Original Article

Effectiveness of Comfort Theory Model Based on Holistic Care for Hospitalized Children with Sickle Cell Disease Crises

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ABSTRACT

Background: Children's experience of hospital when suffering acute sickle cell crises can be improved by a comfort approach to nursing care.

Aim and Design: The true experimental design approach was used to investigate the efficiency of comfort theory in improving the comfort level model for children with SCD crises.

Sample and setting: A convenience sample was taken from children admitted at pediatric inpatient department of Benha University Hospital and Specialized Children Hospital, Benha city, Egypt during sickle cell crises.

Data collection tool: Data collection was undertaken in a number of ways, including a demographic information form, patient Comfort Behaviors Checklist, Comfort Daisies Scale, and General Comfort Questionnaire, both pre- and post-theory intervention, based on the nursing process.

Results: When compared to a control group, significant differences were observed in children with SCD crises post-comfort theory application. There was also a positive correlation between the children's state of comfort and post-comfort theory intervention. An association was also noted between children in secondary education and at a higher economic level in comfort state at second observation, which was deemed to be the best comfort achievement.

Conclusion and recommendations: Nursing care modelled on comfort theory can significantly improve children's experience of hospitalization during sickle cell crises. The nursing of children should be holistic, and evaluate their physical, emotional, and psychological needs when addressing their level of comfort.

Keywords: *comfort theory, pediatric, sickle cell disease crises.*

INTRODUCTION

Sickle cell disease is an inherited blood cell disorder affecting many people worldwide. There are approximately 300 million carriers of sickle cell trait worldwide, and SCD is most commonly found among people from Africa **(Custódio, et al., 2017)**. Studies of Egyptian SCD carrier rates indicate a prevalence of between 9 and 22%, but the distribution is not uniform **(Hasan et al., 2021).** One study on primary school children in Egypt conducted by **Moez and Younan (2016)** using HB electrophoresis and blood counts, found 22% of children had abnormal Hb profiles and 19% had Hb S, the hemoglobin disorder responsible for SCD. Of the children with HB S, 94% had the sickle cell trait and 6% had SCD.

SCD has high morbidity and can be fatal in young children. It has been determined that 98.5% of children suffer from crisis

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characterized by pain, weakness, and exhaustion, and that they often need to be hospitalized between one and five times per year **(Elobied, & Abdelmotaleb, (2021)**.

Hospitalization is one of the most stressful experiences for children with sickle cell disease. A child may often require frequent or long-term admissions and this can be a traumatic experience. Diagnosing SCD is extremely painful, and together with the separation from family members and fear of death or disability, children in hospital with acute SCD crises undergo a very traumatic experience **(Sepahvand, et al., 2021).** It is important for nursing practices to effectively comfort these children. This can be achieved by adopting the comfort model proposed by Kolcaba (1994). This approach (Theory of Comfort) is comprehensive and effective in alleviating discomfort in children, which is a vital component of inpatient care. Proper management of pain can reduce physiological complications in children, improve their psychological state, and ultimately reduce the cost of treatment **(Mansky, (2020).**

In her theory of nursing, Kolcaba (1994) describes the provision of comfort as the primary goal of nursing care. This requires comprehensive assessment of children's needs for comfort and the application of effective interventions. This approach employs a scale for measuring children's comfort, the Comfort Daisies Scale, and is based on observations. A hierarchical structure is used to categorize comfort and includes all dimensions of the comfort construct – socio-cultural, psychological/spiritual, physical, environmental **(Kolcaba, 2021)**.

Kolcaba (1994) describes comfort as an individual's feeling of being strengthened by having their needs addressed on all four levels. Relief involves reducing pain and discomfort, while easing pain involves removing particular discomforts **(Lima, et al., 2017).** The experience of 'ease' does not require that pain or discomfort has been experienced by the child or family members beforehand, although it is possible for nurses to be aware of specific susceptibilities in those children (e.g. SCD crises). Some pain cannot be removed entirely and must be endured. Transcendence refers to the state in which a person bears the pain, but manages to cope by facing it from a higher psychospiritual perspective. In this way a child may understand that walking will hurt, but nonetheless feels reassured that they will be able to do it. Transcendence, therefore, is a state in which the child feels strengthened, rather than one where the pain has been removed. To foster transcendence in children it is important for nurses and relatives to remain positive, and for interventions to be used that improve the environment (including the social environment) and reassure the child. The comfort model is holistic and includes three types of intervention: (a) maintaining equilibrium using standard pain relief. (b) training on anxiety control techniques, listening and reassuring the patient, remaining hopeful, developing a recovery plan. (c) acts of kindness and treats/ distractions for the patient, such as massage and guided imagery, that reinforce feelings of being cared for, alleviate fear, and strengthen the child and family **(DiMarco & Kolcaba, 2005).**

Nursing research has shown that comfort techniques based on empirical evidence can be effective for reducing pain and discomfort during treatments. Accurate evaluation of comfort levels when providing support for children with SCD crisis is essential when assessing specific interventions **("Holistic Comfort," 2017).** Comfort theory can be used to improve pediatric nursing by emphasizing a holistic approach that incorporates the four elements of comfort theory. The evidence suggests that techniques such as comfort holding, meditation, breathing exercises, focusing attention away from symptoms, sensory stimulation, topical anesthesia, cooling aerosols, raising, or changing position, sugar water, and cold/heat treatments can help reduce discomfort and pain and increase feelings of safety and being cared for or protected **(Canbulat, etal., 2015) & (Stevens & Marvicsin, 2016).**

Significance of the study

Nearly a third of a million people worldwide are born with SCD each year. It is a genetic autosomal recessive blood disorder caused by abnormal hemoglobin (HB S) and is more common in Afro-Caribbeans (~1.1% of children in Africa are born with the condition). Children with SCD are admitted to hospital with crisis episodes and pediatric nurses consider their patients' comfort continuously during hospitalization. By taking account of the four dimensions of comfort theory, nurses can help to reduce the symptoms of pain and discomfort in children with SCD **(Lin et al., 2023).** This study evaluates the effectiveness of comfort theory in the management of pain in hospitalized children suffering acute sickle cell crisis.

Aim of the study

To testing the efficiency of comfort theory in the improvement of the comfort levels of hospitalized children with SCD crises, via comparisons between an experimental group and a control group.

Hypothesis

That the instigation of comfort theory will identify the differences between measures of comfort levels in hospitalized children with SCD crises and those in the experimental group.

METHODOLOGY

Technical design

Study design: True-experimental designs were conducted over a period of six months.

Setting: The research conduct in Pediatric inpatient department, Benha University Hospital and Specialized Children Hospital, Benha city, Egypt.

Sample size and criteria: The convenience sample included 62 children (42 boys and 20 girls), aged between 6 to 18 years, with SCD. Children were assigned at random to the comfort theory or control theory group (children chose a white or black ball). Epi Info 7 was used to estimate the required sample size to have the probability of a type 1 error and type 2 error of .01 and .05 respectively. These figures were based on finding an effect that was at least 5 units on the comfort scale assuming an SD of 9. This resulted in 62 children being assigned to the experimental and control groups (N (total) = 124).

$$N = \frac{(s_1^2 + s_2^2)(Z_{1-\frac{\alpha}{2}} + Z_{1-\beta})^2}{(\mu_1 - \mu_2)^2}$$

Inclusion criteria

- Children with SCD crises, both genders.
- All participants were informed about the study and gave their consent

- First day of child's admission to hospital
- Mother as Primary caregiver

Exclusion criteria

- Children with other systematic diseases
- Children with a mental disability.

Description of tool and measurement:

Tool 1: Structured Interviewing Intervention:

Part A: The principal sociodemographic data relating to the educational and economic level of the children.

Part B: "Comfort behavior checklist (Kolcaba, 2021): was used to assess the children. This consists in 30 observations/questions on 5 aspects/signs of comfort: motoric, performance-related, vocalizations, facial expressions, and uncategorized behaviors.

Tool 2: "The comfort measurement scale (Dimarco and Kolcaba, 2005): This categorizes the child's comfort by the completion of the Comfort Daisies Scale" (Figure 2).

Tool 3: "The modified Shortened General Comfort Questionnaire (SGCQ) (Kolcaba, 2003) Application of pre- and post-comfort theory to create comfort care interventions was delivered through the nursing process. The effectiveness of using this approach will be examined".

Outcome measure

"Comfort behavior checklist: A 5-point Likert scale was used to rate the level of discomfort based on observations and ranged from 0 to 4 (none, some, moderate, and strong). A score of 0 could be given if the child was too young or ill to respond or was asleep. Checklist scores ranged from 0 to 120. The experimental group that received the application of comfort theory were observed pre intervention at O1, and post intervention three were observed at O2 immediately, at and O3 and O4 two hours thereafter. The mean score and significance of each observation was compared to control group.

"The comfort measurement scale: This measurement enabled a child to better express his/her feelings as 'this is the way I feel right now', with a possible total score of 16. These were categorized as Very Good - 4 score (100%), Sort of Good – 3 score (75%), Sort of Bad 2 score (50%), Very Bad ≤1 score. The pre- and post-mean score and significance of the results were compared between the two groups".

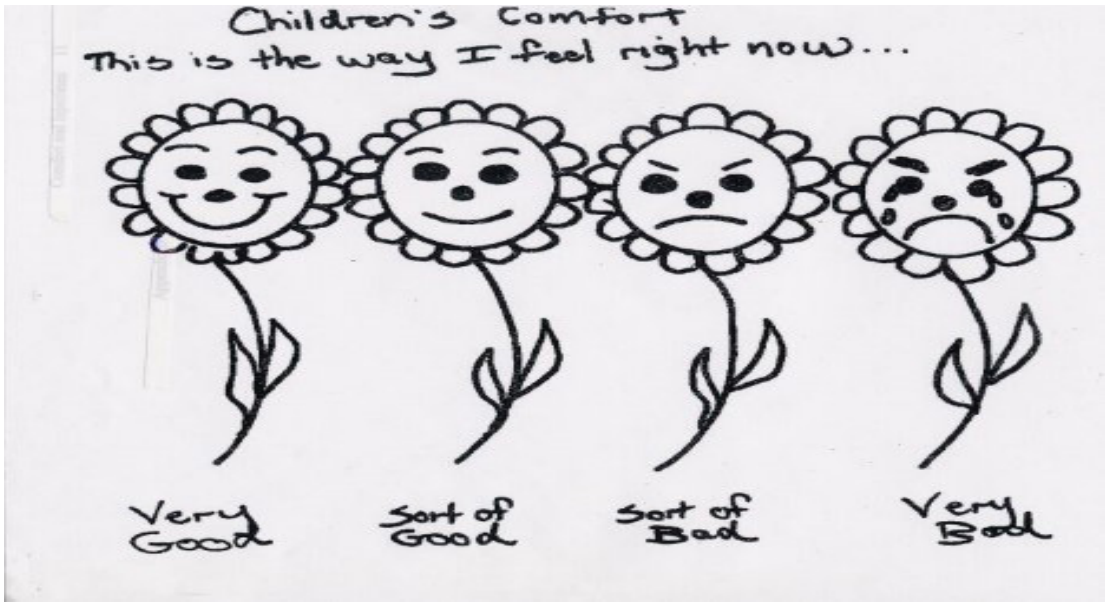

Fig. 2: Comfort measurement scale, Kolcaba's theory of comfort

"The modified Shortened General Comfort Questionnaire (SGCQ): This questionnaire contained 28 items, with a possible total score of 112. The scores were categorized as comfortable state from 90-112 (80%-100%), mid-discomfort from 89-74 (66%-79%), moderate discomfort from 54-73 (50%-65%), and severe discomfort <54 (<50%)".

Validity and reliability

Pediatric nursing experts were used to validate construct content. Interrater reliability was used to validate the Comfort Behavior Checklist (r = .85) and test-retest reliability was carried out for the Comfort Daisies Scale (Cronbach's α = .90). The SGCQ instrument was judged to be reliable, with scores in the range 0.7–0.95.

Operational Design

Ethical aspect

The mother's informed consent was obtained for all children included on the study. Detailed explanation of the purpose of the study was provided, and the potential benefits that could arise for the children who were participating. Participants were told that their data would be used anonymously and that confidentiality would be kept all times. All participants had the right to withdraw and have their data destroyed at any time, and were informed that the study would have no harmful effects.

Pilot study

A pilot study on 5% of participants was conducted to assess the reliability, validity, and clarity of the measuring instruments. Based on the pilot study results, the necessary adjustments were made in the study tools and excluded from the final results of the study.

Fieldwork and administrative design:

The study obtained the consent of the hospitals used and the appropriate authorities. Data collection took place from 04/2021 – 09/2021. The children and mothers had the purpose and procedure of the study fully explained to them. Demographic data was recorded for both experimental and control groups. Before employing the intervention, the Comfort Behavioral Observation Checklist observation (O1), Comfort Daisies Scale and general comfort questions were used to measure comfort levels in both groups. After this evaluation the comfort care interventions were given by the nurses through application of the specified procedures. The four dimensions of comfort care (social, physical, psychological, spiritual, and environmental) are displayed in Table 1. The same measurements were taken after the interventions to evaluate post-experimental comfort levels. These was analyzed and disseminated using three categories of observation, with observation (O2) being carried out immediately, and the subsequent observations (O3, O4) being undertaken at two-hourly hours intervals thereafter for the experimental group only. For the control group, measurement of comfort levels was conducted following routine care.

Statistical design

SPSS 22 was used to analyze the data with descriptive statistics (frequencies, means, SDs) and t-tests. The chi-square test compared two categorical variables. The strength and direction of associations between the variables were assessed with Pearson correlations. An 5% alpha level was used for all tests.

RESULTS

Figure 1 illustrates that the highest number of children with sickle cell disease were at the primary education stage and in a high economic level in each group (experimental and control).

Comfort levels of the SCD crisis children improved after the comfort theory intervention, with higher mean scores on the Comfort Behavior Checklist and Comfort Daisies Scale - as shown in Table 2. The difference between comfort levels before and after the intervention was significant (p < .01). The control group receiving standard care also had significantly improved scores at the end of study period.

Table 1: Comfort care interventions were delivered by using nursing process approach (comfort theory application for children with SCD crises).

Types of comfort	Assess comfort need	Goal	Planning	Implementation	Evaluation
"Relief Nursing interventions Standard base with concerning comfort need encountered"	"Observational check list to assess comfort, comfort level score, comfort daises expression feeling - "Taxonomy structure of comfort grid". **"Physical"** **"**Determine Factors of crisis". "Pain levels intensity scale, quality, frequency, and aggravate or alleviate the pain factor". "Incidence of infection assessed" "Dehydration signs assessed" "Symptom of distress" Psycho spiritual - Anxiety - fear "Sociological "Relief from anxiety	"The children will feel comfort in the relief sense as verification by observation and expression" "Relief of pain". "Decline incidence of crisis". "Enhance sense of self-esteem and power". "Free from complications" "Maintain the child hydrated and oxygenated". sense as verification by observation and expression" "Relief of pain". "Decline incidence of crisis". "Enhance sense of self-esteem and power". "Free from complications" "Maintain the child hydrated and oxygenated	"Standard Nursing care "Document vitals". - "Intake and output chart-maintained balance". "Delivery of comfort bed and positioning" "Provision drug and fluid as tolerated" "Usage of comfortable device" "Soothing child". "Reduction needless noise" "Cognitive and behavioral intervention" "Prevent and manage the crisis" "Preventing and managing infection" "Description to child pre implement intervention" -Consoling child and given developmentally proper knowledge to relieve stressor. "Backup and Consoling	"Standard Nursing care "Document vitals". - "Intake and output chart-maintained balance". "Delivery of comfort bed and positioning" "Provision drug and fluid as tolerated" "Usage of comfortable device" "Soothing child". "Reduction needless noise" "Cognitive and behavioral intervention" "Prevent and manage the crisis" "Preventing and managing infection" "Description to child pre implement intervention" -Consoling child and given developmentally proper knowledge to relieve stressor.	"Relief in the sense of pain, stress and environment disturbance as represent by children expression, and high comfort level".

Types of comfort	Assess comfort need	Goal	Planning	Implementation	Evaluation
	Environmental" - "Relief from environmental stressors"	"The children will feel comfort in the relief sense as verification by observation and expression" "Relief of pain". " D e c l i n e incidence of crisis". "Enhance sense of self-esteem and power". "Free from complications" " M a i n t a i n the child hydrated and oxygenated".	Eliminate environ-mental stressors "	"Child consoled post crying or anger episode". "Intravenous (IV) fluid and oral administered" "Heating pads on back and extremities". "Oxygen for tissue perfusion" "Pediatric hygiene". "Appropriate developmentally knowledge delivered in order to lessen stress and anxiety" "Surrounded noise decreased" - "Remove unnecessary lights disturbing children via curtain " "Crises prevention as well hydrated, no smoke, avoid extremes in temperature, avoid stress, do not miss doses of medications as antibiotics, get sufficient sleep" "Warmer for constant environment temperature" "Breathing exercises, blowing bubbles". "Positive coping behavior model" "implement trusty aseptic technique to avoid nosocomial infections". "Positive strengthening. "Rewarded children's positive speeches, gifts, pre and post painful procedure (as stickers, toys, games, small trophies).	**Evaluation** "Relief in the sense of pain, stress and environment disturbance as represent by children expression, and high comfort level".

Types of comfort	Assess comfort need	Goal	Planning	Implementation	Evaluation
"Ease Emotional oriented comfort care interventions"	"Physical "Ease about pain" "Ease distressing symptoms"	"Ease Goal – The children will experience state of satisfaction (pleasure) by comfort care interventions as verified by pediatric observation and expression".	"Emotional oriented comfort care interventions" "Support coping skills for providing sense of security, hold children hand" "Pay attention children concern, providing development appropriate data to eradicate fear and anxiety" "Emotional sustenance via positive talk". "Destructed attention to painful procedure	"Oriented comfort care emotional interventions used to ease the children" "Mothers children bonding to limit separation" "Holding children hand for enhance security sense" "Dialogue with simple development language to ease fear and anxiety" "Positive conversation about children concern" "Remove unnecessary objects and instruments, which create fear, from children nearness". "Quite environment and prevent unnecessary disturbances". "Limited visitor to comfort children via mother involvement". "According children interest reading story" "Relaxation techniques, breathing exercises, and distraction to ease pain". "Mother involvement to enhance a therapeutic association based on communal trust". "Emphasis on children's strengths rather than deficits to improve active coping skills".	"Children contended or eased as evidence by pediatric expression and vocalization, comfortable talk, absence fear, compact worried behavior"
	"Psycho spiritual Ease about fear and anxiety"		"Listening carefully about children concern and fear". "Psychological support and preparation before any procedure". "Confiscating unnecessary fear creating objects".		
	"Environmental Ease on Stress in the environment as. Noise, light"		"Minimize crying of other children by indulging them with other play activity " "Prevent disturbance as visitors" "Planned intervention not frequent to enhance resting time with comfort sleep"		

Types of comfort	Assess comfort need	Goal	Planning	Implementation	Evaluation
	"**Sociological** -Ease on anxiety due to separation"		"Prevent disturbance as visitors" "Planned intervention not frequent to enhance resting time with comfort sleep" "Eliminate noise surrounding the children to ease".	"Involvement children for caring decisions to rise feelings of control".	
			"Bed time sleep telling stories as interested "		

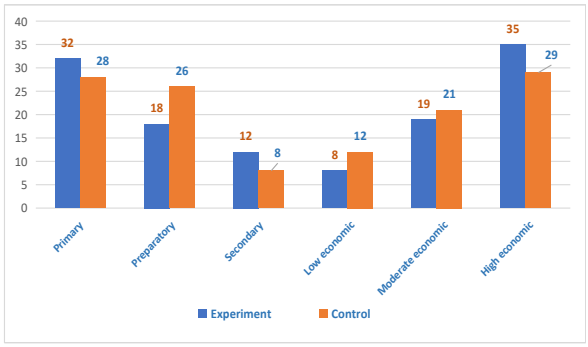

Fig. 1: Frequency distribution of children with sickle cell disease, educational stage and economic level for experiment and control group N= (124)

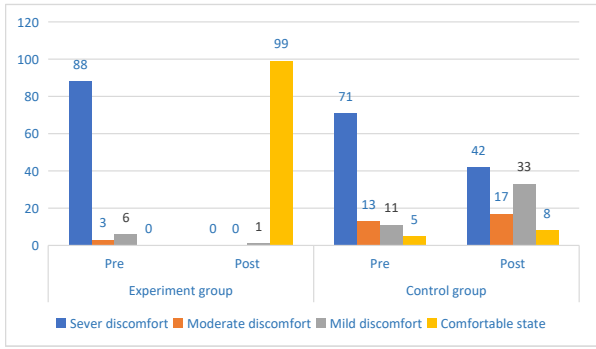

Fig. 2: Total percentage distribution of comfort level in children with sickle cell disease crisis pre-and post-application of comfort theory for the experimental group, and pre- and post-routine care for the control group N=124

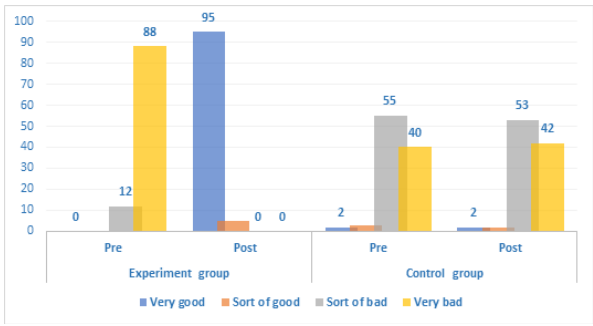

Figure 3: Total percentage distribution of Comfort Daisies Scale results for children with sickle cell disease crisis pre- and post-application of comfort theory for the experimental group, and pre- and post-routine care for the control group N=124

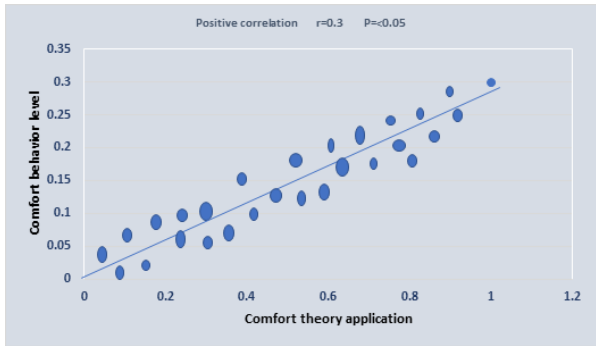

Fig. 4: Correlation between post comfort theory application and comfort behavioral level of children with sickle cell disease crisis (experiment group) N=62

Table 2: Mean and standard deviation of comfort evaluation for children with sickle cell disease crisis pre-and post-application of comfort theory for the experimental group, and pre-and post-routine care for the control group N= (124)

Comfort evaluation	Observation score	Pre	Post			T test	P-Value
		Observe 1	Observe 2	Observe 3	Observe 4		
		Mean ±SD	Mean ±SD	Mean ±SD	Mean ±SD		
Experiment group (62)							
Comfort behavior checklist	Score Max -120	21±3.1	58±2.1	55±2.5	52±2.3	8.21	<0.001
Comfort Daisies (Right now I feel)	Score= (Max-16)	4±2.02	7.8±1.23	7.5±1.21	7.4±1.22	3.01	<0.001
General comfort question	Score= (Max-112)	28±3.01	52±1.33	50±1.34	49±1.35	4.43	<0.001
Control group (62)							
Comfort behavior checklist	Score Max -120	28±3.06	34±3.04	30±3.01	32±3.02	10.31	>0.05
Comfort Daisies (Right now I feel)	Score= (Max-16)	4±2.02	4.8±2.03	4.9±2.06	4.7±2.32	5.02	>0.09
General comfort question	Score= (Max-112)	28±3.55	32±3.41	30±3.44	29±3.45	6.92	>0.08

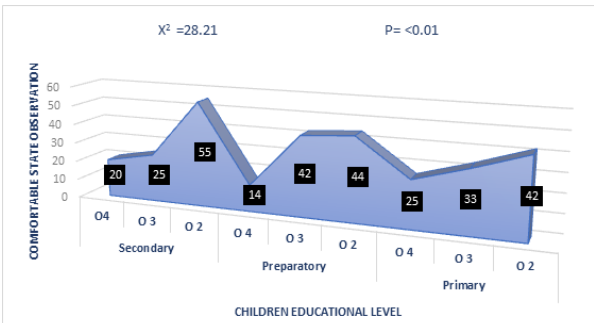

Fig. 5: The association between comfortable state observation of children with SCD crises and their education phase post-application comfort theory (experimental grCoup) N=62

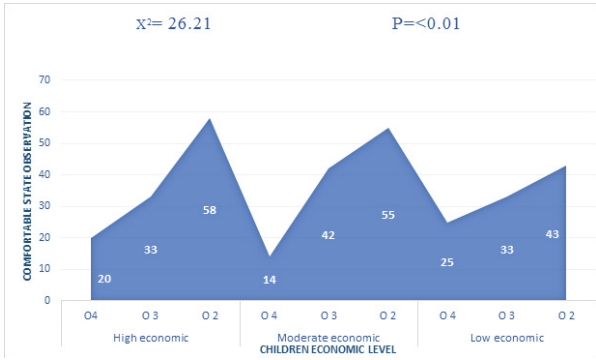

Fig. 6: The association between comfortable state observation of children with sickle cell disease crisis and their economic level post-application comfort theory (experimental group) N=62

Figure 2 reveals the effectiveness of comfort theory on improvement of the comfort levels of the experimental group, where the highest percentage of comfortable state was 99%, compared to 8% for the control group.

Figure 3 indicates that the Comfort Daisies Scale result obtained from the experimental group was 'Feel very Good' at 95% post-comfort theory application, compared to 'Very Good' at 2% in the control group who received routine care.

Figure 4 clarifies that there were statistically significant differences and positive correlations between post-comfort theory application and the comfortable behavior levels of children with sickle cell disease crises.

Children in secondary education and experiencing SCD crisis showed improved comfort levels after the comfort theory intervention (p <.01), the effect is shown in Figure 5.

Figure 6 shows a was statistically significant difference P<0.01 between children at a high economic level and comfortable state

observation two post application comfort theory for children with sickle cell disease crises.

DISCUSSION

The comfort of children with sickle cell disease has both a practical and psychological aspect where these children were admitted to hospital with a crisis episode. The purpose of this study was to evaluate the effectiveness of the comfort theory model to pediatric care in children undergoing SCD crisis. It indicated that this model should be adopted to achieve a comprehensive and holistic standard of care. Post-research done the hypothesis was achieved and the children become comfortable and able to rise above their problem.

The current study illustrates that a high number of the children with sickle cell disease crisis were at the primary education stage and in a high economic level. The participants were unequal boys and girls aged from 6 to 18 years. Usman et al. (2019) found that most SCD children in Nigeria were aged 5 years, and that the disease affected approximately equal numbers of males and females, which is consistent with the results of the current study, where equal numbers of each gender were also found to be affected by SCD. In addition, 36.7% of children undergoing acute SCD crisis were educated to secondary level and 5.5% came from moderate income families.

The present study indicated that there was improvement with the mean post-comfort theory application, as shown in the Comfort Behavior Checklist and the Comfort Daisies Scale, compared to the mean pre-application of comfort theory for children with sickle cell disease crises. There was also a significant improvement in comfort evaluations after the intervention (p <.01) whereas the difference between pre- and post-intervention scores was not significant in the control group. The results are consistent with a study carried out in Iran by Khaleghi et al. (2023), where significant differences in scores on pain, distress, and heart/breathing rates were observed after comfort theory intervention. The current study indicates that nursing using a comfort theory approach can comprehensively comfort children, reducing their pain and discomfort and address their needs at all levels. It can therefore be recommended as an approach for pediatric care in this group of patients. Similar results were obtained by Salehi (2023), also in Iran, who found that the comfort theory approach to the care of children undergoing endoscopy reduced their anxiety. This suggests that comfort theory models should be adopted in the care of children needing invasive surgery. Anxiety scores after intervention were 24.11 and after routine care were 49.88 (SD = 1.98) and this difference was significant (p = .009).

The present study reveals the effectiveness of comfort theory on improvements in comfort levels for the experimental group, where the highest percentage of comfortable state was 99% compared, to 8% for the control group. These results are similar to a study from the Patiala District by Sharma and Kalia (2021), where post-operative discomfort scores were observed to be lower in the group receiving comfort theory care than those in the group receiving standard care (p < .001). These results, together with the current study, imply that nursing care that follows a comfort theory guided approach can help reduce discomfort and promote feelings of ease in children undergoing treatments in hospital.

The current study reveals that the Comfort Daisies Scale score for the experimental group was 'Feel very Good' at 95% post-comfort theory application, compared to 'Very Good' at 2% for the control group who received routine care. These results match those of a study by Chandra and Raman (2016) who applied comfort theory in India. These researchers found that soon after children received integrative comfort care they reported feeling 'very good' on the Comfort Daisies Scale. Observations made later found the child to be experiencing moderate discomfort ('sort of good' on the Daisies Comfort Scale) compared to the first observation (O1) made before the intervention.

This study found there to be a significantly greater improvement in comfort in SCD children receiving intervention based on comfort theory than in those receiving routine care. There was also a significant positive correlation between the comfort theory intervention and behavioural measures of children's comfort levels. The findings agree with those of Wihak et al. (2020) who successfully modified the Comfort Ability Program (CAP) so it could be used through video as an intervention for adolescents affected by sickle cell disease pain (SCP). This effect was also observed in a case study by Sepahvand et al. (2021) of a teenage girl in Iran who showed improvements in her comfort level after receiving comfort theory-based interventions. The current author considers comfort to be an inherently positive outcome that promotes healthy behaviours in both children and family members. Comfort is also necessary for death to be peaceful and dignified. Both the child and carer benefit from administering comfort. It is an altruistic action that is also of practical use and rewarding for nurses and healthcare workers. Understanding and evaluating the relationships between comfort, healthy behaviours, and clinical outcomes provides an evidence base for effective and well-structured nursing care and is essential to guide good practice. This body of research, and the experimental evidence presented here, shows that Kolcaba's (1994) theory of comfort is an effective model for managing the pain and discomfort of children.

The children with SCD in this study were mostly in secondary education and came from families with moderate or moderate to high income levels. The children receiving comfort theory interventions showed significantly higher comfort scores after the study period than the children receiving routine care ($p < .01$). The results are also consistent with those of Sil et al. (2021), where children receiving pain management that incorporated both psychological and behavioural techniques (using the CAP for sickle cell disease pain), showed significant increases in comfort. These children were also mostly in secondary education and came from families with moderate income levels. The researcher suggests there is a significant relationship between a high response to comfortable strategies and younger age children. due to their experience and adaptation to sickle cell disease crises.

This author claims that approaches to pediatric care that use the comfort theory as a model, benefits both children and their carers – including their families and the nursing staff. It strengthens their ability to cope with pain and eases their distress – an outcome which is universally acknowledged to be good. Comfort is not only the relief of pain, but also a multi-dimensional aspect of an individual's wellbeing that includes social and cultural components, as well as physical and psychological components. Evaluating comfort should be carried out by including these holistic elements in any measurements, to enable effective procedures to be designed implemented. Kolcaba's theory of comfort can help to improve the pain management of children as it incorporates the social, cultural, and spiritual aspects of comfort, as well as the purely physical and immediate psychological aspects. This model of comfort is also simple to implement and easy to comprehend, and would enhance pediatric nursing in most contexts, especially in long-term care or treatment.

CONCLUSION

This study demonstrated that Kolcaba's theory of comfort is a valuable and effective holistic approach to managing pain in children with SCD crisis during hospitalisation. It enables the needs of children and carers to be addressed at all levels and thereby improves the wellbeing of both. Interventions based on the comfort theory were delivered to children with SCD crisis by nursing staff in a clinical setting. Kolcaba's theory enhances pediatric care by including sociocultural, spiritual, and environmental aspects of comfort, in addition to the physical and psychological aspects that

standard care can be restricted to. Statistical analysis showed the comfort theory approach resulted in significantly better comfort outcomes than standard care. This model can therefore be considered an effective and holistic approach to children's need for comfort during an SCD crisis.

Recommendations

Comfort theory provides an effective approach to managing pain in chronically ill patients. It reduces pain and stress and should be considered by practitioners when designing care plans for children.

The benefits of the comfort theory approach come from its holistic approach to understanding the needs of those suffering pain and discomfort. It would also be of great benefit in the care of children with other painful and chronic diseases.

The study also showed that comfort theory helps formulate plans to alleviate pain and stress in children before treatment commences in hospital.

Comfort theory should be evaluated by further studies that include it as strategy for pediatric care.

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