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Effect of Upgrading Maternal Concepts and Skills on Reducing Pain Severity of their Children Suffering From Sickle Cell Disease

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Abstract*: *Background; *sickle cell means an abnormal crescent shaped red blood cell. The present study* ***aimed*** *to evaluate an educational program for the mothers and their children including the knowledge and practices needed in dealing with the sickle cell disease and assessment of pain severity before and after the educational program. This study followed a quasi- experimental design. The sample was consist of 50 children suffering from sickle cell disease and their mothers who were attending at Pediatric Hematology and Oncology unit of Tanta University Hospital and Inpatient Pediatric Department of Elhoboor Hospital in Khafer Al-Sheik.*

Three tools were used for data collection: *a structured interview sheet , pain assessment tool, and mothers and their children knowledge Questionnaire.* ***The result*** *revealed that 60% of children with sickle cell disease had a mean age of 12.1±4.02 years. Before program application the total scores of knowledge for mothers are fair and poor with percentage 14% and 43% respectively, whereas immediately and after three months of the program application the total score of knowledge for all mothers is good. There was significant positive impact on total score of the knowledge about sickle cell disease. There was a highly significant positive impact of Quran program on total score of pain severity.*

Conclusion: *the study was found that the three programs of non pharmacological methods (Quran, progressive relaxation and yoga) reduce severity of pain respectively. There was highly improvement of mothers' knowledge immediately, and after three month the application of program. This study* ***recommended:*** *informing parents about non-pharmacological therapies for pain, such as, progressive relaxation and massage*.

I. Introduction:

Sickle cell anemia also known as sickle cell disorder or sickle cell disease is a term that denotes a group of genetic disorders that cause of sickle shaped hemoglobin. The red blood cells of the child with sickle cell disease take a different shape under deoxygenating because of polymerization of the abnormal sickle hemoglobin. This process causes the red blood cells to get attached in blood vessels. This attachment or adherence of the red blood cells deprives the tissues of oxygen. The attachment causes obstruction which leads to recurrent painful episodes called sickle cell crises. (1)

The prevalence of sickle cell anemia, are globally widespread. About 5% of the world's population carries genes responsible for haemoglobinopathies. (2) The first case of sickle cell anemia in Egypt was reported in 1951 by Abbasy (3) sickle cell disease was recorded in Pediatric Hematology and Oncology unit of University Hospital in Tanta that 1(2%) as homozygous sickle cell (HBSS), 3(6%) as compound heterozygous state of sickle cell (SS), 2(4%) as sickle cell B. Thalassemia , 1(2%) as sickle cell hemoglobin C disease (HbSC). (4)

Sickle cell anemia is caused by a mutation in the gene that tells the body to make hemoglobin. The red cells, iron rich compound that gives blood its red color. Hemoglobin allows red blood cells to carry oxygen from the lung to all parts of the body. In sickle cell anemia the abnormal hemoglobin causes red blood cells to become rigid, sticky and misshaped, also the sickle cell gene is passed from generation to generation in pattern of inheritance called autosomal receive inheritance. This means that both the mother and father must pass the defective from of the gene to the child to be affected.(5)

Sickle cell anemia covers a wide spectrum of illness. Most affected children have chronic anemia with a hemoglobin concentration of around 8 g/dl. The main problems arise from the tendency of the red blood cells to become sickle shaped and block capillaries at low oxygen tension. In children, sickle shaped red blood cells often become trapped in the spleen, leading to a serious risk of death before the age of seven years from a sudden profound anemia associated with rapid splenic enlargement or because lack of splenic function that permits an overwhelming infection. Between 6 and 18 months of age the affect children most often present with painful swelling of the hands or feet (hand –feet syndrome). Children may also suffer recurrent and

unpredictable sever painful crises, as well as acute chest syndrome, bone or joint necrosis, priapism, and renal failure.[6]

Effective treatment for sickle cell disease is available, but without cure. Sickle cell disease is treated by bone marrow transplant, with proper treatment, children with sickle cell disease live relatively normal lives. Without treatment, and most children with sickle cell disease will die young. In 1998 the U.S. food and drug administration approved the drug Hydroxyurea for use in adult with sickle cell disease while it still has not been officially approved for use in children. It is now commonly used by pediatric specialists in certain circumstances. [7]

Since sickle cell disease is a lifelong condition, it requires expensive treatment, and can be life threat, it significantly affects many aspect of family life, it is, therefore, important that parent, spouses, and others family members are educated, supported and participates in all aspects of the child care. Drinking plenty of water can be challenging and even overwhelming. It is important for the child to maintain folic acid take supplement daily, and choose healthy diet. The comprehensive care team should have the resources to support family members of a child with sickle cell disease.[8, 9]

Pediatric nurses play an important role for to improving pediatric sickle cell disease care with limited time and staff, children and their mothers should be taught self management skills to avoid pain crises.[10] The self management of sickle cell disease is a difficult task at any age particularly during childhood and adolescent because this is a developmental period in which a series of complex and interrelated developmental tasks are mastered. On the other hand the disease imposes extensive behavioral demand on the young sickle cell disease including adherence to medication regimen, limitation of certain activities and periodic checkup, so the young sickle cell disease and their families must learn how to adapt their lives to cope with the disease positively. [11]

The role of the sickle cell disease nurse is dynamic, comprehensive. She plays a key role in children care management, and provides care and education to the sickle cell children and those who care for them. Thus the nurses play a critical role in assisting the child health management and in improving / maintaining his quality of life. [12]

II. Materials and Method

Research design

A quasi- experimental research design was used in the present study.

Setting:

The study was carried out at: Pediatric Hematology and Oncology unit of Tanta University Hospital - Inpatient Pediatric Department of Elhoboor Hospital in Khafer Al-Sheik which is Afflicted to the Ministry of Health.

Subjects: Clustered randomly selected 50 children suffering from sickle cell disease and their mothers. It was divided into two groups (The first group 30 child and their mothers from Pediatric Hematology and Oncology unit of Tanta University Hospital) (The second group 20 child and their mothers from Inpatient Pediatric Department of Elhoboor Hospital in Khafer Al-Sheik. children had the following criteria:

Both sex, Age ranged from 6-18 years and free from any other disease.

Tools of data collection:

Three tools were developed and used by the researcher after reviewing the literature.

Tool I) A structured Interview Sheet:

This tool was developed to obtain the socio demographic data:

a) Personal history includes:

Children history: child age, sex, birth order, number of sibling, immunization and residence, child hobbies and leisure time activities. Academic data: enquiry about previous academic failure, last year achievement and absenteeism rate.

Mothers' history: mothers' age, level of education, religion, occupation, residence, crowding index, family size and numbers of rooms, Family medical history of sickle cell disease or any other disease

b) Child medical history includes: sickle cell related data, Past medical history including: past illness, onset of fever, difficult of breathing and any other complications and history of hospital admission

c) Pain Management History includes: medication used and non pharmacological methods.

Tool II) Pain Assessment Tool: It was classified into three parts:

Part (1): Behavioral observation sheet

It was used to observe children's behaviors before, immediately and after implementation the program (Verbal, facial expression and motor behaviors was observed as:

1-Vocalization included word as hurt, moaning, crying, screening and grasping.

2-Facial expression included grimacing wide open eyes, wrinkled forehead and tightly closed lips.

3-Body movement included: arm movements as rubbing painful part, Leg movement as purposeless activity and Torso movement as remaining immobile and frequent change position

Part (2): Effect of pain on physical and physiological function such as: sweating, nausea, headache, diarrhea or regression, appetite as anorexia, sleep as insomnia, physical activity as bed ridden, respiratory and blood pressure

-Emotional status and interpersonal relationship as anxiety, sadness, depression, irritability.

-Factors aggravating pain as cough, constipation, anorexia, fatigue and fair factors. [13] The scoring system was done concerning to frequency of 7 pain behaviors (vocalization, facial expression, body movement, physical and physiological function, emotional status and factors aggravating). [13] Score range is 0-3 for each pain behavior. Higher scores represent greater number of behaviors.

Part (3): Adolescent Pediatric Pain Tool (APPT):

Adolescent pediatric pain tool a scale for measurement of pain location, intensity and quality in adolescents by self report**.** Three domains used in this scale pain location by2 body outline drawing back and front using body map drawing to allow children the point location of pain on their body ; intensity(using word graphic pain rating scale) by 100 mm horizontal line with word anchors ranging from " 0 mm= no pain" " 1-35 mm= little pain" " 36-50 mm= medium pain" 51-75 mm= large pain and " 76-100 mm=worst possible pain and quality of pain will described by encouraging children their own words and the researcher selected the similar word on the pain descriptor list or by using the pain descriptor list as children selected word from this list best described their pain

-Sensory qualities of pain as fearful, sickness, anxious and depressed

-Onset and duration of pain as constant, intermittent or rhythmic.

This scale used with children ages from 6 to 18 years.

-The scoring systems was done concerning pain severity regarding location, duration, intensity, frequency, quality of pain associated behavioral signs and symptoms, effect of physical and psychological function, complication after crisis

- Assessed of pain severity before, immediately after and after three months performing the program.[14]

Tool III) Mothers and Children Knowledge Questionnaire Sheet: This was developed by the researcher to assess mothers and their children Knowledge about sickle cell disease before, immediately after and after three months the program application:

Knowledge of the mothers regarding sickle cell was evaluated and classified as: every item was evaluated as follow:

- Correct & complete answer was scored (2)
- Correct & incomplete answer had been scored (1)
- Incorrect & incomplete answer was scored (0)

Tool IV) Progressive Relaxation Technique: was developed by Edmund Jacobson (2010) to combat tension and pain: it included several phases in each phase instructions was given to the patient to tense and relax a group of various muscle of the body systematically with deep breathing exercise. Between each phase the child was relax five second. [15]

III. Method

An official permission to conduct the study was obtained from the responsible authorities. Tool (I) and (III) was developed by the researcher and tested for validity and reliability was established. Tool (II) and IV was translated into Arabic and tested by five experts then validity and reliability was established. Ethical consideration privacy and confidentiality was protected. The pilot study was conducted on 10% of the total sample to test the clarity and applicability of the study tools then the necessary modification was done. The structure interview with the mothers and their children to obtained the basic data. The program was constructed according to the children's and mothers needs. The program was designed by the researcher, after review of the literature to meet mothers and their children knowledge and assess pain before and after program application.

The content was prepared according to mothers and their children level of understand selection of teaching methods, learning aids and evaluation methods were relevant to program contents. Pain assessment was done

using observer rated pain scale, "Adolescent pediatric pain tool" before, immediately after and after three months implementation the program using tool (II). Mothers and their children were teaching non pharmacological methods to relieve pain as follow:

1) Yoga Relaxation Technique: Yoga relaxation technique refers to the loosing of bodily and mental tension. It is intended to be a positive experience that challenges the child by strengthening his body and relax his mind. Poses should be held for 10-15 seconds. Children less than 6 year can do up to 1 minute/ exercise. The total time for the child yoga session can be up to 15 minutes while children 6 year and above can do up 1,5 minutes/ exercise and the yoga session can last up to 25 minutes. [(16)]

2) Holy Quran Relaxation Technique:

In holy Quran relaxation technique the child listening, reading and watching the text of the holy Quran subject (user) can involve the whole body. The entire process will be controlled by brain, as a result during this practice the whole body will receive relaxation / refreshment, and the exhaustion, boring and tiredness will be finished. This physiological biofeedback manner provides groceries for spirit. Hence this means can be used with depression produced pain can radiate from the neck, back, eyes and others muscle group in the body. This approach replaces negative thoughts with positive and truthful thoughts.[(17)]

3) Progressive Relaxation Technique: was conducted for 15 minutes the researcher was give technique instruction to mothers and their children individual and assessment pain severity after provide this technique.

-Assess the effect of program using tool (IV) regarding sickle cells care and pain severity

A pilot study was carried out for 5 mothers and their 5 children to test applicability of tool.

Mothers and their children were interviewed either at the pediatric Hematology and Oncology unit or inpatient pediatric department of Elhoboor Hospital.

The researcher starts to collect data about the child and his/ her mother through the first and second tools. The objectives of the study were explained to the children and their mothers during the interview.

During the initial interview with the child and her mother the history of sickle cell disease taken and mother's knowledge about sickle cell disease explored. The children knowledge about sickle cell disease was assessed (Definition, causes, manifestation, risk factors, pathophysiology, types of sickle cell disease, immunization, pain management, factors increase pain crises, treatment options, treatment side effect and complications of the disease).

Implementation of the program: the program was carried out in six sessions each session was take 30 minutes including periods of discussion according to the mothers' and their children achievement progress and feedback.

-Different teaching media aids was used (lecture, demonstration, audiovisual material and handouts).

First session: was covering the following topics:

Definition, causes, manifestation, risk factors, types of sickle cell disease, immunization, treatment options and complications. By the end of first session children and their mothers were able to define sickle cell disease, mention causes and predisposing factors, they were also able to mention and list all topic discuss in this session.

Second session: begin with review of the concepts previously presented and progress to the next level and focus on path physiology of sickle cell crises and factors increase pain crises, this was done through discussion. At the end of the session mothers question were answered.

Third session: concentrates on assess pain intensity by using pain assessment tools

pharmacological and non-pharmacological pain management intervention. Discussion and demonstrate were used to explain the material to the mothers.

Fourth session: begin with reviewing the points previously instructed and demonstrating about Progressive Relaxation Technique. The content presented to mothers through discussion of related concepts and demonstration of how to application the topic before during and after crisis. The care during crisis was simulated either on the child or on the dolls.

Fifth session: it was focus on demonstrating Yoga and Relaxation Technique. The content presented to mothers through discussion of related concepts and demonstration of how to application the topic before, during, and after crisis. The care during crisis was simulated either on the child or on the dolls.

Sixth session: it was concentrate on demonstrating holy Quran Technique. The content presented to mothers through discussion of related concepts and demonstration of how to application the topic before during and after crisis. The care during crisis was simulated either on the child or on the dolls.

-Evaluation of the program:

Evaluation had been done before, immediately and after three months from the program application

-The mothers and children's knowledge score was considered good when the total score were 65% or more, fair when the total score was from 50%- 64% and poor when the total score was less than less than 50%.

When assessment of pain severity should be compared each child grade before, immediately and after performing the program, it give effect when the severity of pain become between zero to 50 grads. The data was collected over a period of one year from august 2013 to October 2014.

IV. Results

Table (1): show the percentage distribution of children according biosocial characteristics. It was observed that children ages between 6-8 years are more than half of the sample (60%) with mean 12.1±4.02 years. Males constitute 62% of children, while 32% were females. Fifty eight percent of the sickle cell children at the first birth order compared to 6% who at the 4^{th} birth order. Regarding the family residence, it was clear that about more than half of the children (68%) lived in rural area and 32% of them live in urban area. This table also shows that 96% of the studied children are take obligatory immunization while 2% take bacterial and meningitis immunization. It was found that more than half of the children (54%) did not participate in any hobbies while 46% of the children participated at the different activities which are: football 34.8%, art 30.4%, music 26.1% and reading 8.7%. It was found that more than two third (68%) were primary education compared to 2% were Illiterate level. The majority of the children 96.3% and (96%) were failed once at the school and school absent respectively.

Table (2): Presents the percentage distribution of studied children according to post medical history. It was noticed that the majority of the children (92%) had onset of illness during first years. It was found that slightly less than half of the children had four frequency of pain crisis and hospital admission during year. This table show also that more than half of the children (62%) had respiratory distress during pain crisis and (46%) of the children had fever before pain crisis.

Table (3): shows effect of the educational program on children and their mothers' total score of the knowledge about sickle cell disease. Before program application the total scores knowledge for mothers are with percentage 14% fair and 43% poor respectively. Whereas immediately and after three months of the program application the total score of knowledge for all mothers were good. There was a significant positive impact on total score of the knowledge about sickle cell disease was found ($P < 0.001$) but it was found that no significant relation between test II and test III $P = 1.000$.

Figure (4): shows the effect of Quran on total score of pain severity. Before the program application the total scores of pain severity for children were severe and moderate with 46% and 54% respectively. While immediately after the program application all the children hadn't suffered from pain except one child is expressed mild pain. While after three months the total score of pain for children were absent, mild and moderate with 80%, 10% and 10% respectively. Effect of Quran in total score of pain severity was found ($P < 0.001$). It was found that significant relation between test I and test II, test I and test III, test II and test III with $P = (<0.001, <0.001, 0.014)$ respectively.

Figure (5): shows Effect of Relaxation Program on Total Score of Pain Severity. Before the program application the total score of pain for children were severe and moderate with 46% and 54% respectively. While immediately after the program application the total score of 94% and 6% of children were absent and mild of pain respectively. While after three months it was found the total score of pain for children were absent, mild, moderate and severe with percentage 70%, 10%, 12 and 8% respectively. Effect of Relaxation Program in total score of pain severity was found ($P < 0.001$). It was found that significant relation between test I and test II, test I and test III, test II and test III with $P= (<0.001, <0.001, 0.007)$ respectively.

Figure (6): shows Effect of Yoga program on yotal score of pain severity. Before the program application the total scores of pain for children were severe and moderate with 46% and 54% respectively. While immediately after the program application it was found that the total pain score for the majority of the sample (94%) was absent of pain. while after three months the total score of pain for children were absent, mild, moderate with 68%, 12%, 8 and 12% respectively. Effect of Yoga Program on Total Score of Pain Severity was found ($P < 0.001$). It was found that significant relation between test I and test II, test I and test III, test II and test III with $P= (<0.001, <0.001, 0.005)$ respectively.

Table (1): Percentage Distribution of Sickle Cell Children According to Biosocial Characteristics

Biosocial characteristics of children	(n= 50) No	%
Age in year		
- 6-8 year	30	60.0
- 9-11 year	13	26.0
- 12-15 year	4	8.0
-16-18 year	3	6.0
Mean±SD	12.1±4.02	
Sex		
-Male	31	62.0
-Female	19	38.0
Birth order		
- 1st	29	58.0
- 2nd	11	22.0
- 3rd	7	14.0
- 4^{th}	3	6.0
Residence		
- Urban	16	32.0
- Rural	34	68.0
Immunization		
- Yes	50	100.0
Immunization types		
- Obligatory immunization	48	96.0
- Bacterial immunization	1	2.0
- Meningitis	1	2.0
Hobbies		
-Yes	23	46.0
-No	27	54.0
Types of hobbies		
- Football	8	34.8
- Art	7	30.4
- Music	6	26.1
- Reading	2	8.7

Percentage Distribution of Sickle Cell Children According to Biosocial Characteristics (continued)

Children educational level	(n= 50) No	%
Educational levels		
-Primary education	34	68.0
-Preparatory education	10	20.0
- Secondary education	5	10.0
- Illiterate level	1	2.0
School failure		
-Yes	27	54.0
-No	23	46.0
Frequency of failure		
-Once	26	96.3
-Twice	1	3.7
School absent		
-Yes	48	96.0
-No	2	4.0

Table (2): Percentage Distribution of the studied Children According to Past Medical History

Medical history	(n= 50) No	%
Onset of illness from age		
- First year	46	92.0
- Second year	3	6.0
- Third year	1	2.0
Frequency of pain crisis during year		
-Twice	10	20.0
-Third	12	24.0
-Fourth	22	44.0
-More than fourth	6	12.0
Onset of fever		
-Before pain crisis	23	46.0
-During pain crisis	14	28.0
-After pain crisis	9	18.0
-Not found	4	8.0
Onset of respiratory distress		
-Before pain crisis	8	16.0
-During pain crisis	31	62.0
-After pain crisis	6	12.0
-Not found	5	10.0
Frequency of hospital admission \ year		
-Twice	12	24.0
-Third	11	22.0
-Fourth	22	44.0
-More than fourth	5	10.0

Table (3): Percentage Distribution of Effect of the Educational Program on Children and their Mother's Total Score of Knowledge about Sickle Cell Disease

Total score of Knowledge		Before program (I) (n=50)		Immediately after program (II) (n=50)		Three months after program (III) (n=50)		Chi-square	
		No	%	No	%	No	%	X^2	P- value
Good		0	0.0	50	100.0	50	100.0	100	<0.001*
Fair		7	14.0	0	0.0	0	0.0		
Poor		43	86.0	0	0.0	0	0.0		
Total		50	100.0	50	100.0	50	100.0		
Scheffe test	I&II	<0.001*							
	I&III	<0.001*							
	II&III	1.000							

Significant at level 0.05

Figure (4): the effect of Quran on total score of pain severity.

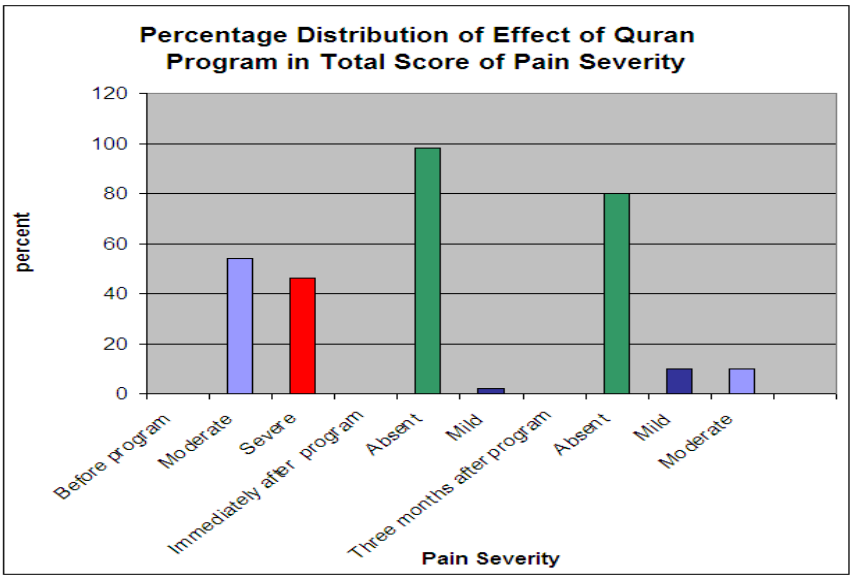


Figure (4): Effect of Relaxation Program on Total Score of Pain Severity.

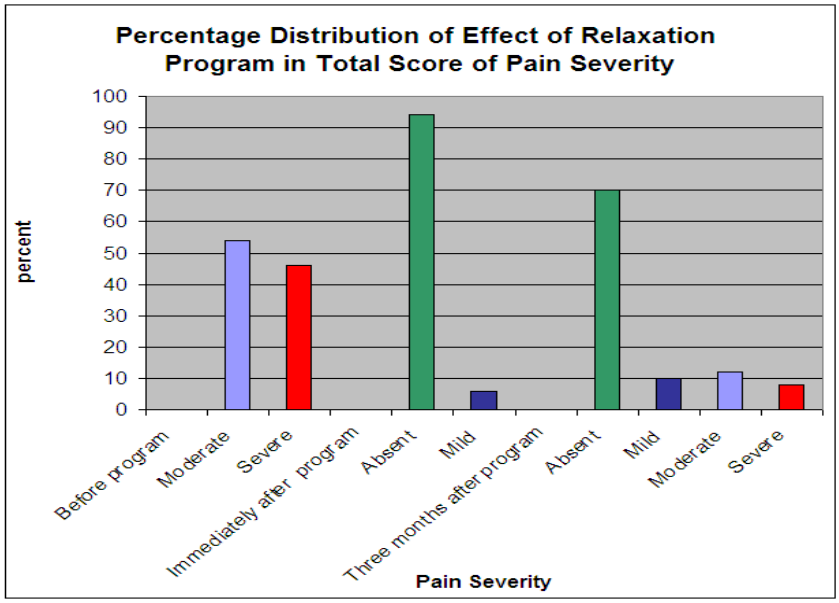
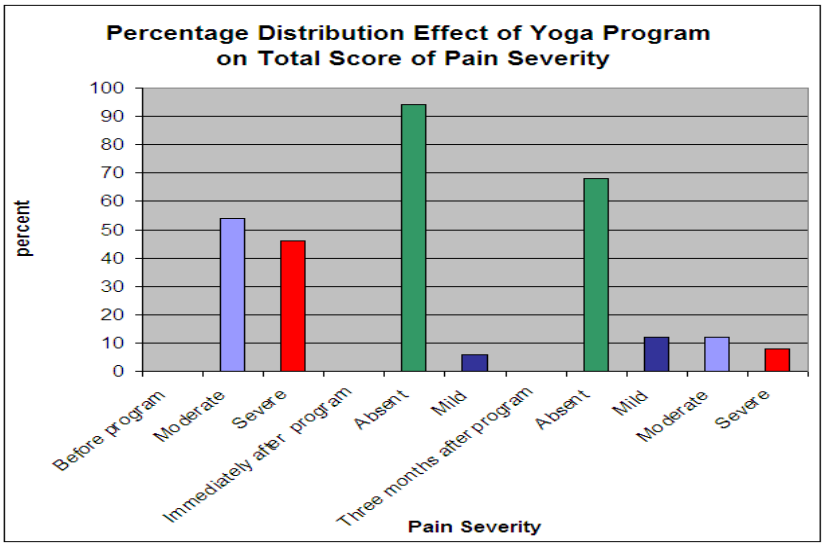


Figure (6): Effect of Yoga Program on Total Score of Pain Severity.



V. Discussion

Sickle cell disease refers to a group of genetic disorders in which children red blood cells undergo a change of shape known as sickling. This shape change disrupts the normal flow of the red blood cells through the blood vessels of the body, ultimately preventing tissues from receiving adequate oxygen [(18)].

As regards biosocial characteristics, the present study showed that, about two thirds the age of the studied children was between 6-8 years (Table1) this is agreement with Carson J, et.al (2003) they found that 64% of seven to twelve year-old children have SCD.[(19)] this result is in disagreement with Yaster M, et.al (2005) they found In one survey that 38% of children did not report a pain crisis during a seven-year evaluation period.[(20)]

Moreover, The male to female incidence in this study was 62% : 38%. This result is agreement with Girshab M (2005) who found that males more than females with sickle cell disease.[(21)] This result disagrees with Abbas A et.al(2009) they found that the male and female with sickle cell disease were equal in percent. [(22)]

Furthermore, the present study revealed that high percent (68%) live in rural areas (Table1). This result may reflect the lack of knowledge and health education. That common in rural and suburban area about the family health affairs including those concerned with marriage matters should be sensitized on this problem and be well informed about appropriate marriage related decisions. This is in agreement with Anie A (Estimated in 2005) who found that the children lives in urban areas 15.9 and 72% living in rural areas.[(23)] The result of

present study disagree with Haque, A et.al (2005) they found that 70% of the children lived in urban area while 30% lived in rural parts.[24]

Optimally, infants who have positive test for sickle cell disease must take preventive antibiotic medication (usually penicillin) and immunizations are starting at 3 to 4 months of age. The immunization of the children with sickle cell disease in the present study illustrated that the majority of the sample 96% take obligatory immunization and 2% take bacterial and meningitis immunization. Special immunization(bacterial and meningitis vaccination) are not taken by almost of the sample, this result may be due to the lack of health education to parents of children with sickle cell disease about the important of special immunization. This result is in agreement with Fleming A (2009) who found that the obligatory vaccines are the more immunizations take during the survey then pneumococcal vaccines at 2, 4, 6 and 12 months and meningococcal vaccine at 24 months, 5 years and then every 5 years other vaccines that might be recommended by the medical team, such as hepatitis B.[25]

The present study, revealed that more than half of the sample (Table 1) didn't participate any hobbies. This result may be due to children fear of Overexertion that can trigger a crisis This result is in agreement with Anie A (2005) who found that the exercise and play is important for all children, but sickle cell disease can limit a child's endurance level.[28] in the other hand this result is in disagreement with Huffman C (2006) who found a moderate exercise program 3 to 4 times a week is usually encouraged by sickle cell children. However, the best type and amount of physical exercise is different for each child. Most children learn to set their own limits, based on experience.[26]

In addition, the current study showed that more than half of the sample (Table 1) have school failure. This result may be explained by recent research by Schatz J et.al they have determined that Overt (obvious) stroke occurs in 5% to 8% of children with Hemoglobin SS sickle cell. Silent strokes may occur in as many as 20% to 30% of children with Hemoglobin SS type sickle cell. Silent stroke is a stroke that occurs with no apparent symptoms and results in some but less obvious damage to brain tissue.[27] Overt strokes are associated with a 10% to 15% decline in IQ scores. Children who have silent strokes may have no visible brain tissue injury and their IQ may not be affected, but they are more likely to have difficulties with verbal processing, memory, and auditory processing so the role of helping by parent and academic staff is very important. This explanation is in agreement with Richard, H et.al also showed that the Strokes can impact a child's likelihood of academic success. [28]

As regards post medical history of sickle cell children, the present study showed that the child onset of illness at 1 year in 92% (Table 2). Onset of sickle cell disease occurs at1 year as the infants motors ability increase and this causes lowering in oxygen level and aggravate sickling of the red blood cell. This result of the present study is in agreement with Creary M et.al (2007) they found that the first sign of sickle cell anemia in infants is hand-and-foot syndrome (Sickle dactilitis). Is usually begins between 6 months and 2 years of age.[29] the result is disagreement with Burch-Sims G et.al (2009) they found that the Signs and symptoms of sickle cell disease vary from child to child, but usually start at 4 to 6 months of age and continue through life. [30]

Moreover, the present study revealed that more than three quarters of the sample have frequency of pain crises three or more during year (Table 2). which mean that the children and caregivers have insufficient knowledge about factors that increase pain crises and how to prevent it. There for it may be useful for to know the certain factors that may be produce crisis. This result is in agreement with Omonzejele P (2008) who found that the frequency of sickle cell crisis can range from every few years to many times per year. [31] This is in disagreement with Platt O et.al (2009) they found that, only a few children experienced episodes of painful crisis during year, only 5% of children experienced three or more painful episodes a year.[32]

In the other hand, more than half of the sample suffering from respiratory distress during crisis and 28%of children suffering from fever during crisis also (Table 2). This result is in agreement with Vichinsky E (2004) who found that in children, the symptoms of a sickle cell crisis are severe pain, coughing, chest pain, difficulty breathing, fever, swelling and inflammation. [33] Also the results of the present study revealed that 44% of sickle cell children have already four frequency of hospital admission during year. Hospital admission in children with sickle cell disease resulting from pain and swelling which indicated blockage of blood vessels.

This interpretation was in line with Buchanan D et.al (2007).They found that the Pain and swelling indicate a blockage of the blood vessels. Sudden or chronic pain throughout the body is called a "sickle cell crisis" These symptoms can last for hours or for weeks. If caught early, patients can find some relief with over-the-counter pain relievers, but often require hospitalization and strong pain medication, such as morphine.[34]

Regarding, the effect of educational program on children and their mothers total score of knowledge about sickle cell, the finding of the current study showed that, there was a statistical significant difference between pre program, immediately and after three month (Table 3).This means that the caregiver remains the same for a long time , she/he acquired more knowledge concerning different aspects of care , but on the other hand, if the caregiver is out of reach , there will be probability for not finding any well prepared person available as substitution for the primary caregiver and his definitely effects the process of care providing. These findings

are in accordance with Vichinsky E et.al. They assured that there was a statistically significant differences between pre and post education mean scores in the children with sickle cell disease examination knowledge acquisition. (35)

Meanwhile, regarding effect of Quran, yoga and progressive relaxation program on pain severity, the present study showed that there was a statistical significant between the severity of pain and use the three program for relieving pain using adolescent pediatric pain tool (Table 4). Quran program is the most effective in reduction on the severity of pain marked immediately and after three month of application. This result is in agreement with Sadock S et.al (2008) they found that the aim in using Quran is to increases the tolerance for pain and decrease the sensitivity for pain. This method includes listening to Quran that getting the attention away from the pain and reduces its severity. (36)

In addition, the effect of Quran on total pain severity score, the present study revealed that Quran highly a significant positive impact on total score of pain severity (Table5). This may be due to the effective use of Quran as one of a non pharmacological pain reliever.

In the other hand, the present study showed that the progressive relaxation more highly using from the children to improve and relief pain. This result is agreement with Nahin R et.al (2009) They found that a comprehensive survey on the use of complementary health approaches by Americans, 12.7 percent of the sample used deep-breathing exercises, 2.9 percent used progressive relaxation, and 2.2 percent used guided imagery for health purposes. Most of the sample reported using a book to learn the techniques rather than seeing a practitioner. (37)

The present study also agree with Frost H et.al (2008) they found that the significant improvements by yoga subjects were maintained at the 3-month follow-up, indicating that the yoga intervention is associated with longer lasting reductions in disability and pain outcomes. (38) But this result disagreement with Cox S study in (2010) who reported that measured pain-related outcomes. They did find greater improvements in pain self-efficacy for the yoga group at 6 month follow-up (39), also the present study is disagreement with Huffman H et.al 2007 they found that a "fair" level of evidence was found for yoga is moderate effects. (40)

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