

## MOTHERS KNOWLEDGE ATTITUDES AND PRACTICES AMONG CHILDREN WITH GLUCOSE-6-PHOSPHATE DEHYDROGENASE DEFICIENCY

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### ABSTRACT

**Purpose:** The study aimed to determine mothers' knowledge, attitudes, and practices toward children with G6PD and to find out the relationship between mothers' knowledge, attitudes, and practices toward G6PD and their demographic variables.

**Subjects and Methods:** A cross-sectional study, a non-probability (purposive) sample was conducted in the period from April to October 2022 at Al-Najaf City. The participants in this study were the following mothers, who were admitted for the care and treatment of their children in the three main hospitals: The division of the sample was as follows: Al-Zahra Hospital 50 sick children; Al-Furat Al-Awsat 32 children; and finally, Al-Najaf Hospital 18 sick children.

**Results:** It demonstrates that most mothers lack enough understanding about glucose-6-phosphate dehydrogenase, as well as have positive attitudes and inappropriate practices.

**Conclusions:** Based on the results, it is concluded that there must be emphasis on early newborn screening for G6PD deficiency. Developing and implementing awareness programs for mothers with children suffering from this disease.

### INTRODUCTION

Glucose-6-phosphate dehydrogenase (G6PD) deficiency is the most common human enzymopathy, affecting approximately 400 million people globally (Bubp, *et al.*, 2015). An infection, certain meals, hyperglycemia, and certain drugs can all trigger hemolysis (Ebrahim, *et al.*, 2021). It is a hereditary condition brought on by a deficiency of G6PD, an enzyme necessary for controlling a number of metabolic activities in the body and in control of guarding against the oxidation of red blood cells. Hemolysis, or breakdown of red blood cells, occurs when there is insufficient of this enzyme (Alaarg, *et al.*, 2013). All cells contain glucose-6-phosphate dehydrogenase, which is required for the production of reduced nicotinamide adenine dinucleotide phosphate (NADPH), a coenzyme that keeps the intracellular pool of reduced glutathione maintained and shields cells from oxidative damage (Kwolk-Mirek *et al.*,

2019). Favism, which affects 400–600 million individuals globally, is one of the most common enzyme deficiency diseases. Favism, however, mostly spreads in the Mediterranean region. The most common life-threatening symptom of G6PD deficiency and jaundice is "hemolytic anemia," which is caused by the absence of this enzyme and occurs when a patient consumes significant amounts of fava beans or is exposed to bean-bean plant pollen (Kawulur *et al.*, 2020).

Hemolytic anemia related to favism, which is more common and severe in children, presents 1 to 2 days after fava beans eating with mild fever, irritability, pallor, and fatigue. Shortness of breath and tachycardia, abdominal pain, nausea, dark urine, and splenomegaly are all symptoms of hypoxia, which is caused by the lysis of erythrocytes (NORD, 2019). Some researchers propose that both neonatal screening and systematic analyses of G6PD gene mutations may be useful for the personalized management of patients with G6PD-deficient hemolytic anemia (Kanno & Ogura, 2015). Screening is advised by the WHO in areas where the frequency of G6PD deficiency is 3-5 % however, this screening is not common in many areas of Iraq due to the high cost, lack of knowledge of the disease among the general population, and lack of guidelines regarding high-risk groups that should be screened preferentially when screening of the general population is not possible. All these factors are obstacles that prevent a routine examination (Hassan, 2018). The diagnosis of this disorder depends on the family history, especially if it is a genetic disease; physical exam signs aid in diagnoses, such as splenomegaly, pale conjunctiva, and hyperkinetic apical pulse; and some tests, such as a complete blood count, especially a red blood cell count; liver enzymes (bilirubin level, measure hemoglobin in the urine, hemoglobin level, lactate dehydrogenase test, methemoglobin reduction test, and reticulocyte count (El-Bastwese, *et al.*, 2020).

The management of G6PD deficiency consists of removing the cause of the trigger that can lead to the appearance of symptoms. Once hemolytic anemia results from G6PD deficiency, however, more measures that are drastic may be required. To ensure a full recovery free of complications, hospitalization during treatment is essential, and this includes oxygen therapy, a blood transfusion to compensate for the levels of oxygen and red blood cells, and an accurate assessment of severe hemolytic anemia. Vaccination against common microorganisms (such as hepatitis A and B) can prevent infection-induced attacks, but avoiding drugs and nutrients that trigger hemolysis is the primary approach (Ho *et al.*, 2014; Ebrahim, *et al.*, 2021).

## METHODOLOGY

A cross-sectional study with a non-probability (purposive) sample was selected to obtain a representative sample that met the criteria. The study was conducted in Al-Najaf City from April to October 2022. The participants in this study were the following mothers, who were admitted for the care and treatment of their children in the three main hospitals: The division of the sample was as follows: Al-Zahra Hospital 50 sick children; Al-Furat Al-Awsat 32 children; and finally, Al-Najaf Hospital 18 sick children.

### The study instruments

An assessment tool was adopted and developed by the researcher to assess mothers' knowledge, attitudes, and practices toward G6PD. The final study instrument was made up of four parts, which were as follows: Part 1: Sociodemographic data for mothers and children. Part 2: Mothers' Knowledge about G6PD: This part of the questionnaire is measured by multi-optional questions. Part 3: Mothers' Attitudes toward G6PD: consists of 15 items and is measured by using Likert scales (agree, neutral, disagree). Part 4: Mothers' practices about G6PD involves 18 items describing the mother's practices about G6PD, which is measured by using multiple-choice questions.

**Table 1: Socio-demographic characteristics of the study sample**

| <b>Socio -Demographic data</b> | <b>Items</b>                  | <b>Frequency</b> | <b>Percent</b> |
|--------------------------------|-------------------------------|------------------|----------------|
| <b>Mother's age (Years)</b>    | 16- 20                        | 17               | 17.0           |
|                                | 21 - 25                       | 27               | 27.0           |
|                                | 26 - 30                       | 30               | 30.0           |
|                                | 31 - 35                       | 18               | 18.0           |
|                                | More than 36                  | 8                | 8.0            |
| <b>Mother's education</b>      | Able to read and write        | 14               | 14.0           |
|                                | Primary school graduated      | 44               | 44.0           |
|                                | Intermediate school graduated | 19               | 19.0           |
|                                | Secondary school graduated    | 8                | 8.0            |
|                                | Institute and above           | 15               | 15.0           |
| <b>Mother's occupation</b>     | Employee                      | 16               | 16.0           |
|                                | Housewife                     | 84               | 84.0           |
| <b>Type of family</b>          | Nuclear Family                | 64               | 64.0           |
|                                | Extended Family               | 36               | 36.0           |
| <b>Monthly income</b>          | Insufficient                  | 54               | 54.0           |
|                                | Sufficient with some need     | 39               | 39.0           |
|                                | Sufficient                    | 7                | 7              |
| <b>Child's age</b>             | 5-8years                      | 52               | 52.0           |
|                                | 9-12years                     | 22               | 22.0           |
|                                | 13-16years                    | 26               | 26.0           |
| <b>Child's gender</b>          | Female                        | 38               | 38.0           |
|                                | Male                          | 62               | 62.0           |
| <b>Total</b>                   |                               | 100              | 100.0          |

The sociodemographic characteristics of the study sample are shown in this table. About 30% of the study participants were between the ages of 26 and 30. Concerning the mother's education, the study indicates that about 44% of mothers graduated from primary school. In terms of occupation, 84% of mothers are housewives. Extended families make up 64% of them in terms of family type. Concerning monthly income, more than half of the study sample (54%) had insufficient monthly income. Regarding the children's age, the majority of them are between the ages of 5 and 8 years old, as well as their gender 62% are male.

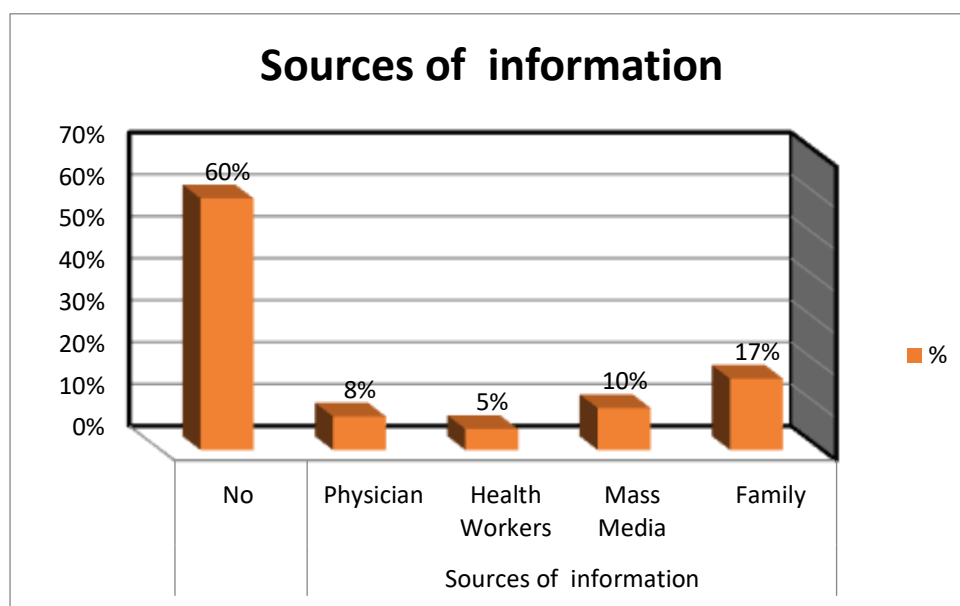


Figure 1: Sources of information about glucose-6-phosphate dehydrogenase deficiency

This figure demonstrates that 60% of the study group did not receive information or had not heard about this disease earlier. As for the remaining 40% of mothers, they have heard about the disease, the family was the main source of information in the rate (17%).

**Table 2: Overall assessment of mothers' knowledge about glucose-6-phosphate dehydrogenase deficiency**

| Main domain                | M.S  | SD   | Assessment |
|----------------------------|------|------|------------|
| Overall mother's knowledge | 1.46 | 0.40 | Poor       |

*Poor (Mean of score < 1.5), Good (Mean of score ≥ 1.5)*

This table reveals that the mothers' knowledge about glucose-6-phosphate dehydrogenase deficiency is poor.

**Table 3: Overall assessment of mothers' attitudes about glucose-6-phosphate dehydrogenase deficiency**

| Overall Assessment of mothers' attitudes | Freq. | Percent | M.S. | Assessment        |
|------------------------------------------|-------|---------|------|-------------------|
| Negative Attitude                        | 44    | 44.0    | 2.36 | Positive Attitude |
| Neutral attitude                         | 6     | 6.0     |      |                   |
| Positive Attitude                        | 50    | 50.0    |      |                   |

*Positive (M.S = 2.34- 3), neutral (M. S= 1.67-2.33), and negative (M. S= 1-1.66)*

According to this table, the majority of mothers have positive attitude regarding glucose-6-phosphate dehydrogenase deficiency.

**Table 4: Overall assessment of mother's practices toward glucose-6-phosphate dehydrogenase deficiency**

| Main domain                | Incorrect |      | Correct |      | M.S  | Assessment |
|----------------------------|-----------|------|---------|------|------|------------|
|                            | Freq.     | %    | Freq.   | %    |      |            |
| Overall mother's practices | 54        | 54.0 | 46      | 46.0 | 1.48 | Poor       |

Table (4) shows that 54% of mothers having a child diagnosed with glucose-6-phosphate dehydrogenase deficiency had incorrect practices toward this disease versus 46 % of others having correct practices. Generally, the overall assessment of the mothers' practices regarding Glucose-6-Phosphate Dehydrogenase Deficiency was incorrect, with a mean score of 1.48.

**Table 5: Correlation between mothers' knowledge, attitude, and practices items about glucose-6-phosphate dehydrogenase deficiency**

|                    | Domains             | Mother's knowledge | Mother's attitude | Mother's practices |
|--------------------|---------------------|--------------------|-------------------|--------------------|
| Mother's Knowledge | Pearson correlation |                    | .089              | .322**             |
|                    | sig.                |                    | .270              | .001               |
| Mother's Attitude  | Pearson Correlation | .089               |                   | .085               |
|                    | sig.                | .270               |                   | .291               |
| Mother's Practices | Pearson Correlation | .322**             | .085              |                    |
|                    | sig.                | .000               | .290              |                    |

**\*\* Correlation is significant at the 0.01 level**

Table (5) reveals that there is a highly significant correlation between mothers' knowledge and practices toward glucose-6-phosphate dehydrogenase deficiency.

**Table 6: Relationship between mothers' knowledge and their demographic data**

| Demographic data | Chi-square ( $X^2$ ) | d.f | P-value (Sig.) |
|------------------|----------------------|-----|----------------|
| Mother's age     | 7.268                | 4   | 0.010 (S)      |
| Education        | 15.453               | 7   | 0.030 (S)      |
| Occupation       | 16.820               | 6   | 0.010 (S)      |
| Type of family   | 0.906                | 1   | 0.341 (NS)     |
| Monthly income   | 0.442                | 2   | 0.801 (NS)     |

This table shows that there is a significant relationship between mothers' knowledge about glucose-6-phosphate Dehydrogenase deficiency disease and some demographic characteristics such as age, occupation, and level of education, while there is no significant relationship with the remaining variables.

**Table 7: Relationship between mothers' attitude and their demographic data**

| Demographic data | Chi-square ( $X^2$ ) | d.f | P-value (Sig.) |
|------------------|----------------------|-----|----------------|
| Mother's age     | 3.488                | 8   | 0.903 (NS)     |
| Education        | 9.369                | 14  | 0.802 (NS)     |
| Occupation       | 2.216                | 4   | 0.695(NS)      |
| Type of family   | 2.344                | 2   | 0.320 (NS)     |
| Monthly income   | 7.793                | 4   | 0.098 (NS)     |

According to Table 7, there is no statistically significant correlation between mothers' attitudes toward G6PD and their demographic data at (p-value > 0.05).

**Table 8: Relationship between Mothers' practices and demographic data**

| Demographic data     | Chi-square ( $X^2$ ) | d.f | P-value (Sig.) |
|----------------------|----------------------|-----|----------------|
| Mother's age (years) | 4.039                | 4   | 0.411 (NS)     |
| Education            | 12.476               | 6   | 0.051 (NS)     |
| Occupation           | 2.137                | 1   | 0.145 (NS)     |
| Type of family       | 0.009                | 1   | 0.922 (NS)     |
| Monthly income       | 2.139                | 2   | 0.344 (NS)     |

According to the table above, there is no statistically significant association between mothers' practices and their demographic characteristics.

According to the study findings, 30% of the study sample was between the ages of 26 and 30. This result is consistent with (El-Sayed *et al.*, 2012), who found that 60% of participants between ages (25 - 35) years. Concerning the mother's education, the study indicates that about 44% of mothers are graduated from primary school, and most of them had insufficient monthly incomes. This finding is consistent with research done by (El-Bastwese *et al.*, 2020), which

found that the majority of participants had poor socio-economic levels. Concerning mothers' occupations, the result revealed that 84% of them were housewives, whereas the remaining mothers were employed. These findings are consistent with the result done by (Pradeep, *et al.*, 2016), who reported that 70% of the sample was made up of housewives. The majority of the study participants 52% are between the ages of 5 and 8 years and are male. These findings are consistent with a study done by (Rai and Kumar, 2016), who mention that 51% of children in the dominant age group were boys. Additionally, about 60% of mothers don't hear about glucose-6-phosphate dehydrogenase deficiency. This finding is similar to another study demonstrated by (Alqahtani, *et al.*, 2022), which mentions that about half the Saudi mothers had never heard of G6PD deficiency. This shows that moms with low levels of education are unable to understand and absorb the information contained in posters, brochures, and other modern media. 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 the current study's findings, the family is the primary source of information concerning glucose-6-phosphate dehydrogenase deficiency.

Generally, the overall assessment of mothers participating in Table (2) shows those mothers had poor knowledge levels about glucose-6-phosphate dehydrogenase deficiency. This finding agreed with the result by (Kasemy, *et al.*, 2019; Almuhaeni, *et al.*, 2017). They found that only 17 % of mothers had good knowledge of G6PD deficiency. According to the mothers' attitudes, most of them have a positive opinion about this disease. Some mothers believe that the attack of this disease occurs as a result of eating only fava beans, which is a false belief in itself because several factors can trigger it, such as taking certain medications, exposure to infection, the smell of beans, and other factors that must be avoided to protect the child from exposure to an attack. Concerning mothers' attitudes, Table 3 demonstrated that half of the mothers have positive attitudes regarding G6PD deficiency. This result agrees with another study done by (Alqahtani, *et al.*, 2022), which mentions that about half of the participants had good attitudes toward glucose-6-phosphate dehydrogenase deficiency. Regarding mothers' practices, the current study results show that the practices of the majority of them were unsatisfactory or incorrect because the majority of the study sample had poor knowledge. The higher the educational level of the mother, the greater her knowledge of the disease and the necessary measures and precautions that should be taken. This finding is consistent with another study carried out by (Kasemy *et al.*, 2019), which reported that only 19.9% of mothers have good practices toward G6PD deficiency.

As for the relationship between mothers' knowledge and practices, the study's findings indicate 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. The study was supported by another study done by (Balgir, 2010), which reported a highly significant relationship between knowledge and practice. On the other hand, there is no association between the mothers' knowledge and attitude or between practices and attitudes toward glucose-6-phosphate dehydrogenase deficiency. Table 6, shows that there is a statistically significant relationship between mothers' knowledge about glucose-6-phosphate dehydrogenase deficiency and some demographic characteristics such as (age, level of education, and occupational status); while there is a non-significant correlation with the other remaining variables. Regarding Tables 7 and 8, the study's findings show that there is a non-significant relationship between mothers' practices or attitudes and their demographic variables.



## CONCLUSION

The majority of mothers who participated in the study had inadequate knowledge, positive attitudes, and inappropriate practices toward glucose-6-phosphate dehydrogenase deficiency. There is a statistical relationship between mothers' knowledge of glucose-6-phosphate dehydrogenase deficiency and some of their demographic characteristics, such as age, level of education, and occupational status.

## ACKNOWLEDGMENTS

According to the study's findings and conclusions, the researchers suggested that there should be early newborn screening for G6PD deficiency. Developing and implementing awareness programs for mothers about the disease and how to prevent severe attacks that the child may face. Also, should be spread cultural awareness among people through the media, brochures, and posters on how to prevent exposure to this disease.

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