Kufa Journal for Nursing Sciences
Open Access Full Text Article

Publisher
University of Kufa, Faculty of Nursing

Received: 10 November, 2022
Accepted: 19 December, 2022
Published: 25 December, 2022
Vol. 12(2), 2022: 87 – 95

DOI: https://doi.org/10.36321/kjns.vi20222.10489

ORIGINAL RESEARCH

Assessment of Nurses' Knowledge about the Care of Children with Glucose-6-Phosphate Dehydrogenase Deficiency

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ABSTRACT

Background: Glucose-6-phosphate dehydrogenase deficiency is a genetic disorder that affects red blood cells, which carry oxygen from the lungs to tissues throughout the body. In affected individuals, a defect in an enzyme called glucose-6-phosphate dehydrogenase causes red blood cells to break down prematurely. This destruction of red blood cells is called hemolysis.

Objectives: To assess of nurses knowledge regarding nursing care for children with Glucose-6- phosphate dehydrogenase deficiency at the maternity and child hospital in AL-Amara city to find out the relationship between the nurses knowledge and their demographic characteristics (age, gender, level of education, years of experience and training session.

Methodology: A descriptive study assessment nurses' knowledge about Glucose-6-phosphate dehydrogenase deficiency in children in child and birth hospital in Al-Amara city the present study was conducted for the period January 10th ,2022 to June 15,2022, the present study purposive sample comprised of (30) patients the questionnaire was a single section consisting of two parts. The first part was related to the demographic characteristics of the patients (age, gender, education level, social status) and the second part contains knowledge about the complications of the Glucose-6- phosphate dehydrogenase deficiency.

Results: Study participants were within (21-25 years) (the table also shows that the most of participants (27) 90% were female. Also In regarding to the subjects level of education, The results show that half of them has diploma in nursing in addition, years of experience years more than three quarters of nurses 25(83.4%) has (1-5 years) in the service. Addition, addition, the most of participants (25) 83.4% have training courses, and their most were number of training courses (1-5 sessions).

Conclusion: The majority of participants have a high level of nurses' knowledge regarding nursing care for children with glucose-6-phosphate dehydrogenase at the study sample. and there was no a significant relationship between nurses' knowledge regarding nursing care for children with glucose-6-phosphate dehydrogenase and their and age.

Keywords: Assessment, nurses' knowledge, glucose-6- phosphate dehydrogenase deficiency.

INTRODUCTION

The enzyme glucose-6- phosphate dehydrogenase (G6PD) was discovered in 1932 by Walter Christian and Otto Warburg in red blood cells and yeast [1] Moreover, severe anemia and hemoglobinuria were observed in children who ingested fava beans by pediatricians in Greece, Portugal, and Italy [2]. Favism is the term used to describe hemolysis triggered by the ingestion of fava beans in G6PD deficient individuals, and it ordinarily runs in families. Sulfa drugs used in treatment, as well as prophylaxis for malaria, lead to severe hemolysis [1].

Glucose-6-phosphate dehydrogenase (G6PD) is the first enzyme of the pentose phosphate pathway [3] and the sole source of reduced nicotinamide adenine dinucleotide phosphate (NAPDH) required by the red blood cells to withstand oxidative stress [4]. It is encoded by a highly polymorphic gene located on the X-chromosome. Over 400 G6PD single nucleotides polymorphism (SNPs) have been identified until 2012 with 186 SNPs being associated with the loss of G6PD activity and stability. The SNPs cause G6PD deficiency which clinically manifests as neonatal jaundice, acute hemolytic anemia and chronic hemolytic anemia [5]. However, most people carrying this genetic defect are asymptomatic. Qualitative and enzyme activity tests are currently used to phenotypically classify G6PD deficiency at the point-of- care. Since G6PD deficiency is X-linked, males are classified as either G6PD normal or deficient whereas females are classified into three G6PD phenotypes, normal, intermediate and deficient [6].

The G6PD gene is located on X.28 and inherited as an X-linked recessive (G6PD is a housekeeping enzyme found in all human cells. Nicotinamide adenine dinucleotide phosphate (NADP) is reduced to NADPH in the pentose phosphate pathway. NADPH protects the red blood cells from oxidative damage [5]. This is the only pathway to generate NADPH. Therefore, in patients who are deficient in G6PD, these cells are damaged and undergo lysis, leading to acute hemolysis In patients with G6PD deficiency with malaria, G6PD status does not impact baseline hemoglobin, parasitemia, temperature, or the outcomes of antimalarial therapy. The worldwide distribution of G6PD deficiency is mostly related to genetic abnormalities, ethnicity, and population migration. Assessment of nurses' knowledge about caring for children with deficient glucose-6-phosphate, the procedures to be followed in case the child is exposed to an oxidant and preventing him from getting shock, and the extent of nurses' knowledge of the initial symptoms of shock, their knowledge of medications that may cause seizures, and their knowledge of the child's medical history and the fact that he suffers from a deficiency Glucose hexa-phosphate dehydrogenase, the speed of their behavior and their health with affected children, knowing that there is no cure for this disease, as the treatment is preventive and is by avoiding the intake of some oxidizing substances, such as: beans, naphthalene, and certain types of medicines, and the knowledge of nurses about the cases in which there are It is necessary to provide the patient with blood in case of exposure to oxidizing substances, to avoid anemia [6, 7].

AIMS OF THE STUDY

To assess of nurses' knowledge about the care of children with glucose- 6-phosphate dehydrogenase deficiency and To find out the relationship between the nurses knowledge and sociodemographic characteristics such as age, gender, level of education, years of experience and training courses).

METHODOLOGY

Study Design

A descriptive design study was conducted to assess of nurses knowledge regarding nursing care for children with Glucose-6- Phosphate Dehydrogenase Deficiency at the Maternity and Child Hospital in AL- Amara city the study was conducted from November 28,2021 to May 26, 2022. The current study was conducted at the Maysan health directorate / public health department / the Maternity and Child Hospital in AL-Amara city. All nurses the Maternity and Child Hospital in AL-Amara city. the size of sample are 30 nurses.

Dehydrogenase Deficiency the questionnaire consists of one section composed of two parts : the first part used to collect data about socio-demographic characteristics of the studied nurses including age, gender, educational level. This part included (5) questions.

The First Part: used to collect data about socio-demographic characteristics of the studied nurses including age, sex, educational level. this part included (5) questions .

The Second Part: the second part included fifteen (15) questions testing the knowledge of the nurses on the study about the care of children with of Glucose-6- Phosphate Dehydrogenase Deficiency such definition, causes, risk factors and clinical features. The collected data will be computerized, analyzed tabulated by using appropriate statistical analysis program. The reliability of the present study instrument was determined through Alpha (Cronbach) approach. The result of reliability coefficients was (r=0.79). The result of the reliability for the study instruments indicated that the items of the questionnaire were clear, relevant, and understandable. The data were analyzed by applying the appropriate statistical methods using the statistical package for social sciences (spss), in order to analyze and evaluate the results of this study.

ETHICAL CONSIDERATION

Verbal consents were obtained from nurse who agree to participate in the study and informed them that they are free to participate and withdraw at any time during the study. Each Participant were informed that all their data are highly confidential, anonymity.

RESULTS

Table (1): Distribution of the nurses by their demographic characteristics

No.	Variables	Characteristics	F	%
1.	Age (Year)	21-25	23	76.6
		26-30	6	20
		41-45	1	3.4
		Total	**30**	**100.0**
		$\bar{x} \pm Std.\ Dev.$	**24 ± 4.78**	
2.	Gender	Male	3	10
		Female	27	90
		Total	**30**	**100.0**
3.	Level Of Education	Secondary School Nursing	14	46.6
		Diploma In Nursing	15	50
		Bachelor In Nursing or More	1	3.4
		Total	**30**	**100.0**
		1-5 Years	25	83.4

4.	**Years Of Experience**	6-10 Years	4	13.2
		≥ 11 Years	1	3.4
		Total	**30**	**100.0**
5.	**Training Courses**	No	5	16.6
		Yes	25	83.4
		Total	**30**	**100.0**
6.	**Number Of Training Courses**	1-5 Sessions	24	96
		6-10 Sessions	1	4
		Total	**25**	**100.0**

No. = Number Of Variable , F= Frequencies , % = Percentages, Arithmetic Mean (X .) And Std. Dev.= Standard. Deviation

The results of this table show that the two-third of age group in the study sample were within (21-25 Years) it presented 23 (76.6%), with arithmetic mean and standard deviation (24 ± 4.78). The above table also shows that the more half of participants 27 (90%) were female. Also in regarding to the subjects level of education, the results show that half of them has diploma in nursing 15 (50%). In addition, years of experience more than three-quarters of nurses 25 (83.4%) has (1-5 years) in the service. Addition, not all of participants have training courses, and almost all of who trained were number of training courses (1-5 sessions) as their percentage reached 24 (90%).

Table (2): overall assessment of nurses' knowledge regarding nursing care for children with glucose-6- phosphate dehydrogenase deficiency.

Levels Of Assessment	Frequency	Percent
Low: (1 - 1.67)	0	0.0
Moderate: (1.68 - 2.33)	3	10.0
High: (2.34 - 3.00)	27	90.0
Total	**30**	**100.0**
k ± Std. Dev.	**2.6±0.21**	

Arithmetic Mean (x") And Std. Dev.= Standard. Deviation

This table reveals that the majority of participants have a high level of nurses' knowledge regarding nursing care for children with glucose-6- phosphate dehydrogenase deficiency at the study sample (n=30; 27) (90%).

Table (3): Assessment of nurses' knowledge regarding nursing care for children with glucose-6- phosphate dehydrogenase deficiency at the study sample.

No	Items	I Know		Uncertain		I Don't Know		M.S.	S.D.	Ass.
		F	%	F	%	F	%			
1	**G6PD is known as the most common type of anemia and is anenzyme necessary to protect red blood cells from oxidative damage in stressful situations.**	15	50	8	26.6	7	23.4	2.27	0.81	M
2	**G6PD is a genetic disease**	16	53.3	10	33.4	4	13.3	2.37	0.71	H

3	Legumes, especially green beans, are one of the most importantcauses of G6PD*	20	66.6	9	30	1	3.4	2.63	0.55	H
4	One of the signs of G6PD is a change in the color of urine to tea color or blue	17	56.6	7	23.4	6	20	2.37	0.81	H
5	Is it important to monitor the oxygen of the injured child?	25	83.3	5	16.7	0	0.0	2.83	0.37	H
6	G6PD spreads rapidly in thelegume season	18	60	11	36.6	1	3.4	2.57	0.56	H
7	G6PD causes jaundice	14	46.6	14	46.6	2	6.8	2.43	0.61	H
8	Find the complications of G6PD, the occurrence of kidney failure	8	26.6	14	46.8	8	26.6	2	0.73	M
9	Providing continuous nursing carefor the affected child, which is monitoring urine output	22	73.3	5	16.7	3	10	2.63	0.66	H
10	Commitment of the child with G6PD disease to treatment and totake intravenous fluids in case of poor urine	23	76.6	5	16.7	2	6.7	2.66	0.59	H
11	Paleness, headache and mild feverare evidence of G6PD disease in the child.	19	63.3	11	36.7	0	0.0	2.63	0.48	H
12	If a child with G6PD suffers from severe hemolysis, it is recommended to exchange or give Blood	19	63.3	8	26.7	3	10	2.53	0.67	H
13	Among the drugs prohibited in patients with (G6PD) are aspirin, methylprednisolone, and Hydralazine	10	33.4	17	56.6	3	10	2.23	0.66	M
14	Be careful not to give legumes to children with G6PD.	26	86.6	4	13.4	0	0.0	2.87	0.34	H
15	Infection of a child with G6PDdisease may lead to death	16	53.3	10	33.4	4	13.3	2.4	0.71	H

No. = Number Of Item , F=Frequencies , % = Percentages, M.S.= Mean Of Score. Ass.= Assessment; Assessment Levels : (1.00-1.67) = Low; (1.68-2.33) = Moderate; (2.34-3.00) = High.

Table 3 reveals that there are high level of arithmetic mean in most items related to assessment of nurses' knowledge regarding nursing care for children with glucose-6- phosphate dehydrogenase deficiency at the study sample, except for the paragraphs with the number (1-8-13) its estimate was moderate.

Table (4): Relationships Between the Nurses' knowledge and their Ages

Age (Year)		Nurses' Knowledge			Total
		I Know	Uncertain	I Don't Know	
21-25	**F**	204	93	33	330
	%	45.4%	20.6%	7.3%	73.3%
26-30	**F**	66	32	7	105
	%	14.6%	7.2%	1.6%	23.4%
41-45	**F**	11	4	0	15
	%	2.4%	0.9	0.0%	3.3%
Total	**F**	281	129	40	450
	%	62.4%	28.7%	8.9%	100.0%

$X^2obs. = 1.515$ $\%^2crit. = 1.647$ $Df = 8$ $P > 0.95$ $P\ Value = 0.982$

F= Frequencies, % = Percentages, %2obs. = Chi-Square Observed, %2 crit = Chi-Square Critical, Df= Degree Of Freedom, P = Probability Value, P > 0.95=None Significant

Table (4) indicates that there was no a significant relationship between nurses' knowledge regarding nursing care for children with glucose-6- phosphate dehydrogenase deficiency and their age at (p>0.95), when analyzed by chi-square test.

Table (5): Relationships between the Nurses' Knowledge and their Gender

Gender		Nurses' Knowledge			Total
		I Know	Uncertain	I Don't Know	
Male	**F**	30	9	6	45
	%	6.7 %	2 %	1.3 %	10 %
Female	**F**	251	120	34	405
	%	55.7%	26.7%	7.6 %	90 %
Total	**F**	281	129	40	450
	%	62.4%	28.7%	8.9 %	100.0%

$X^2obs. = 2.56$ $\%^2crit. = 2.77$ $Df = 2$ $P > 0.25$ $P\ Value = 0.767$

F= Frequencies , % = Percentages , $X2obs.$ = Chi-Square Observed, $\%2crit$ = Chi-Square Critical , Df= Degree Of Freedom, P = Probability Value, P > 0.05= Non-Significant

The data analysis presented in table (5) shows that there was no a significant relationship between nurses' knowledge regarding nursing care for children with glucose-6- phosphate dehydrogenase deficiency and their gender at (p > 0.25), when analyzed by chi- square test.

Table (6): Relationships between the nurses' knowledge and their educational level

Level of Educational		Nurses' Knowledge			Total
		I Know	Uncertain	I Don't Know	
Secondary School Nursing	**F**	140	58	12	210
	%	31.2 %	12.9 %	2.7 %	46.8%
Diploma In Nursing	**F**	129	70	26	225
	%	28.6 %	15.7 %	5.7 %	50 %
Bachelor In Nursing ormore	**F**	12	1	2	15
	%	2.6 %	0.2 %	0.4 %	3.2 %

Total	**F**	281	129	40	450
	%	62.4%	28.8%	8.8%	100.0%

$X^2obs. = 9.877$ $\%^2crit. = 13.28$ $Df = 4$ $P > 0.01$ $P\ Value = 0.273$

f= frequencies , % = percentages, $X2obs.$ = chi-square observed, $\%2crit$ = chi-square critical , df= degree of freedom, p = probability value, p > 0.05= non-significant

The findings in table (6) revealed that there was a non-significant relationship between nurses' knowledge regarding nursing care for children with glucose-6- phosphate dehydrogenase deficiency and their educational level at (p > 0.01), when analyzed by chi-square test.

Table (7): Relationships between the nurses' knowledge and their years' experience

Years' Experience		**Nurses' Knowledge**			**Total**
		I Know	**Uncertain**	**I Don't Know**	
1 -5 Years	**F**	226	114	35	375
	%	50.3 %	25.4 %	7.8 %	83.5%
6 – 10 Years	**F**	44	11	5	60
	%	9.7 %	2.4 %	1.2 %	13.3 %
≥ 11 Years	**F**	11	4	0	15
	%	2.4 %	0.8 %	0.0 %	3.2 %
Total	**F**	281	129	40	450
	%	62.4 %	28.6 %	9 %	100.0%

$X^2obs. = 5.795$ $\%^2crit. = 7.78$ $Df = 4$ $P < 0.1$ $P\ Value = 0.67$

f= frequencies , % = percentages, $X2obs.$ = chi-square observed, $\%2crit$ = chi-square critical , df= degree of freedom, p = probability value, p > 0.05= non-significant.

The results of data analysis, as presented in table (7) revealed that there was not a significant relationship between years of experience and their nurses' knowledge regarding nursing care for children with glucose-6-phosphate dehydrogenase deficiency at (p<0.1), when analyzed by chi-square test.

Table (8): Relationships between the nurses' knowledge and their number of training courses.

Number of training courses		**Nurses' Knowledge**			**Total**
		I Know	**Uncertain**	**I Don't Know**	
1-5	**F**	223	103	34	360
	%	59.5 %	27.4 %	9.1%	96 %
6-10	**F**	10	5	0	15
	%	2.7 %	1.3%	0.0%	4 %
Total	**F**	233	108	34	375
	%	62.2%	28.7%	9.1%	100.0%

$X^2obs. = 1.579$ $\%^2crit. = 1.647$ $Df = 8$ $P < 0.95$ $P\ Value = 0.904$

F= Frequencies , % = Percentages, $X2obs.$ = Chi-Square Observed, $\%2crit$ = Chi-Square Critical , Df= Degree Of Freedom, P = Probability Value, P > 0.05= Non-Significant.

The table (8) indicates that there was non-significant relationship between nurses' knowledge regarding nursing care for children with glucose-6- phosphate dehydrogenase deficiency and their number of training courses at (p <0.95), when analyzed by chi-square test.

DISCUSSION

Nurses knowledge and practice regarding Glucose-6-Phosphate Dehydrogenase Deficiency

Findings of the recent study reveal that there are high level of arithmetic mean in all items related to assessment of nurses' knowledge regarding nursing care for children with Glucose-6- Phosphate Dehydrogenase Deficiency at the study sample. This table reveals that the majority of participants have a high level of nurses' knowledge regarding nursing care for children with Glucose-6- Phosphate Dehydrogenase Deficiency at the study sample (n=30; 27 (90%). indicates that there was no a significant relationship between nurses' knowledge regarding nursing care for children with Glucose-6-Phosphate Dehydrogenase Deficiency and their age at (P>0.95), when analyzed by Chi-Square test. This result agree with the study that conducted on Sokoto, area of Nigeria. entitled "Glucose-6-phosphate dehydrogenase deficiency among children attending the emergency pediatric Unit of Usmanu Danfodiyo University Teaching Hospital, Sokoto, Nigeria" which demonstrated that there is a need for the routine screening of children for G6PD deficiency, to allow for evidence-based management of these children and to ensure the avoidance of food, drugs, and infective agents that can potentially predispose these children to oxidative stress as well as diseases that deplete micronutrients that protect against oxidative stress. There is need to build capacity in our setting among pediatricians to ensure the effective management of children with G6PD deficiency [8].

Assessment of Glucose-6- Phosphate DehydrogenaseDeficiency patients:

The data analysis presented shows that there was no a significant relationship between nurses' knowledge regarding nursing care for children with Glucose-6- Phosphate Dehydrogenase Deficiency and their gender. The results of data analysis, there was not a significant relationship between years of experience and their nurses' knowledge regarding nursing care for children with Glucose-6- Phosphate Dehydrogenase Deficiency The findings in revealed that there was a non-significant relationship between nurses' knowledge regarding nursing care for children with Glucose-6- Phosphate Dehydrogenase Deficiency and their educational level at suggested that there is a non-significant relationship between nurses' knowledge regarding nursing care for children with Glucose -6- Phosphate Dehydrogenase Deficiency and their educational level. the results of data analysis, that there was non-significant relationship between nurses' knowledge regarding nursing care for children with Glucose- 6- Phosphate Dehydrogenase Deficiency and their number of training courses. In a study that was conducted by in three hospitals in Baghdad and Mosul. Entitled "Epidemiological, clinical and laboratory profile of glucose-6-phosphate dehydrogenase deficiency in the middle and north of Iraq: a comparative study" showed that All patients received blood transfusions in various amounts and were discharged within 2–4 days of hospitalization. No deaths were recorded [9].

CONCLUSION

The study showed there were no relationship in the knowledge of nurses regarding nursing care for children with glucose-6- phosphate dehydrogenase deficiency and their ages and their gender and a high level of experience regarding nursing care for children with glucose-6- phosphate dehydrogenase deficiency and there were a non-significant relationship between nurses' knowledge regarding nursing care for children with glucose-6- phosphate dehydrogenase deficiency and their educational level, there were not a significant relationship between years of experience and their nurses' knowledge regarding nursing care for children with glucose -6- phosphate dehydrogenase deficiency and the study revealed

that there were non-significant relationship between nurses' knowledge regarding nursing care for children with glucose -6- phosphate dehydrogenase deficiency and their number of training courses.

RECOMMENDATION

1. Hospitals should pay attention to the establishment of continuous training courses in addition to providing the necessary financial and moral support to encourage nurses to develop their skills and to raise the quality of the nursing services provided.
2. Adoption of brochures which contain key knowledge that nurses should know regarding therapeutic interventions for children with Glucose-6- Phosphate Dehydrogenase Deficiency.
3. Require newly hired nurses to follow training and educational courses prior to initiating fieldwork.

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