ISSN 2786-0183
Helwan International Journal for Nursing Research and Pratctice
Vol. 3, Issue 7, Month: September 2024, Available at: https://hijnrp.journals.ekb.eg/

A Health Educational Program for Mothers with Children Suffering from Sickle Cell Anemia

Marwa Mohamed Younes [(1)] Dr. Ons Said El-Zayat [(2)] Dr. Sahar Mahmoud S. El Awady [(3)]

(1)Clinical Instructor at Health Technical Institute for Nursing in Baharia Oasis

(2), (3) Assistant Professor of Community Health Nursing – Faculty of Nursing – Helwan University,

Abstract:

Background: Sickle cell anemia is a hereditary blood disorder characterized by the production of abnormal hemoglobin. Children with sickle cell anemia suffer from chronic pain, frequent infections, and fatigue due to the blockage of blood flow and the subsequent reduction in oxygen delivery to tissues. **Aim:** This study aimed to evaluate the effect of health educational program for mothers having children suffering from sickle cell anemia. **Research design:** A quasi-experimental research design was used in this study. **Sample:** Purposive sample include 150 mothers with children suffering from sickle cell anemia. **Setting:** It was conducted at hematology outpatient clinic at Baharia Oasis hospital in Baharia Oasis City. **Tools:** One tool included four parts: **1st:** Demographic characteristics of mother and child, **2nd**: Medical history for the child, **3rd:** Mothers' knowledge about sickle cell anemia, and **4th:** Mothers' reported practice about caring of children with sickle cell anemia. **Results:** The study result revealed that, 5.3 % of studied mother had good total knowledge pre apply education program become 77.2 % of them had good total knowledge post apply education program. While, 4.9 % of studied mother had satisfactory with total reported practices pre apply education program, become 98.0 % of them had satisfactory total reported practices post apply educational program. **Conclusion:** The study concluded the health education program improved the knowledge, and reported practices of mothers about caring of children with sickle cell anemia. **Recommendations**: Continuing health education program for mothers with children suffer from sickle cell anemia to improve their condition.

Key words: *Children, Health Education Program, Mothers, and Sickle Cell Anemia.*

Introduction

Sickle cell disease is a group of inherited red blood cell disorders that affect hemoglobin, the protein that carries oxygen through the body. Normally, red blood cells are disc-shaped and flexible enough to move easily through the blood vessels. In sickle cell disease, red blood cells become crescent- or "sickle"-shaped due to a genetic mutation. These sickled red blood cells do not bend or move easily and can block blood flow to the rest of the body ***(Bender & Carlberg, 2021).***

The global prevalence of sickle cell disease is significant, particularly among populations with ancestry from sub-Saharan Africa, Spanish-speaking regions in the Western Hemisphere, Saudi Arabia, India, and Mediterranean countries such as Turkey, Greece, and Italy. Between 2000 and 2021, the total number of children with sickle cell disease globally increased by 13.7 %, reaching approximately 515,000 ***(Tisdale et al., 2023).*** Sickle cell disease considered a significant public health problem in Egypt, with an estimated carrier frequency of 8-8.4 %. Studies have reported varying prevalence rates of sickle cell disease in different regions of Egypt, ranging from 0.45% in Alexandria to 22.2 % in some areas in Upper Egypt. More specifically, studies have shown sickle cell disease prevalence rates of 10.6 % in Giza Governorate ***(Mandal et al., 2023).***

Sickle Cell Anemia is usually the most severe form of sickle cell disease. It is caused when a person inherits two abnormal hemoglobin S genes (one from each parent). However, there are other forms of sickle cell disease, such as HbSC disease, which is generally milder and occurs when a person inherits one abnormal hemoglobin S gene and one abnormal hemoglobin C gene. Sickle cell anemia is caused by a change in the gene that tells the body to make

ISSN 2786-0183
Helwan International Journal for Nursing Research and Pratctice
Vol. 3, Issue 7, Month: September 2024, Available at: https://hijnrp.journals.ekb.eg/

hemoglobin. Hemoglobin is the iron-rich compound in red blood cells that allows these cells to carry oxygen from the lungs to the rest of the body. The hemoglobin associated with sickle cell anemia causes red blood cells to become rigid, sticky and misshapen ***(Steinberg, 2023).***

This blockage prevents oxygen from being delivered properly to different parts of the body, resulting in various symptoms and complications associated with sickle cell anemia. Common symptoms of sickle cell anemia include fatigue, jaundice, pain, increased susceptibility to infections, and delayed growth and development in children ***(Alzubaidi et al., 2024).*** The severity of the symptoms may vary among children, with some experiencing mild symptoms while may have severe complications. Treatment for sickle cell anemia focuses on managing symptoms and preventing complications. This may include pain management, blood transfusions, medication to prevent infections and complications, and in severe cases, stem cell transplantation ***(Obeagu et al., 2023).***

Mothers' knowledge and practices about sickle cell anemia children increases after a child diagnosed correctly, will focus on child's betterment, demands and teaching strategy of sickle cell anemia's children is unique. Lack of awareness and insufficient knowledge about sickle cell anemia among mothers, causes delayed identification and intervention leading to unsatisfactory outcomes in children. The level of mothers' information affects the level of their practices. Improving the level of information and practices of mothers improves the level of adaptation to the situation of children, reduces the level of anxiety and improves care provided to children ***(Kavanagh et al., 2022).***

Health education program means plan instructions, guidelines or principles by which mothers and their children learn it to change or behave in a manner conducive for the promotion, maintenance, or restoration of sickle cell anemia's children health. Health education involves combination of planned learning experiences based on sound theories that provide child, mothers, and communities the opportunity to acquire information and the skills needed to make quality health decisions for care of sickle cell anemia's children. Today, health systems plan their most important programs based on evidence-based practice to reduce complication of sickle cell anemia's children ***(Yeruva et al., 2024).***

Community health nurse play a role to get mothers who have children with sickle cell anemia on way to receiving appropriate health and related services, enhance ability to access health insurance coverage. The plan focusses increased access to health, social services in a cost efficient and highly efficacious manner. Nurses coordinate referrals and assist to facilitate enrollment in clinical trials. Assist mothers to meet the many obstacles that face them and overcoming it to the prompt diagnosis and treatment of health problems ***(Pecker et al., 2024).***

Significance of the study

Globally, the prevalence of homozygous sickle cell disease was 112 per 100 000 between children. The condition affects more than 100,000 children in the United States and 20 million children worldwide. In the United States, most people who have sickle cell disease are of African ancestry or identify themselves as Black. About 1 in 13 Black or African American babies are born with sickle cell trait. Sickle cell disease (SCD) is one of the most common genetic diseases worldwide ***(Mostafa et al., 2024).*** In Egypt, sickle hemoglobin carrier rates vary from 9% to 22% with a heterogeneous distribution. Among Egyptians, most of the reported globin gene haplotypes are the African ones and the SCD phenotype is severe ***(Joacquim et al., 2024).***

Community health nurse support healthy positive behavior and offering knowledge about sickle cell disease can improve and foster child and family health outcomes. Involvement and education can help mothers become more empowered. By retaining their independence, mothers can be assisted in keeping control over the wellbeing of their children. By expanding mothers' knowledge and assisting mothers in understanding options, educational program encourages mothers and their children to manage with sickle cell anemia ***(Mandal et al., 2023).*** Therefore, this study conducted to evaluate the effect of educational program for mothers with children suffering from sickle cell anemia.

Aim of the Study

This study aimed to evaluate the effect of a health educational program for mothers with children suffering from sickle cell anemia through the following objectives:

-Assessing mothers' knowledge and reported practice regarding their children with sickle cell anemia
-Planning and Implementing health education program for mothers in the light of the actual need

ISSN 2786-0183
Helwan International Journal for Nursing Research and Pratctice
Vol. 3, Issue 7, Month: September 2024, Available at: https://hijnrp.journals.ekb.eg/

- Evaluating the health education program for mothers about caring their children with sickle cell anemia.

Research Hypothesis:

The mothers' knowledge and reported practices will be improved after applying health education program regarding caring of their children with sickle cell anemia.

Subjects & Methods:

1. Technical Item:

The technical item includes (research design, setting, sample and tools for data collection).

Research design:

A quasi-experimental research design was conducted to achieve the study.

Setting:

This study was conducted at the hematology outpatient clinic at Baharia Oasis hospital in Baharia Oasis City, Giza Governorate, Egypt.

Sample:

Purposive sample was used in this study.

Sample size:

Total number of children with SCA in the previous year from august 2021 to end of July 2022 is 500, the sample size can be calculated using the following formula: $n = \frac{N \times p\,(1-p)}{(N-1)\times(\frac{d^2}{z^2})+P(P-1)}$

Based on ***the flow rate,*** where, n=sample size; N, studied total population; d =error percentage (=0.05); p= 0.167 prevalence or proportion of event of interest for the study; $Z_{\alpha/2}$= 1.96 (for 5% level of significance). Therefore,

$$n = \frac{500\times 0.167\,(1-0.167)}{(500-1)\times(\frac{0.05^2}{1.96^2})+0.167(1-0.167)} = \mathbf{149.7}$$

Accordingly, the sample size required was **150.**

The estimated sample of children was selected according to inclusion criteria.
Inclusion criteria:

1- Mothers with children diagnosed with sickle cell anemia.
2- Mothers accepting to participate in the study.

Tool for data collection:

Data was collected using the one tool as the following:

Tool (I): Interview questionnaire

A Structure interview questionnaire developed by investigators after reviewing the national and international related literature and approved by supervision. It was written in Arabic language and consists of four parts as the following:

Part (I): Demographic characteristics of the studied samples: It divided into 2 sub items:

A- Demographic characteristics of mothers consisted of 5 items as: mothers age, mothers' education levels, mothers' job.

B- Demographic data of child consisted of 3 items as: child age (6-12) years, gender.

Part II: Medical history for the child and family consisted of 9 items as: the beginning of the disease, duration of illness, have you taken the medication, does the child have other types of anemia.

Part III: Mothers' knowledge regarding sickle cell anemia consisted of 22 items (pre – post format) as: meaning of sickle cell anemia, the group most vulnerable to sickle cell anemia, types of anemia, causes of sickle cell anemia, factors that increase the incidence of the disease.

ISSN 2786-0183
Helwan International Journal for Nursing Research and Pratctice
Vol. 3, Issue 7, Month: September 2024, Available at: https://hijnrp.journals.ekb.eg/

Scoring system, it included 22 questions; the answer score 2 point for correct answer and complete, 1 point for correct answer and not complete and zero point to wrong or no answer. The total score of mothers 44 points knowledge regarding sickle cell anemia divided into three levels as the following:

- Poor knowledge < 50 % (< 22 score)
- Average knowledge 50 -70 % (22:26 score)
- Good knowledge > 70% (> 26 score).

Part (IV): Reported practice of the mothers about the sickle cell anemia consisted of 4 sub items (pre – post format):

A-Reported practice of the mothers regarding child's nutrition included 6 closed ended questions as: make sure my child drinks enough water a day. From 6 to 12 months, from one cup to one and a half cups, increase the amount of water and fluids (juice, dairy, etc.) as the weather temperature rises or when the child becomes dehydrated, make sure my child eats a balanced diet.

B-Reported practice of the mothers regarding child's physical activity included 4 closed ended questions as: allow the child to follow an organized program to reported practice simple sports that do not require a lot of energy.

C-Reported practice of the mothers regarding child's health responsibility included 12 closed ended questions as: make sure that my child is not exposed to cold drafts, especially early in the morning or at the end of the day, the child receives full vaccinations on time, notice the color of my child's skin (pink - pale - yellow tending to orange), go to the hospital immediately if my child's skin color changes to a pale color or pain occurs in the body and joints.

D-Reported practice of the mothers regarding child's administers medications included 9 closed ended questions as: keep giving my child hydroxyurea (Hydria) daily at the same time and always before bedtime, give hydria after eating to prevent stomach upset, give the child plenty of water along with the hydration doses, if my child vomits the dose of hydria after less than half an hour.

Scoring system, it included 31 questions; 2 points for always, 1 point for sometimes answer and zero point to never. The total score of mothers 62 points reported practices about sickle cell anemia classified into two levels:

- **Satisfactory reported practices ≥ 60 % (≥ 37 point).**
- **Unsatisfactory reported practices < 60 % (< 37 point).**

Tool validity and Reliability:

Content Validity:

The validity of the tool was tested through five experts from Faculty of Nursing - Helwan University (4 experts in the community health nursing and one expert in pediatric nursing) to review the relevance of the tools for clarity, relevance, comprehensiveness, understanding and applicability.

Tool Reliability:

Reliability was applied for testing the internal consistency of the tool, by administration of the same tools to the same subjects under similar conditions two times. Answers from the repeated testing were compared (Test- re- test reliability was 0.82 for knowledge), Cronbach's Alpha reliability was 0.890 for reported practice.

Ethical consideration:

An official permission to conduct the proposed study obtained from the Scientific Research Ethics Committee. Participation in the study is voluntary and subjects was given complete full information about the study and their role before signing the informed consent. The ethical considerations included explaining the purpose and nature of the study, stating the possibility to withdraw at any time, confidentiality of the information where it was not be accessed by any other party without taking permission of the participants. Ethics, values, culture and beliefs respected.

II) Operational item:

Preparatory phase:

It included reviewing of related literature and theoretical knowledge of various aspect of the study using books, articles, internet and magazines to develop tools for data collection.

ISSN 2786-0183
Helwan International Journal for Nursing Research and Pratctice
Vol. 3, Issue 7, Month: September 2024, Available at: https://hijnrp.journals.ekb.eg/

Pilot study:

A pilot study conducted on (10%) of the mothers equal 15 mothers under study to assess the feasibility, practicability, clarity and objectivity of the tools. Based on the results, no modification was done. Mothers in the pilot study were included in the main study sample because no modifications were done.

Field work:

After attaining the approval to conduct the study, sample was collected during the day of the hematology outpatient clinic. After establishing a trustful relation, every mother interviewed childly by the investigators to explain the study purpose then study tools completed by mothers. Teaching method used: group discussion, brainstorming, demonstration and re-demonstration, also media picture and handout. Booklet and cylinder disk prepared by the investigators.

The study implemented through three phases: preparatory, implementation and evaluation item.

Health education program conducted in following phases:

Assessment phase: by using pre-testing questionnaire to assess the mother's knowledge, and reported practice about sickle cell anemia. The investigators first introduced herself and explained the purpose of the study briefly to the mother. Every mother was met childly and written consent for participation was obtained. Mothers were assured that the obtained information confidentially, and used only for the purpose of the study.

Planning phase:

- The investigators introduced herself to each participant and explain the aim of the study to gain the participants confidence and trust in order to obtain their written consent from mothers then explain the aim of the study to each mother to fulfill the interview questionnaire.
- Actual field work carried out in the period from April 2023 up December 2023 years, two days per week (Wednesday and Tuesday) from 9 am -1pm and interview mothers in hematology outpatient clinic at Baharia Oasis hospital in Baharia Oasis City, Giza Governorate, Egypt.
- Health education program was improved mothers' knowledge, and reported practice about sickle cell anemia and aimed explained to all participants. Based on the result of the pre-test questionnaire the investigators utilized 5 sessions each session needs from 30-45 minutes and the education program conducted through 4 theoretical sessions and 1 practical session.
- Post-test done immediately after applies sessions. The study sample equal 150 mothers divided to 6 groups: contained about 25 mothers in each group.

Implementation phase:

Based on the result obtained from the assessment phase, the investigators designed the health education program sessions contents according to the mother's needs. Detected needs, requirements and were clarified and discussed in the form of booklet. Contents of the booklet were selected on the base of identified needs. The booklet consisted of knowledge about autism such as meaning of anemia, meaning of sick cell anemia, types of anemia, development of sickle cell anemia in the child's body, causes of sickle cell anemia, symptoms and signs of sickle cell anemia, factors that increase the incidence of sickle cell anemia, diagnostic methods for sickle cell anemia, complications of sickle cell anemia, medical treatment, the correct way to administer hydration treatment, mothers reported practices for a healthy diet for a child with sickle cell anemia, physical activity, health responsibility, and administer medications . Teaching methods used as lecture, open discussion, brain storming demonstration and re-demonstrations were frequently applied during sessions. Media such as PowerPoint, data show, pictures, video and booklet prepared by investigators.

Evaluation phase:

This phase utilized to evaluate the effect of educational program on improving mothers' knowledge, and reported practice. It conducted pre-intervention and post intervention after an educational program, utilizing the same format utilized pre intervention.

III) Administrative Item:

After explanation of the study aim and objectives, an official permission was obtained from the Dean of faculty of nursing and the general director of the hematology outpatient clinic at Baharia Oasis hospital in Baharia Oasis City, Giza Governorate, Egypt, asking for cooperation and permission to conduct the study.

ISSN 2786-0183
Helwan International Journal for Nursing Research and Pratctice
Vol. 3, Issue 7, Month: September 2024, Available at: https://hijnrp.journals.ekb.eg/

IV) Statistical Item:

Upon completion of data collection, data computed and analyzed using Statistical Package for the Social Science (SPSS), version 24 for analysis. The P value set at 0.05. Descriptive statistics tests as numbers, percentage, mean standard deviation (SD), was used to describe the results. Appropriate inferential statistics such as "F" test or "t" test used as well.

- Degrees of Significance of the results were:
- Non-significant (NS) if p > 0. 05.
- Significant (S) if p < 0.05.
- Highly significant (HS) if p < 0.01.

Results:

Table (1): Frequency Distribution of the Studied Mother's Demographic Characteristics (N=150).

Item	No.	%
Mothers age		
-20 >25	45	30.0
-25< 35	12	8.00
-35< 45	78	52.0
-45< 60	15	10.0
Mean ± SD	39.4 ± 3.4 years	
Mothers' education levels		
Not read and write	10	6.67
Read and writes	8	5.33
Basic education	21	14.00
Secondary education	93	62.00
University or more	18	12.00
Mothers' Job		
Housewife	38	25.33
Working	112	74.67
Place of Residence		
Rural	122	81.33
Urban	28	18.66
Family monthly income		
Not enough	23	15.33
Sufficient for basic needs only	114	76.00
Sufficient for basic needs and savings	13	8.67

Table (1): Shows that, 52.0 % of studied mother age from -35< 45 years and the mean age of studied mother was 39.4 ± 3.4 years .Also, 62.00 %of the studied mother had secondary education in education level. Moreover 74.67 % of the studied mother were working. Additionally, 81.33 % of the studied mother had rural area in place of residence and 76.00 % of the studied mother's family monthly income was sufficient for basic needs only.

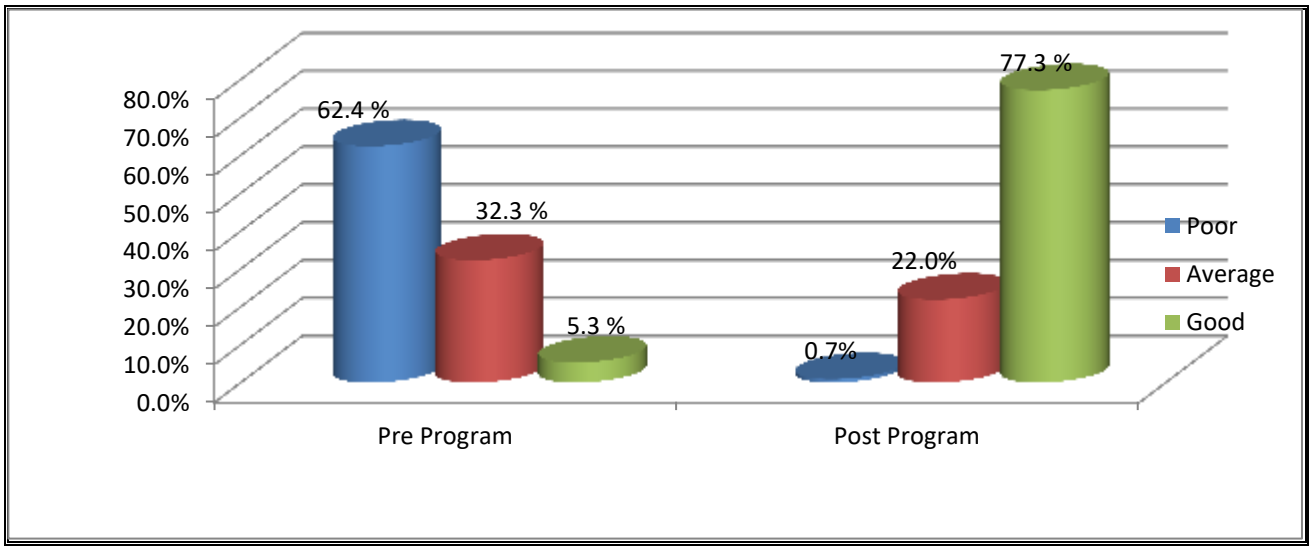
Table (2): Frequency Distribution of Child's Demographic Characteristics (N=150).

Item	No.	%
Child age (1-10) years		
1 < 5 years	128	85.33
5 ≤ 10 years	22	14.67
Mean ± SD	7. 46 ± 1.2 years	
Gender		
Male	90	60.00
Mothers	60	40.00
Child rank		

ISSN 2786-0183
Helwan International Journal for Nursing Research and Pratctice
Vol. 3, Issue 7, Month: September 2024, Available at: https://hijnrp.journals.ekb.eg/

First	**12**	**8.00**
Second	**37**	**24.67**
Third	**78**	**52.00**
Fourth and more	**23**	**15.33**

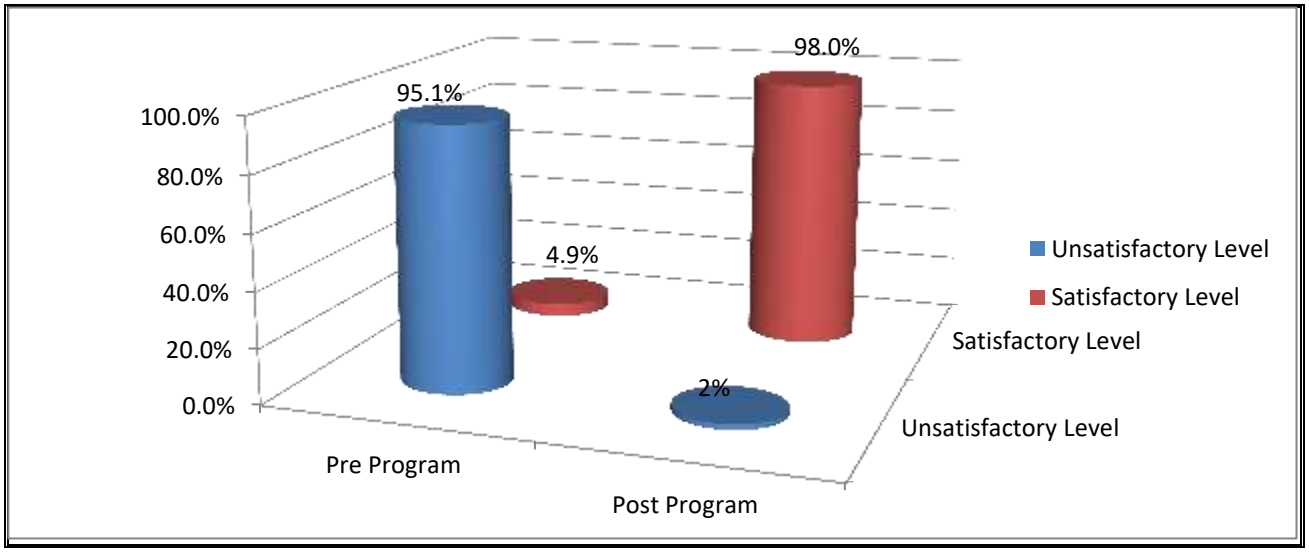
Table (2): Shows that, the mean age of child was 7. 46 ± 1. 2 years, 60.00 % of the child's were male, and 52.00 % of the child rank was third children.



χ2=23.14 **P value=0.000

Figure (1): Percentage Distribution of Total Knowledge among Studied Mother regarding Sickle Cell Anemia Pre and Post Applying Health Education Program (N=150).

Figure (1): Shows that, 77.3 % of studied mother had good total knowledge post apply educational program. While 220 % of studied mother had average total knowledge post apply educational program. While 0.7 % of studied mother had poor total knowledge post applied education program where P value 0.000 and paired t test = 23.14.



χ2=30.17 **P value=0.000

Figure (2): Number and Percentage Distribution of Total Reported Practices among Studied Mother regarding Mother's Skills for Sickle Cell Anemia Pre and Post Applying Health Education Program (N=150).

ISSN 2786-0183
Helwan International Journal for Nursing Research and Pratctice
Vol. 3, Issue 7, Month: September 2024, Available at: https://hijnrp.journals.ekb.eg/

Figure (2): Illustrate that, 95.1 % of studied mother had unsatisfactory with total practice pre apply educational program. While 98.0 % of studied mother had satisfactory total reported practice post apply educational program where P value 0.000 and paired t test =30.71.

Table (3): Correlation between Total Score Knowledge and Reported Practice of Studied Mother's Pre & Post Health Education Program (N=150).

Item	Total reported practice			
	Pre- program		Post –program	
	R	P value	R	P value
Total Knowledge	- 0.027	0.663	0.325	0.000**

(*) statistically significant & (**) high statistically significant P≤0.00

Table (3): Shows that, there was positive correlation between studied mother's total knowledge regarding to sickle cell anemia and their total reported practice. Moreover, there was highly significance improvement in studied mother's total knowledge and total reported practice.

Table (4): Relation between Demographic Characteristics and Total Knowledge of Studied Mothers Post - Health Education Program (N=150).

Items	The studied mother Post -Educational Program						χ^2	P value
	Poor (1)		Average (33)		Good (116)			
	No.	%	No.	%	No.	%		
Mothers age								
-20< 25	1	100.0	3	9.1	41	35.3	12.206	0.000
-25< 35	0	0.00	2	6.1	10	8.6	14.638	0.000
-35< 45	0	0.00	23	69.7	55	47.4	11.026	0.000
-45< 60	0	0.00	5	15.2	10	8.6	13.200	0.001
Mothers' education levels								
Not read and write	0	0.00	0	0.00	10	8.6	11.325	0.002
Read and writes	1	100.0	1	3.0	6	5.2	12.209	0.005
Basic education	0	0.00	5	15.2	16	13.8	17.118	0.001
Secondary education	0	0.00	23	69.7	70	60.3	12.211	0.000
University or more	0	0.00	4	12.1	14	12.1	19.253	0.001
**** Mothers' Job***								
Housewife	1	100.0	5	15.2	32	27.6	10.321	0.005
Working	0	0.00	28	84.8	84	72.4	13.144	0.000
**** Place of residence***								
Rural	1	100.0	33	100.0	88	75.9	15.215	0.002
Urban	0	0.00	0	0.00	28	24.1	12.066	0.000
Family monthly income								
Not enough23	1	100.0	2	6.1	20	17.2	10.325	0.002
Sufficient for basic needs only	0	0.00	27	81.8	87	75.0	14.258	0.001
Sufficient for basic needs and savings	0	0.00	4	12.1	9	7.8	11.102	0.000

Table (4): Shows that, there was high statistically significant relation between studied mother's total knowledge about sickle cell anemia post-educational program with educational level and age where p value = 0.005 respectively.

ISSN 2786-0183
Helwan International Journal for Nursing Research and Pratctice
Vol. 3, Issue 7, Month: September 2024, Available at: https://hijnrp.journals.ekb.eg/

Discussion:

Children with sickle cell anemia face significant challenges due to the chronic nature of their condition. This genetic disorder causes red blood cells to become rigid and shaped like a crescent or sickle, leading to severe pain, frequent infections, and potential organ damage. These children often endure episodic pain crises that can be debilitating and require hospitalization. Regular medical check-ups and strict adherence to treatment regimens are essential to manage symptoms and prevent complications ***(Constantinou et al., 2024).*** Despite these challenges, children with sickle cell anemia show remarkable resilience, often adapting to their condition with the support of their families and healthcare providers. Children may require special accommodations in school to address fatigue and pain, but with proper care and support, children can lead fulfilling lives and participate in many typical childhood activities ***(Srikanthan, 2024).***

Mothers of children with sickle cell anemia play a vital and multifaceted role in managing their child's chronic condition. Mothers provide constant care, ensuring that their children adhere to treatment plans, stay hydrated, and avoid triggers that can precipitate painful crises. These mothers educate themselves extensively about the disease to advocate effectively for their children's needs within the healthcare system. Mothers offer unwavering emotional support, helping their children cope with the physical pain and emotional stress associated with the disease. Moreover, mothers often foster a supportive environment at home, balancing medical care with efforts to allow their children to enjoy as normal a childhood as possible, despite the challenges posed by sickle cell anemia ***(Sisk et al., 2024).***

The present study finding concerning mothers' age, more than half of studied mothers had aged from 35 to less than 45 years, this finding was in agreement with **Green et al., (2024)** who conducted published study at Jamaica entitled as "Social construction of barriers or challenges to parenting: black Jamaican fathers' and mothers' perspectives." who reported that, 55.1 % of studied subjects were aged from 35 to less than 45 years. From investigators point view, this might be due to sickle cell anemia is a genetic disorder inherited when a child receives two sickle cell genes, one from each parent. It is linked to the inheritance of the sickle hemoglobin (HbS) gene from both parents, who may carry the sickle cell trait. Older mothers might have more access to genetic counseling and be more aware of their carrier status, leading to a better understanding of the risks involved.

Concerning to mother's level of education, less than two third of studied mother's education levels were secondary education than two third of them were working. This result was in accordance with **Jameel et al., (2024)** who conducted published study at Saudia Arabia entitled in " Consanguineous marriages, premarital screening, and genetic testing: a survey among Saudi university students", who reported that 63.2 % and 71.5 % of studied sample's education levels were secondary education and employee, respectively. From investigators point view, this might be due to mothers with secondary education levels are often knowledgeable about genetic conditions like sickle cell anemia. Mothers may seek genetic counseling and testing, leading to a greater awareness of their carrier status and the risks associated with having children with the condition.

Regarding to mother's monthly income of the present study revealed that more than two third of studied mother had sufficient for basic needs only, this finding was in agreement with **Robbins & Nixon-Cave, (2024)** who conducted a published study at Kaduna State in Nigeria entitled in ″ The Family and Child's Environment in Children with Sickel Cell Anemia ″, who stated that ٧4.6 % of studied sample monthly income were sufficient basic needs only. From investigators' point of view, this might be due to the cost of living, especially in urban areas where job opportunities are often concentrated, can be high. Housing, transportation, and childcare costs can consume a significant portion of their income. Even with higher education, mothers may find themselves in positions that do not fully utilize their skills and qualifications, leading to lower earnings.

Concerning to mother's place of residence, the present study finding revealed that majority of studied mother were residence in rural area. This result was in accordance with **Maleki et al., (2024)** who conducted published study at Minneapolis entitled as " Quality of Life in Menopausal Samples with Polycystic Ovarian Syndrome" reported that 84.1 % of studied samples were residence in rural area. From investigators point view, this might be due to strong social networks and community ties in rural areas can influence mothers to remain in or return to their hometowns and economic limitations might prevent mothers from relocating to urban areas, where living costs are higher.

Regarding to child's gender of the present study revealed that less than two third of child were male, this finding was in agreement with **Obeagu et al., (2024)** who conducted a published study in Iran entitled in ″ Understanding

ISSN 2786-0183
Helwan International Journal for Nursing Research and Pratctice
Vol. 3, Issue 7, Month: September 2024, Available at: https://hijnrp.journals.ekb.eg/

apoptosis in sickle cell anemia patients: Mechanisms and implications ", who stated that 61.6 % of studied samples were male. From investigators' point of view, this might be due to in some cases, health disparities can affect survival rates differently for males and females. If males with sickle cell anemia receive more aggressive treatment or healthcare, it might seem like they are more affected due to higher diagnosis and treatment rates.

The following paragraphs enhancing research hypothesis, that the mothers' knowledge and practices will be improved after applying health education program regarding caring of their children with sickle cell anemia.

Concerning the effective of the program on total knowledge studied mothers, the present study revealed that there was statistical significant difference between pre and post program apply in all knowledge items this finding was supported with **Alghamdi et al., (2024)** whose conducted published study in Nigeria under title of " Risk factors for acute chest syndrome among children with sickle cell anemia hospitalized for vaso-occlusive crises." who reported that, there statistical significant difference between pre and post implementation program in the knowledge of studied subjects. From investigators' point of view, this might be due to conduct regular education sessions specifically focused on sickle cell anemia, its causes, symptoms, treatment options, and management strategies. These sessions should be conducted in a clear and understandable language, avoiding medical jargon as much as possible. Provide written materials, pamphlets, or booklets that outline essential information about sickle cell anemia, including its diagnosis, treatment options, management of symptoms, and resources for further support. Ensure that these materials are available in languages and formats that are accessible to all mothers.

Regarding the effective of the program on total reported practices studied mothers, the present study revealed that there was statistical significant difference between pre and post program apply in all reported practices items this finding was supported with **Ohemeng et al., (2024)** whose conducted published study in Ghana under title " Knowledge and nutrition-related practices among caregivers of adolescents with sickle cell disease in the Greater Accra region of Ghana " who reported that, there statistical significant difference between pre and post implementation program in the reported practices of studied subjects. From investigators' point of view, this might be due to take precautions to minimize the risk of infections, such as avoiding crowded places during flu season, practicing good hand hygiene, and ensuring vaccinations are up-to-date. Infections can trigger sickle cell crises and worsen the child's condition. Monitor for signs of pain or discomfort and implement strategies to manage sickle cell pain effectively. This may include using pain medications as prescribed, applying heat or cold packs, and practicing relaxation techniques.

The present study clarified that there statistically significant relation was between knowledge and reported practices post apply health education program and this finding supported by **Ngonde et al., (2024)** who conducted published study at Congo under title" Knowledge and practices of sickle cell disease among healthcare providers in Kinshasa, Democratic Republic of the Congo " who reported that, there was a significant and direct relation between knowledge and reported practices. From the investigators' point view, a targeted educational program was needed to promote knowledge of mothers about sickle cell anemia.

Concerning correlation between total percentage of knowledge and reported practices post apply health education program, the present study show significant correlation between total score knowledge and reported practices and this finding was supported with **Lawal et al., (2024),** who published study at Nigeria under title of " Faith Healing Techniques in the Management of Sickle Cell Anaemia in Nigeria " reported that, there was significant correlation observed between samples knowledge and practices. From investigators' point view, this might be providing emotional support and encouragement to child. Living with a chronic illness like sickle cell anemia can be challenging, and emotional well-being is essential for coping with the disease.

Regarding relationship between total knowledge and mother's demographic characteristics post apply health education program, the present study showed significant relation between them and this finding was in agreement with **Mosley et al., (2024)** who published study at Argentine under title **"**A Mixed-Methods Evaluation of a Project ECHO Program for the Evidence-Based Management of Sickle Cell Disease", who reported that, statically significant relation between total knowledge and demographic characteristics post apply health education program. In addition, this finding in accordance with **Anderson et al., (2024),** who published study at Western Asia under title "National Quality Indicators in Pediatric Sickle Cell Anemia" who reported significant relation between total knowledge level among the studied subjects and demographic characteristics. From investigators' point view, this might be maintaining open communication

ISSN 2786-0183
Helwan International Journal for Nursing Research and Pratctice
Vol. 3, Issue 7, Month: September 2024, Available at: https://hijnrp.journals.ekb.eg/

with healthcare providers, teachers, and caregivers about child's condition. This ensures that everyone involved in child's care is informed and prepared to provide appropriate support.

Conclusion

On the light of the current study, it could be concluded that:

The results of present study supported the research hypothesis that there is marked an improvement in total knowledge, and total reported practices regarding sickle cell anemia for mother's post applying of health educational program. There was statistically significant relation between mothers' demographic data and their total knowledge, and total reported practices regarding sickle cell anemia.

Recommendations

In the light of the findings of the present study, the following recommendations are suggested:

1- Continuing health education program for mothers with children suffer from sickle cell anemia to improve their condition.

2- Providing mothers who have children with sickle cell anemia with a booklet about their care and how to avoid complications.

3- Make posters or banners about reported practices of sickle cell anemia and put hematology outpatient clinic at Baharia Oasis hospital in Baharia Oasis city under observation of community health nurse.

4- Encourage group discussion for mothers who have children with sickle cell anemia under supervision of community health nurse.

5- Apply further research in large sample and other setting for generalization.

References:

1. **Alghamdi, F. A., Al-Kasim, F., Alshhada, F., Ghareeb, E., Azmet, F. R., Almudaibigh, A., ... & Alluqmani, R. (2024).** Risk factors for acute chest syndrome among children with sickle cell anemia hospitalized for vaso-occlusive crises. Scientific Reports, 14(1), 5978.
2. **Alzubaidi, L., Fadhel, M. A., & Duan, Y. (2024).** Health education program for mothers about sickle cell anemia diagnosis. Electronics, 9(3), 255.
3. **Anderson, A. T., Mack, W. J., Horiuchi, S. S., Paulukonis, S., Zhou, M., Snyder, A. B., ... & Freed, G. (2024).** National Quality Indicators in Pediatric Sickle Cell Anemia. Pediatrics, 153(4), e2022060804.
4. **Bender, M. A., & Carlberg, K. (2021).** Sickle cell disease. : a review. Jama, 328(1), 88-95.
5. **Constantinou, C., Payne, N., van den Akker, O., & Inusa, B. (2024).** Exploring health-related quality of life, exercise and alcohol use in adolescents with sickle cell disease and healthy siblings. Psychology & Health, 1-21.
6. **Green, D. S., Chuang, S. S., & Goldstein, A. L. (2024).** Social construction of barriers or challenges to parenting: black Jamaican fathers' and mothers' perspectives. Journal of Child and Family Studies, 33(3), 998-1014.
7. **Jameel, T., Baig, M., Murad, M. A., Gazzaz, Z. J., Mal, Y., Alyoubi, W. E., ... & Alkaabi, T. (2024).** Consanguineous marriages, premarital screening, and genetic testing: a survey among Saudi university students. Frontiers in Public Health, 12, 1328300.
8. **Joacquim, A. O., Akinsete, A. M., & Esezobor, C. I. (2024).** Acute kidney injury is more common in hospitalised children with sickle cell anaemia in Africa. Acta Paediatrica, 113(3), 557-563.
9. **Kavanagh, P. L., Fasipe, T. A., & Wun, T. (2022).** Sickle cell disease: a review. Jama, 328(1), 57-68.
10. **Lawal, M. O., Akinrinde, O. O., & Jegede, A. S. (2024).** Faith Healing Techniques in the Management of Sickle Cell Anaemia in Nigeria. Global Social Welfare, 1-10.
11. **Maleki, M., Nayeri, N. D., Hamidieh, A. A., Pouraboli, B., & Mardani, A. (2024).** Harmony in hardship: Unveiling parental coping strategies with the challenges of child's hematopoietic stem cell transplantation. Journal of Pediatric Nursing.
12. **Mandal, A. K., Mitra, A., & Das, R. (2023).** Sickle cell hemoglobin. Vertebrate and Invertebrate Respiratory Proteins, Lipoproteins and other Body Fluid Proteins, 297-322.

ISSN 2786-0183
Helwan International Journal for Nursing Research and Pratctice
Vol. 3, Issue 7, Month: September 2024, Available at: https://hijnrp.journals.ekb.eg/

13. **Mosley, C., Farrell, C. B., Quinn, C. T., & Shook, L. M. (2024).** A Mixed-Methods Evaluation of a Project ECHO Program for the Evidence-Based Management of Sickle Cell Disease. International Journal of Environmental Research and Public Health, 21(5), 530.
14. **Mostafa, A. S., Hamed, D. H., ELSayed, B. B., Kholeif, A. M., & Youssry, I. (2024).** Evaluation of pulmonary function in Egyptian children with sickle cell disease: a single center study. Egyptian Pediatric Association Gazette, 72(1), 47.
15. **Ngonde, A. C. M., Fina, J. P. L., Burgueno, E., & Lukanu, P. N. (2024).** Knowledge and practices of sickle cell disease among healthcare providers in Kinshasa, Democratic Republic of the Congo. African Journal of Primary Health Care & Family Medicine, 16(1), 3631.
16. **Obeagu, E. I., Ubosi, N. I., Obeagu, G. U., Egba, S. I., & Bluth, M. H. (2024).** Understanding apoptosis in sickle cell anemia patients: Mechanisms and implications. Medicine, 103(2), e36898.
17. **Obeagu, E. I., Obeagu, G. U., Akinleye, C. A., & Igwe, M. C. (2023).** Nosocomial infections in sickle cell anemia patients: prevention through multi-disciplinary approach: a review. Medicine, 102(48), e36462.
18. **Ohemeng, A., Nartey, E. B., Quaidoo, E., Ansong, R. S., & Asiedu, M. S. (2023).** Knowledge and nutrition-related practices among caregivers of adolescents with sickle cell disease in the Greater Accra region of Ghana. BMC Public Health, 23(1), 434.
19. **Pecker, L. H., Hussain, S., Mahesh, J., Varadhan, R., Christianson, M. S., & Lanzkron, S. (2024).** Diminished ovarian reserve in young samples with sickle cell anemia. Blood, The Journal of the American Society of Hematology, 139(7), 1111-1115.
20. **Robbins, L. J., & Nixon-Cave, K. (2024).** The Family and Child's Environment in Children with Sickel Cell Anemia. In Pediatric Stroke Rehabilitation (pp. 211-225). Routledge.
21. **Sisk, B. A., Antes, A. L., Bereitschaft, C., Bourgeois, F., & DuBois, J. M. (2024).** Providing Adolescents with Access to Online Patient Portals: Interviews with Parent-Adolescent Dyads. The Journal of Pediatrics, 270, 114015.
22. **Srikanthan, S. (2024).** Whiteout: a social history of sickle cell disease in Ontario, Canada. Critical Public Health, 34(1), 1-11.
23. **Steinberg, M. H. (2023).** Treating sickle cell anemia: a new era dawn. American journal of hematology, 95(4), 338-342.
24. **Tisdale, J. F., Thein, S. L., & Eaton, W. A. (2023).** Treating sickle cell anemia. Science, 367(6483), 1198-1199.
25. **Yeruva, S., Varalakshmi, M. S., Gowtham, B. P., Chandana, Y. H., & Prasad, P. K. (2024).** Identification of sickle cell anemia using deep neural networks. Emerging Science Journal, 5(2), 200-210.