Effect of Foot Reflexology on Fatigue, Pain and Insomnia among Children undergoing Chemotherapy

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Abstract

Background: Children receiving chemotherapy experience discomfort, exhaustion, and disturbed sleep patterns. Thus, it is imperative to employ foot reflexology, which seems to be efficient, inexpensive, flexible, and easy to apply. **Aim:** This study aimed to evaluate the effect of foot reflexology on fatigue, pain, and insomnia among children undergoing chemotherapy ***Method:*** A quasi-experimental (pretest/posttest) research design was used. ***Setting:*** The study will be conducted at Minia Oncology Centre. ***Sample:*** (80 children) were randomly assigned to either study or control groups at the Minia Oncology Centre over the period of 6 months period. ***Tools:*** Three tools were used to collect data including: tool (I): include two parts, Part (I) demographics data**,** Part (II) Fatigue assessment scale, tool (II): OUCHER pain measurement tool, and tool (III) Insomnia Severity Index. ***Results:*** According to the results of the current study, most of the children in the study group had sub-threshold insomnia with (p = 0.002), a little pain with (p = 0.003), and mild fatigue with (p = 0.001). Furthermore, there were very significant statistical differences between the study group and control group in terms of pain, fatigue, and sleep quality (P= <0.0001). ***Conclusion:*** Compared to the control group following the intervention, it was shown that foot reflexology was beneficial in lowering levels of discomfort, exhaustion, and improving sleep among children receiving chemotherapy in the study group. ***Recommendations:*** Nurses and other health organizations should use foot reflexology as a low-cost intervention to lessen pain, exhaustion, and enhance sleep quality.

Keywords: Children, Chemotherapy, Foot reflexology, Fatigue, Insomnia, Pain

Introduction

The most prevalent cancer in children is leukemia, which is also one of the most significant cancer forms in terms of public health concerns. Chronic lymphocytic leukemia (CLL)) and acute lymphoblastic leukemia (ALL) are typical forms of leukemia **(Kantarjian, et al., 2021)**.

In 2020, the most recent report on the worldwide burden of illness research found that the incidence of ALL and CLL in children worldwide was 17.6% and 12.4%, respectively. Furthermore, data indicates that leukemia is more common in Asia (Dong, et al., 2020). Iran has more than 474,519 leukemia patients, according to the most recent statistics of GLOBOCAN **(Globocan, 2021).**

Leukemia is the most frequent disease in children in Egypt, accounting for over thirty three of newly diagnosed cases of children cancer. The National Cancer Institute (NCI), Cairo University, Egypt reports a yearly occurrence about four cases per 100,000 youngsters. **(MOHAMMED, et al., 2018)**

Cytotoxic medications are used in chemotherapy to treat and alleviate symptoms. Chemotherapy can be given orally, intravenously, via catheter, or by injecting cerebrospinal fluid intracheally (IT). Patients experience anxiety upon beginning chemotherapy due to physical and psychological side effects, and they may even oppose or reject anti-cancer treatment regimens. Furthermore, it results in high expenses for patients, lengthens hospital stays, and lowers patient performance and quality of life. The most frequent and irritating symptom that leukemia patients encounter is pain. Children who have uncontrolled pain eventually experience problems with their immunological, gastrointestinal, respiratory, and cardiovascular systems one of the most difficult parts of cancer patient care is pain

management **(Estey, 2021) & (Macmillan Cancer Support, 2021).**

Chemotherapy has several negative effects and is a lengthy treatment. nausea, mucositis, vomiting, rash, dark skin, gastrointestinal disturbance, alopecia, fatigue, nail changes, pain, pericarditis, inflammation in heart muscles, left ventricular alterations, decrease in in the blood pressure, pneumonitis, electrolyte imbalances, leukoencephalopathy, as well as acute pancreatitis are some of the acute side effects following chemotherapy (**Worldwide organization, 2019).**

One of the more prevalent as well as crippling adverse impact of cancer diagnosis as well as fatigue management clinical signs of tiredness involve overall fragility, bad mental focus, sleep disturbances, as well as disturbances emotionally. These symptoms notably lower the general life quality for cancer patients both during as well as post the treatment. The exact reason of the cancer-fatigue association is unidentified, although problems in the body's physiology, biochemistry, and psychology seem to be involved. Because of their difficulty, a number of approaches to treat cancer-regard tiredness have been studied **(Armstrong, et al., 2018).**

Within the realm of alternative therapeutics, foot reflexology is among the most often used massage techniques. Although it may seem a bit awkward at first, the approach that helps with pain alleviation is typically rather soothing. Foot reflexology stimulates cutaneous mechanoreceptors, which in turn activates large primary afferents. GABA and endorphins are produced by them, and they inhibit neurotransmitters released by primary nociceptive neurons result in depressed responses in the receptive part of the pain pathway. Tactile stimulation from foot reflexology passes through large diameter fibers. Faster data transmission is another benefit of these fibers. The benefits of foot reflexology therapy include increased circulation, which releases stress and soreness from the muscles and promotes a more calm, energetic, and overall healthier state of being (**Locatelli, et al., 2021)**.

Among these, foot reflexology therapy has a lengthy history in various global civilizations. Different forms of foot reflexology therapy are used today for a range of health benefits. The natural practice of foot reflexology involves lightly touching all over the body to provide comfort on a physical and psychological level, as well as general relaxation and a reduction in pain perception. It also helps to reduce fatigue by influencing the nervous, cardiovascular, and locomotor systems **(Elsabely, et al., 2021)**

In order to guarantee the technique's success, nurses are essential in playing an effective role in counseling, teaching, and advise, additionally, you are crucial in helping patients decrease their discomfort and enhance their quality of sleep. Pharmacological treatment, information, distraction, attention-focusing techniques, and calming therapies such as foot reflexology for children receiving chemotherapy are examples of non-pharmacological therapeutic tactics and approaches **(Esther Lilly and Dakshayani, 2018).**

Significance of the study:

Children may easily employ foot reflexology, which reduces worry and weariness and improves the patient's capacity for adaptation. It also comes with children and parents easily accepting one other and cooperating. One of the most popular supplementary therapies utilized by nurses is foot reflexology, which is a form of massage. Reflexology has also been demonstrated in many trials to reduce cancer discomfort (**Elsabely, et al., 2021**).

One independent nursing technique that may be utilized to assist patients with pain is foot reflexology massage. Foot reflexology massage is easy to perform, affordable, and doesn't need any specialized tools. It might be included in standard nursing duties **(Bauer et al., 2019).** The most frequent adverse effects of chemotherapy are pain and fatigue. It negatively impacts a child's everyday functioning, activities, connections with family as well as friends, also the tolerance to therapy, in addition to their feeling of wellbeing **(Miladinia, et al., 2021**). So, the study was performed to evaluate the effect of foot

reflexology on fatigue, pain, and insomnia among children undergoing chemotherapy**.**

Research's Aim:

This study aimed to evaluate the effect of foot reflexology on fatigue, pain, and insomnia among children undergoing chemotherapy

Research Hypothesis:

H1: Children receiving chemotherapy who also receive foot reflexology will feel less fatigue and in pain than the children in the control group.

H2: When children receiving chemotherapy also receive foot reflexology, their sleeplessness improves compared to the control group.

Research design: A quasi-experimental (pretest/ posttest) research design was used.

Operational Definitions:

1) **Foot reflexology:** Is a form of massage that works by activating cutaneous mechanoreceptors to activate large primary afferents. The neurotransmitters produced by primary nociceptive neurons are blocked by the release of GABA and endorphins. Tactile stimulation from massage passes through fibers with a large diameter. Faster data transmission is another benefit of these fibers. By increasing circulation, massage therapy relieves tense and painful muscles and makes the body feel more alert and at ease **(Chanif et al., 2019).**

2) **Chemotherapy:** Cytotoxic medications are used in chemotherapy, a treatment for leukemia, to treat and alleviate symptoms. There are numerous routes to deliver chemotherapy, including IT injection of CSF fluid, intravenous, oral, and catheterization **(Locatelli, et al., 2021).**

Setting: The study will be conducted at Minia Oncology Centre at 3rd floor. It receives all children with chemotherapy from all over Minia governorate, and the total number of beds in this unit is nine and provides high levels of care.

Sample: The study sample consisted of all available pediatric patients who admitted to chemotherapy unit at the Minia Oncology Centre over the period of 6 months period (the total number was 80 pediatric patients) Subjects were randomly recruited to either study or control group (forty subjects in the both group). **The criteria of inclusion were:** Aged among six and eighteen, wholesome feet, Accept taking part in the research**. The criteria of exclusion was:** Lack of desire to take part, Foot issues, a history of persistent pain, injuries to the limbs, restlessness in children, seizures, heart disease, and severe respiratory illnesses

Tools: Three tools were used to collect data including:

Tool one: A structured interview questionnaire: The researchers produced it following an assessment of pertinent evidence **(American Cancer Society, 2021 as well as worldwide organization, 2019);** this was divided into two sections:

First part: Demographic data: This involved the patient's age, gender, degree of education, place of residence, and length of illness.

Second part: Fatigue assessment scale: the self-developed rating scale, which was taken from **De Kleijn et al. (2011),** it contained ten items that evaluated an individual's level of fatigue during a week's worth of activities in the social, physical, psychological, as well as spiritual domains as well as how those domains related to the day. With a score's total ranked from zero to hundred, the scores varied from (no fatigue) to ten (worst fatigue). No fatigue (equal zero), very little (from one to nine), mild (from ten to thirty), moderate (from thirty one to sixty), severe (from sixty one to eighty), worst denotes (from eighty one to hundred).

Tool two: OUCHER pain measurement tool: The source of this tool is (Beyer et al., 1992). One common pain tool that is appropriate for kids is the OUCHER. This program uses pictures of children's expressions, both happy and sad, that were taken of them in hospitals when they were actually in genuine suffering. This tool has six images of kids in various states of pain, arranged vertically, from bottom to top, from least to most severe. The

photographs have ratings ranging from one to six, where one denotes no pain and six represents very severe agony. A score of one denotes no pain for children who cannot count to hundred; a score of two is light pain; a score of three or four is moderate pain; a score of five is severe pain; and a score of six denotes the child's most extreme agony. Additionally, the numbers zero to hundred are positioned to the left of the pictures. For kids who can count, the number represents the degree of pain: zero represents no pain at all, one to twenty nine represents mild pain, thirty–sixty nine represents moderate pain, seventy–ninety nine represents severe pain, and hundred represents the highest level of agony. The current study employed a numerical format with zero–hundred Oucher tools.

Tool three Insomnia Severity Index: The source of this tool is (**Morin et al., 2011).** The seven-item Insomnia Severity Index (ISI) was a self-report questionnaire created to evaluate the severity of sleep start and maintenance, difficulties waking up early in the morning, dissatisfaction of sleep, and interference of sleep problems with daily performance.. For each item, a five-point Likert scale was employed. **Scoring** A total score were ranged from zero to twenty eighty. The total score was classified as: absence of insomnia (from zero to seven); sub-threshold insomnia (from eight to fourteen); moderate insomnia (from fifteen to twenty one); and (from twenty two to twenty eight) severe insomnia.

Validity and Reliability:

A team of three specialists from the pediatric nursing department examined the content validity to make sure it was valid in terms of comprehensiveness, correctness, clarity, and relevancy. The appropriate adjustments were made as a result. The Cronbach Alpha Test yielded results of 0.83 for the tiredness scale, 0.94 for the OUCHER pain, and 0.87 ISI, indicating that the instrument was trustworthy.

Pilot study:

A pilot research with 10% of participants was conducted. A pilot research was carried out to evaluate the study tools' completeness and clarity as well as the amount of time needed to fill them out. The necessary additions, exclusions, and/or modifications were made in accordance with the pilot's results. Prior to beginning the real study, a jury accepted the final forms, and the reliability was evaluated in a pilot study by calculating the internal consistency of the forms using the Cronbach's alpha coefficient technique.

Ethical consideration:

Before beginning the study, the Scientific Research Ethical Committee of Minia University's Faculty of Nursing granted research approval. After the researcher made clear the purpose of the study to each participant in an effort to earn their trust and confidence, each participant gave their oral consent. The researcher guaranteed to keep participant data private and anonymous. The nurses were made aware that participation is entirely optional.

Field work:

The six months that the field work was conducted, from February 2022 to July 2022, corresponded to the six months needed for the program's implementation. Pre- and post-tests take one month, while the program's implementation takes five months. At first, the researcher estimates that doing in-person interviews took between 50 and 60 minutes to complete the interview instruments. Getting the cooperation of children by establishing a friendly rapport with them through quick chats, the study group and control group were assessed twice before the intervention, after the intervention was completed by the researchers, and after the control group took routine hospital care. Also researchers filled out a questionnaire for structured interviews and a fatigue evaluation scale, OUCHER pain, and ISI measurement tools.

The following procedures were used to complete the fieldwork: A researcher gave a foot reflexology treatment to the intervention group. The children and surroundings were readied for the intervention by the researcher prior to its implementation. Prior to the foot massage, the demographic information questionnaire was finished. It was forced upon the children to lie on their backs. Their pants were pulled up to the knees, and a cushion was

positioned beneath their foot. In front of the children, the researcher sat in a very calm and at ease posture. Using a tiny bit of non-therapeutic baby lotion, the researcher applied it to his hand. In general massage, the calf was used as the starting point. The soles of the feet and toes were massaged successively for 2 min for relaxation. Special attention was paid to four important reflection points of the sole as in **Figure (1),** namely the solar plexus, pituitary gland, heart, and liver. The pituitary gland is situated in the center of the big toe, and the solar plexus lies between the upper and middle third of the sole and the region under the chest between the heart and liver. It is mostly utilized as a reflection point for vital signs. Each of the foot's reflection spots was massaged in a circular motion at a pressure of 0.5 cm using the middle section of the first finger as well as the fleshy area of the researcher's toe. This resulted in thirty three of the nail bed being white without causing the toes' skin to come into contact with the nail bed. Using the middle portion of the first finger and the fleshy part of the researcher's toe, each of the foot's reflection points was massaged in a circular motion at a pressure of 0.5 cm. This resulted in thirty three of the nail bed being white without causing the toes' skin to come into contact with the nail bed. Constant pressure was applied throughout the reflective massage, which involved rotating each portion clockwise in a continuous motion. The sole of the other foot mirrored the first foot's finish in the same way. The left foot was massaged initially, followed by the right foot. Each foot had a 10-minute reflexology massage, for a total of 20 minutes for both feet. - The major techniques used in specialized massage were rotating friction motions, stretching, grasping, and flexing on various foot parts while concentrating on a particular location. The definition of friction is deep, circular motions that aim to enhance blood flow by rubbing tissue layers against one another.

The following methods of massage were applied: The lubricant was applied to the participants' feet via effleurage, which involved massaging them from the toes to the ankles. Squeeze and roll your fingers, toes, as well as feet using the petrissage technique—a quick, gentle, and swift action. -Tapotement, or pounding or drumming, was achieved by short finger taps. - Friction was applied to the tissue layers in order to encourage blood flow. The youngster was sent to the chemotherapy chamber after receiving massage treatment for 20 minutes. The youngster received assistance from the researcher ten minutes after treatment, who monitored their ISI, discomfort, and degree of exhaustion. Utilizing the OUCHER pain instrument, the child's report and pain intensity were completed simultaneously**.** Every measurement was taken in its entirety, and the ISI, pain, and exhaustion threshold were all examined once. The technique of work was authorized by the acupuncturist as well as reflexology specialist since simultaneous validity was utilized to determine the reflection sites of the foot correctly and how to apply pressure. The researcher received training from a physical therapist prior to the intervention. As per the hospital protocol**,**

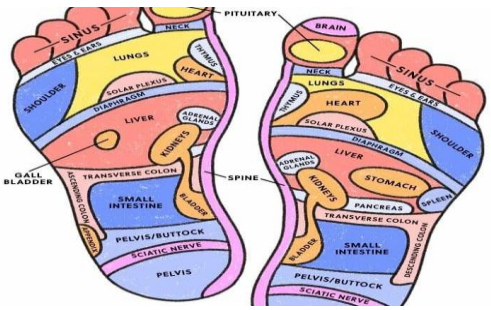

Fig (1): Foot Reflexology Chart

https://www.researchgate.net/figure/Foot-Reflexology-Chart-Credit-by-Can-Stock-Photo-Inc-Peter-Hermes-Furain Permission_fig1_324785947/download

The control group received standard management and care for twenty minutes prior to chemotherapy. This included the administration of medication, as analgesics, to minimize pain as well as offer support emotionally. Additionally, fatigue, pain, as well as ISI were assessed at predetermined intervals (ten minutes prior to and after chemotherapy), just like in the intervention group. This investigation was carried out in a blind fashion. In this manner, exhaustion, pain, and ISI were assessed following the intervention by a study assistant who possessed the traits of a researcher.

Analytical statistics:

Version twenty of the SPSS statistical program was used to evaluate the data. For 3 days, continuous data were gathered before as well as post the massage, as well as the mean standard deviation (SD) was used to represent the results. Numerical and percentage methods were used to convey categorical data. The findings were evaluated using the chi-square test. The test of chi-square was utilized to look into the connection between the two elements. In the instance of data noncontiguous, the connection between two elements was examined through the test of chi-square. P-values below 0.05 were considered statistically significant.

Results:

Table (1) revealed that children in the study as well as control groups had a mean age of (M ± SD) 10.12 ± 2.43 as well as 9.10 ± 1.66; respectively, 60% of the children in the control group were male, compared to 65% of the children in the study group. Regarding (Residence), there were 65% of children from urban areas and 57.5% of children from rural areas in the study group.

Table (2): illustrates that children receiving chemotherapy showed a very significant improvement in their degree of fatigue, with a decrease in the study group's fatigue levels when compared to the control group.

Table (3): demonstrates that there was a very statistically significant difference in the children's level of fatigue between the study and control groups' mean pretest and posttest scores for the children receiving chemotherapy, with P=(0.0001).

Table (4): shows that children receiving chemotherapy had a highly significant reduction in their pain level, as seen by the study group's pain levels being lower than those of the control group.

Table (5): shows that there was a very statistically significant difference in the pain level between the mean pretest and post-test assessments for the study and control groups of the children under examination undergoing chemotherapy (p=0.0001).

Table (6): demonstrates that children receiving chemotherapy showed a highly significant increase in their sleep quality, with a decrease in the number of patients experiencing insomnia in the intervention group when compared to the control group.

Table (7): demonstrates that the mean pretest and post-test scores of the children under study receiving chemotherapy showed a very statistically significant change in the insomnia severity index with p=(0.0001).

Table (1): Main characteristics studied in both groups n=80

Personal data	Study (n = 40)		Control (n = 40)	
	No.	%	No.	%
Age of children				
6:10years	20	50	14	35
10:14 years	12	30	16	40
14:18yrs	8	20	10	25
Mean ± SD	10.12 ± 2.43		9.10 ± 1.66	
Sex				
Male	26	65	24	60
Female	14	35	16	40
Residence				
Rural	23	57.5	26	65
Urban	17	42.5	14	35

Table (2): Frequency distribution of post-test fatigue level between the children receiving chemotherapy n=80

Fatigue level	Study (n = 40)		Control (n = 40)		X^2-test (P.value)
	No.	%	No.	%	
No fatigue (0)	8	20	4	10	
Very little (1-9)	14	35	6	15	5.12
Mild (10-30)	16	40	8	20	(0.0001)**
Moderate (3- 60)	2	5	22	55	
Severe (61-80)	0	0.00	0	0.00	
Worst (81-100)	0	0.00	0	0.00	

** *High statistical significance*

Table (3): Mean scores of fatigue among children receiving chemotherapy in two intervention as well as control groups pre as well as post-test n=80

Groups	Fatigue level		X^2-test (P.value)
	Pre-test	Post-test	
	Mean ± SD		34.12
Study n=40	3.14 ± 12.32	2.22 ± 16.35	(0.0001)**
Control n=40	2.15 ± 16.42	2.18 ± 16.45	

** *High statistical significance*

Table (4): Frequency distribution of post-test OUCHER pain level among the children receiving chemotherapy n=80

OUCHER pain level	Study (n = 40)		Control (n = 40)		X^2-test (P.value)
	No.	%	No.	%	
No pain (1)	6	15	2	5	
Mild pain (2)	28	70	20	50	26.10
Moderate pain (3,4)	6	15	18	45	(0.0003)**
Severe pain (5)	0	0.00	0	0.00	
Very Severe pain (6)	0	0.00	0	0.00	

** *High statistical significance*

Table (5): Mean scores of OUCHER pain among children receiving chemotherapy in two intervention as well as control groups pre as well as post-test n=80

Groups	OUCHER pain level		X^2-test (P.value)
	Pre-test	Post-test	
	Mean ± SD		44.10 (0.0001)**
Study n=40	3.22 ± 10.38	2.34 ± 12.34	
Control n=40	4.24 ± 16.40	3.22 ± 14.55	

Table (6): Frequency distribution of post-test ISI among the children receiving chemotherapy n=80

Insomnia Severity Index	Study (n = 40)		Control (n = 40)		X^2-test (P.value)
	No.	%	No.	%	
Absence of insomnia (0–7)	4	10	2	5	
Sub-threshold insomnia (8–14)	30	75	18	45	23.12
Moderate insomnia (15–21)	6	15	20	50	(0.0002)**
Severe insomnia (22- 28)	0	0.00	0	0.00	

*** High statistical significance*

Table (7): Mean scores of ISI among studied children receiving chemotherapy in two intervention as well as control groups pre as well as post-test n=80

Groups	Insomnia Severity Index		X^2-test (P.value)
	Pre-test	Post-test	
	Mean ± SD		45.16
Study n=40	18.11 ± 10.30	8.22 ± 16.35	(0.0001)**
Control n=40	18.15 ± 16.24	13.20 ± 12.35	

*** High statistical significance*

Discussion

Foot reflexology is a unique type of massage that involves applying pressure with the fingers—particularly the thumbs—to the reflex zones, which are often found in the feet. These regions are thought to be connected to every part of the body, and pressure applied to them can alter the body's physiological reactions. They are supposed to promote healing and restore equilibrium. Hemodynamic factors and blood circulation can be regulated by foot reflexology. Reflexology's fundamental workings are not fully known. It is believed that reflexology promotes relaxation, releases endorphins, and modifies the perception of pain and the transmission of pain impulses. Consequently, exhaustion and sleep quality might be impacted by relaxing. Additionally, patients' discomfort may be lessened by massaging and touching the foot's reflex points. Energy blockages in the body are what create diseases; reflex point stimulation can help remove these blockages and allow the body to produce more energy (**Samarehfekri, et al., 2020).**

Chemotherapy side effects are now viewed as subjective criteria of distress that lower a quality of life in child rather than as symptoms. undesired cancer symptoms that may go away, fatigue and pain persist for children as well as adolescents undergoing cancer therapy after therapy ends. Children become more flexible and have reduced stress, pain, and muscular tightness after receiving massage therapy (**Abrams et al., 2019**).

The aim of this study aimed to evaluate the effect of foot reflexology on fatigue, pain, and insomnia among children undergoing chemotherapy

In relation to the demographic data children, it was noticed that this study indicated that those children in the study as well as control groups had a mean age of (M ± SD) 10.12 ± 2.43 and 9.10 ± 1.66; respectively, more than fifty of children in study aswell as control groups were male. In relation to (Residence) about half of children from rural area in study group, as well as higher fifty percent of children from urban area. These findings were consistent with those of **Elsabely et al. (2022),** they reported that the majority of the children in the study were male, with mean

ages ranging from 7.08 ±2.34 to 7.89 ± 2.86 yrs. in the managed and control group, respectively. These findings aligned with **Syan et al. (2019),** they examined ninety children at South Egypt Cancer Institute that had leukemia. They discovered that over two-fifths of them had a mean age of 7.1± 3.5 yrs. old, as well as over fifty of them were male. The majority of children—more than two thirds—came from rural areas. These results were in line with those.

The results this study show that children receiving chemotherapy had a highly significant improvement in their degree of exhaustion, with a drop in their fatigue levels when compared to the control group. Between the study and control groups' pre- as well as post-test mean scores for the children receiving chemotherapy, there was a highly statistically variations in the children's level of fatigue (p=0.0001). These in line with those of **Elsabely et al. (2022),** who discovered a statistically significant reduction in the degree of exhaustion in children receiving chemotherapy, as well as a drop in the fatigue degree of the managed group relative to the control group. According to the investigators, the results of this study could be explained by the physiological impact of massage that can increase autonomic nervous system activity and release endorphins and serotonin, both of which are known to improve mood. This could lead to an integrated impact at the level of hypothalamus and relaxation centers. Massage relieved muscle tension as well as nervous system excitability, which enhanced one's feeling of wellbeing. Additionally, small toddlers found massage treatments to be enjoyable and thought it was a cozy, comfy game.

According to the current study, children receiving chemotherapy showed a very significant improvement in their pain level as well as a reduced in their pain scores when compared to the control group. Between the study and control groups' pre- as well as post-test mean ratings for the children undergoing chemotherapy, there was a statistically variations in the children's level of discomfort (p=0.0001). These were in line with **Salama et al. (2017),** who looked at sixty cancer patients in Egypt between the ages of one and eighteen and discovered that therapeutic massage greatly decreased the children's level of weariness. **Haun et al.'s (2019)** research indicates that by lowering both physical and psychological discomfort, massage therapy might enhance the life quality for children afflicted with cancer as well as blood disorders.

According to the current study, children receiving chemotherapy showed a very significant increase in their sleep quality, with a drop in insomnia ratings among the managed group when compared to the group that take the routine care. Between the mean pretest a s well as post-test scores of the children under study take chemotherapy in two groups the intervention as well as control, there was a statistically variation in the ISI(p=0.0001). These were in line with **Samarehfekri et al. (2020),** who discovered that both groups' sleep quality improved on the fourth as well as eleventh days following surgery. By the end of the trial, the foot reflexology group's sleep score had grown by 36, whereas the control group had only scored almost 17 points. The two groups' 19-point disparity demonstrates the clinical significance of foot reflexology for sleep quality. Reflexology on the feet has the potential to enhance sleep quality by inducing dopamine release and stimulating the neurological system.

Conclusion:

According the research's findings, it was determined that, as compared to the control group following the intervention, foot reflexology was beneficial in lowering levels of pain, fatigue, and improving sleep among children receiving chemotherapy.

Recommendation:

When a child is receiving chemotherapy, foot reflexology can be utilized as a supplemental treatment in addition to traditional treatments. It's an easy-to-use method of easing pain and weariness while promoting better sleep. Nurses and other health organizations should use foot reflexology as a low-cost intervention to lessen pain, exhaustion, and enhance sleep quality. More research is needed to determine how various massage techniques affect children receiving chemotherapy's levels of weariness,

discomfort, and sleep in order to reduce their physical and psychological side effects.

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