data were analyzed using descriptive statistics, including frequencies and percentages for qualitative variables and means and standard deviations for quantitative variables. The chi-square test was employed. A significance level of $p < 0.05$ was utilized to determine statistical significance.

Results

Table (1): Distribution of studied mothers according to their Socio-demographic characteristics (N=60)

Socio-demographic data of mothers	(n=60)	
	N	%
Age/ years		
Less than 20 yrs.	4	6.7
20-30yrs.	38	63.3
31-40yrs.	12	20.0
More than 40 yrs.	6	10.0
Mean ± SD	29.30± 6.4	
Level of education		
Can't read and write	20	33.4
Primary	6	10
Preparatory	11	18.3
Secondary	21	35.0
Higher education	2	3.3
Residence		
Rural	49	81.7
Urban	11	18.3

Figure (1): Distribution of studied mothers according to their social status (N=60)

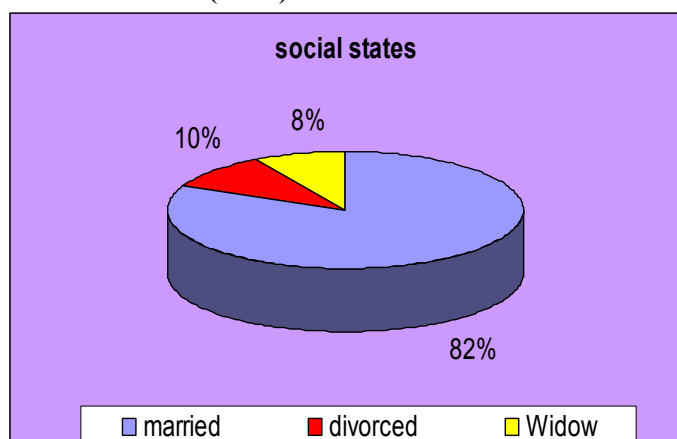
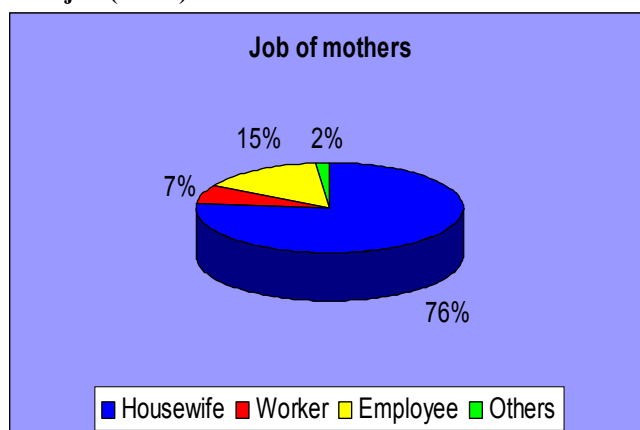


Figure (2): Distribution of studied mothers according to their job (N=60)



Tables (1) and Figures (1 and 2) illustrate the personal characteristics of mothers with children with favism. It was 63.3% of mothers aged 20:30 years, with the mean age was 29.30 ± 6.4 years. As for educational level, it was found that secondary school-educated mothers were more frequent (35%), while 33.4% were illiterate. As regards mothers' residence, 81.7% of them were from rural areas. Regarding mother's occupations, it was found that the majority of mothers were housewives (76%). The majority of the studied mothers are married (82%).

Table (2): Distribution of children with favism according to their Socio-demographic characteristics (N=60)

Socio demographic data of child	(n=60)	
	N	%
Age / years		
Less than 5yrs	49	81.7
From 6:10yrs	11	18.3
More than 10yrs	0	00.0
Mean \pm SD	3.33 \pm 1.8	
Sex of children		
Male	47	78.3
Female	13	21.7
Does child have chronic illness		
Yes	0	0.00
No	60	100
Does child have malaria		
Yes	3	5.0
No	57	95.0
Is child aware of favism		
Yes	24	40.0
No	36	60.0
Rank of child		
1 st	25	42%
2 nd	14	23%
3 rd	10	17%
4 th	11	18%

Table (2) shows the age of the studied children; it was found that 81.7% of them were less than five years of age, with a mean age was 3.33 ± 1.8 . More than three-quarters of the studied children (78.3%) were males. Regarding the rank of the studied children, it was found that the majority were 1st children, with a percentage of 42%, and the minority were 3rd, with a percentage of 17%. None of the studied children had suffered from another chronic illness except favism. The majority of the studied children were not suffering from malaria, 95%. Regarding the awareness of the studied children about their disease, it was found that 60% of them had awareness about their disease.

Table (3): Distribution of children according their medical history (in the last six months)

Items	(n=60)	
	N	%
Child hospitalization in the last six months		
Yes	50	83.3
No	10	16.7
If yes, how many times		
One	37	61.7
Twice	18	30
Three	5	8.3
Fourth or more	0	0.00
Anyone in the family suffers from favism.		
Yes	32	53.3
No	28	46.7
If yes, mention consanguinity	(n=32)	
Fathers	7	21.8
Mothers	9	28.2
Uncle	13	40.6
Grandparents	3	9.4
Others	0	0.00

Table (3) Presents that 83.3% had previous history and hospitalization because of hemolytic attack favism. The highest percentage (61.7%) suffered from one hemolytic attack of favism before; 30% had twice and more than twice was 8.3%. 53.3% had a positive family history of the disease, and 46.7% had a negative family history of the disease. Regarding the degree of consanguinity, it was found that 40.6% of their uncle complains of the same disease, 28.2% of their mother complains of the same disease, and 21.8% of their father complains of the same disease.

Table (4): The relation between personal characteristics and the total score of mother’s knowledge (N=60)

Items	Poor knowledge		Fair knowledge		Good knowledge		X ² test P-value
	N	%	N	%	N	%	
Age/years							
Less than 20 yrs.	3	75.0	1	25.0	0	0.00	X ² =3.010 P=0.80
20-30yrs	25	65.8	8	21.1	5	13.1	
31-40yrs	8	66.7	4	33.3	0	0.00	
More than 40yrs	4	66.6	1	16.7	1	16.7	
Level of education							
Can't read and write	14	70.0	5	25.0	1	5.0	X ² =4.98 P=0.07
Primary	5	83.3	0	0.00	1	16.7	
Preparatory	6	54.5	4	36.4	1	9.1	
Secondary	13	61.9	5	23.8	3	14.3	
Higher education	2	100.0	0	0.00	0	0.00	
Residence							
Rural	32	65.3	13	26.5	4	8.2	X ² =2.14 P=0.34
Urban	8	72.7	1	9.1	2	18.2	
Social status							
married	33	67.3	11	22.4	5	10.3	X ² =2.61 P=0.62
divorced	5	83.3	1	16.7	0	0.00	
Widow	2	40.0	2	40.0	1	20.0	
Job of mothers							
Housewife	28	60.9	16	34.8	2	4.3	X ² =4.54 P=0.60
Worker	3	75.0	1	25.0	0	0.00	
Employee	6	66.7	3	33.3	0	0.00	
Others	1	100	0	0.00	0	0.00	

Table (4) shows that 75.0% of mothers with poor total knowledge scores were observed among mothers under 20 years old. 83.3% of mothers with a poor total knowledge score were observed among mothers who had primary School, and 72.7% of mothers in the rural areas had a poor total knowledge score. 83.3% of divorced mothers have poor total scores of knowledge.

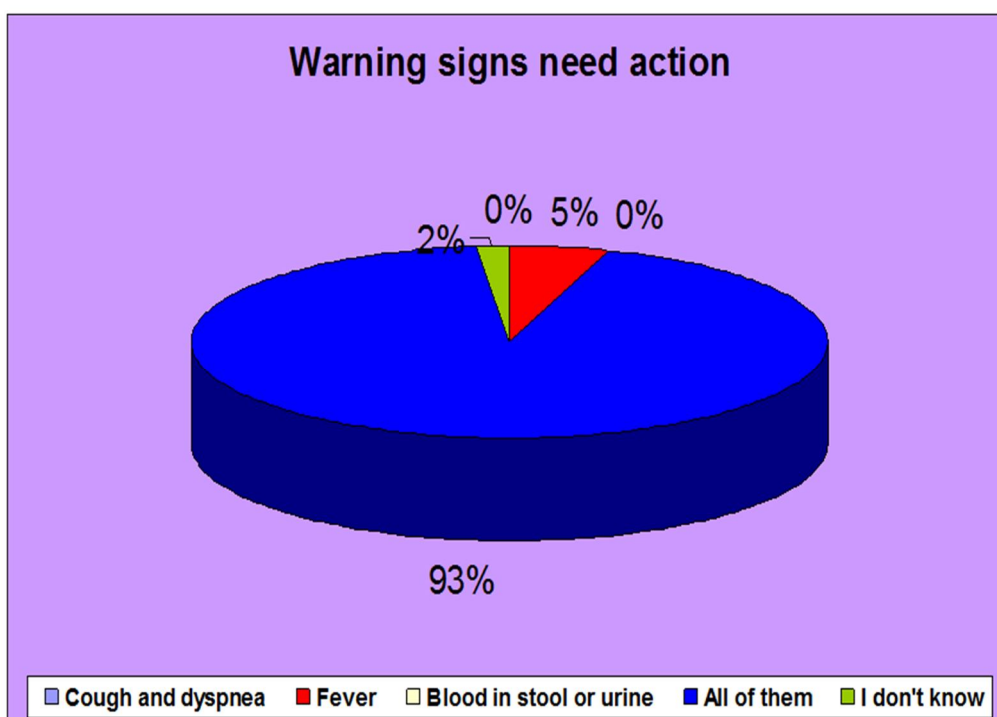


Figure (4): Distribution of mothers according to their knowledge about favism warning signs and need action (N=60).

Figure (4): Highly shows the percentage of studied mothers; 93.3% had a correct answer about all warning signs that need action, and 5% of the studied mothers mentioned that fever is the only sign that needs action.

Table (5): the relation between personal characteristics and total score of mother’s practices (N=60)

Items	Mal Practice		Fair practice		Good practice		X ² test P-value
	N	%	N	%	N	%	
Age/ years							
Less than 20 yrs.	2	50.0	2	50.0	0	0.00	X ² =5.21 P=0.51
20-30yrs	22	57.9	14	36.8	2	5.3	
31-40yrs	8	66.7	4	33.3	0	0.00	
More than 40yrs	6	100.0	0	0.00	0	00.0	

Items	Mal Practice		Fair practice		Good practice		X ² test P-value
	N	%	N	%	N	%	
Level of education							
Can't read and write	13	65.0	6	30.0	1	5.0	X ² =7.44 P=0.48
Primary	5	83.3	1	16.7	0	0.00	
Preparatory	4	36.4	7	63.6	0	0.00	
Secondary	14	66.6	6	28.6	1	4.8	
Higher education	2	100.0	0	0.00	0	0.00	
Residence							
Rural	29	59.2	18	36.7	2	4.1	X ² =2.10 P=0.34
Urban	9	81.8	2	18.2	0	0.00	
Social status							
married	31	63.3	17	34.7	1	2.0	X ² =6.015 P=0.19
divorced	5	83.3	1	16.7	0	0.00	
Widow	2	40.0	2	40.0	1	20.0	
Job of mothers							
Housewife	28	60.9	16	34.8	2	4.3	X ² =1.41 P=0.09
Worker	3	75.0	1	25.0	0	0.00	
Employee	6	66.7	3	33.3	0	0.00	
Others	1	100.0	0	0.00	0	0.00	

Table (5) shows that 100% of mothers have poor total scores of practices observed among mothers older than 40yrs. 100% of mothers with poor total scores of practices were observed among mothers with higher education, and 81.8% of the mothers from urban have poor scores of practices. 63.3% of married mothers have poor total scores of practices.

Table (6): The correlation regarding the total scores of mothers' knowledge regarding favism and reported practices (N=60)

	Performance	
	Correlation Coefficient (r)	P. value
Knowledge	0.70	0.001*

Table (6) Shows a positive statistically significant correlation between the total scores of mothers' knowledge and reported practice (r=0.70, P.value= 0.001).

Discussion

The mothers' socio-demographic according the present study findings revealed that nearly two-thirds of mothers were below the age of 30years old and the majority of them had secondary school-educated level. A similar study on " health education program for mothers their children diagnosed with favism" done by **Gad et al. (2020)** supported these finding and found that the majority of mothers were aged 20 - <30 years. Furthermore, **Hamali et al. (2022)** study about public awareness and knowledge toward glucose-6-phosphate dehydrogenase deficiency in Jazan region, pointed out that the most of their study's sample was within the age range of 20 to less than 40 years and had bachelor/diploma level.

On the other side, the present study results were incongruent with the findings of **Alqahtani (2022)** , who conducted a study on the "Saudi mothers' attitude, knowledge, and practice towards glucose six phosphate dehydrogenase deficiency, "who found that the peak incidence age of mothers was between 41-50 years and a majority of mothers had a university level of education or above.

Regarding mothers' occupation, social status and residence, the findings of the current study indicated that; the majority of mothers were housewives and married, while three-quarters lived in rural areas. This finding was reinforced by **Gad et al. (2020)**, who confirmed that the majority of the mothers were housewives, married, and lived in rural areas .Also, this result was congruity with the study of **Al-Joborae (2015)** about the "extent of knowledge of mothers of neonates with G6PD Deficiency in Hilla city," who cleared that the majority of mothers were unemployed, and more than half of mothers had Primary and secondary level of education.

Regarding the characteristics of the studied children, two-thirds were 1-5 years old. The majority of them

ranked first and had a family history of G6PD. These results were supported by the study of **Athab et al. (2017)** about "favism clinical experience in Al-Elwia pediatric teaching hospital in Iraq, "who found that the peak age of incidence was between 1-5 years of age and had a family history of G6PD. Also, these results were supported by the study of **Ahmed Mahmoud et al. (2022)** about the "relationship between mothers' ingestion of fava beans and occurrence of favism attack among their breastfed infants," who revealed that less than three-quarters of them ranked the first. The majority of them had a family history of G6PD deficiency and were over one year old. Similarly, the current finding was agreed by the study of **Hagag et al. (2018)**, who studied "Glucose-6-Phosphate Dehydrogenase Deficiency in 5 Years Retrospective Egyptian Study" and found that the highest prevalence of hemolytic crisis in G6PD deficiency patients was found within the age group of 1-3 years.

The findings of this study were inconsistent with those of **Ebrahim et al. (2021)**, who conducted a study on" the impact of the Family-centered Empowerment Model on the knowledge and stress levels of mothers with children affected by Glucose-6-Phosphate Dehydrogenase Enzyme deficiency." who reported that the highest occurrence of G6PD deficiency in children was observed between the ages of 6 and less than ten years.

The present study reveals that over three-quarters of the studied children were males. The study, in accordance with **Tang et al. (2018)**, "Evaluations of newborn screening program performance and enzymatic diagnosis of glucose-6-phosphate dehydrogenase deficiency," found that newborns with G6PD males were more commonly affected than females. In addition, **Hagag et al. (2018)** found that males were more commonly affected than females.

The observed outcome can be attributed to the higher prevalence of X-linked recessive disorders in males with a single X chromosome (alongside a Y chromosome). Females possess a pair of X chromosomes, and if a mutation occurs on one of them, they retain one X chromosome that remains unaffected by the mutation. This rationalization is available in identical line with **Athab et al. (2017)**; similarly, the current finding was agreed by the study of **Broek et al. (2016)** about "Glucose-6-phosphate dehydrogenase deficiency: not exclusively in males", who found that G6PD is a genetic deficiency that is inherited in an X-linked manner, predominantly impacting males. However, it is important to consider this condition even in females with hemolytic anemia, despite having no family history of the disorder and normal G6PD levels upon initial assessment.

Furthermore, the findings of this study align with the research conducted by **Devi et al. (2016)** on the topic of "Living with Glucose-6-Phosphate Dehydrogenase Deficiency." **Devi et al. (2016)** reported that G6PD deficiency was more prevalent among males. However, this finding contradicts the results of **Mahdi and Hasan's (2018)** study about the "assessment of mothers' knowledge of their children with enzyme deficiency (G6PD) in pediatric teaching hospital at AL-Hilla City" which indicated that a higher prevalence of the condition among females than males.

From the researcher's point of view, male infants and individuals with a family history of favism are more likely to exhibit heightened susceptibility to G6PD deficiency and the associated condition known as favism. Furthermore, it is worth noting that within Egyptian culture, there is a greater emphasis placed on seeking medical care for male children than female children, particularly in the context of specialized healthcare facilities like hematologic clinics in pediatric university hospitals. This preference is driven by the need to ensure appropriate care and management for conditions such as favism attacks.

The present study revealed that a majority of mothers exhibited a favorable consanguinity, with slightly over fifty percent reporting a positive familial background of G6PD deficiency. This finding was in a similar line to the study of **Kasemy et al. (2020)** about the "Prevalence of mothers' knowledge, attitude, and practice towards glucose-6-phosphate dehydrogenase deficiency among neonates with jaundice" who found that a significant proportion of the parents included in the study exhibited appositive consanguinity, while over 75% of them possessed a positive family history.

Also, this result was compatible with the study of **El-Sayed et al. (2012)**, "The Impact of an Educational Program Intervention on the Prevention of Hemolytic Crisis in Children with Glucose-6-Phosphate Dehydrogenase Deficiency", who reported that almost of the studied sample had a positive family history of G6PD deficiency. On the contrary, **Tsuzuki et al. (2013)** studied "A Japanese neonatal case of glucose-6-phosphate dehydrogenase deficiency presenting as severe jaundice and hemolytic anemia without apparent trigger". They indicated that no familial background of G6PD deficiency was observed within the cohort under investigation. Additionally, the findings presented in the study conducted by **Athab et al. (2017)** contradicted the current results, as they reported that over two-thirds of the parents included in their research had entered non-consanguineous marriages.

Generally, the maternal participants in the study exhibited low levels of knowledge concerning G6PD deficiency, which aligns with the findings of previous studies conducted by **Alqahtani (2022)** and **Almuhaini et al. (2017)** who studied "Public Awareness of Glucose-6-Phosphate Dehydrogenase (G6PD) Deficiency Causes and Prevalence Factors". They found that the participants exhibited limited awareness and knowledge regarding G6PD deficiency, but in contrast to **Al-Joborae (2015)** and **Alarrayed and Al Hajeri (2011)**, the knowledge level was good. However, **Hamali et al. (2022)** reported an acceptable knowledge level.

The results reveal a relation between the studied sample personal characteristics and the total score of mothers' knowledge, as more than two-thirds of mothers residents from rural had a poor total score of knowledge. The majority of divorced mothers had a poor total score of knowledge that was similar to what was observed in a study by **Alqahtani (2022)**, who found a positive correlation between educational attainment and residential location in urban areas, which was found to be significantly associated with heightened levels of awareness among women. Moreover, individuals who entered into consanguineous unions exhibited a higher level of awareness regarding the ailment.

Regarding the relation between the studied sample personal characteristics and the total score of mother's practices. It indicates that all mothers with poor total scores of practices were observed among mothers older than 40 years. All mothers have a poor total score of practice observed among mothers who had higher education; the majority of the mothers residents in urban had a poor total score of practice. More than half of married mothers have a poor total practice score; this is inconsistent with a study by **Awd et al. (2018)**, who showed a strong and statistically significant correlation between the overall practice score of mothers and their educational attainment. Additionally, a significant correlation was observed between the total practice score of mothers and both their age and occupation. This phenomenon can be attributed to the fact that older mothers possess a greater level of knowledge and experience in blood disease and crisis prevention, whereas younger mothers may lack such expertise and educational attainment. Consequently, this disparity in knowledge and experience empowers older mothers to effectively act in addressing these issues.

The present study shows the correlation between the total scores of mothers' knowledge and practice regarding favism. There was a positive statistically significant correlation found between the total scores of mothers' knowledge and practice, similar to what was observed in a study by **al Abedi et al. (2023)** about "Mothers' Knowledge, Attitudes and Practices among Children with Glucose-6-Phosphate Dehydrogenase Deficiency" which indicated that a highly significant association between mothers' knowledge and practices. This indicates that mothers who have information are more knowledgeable about the most important strategies used to avoid or reduce the severity of the attack. Also, these results were supported by the study of **El-Sayed et al. (2012)**, who found that the prevalence of hemolytic diseases among children with favism can be attributed to insufficient understanding and implementation of preventive measures by their mothers. This lack of knowledge pertains to factors that increase susceptibility to favism as well as appropriate actions to be taken during an episode. Additionally, implementing an educational program intervention yielded positive results in enhancing the factual

knowledge and behaviors of mothers about favism predisposing factors, consequently reducing the incidence of hemolytic anemia among their offspring.

From the researcher's point of view, regular investigations and genetic testing should be conducted as part of routine healthcare for children affected by G6PD deficiency. Additionally, it is important to educate all breastfeeding mothers who have infants with favism or a family history of the condition about the importance of avoiding fava beans while breastfeeding. This precautionary measure aims to prevent the onset of a favism crisis in their infants.

Limitations of the Study, The environment was not ideal for interviewing because of noise, it was better to be present a separate room other than diagnosis room.

Conclusion: This study concluded that the mothers' knowledge of dangerous clinical features is very important in influencing their decisions regarding when to decide to seek medical care; assessment of mothers' knowledge and reported practices toward dangerous clinical features help in reducing exposure to hemolytic attack and occurrence of complications. The majority of mothers in this study had an unsatisfactory level of knowledge, while a minority had a satisfactory level of knowledge about favism. As well as, almost all of the mothers had malpractice about favism while about half of the mother's reported practices were fair, and the minority of mothers had good practices about favism.

Recommendation: Based on the findings of the current study, the following recommendations were suggested:

- Ongoing professional development programs should be implemented to ensure that pediatric nurses are well-informed about the significance of providing comprehensive instructions to mothers regarding favism.
- A multidisciplinary team should be responsible for developing, implementing, and evaluating educational sessions targeting mothers.
- Disseminating information through mass communication channels within the pediatric unit, such as posters, banners, local cable channels, and more.
- Implementing educational centers and helplines to enhance public awareness regarding favism.

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