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THE EFFECTS OF *"CERIA"* CHEMOTHERAPY EFFECT MANAGEMENT ON THE LIFE QUALITY IMPROVEMENT OF CHILDREN WITH CANCER

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ABSTRACT

The prevalence of cancer in children is now increasing and followed by an increasing number of them who undergo chemotherapy. The effect of chemotherapy can reduce the children's quality of life, hence it requires the contribution of nurses in improving health services to children with cancer. The purpose of the study was to analyze the effect management of *"Ceria"* chemotherapy : *(C)egah Sariawan* (preventing mucositis), *Cegah (E)kstravasasi* (preventing extravacation), *(R)elaksasi* (Progressive Muscle Relaxation to reduce fatigue), *Cegah (I)nfeksi* (preventing infection), *(A)kupresur* (acupressur to reduce nausea and vomiting) on the life quality of children with cancer. The method applied was experimental research using control group design with pretest posttest. The treatment group received intervention in the form of *"Ceria"* chemotherapy effect management from the researchers while the control group did not receive intervention treatment. The selection of research subjects for the treatment and control groups was done randomly. The children's quality of life was measured before and after one week of intervention using PedsQL (Children's Quality of Life Inventory). The participants were 76 children (38 in the treatment group and 38 in the control group). The results of the paired t test showed that there were significant mean differences of life quality before and after *"Ceria"* chemotherapy effects management on children with cancer (p = 0,0001; sig = 0.05), the highest life quality improvement was found on children who experienced progressive muscle relaxation. This study concludes that *"Ceria"* chemotherapy effect management can improve the life quality of children with cancer. Therefore, the reseachers recommend nurses to apply *"Ceria"* chemotherapy effect management to improve the life quality of children with cancer.

Keywords: cancer, children, quality of life, "Ceria" chemotherapy effect management

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INTRODUCTION

The prevalence of cancer in children is increasing every year. Published in 2012 by WHO for cancer research, Cancer World (2014) states that the incidence of new cancers is estimated to rise 14 millions with 8.2 millions of them were dead and an estimated 19.3 million in 2025 (Gulland, 2014). According to the National Cancer Institute in the United States, 25% or 30-40 per 1 million cases of cancer experienced by children with 90 cases per 1 million / year occur at the age of 2-3 years and decreased to 30 cases at the age of 8 years and the comparison between male and female is 55: 45% (Longo et al., 2015).

The side-effects and long-term sequelae of anti-cancer chemotherapy remain a major source of concern for both patients and clinicians despite the improved efficacy and enhanced survival offered by modern treatments. Current drugs or other approaches to counteract chemotherapy-induced adverse effects are often incompletely effective, frequently do not address potential longer-term sequelae or may even induce other side-effects which only add to patient discomfort. New approaches to improve tolerance and reduce sequelae of cancer chemotherapy are urgently needed and the present Research Topic focuses on this issue and highlights several areas of progress. Nausea and vomiting are amongst the most feared side-effects for patients embarking on cancer chemotherapy (Nurgali, Jagoe, & Abalo, 2018). Giving treatment to children with cancer is a challenge for nurses. The challenge is in the form of aggressive therapy that is needed to overcome the disease and to slow the progression of the disease, while minimizing toxicity and increasing the long-life quality by

Chemotherapy is one of the therapies used to treat cancer in children. Chemotherapy is effective for systemic cancer that cannot be treated with surgery and radiation. Chemotherapy is beneficial for cancer patients, but on the other hand chemotherapy has weakness as it does not only kill malignant cells but also kills other normal cells that grow quickly which cause side effects. The side effects of chemotherapy are predicted to occur based on the chemotherapy agents given. Side effects that often occur during chemotherapy are nausea, vomiting, no appetite, mucosal ulceration especially in the mouth, neuropathy, hemorrhagic cystitis, alopecia, moon face, and changes in the child's mood (Allenidekania, 2017).

METHOD

This research was an experimental study using a control group design with pretest posttest. In this design there were treatment groups and control groups. The treatment group was the group that received the intervention in the form of *"Ceria"* chemotherapy effect management from the researcher and the control group was the intervention-free group. The subjects for the control and treatment group were chosen randomly. Children's quality of life was measured after one week of intervention using PedsQL (Child's Quality of Life Inventory). The measurements were done before and after the intervention.

The population in this study were all children who received chemotherapy treatment using total sampling at "Rumah Kita" Yayasan Kasih Anak Kanker Semarang. The inclusion criteria as follows: (1) Children undergoing chemotherapy, (2) Aged 2-18 years, (3) can hear and see, (4) parents and children willing to participate in the test by filling out informed consent, (5) are in a stable condition, (6) experiencing the effects of chemotherapy such as nausea, vomiting, mucositis, fatigue, and extravasation. Then the exclusion criteria in this study consisted of respondents who had less stable conditions to be included and dropped out (not cooperative) during this study. The instruments used in this study included: (1) PedsQL (Quality of Life Inventory of Children) Questionnaire and FOA-A (Fatigue Oncology Scale in Children), and questionnaires for *"Ceria"* chemotherapy effect. The questionnaire had been tested for its validation and reliability and was declared valid and reliable. Data was analyzed using paired t-test.

RESULTS

Table 1.
The mean differences of children life quality before and after parents of children with cancer were given *CERIA* chemotherapy effect management education during the chemotherapy period (treatment group) (n=38)

Variabel	Mean	S.d	N	P value
Life quality-before	7,64	2,66	38	0,07
Life quality-after	8,28	2,72		

Based on the results of statistic analysis, it is found that there is a significant difference between the means of children life quality before and after the children with cancer were given *CERIA* chemotherapy effect management education (p=0,0001; $\alpha = 0,05$).

Table 2.
The mean differences of children life quality before and after parents of children with cancers were given *CERIA* chemotherapy effect management education during the chemotherapy period (treatment group for each effect) (n=38)

Variable	Mean	S.d	N	P value
Life quality-before	7,47	2,75	38	0,0001
Life quality-after	11,13	3,06		

Based on the table above, it is known that each variable has different significant value. There are 4 variables which have significant effects on the improvement of children life quality namely overcome mucositis, fatique, infection, and nausea, while the variable to overcome extravantion does not have significant effect.

Table 3.
The mean differences of children life quality at the beginning and at the end of chemotherapy period (control group) (n=38)

Variable	*Mean*	S.D	N	P value
Overcome mucositis				
Life quality before	7,25	2,75	24	0,0001
Life quality after	11,49	3,06		
Overcome extravasation				
Life quality before	6,76	2,65	2	0,068
Life quality after	8,76	3,47		
Overcome Fatique				
Life quality before	7,25	2,26	38	0,002
Life quality after	11,38	3,88		
Overcome Infection				
Life quality before	6,67	2,08	8	0,003
Life quality after	9,24	3,22		
Overcome Nausea				
Life quality before	7,02	2,02	32	0,0001
Life quality after	11,27	3,43		

Based on the statistic analysis, it is known that there is no significant difference between the scores at the beginning and at the end of chemotheraphy period (p=0,07; $\alpha = 0,05$) at the control group.

The results of *paired t-test* show that there is significant effect of *CERIA* chemotherapy effect management on the life quality of children with cancers. It is proven by the significant mean difference between the children life quality before and after the parents were given *CERIA* chemotherapy effect management education which consisted of *(C) egah Sariawan* (preventing mucositis), *Cegah (E)kstravasasi* (preventing extravation), *(R)elaksasi* (progressive Muscle Relaxation to reduce fatigue), *Cegah (I)nfeksi* (preventing infection), *(A)kupresur* (acupressur to reduce nausea and vomiting) on the life quality of children with cancers with significant value of 0,0001.

DISCUSSION

Most cancers in children originate from the mesodermal embryonic layer which will become connective tissue, muscle, bone, cartilage, sex organs, blood, blood vessels and lymph, and lymphoid organs. As a result, 92% of cancers in children (sarcoma, leukemia, and lymphoma) develop from embryonal primitive tissue. While 8% of cancers in children come from neuroectodermal tissue which then develops into a central nervous system tumor. Inversely related to children, cancer in adults includes epithelial tissue called carcinoma. Epithelial cancer is quite rare in children under 15 years old. This is also supported by the results of Abusaad and Ali's research (2016) that the most common diagnosed cancers are leukemia (56.6%), hodgkin (20%) and neuroblastoma (23.4%) (Yarbro et al., 2011).

Stomatitis or thrush is one of the effects of chemotherapy that the patients often suffer. This is because epithelial cells stop dividing resulting in tissue atrophy which ends in ulceration, and affects salivary volume, flora in the mouth, mucosal composition and integrity. The intervention to prevent stomatitis consisted of stomatitis prevention education, oral care and monitoring by family, and observation of the degree of stomatitis by nurses. The severity of stomatitis was observed using the WHO scale, namely: degree 0 if there were no signs and symptoms, grade 1 if there was erythema, painless ulcers, grade 2 if there were ulcers and erythema which was very painful, but the patients could still eat, grade 3 if there were ulcer, pain, and the patients were unable to eat, degree 4 if there was an ulcer and required enteral and parenteral nutrition support Yarbro et al. (2011).

In this research, oral care interventions began with education about the definition, risk factors, signs and symptoms, impacts, and ways to prevent thrush. Education can improve the knowledge and ability of clients and families in carrying out oral care. According to Yarbro et al. (2011) the main components of oral care are mouth assessment, education to patients and their families, brushing teeth, and using mouth rinses. This is in line with studies conducted by Leppla (2016) which identify the intervention of Oral Care Self Management Support protocol (OrCaSS) started with oral care education and continued with behavioral counseling by demonstrating ways to brush teeth, and giving reminders to implement the protocol, the results show the occurrence of oral mucositis in the group given OrCaSS intervention was slower and the severity of oral mucositis took shorter time, hence this intervention could be applied.

The oral care treatment to children undergoing chemotherapy has shown that it can prevent stomatitis. In this study, oral care for the prevention of stomatitis was done by brushing teeth with a soft bristled toothbrush or mouth swab if the leukocytes and

platelets of children were low and gargling using normal saline or 0.9% NaCl or Chlorhexidine gluconate 0.2%. Chlorhexidine gluconate 0.2% is effective for treating gingivitis and controlling the plaque which is caused by the lack of oral hygiene, but it has the side effects of tooth decay and oral mucosa if it is used for a long time. According to Mcguire et al. (2013) normal saline solution is a relatively safe mouth rinse that can maintain oral hygiene and patient comfort, especially for children. Normal saline can be used to prevent mouth infections during chemotherapy (Elad et al., 2015). Normal saline is a physiological fluid that is compatible with body fluids. It can clean debris, it does not irritate neither change the pH of saliva, so that the natural buffer of the mouth will not be disturbed. The physiological mouth will be maintained because there is no irritation. Reducing the number of debris will result in a reduction of bacteria in the mouth. If the patient rinses with normal saline, it is expected that the patient's (oral) endurance will increase (Elad et al., 2015).

The results of the research on the prevention of mucositis are in line with the research conducted by Qutob (2013) that oral care protocols consisting of consulting a dentist, brushing teeth with soft bristles, gargling or swabing directly in the oral cavity can prevent oral mucositis. In addition, Yavuz et al. (2014) identifies oral care protocols applied to children undergoing chemotherapy by brushing their teeth, gargling with 0.9% NaCl and using glutamine mouthwash can reduce the degree of mucositis and pain in children who are given oral care education before chemotherapy and after they do regular oral care compared to children who get standard treatment.

Monitoring the implementation of oral care by patients and families needs to be done to empower families. The family is educated to conduct routine monitoring if there is canker sores and pain when swallowing. Besides, they also do documentation if they have carried out the routine oral care, and the reasons for not doing so. This is in line with a study conducted by Leppla (2016) which also applies self-assessment to improve patient compliance and empowerment in taking daily oral care to reduce the severity of oral mucositis.

Based on the observations during the study it was found that there were 2 extravasations in children. The prevention of extravasation was done by providing education to parents about extravasation, providing education to patients and families about extravasation that had been integrated with *CERIA* education package, giving the families booklets that contain monitoring guidelines using SLB. Based on the results of the study it was found that there was no increase in the average life quality scores before and after being given education about extravasation. This can occur because the respondents were lack of extravasation experiences. The results of a research conducted by Kermani, Hosseini, Salek, and Pourali (2015) reveals that the provision of education can help improve parental knowledge and attitudes about chemotherapy which includes prevention of complications effects of chemotherapy such as extravasation.

Progressive muscle relaxation that is carried out routinely and repeatedly has been shown to reduce the level of patient fatigue, and even prevent the occurrence of pain or aches that are sometimes felt by patients receiving chemotherapy. This is in line with research conducted by Pathak, Mahal, Kohli, and Nimbran, (2013) who state that progressive muscle training for four weeks routinely is effective in reducing pain in

cancer patients receiving radiotherapy. Charalambous, et al. (2016) also states that progressive muscle training can reduce some symptoms chemotherapy effects including pain, fatigue, nausea and vomiting, anxiety and depression. Relaxation therapy is done by tightening and relaxing the muscles in one part of the body to give a feeling of physical relaxation. McCarthy et al. (2013) states that pain often gets worse when the patient is stressed, tense and focused on the experience of pain, but that pain will decrease if the child is relaxed.

Progressive muscle relaxation exercise (PMR) is a type of nonpharmacologic therapy that is easy to do and in general it has no side effects. A progressive muscle relaxation intervention is given by teaching 13 light stretching and deep breathing movements which enable patients to do it in bed and it does not require extra energy to do. In addition, the time needed in one exercise is only about 10-15 minutes (Synder & Lindquist, 2009).

Infection risk is one of the chemotherapy side effects. In this research, the infection prevention was carried out by providing education about infection prevention, teaching how to wash hands and use masks and sharing samples of maskwith motif to increase children's interest in using masks. Washing hands properly is one of the important strategies in preventing infections in children with cancer who are receiving chemotherapy considering the skin is the body's protection against bacteria where most infections that occur in patients with decreased immunity are caused by endogenous flora from the body or bacteria in their habitat environment. Also in other studies it is mentioned that frequent hand washing can prevent virus infections (Sim, Moey, Tan, 2014). Based on the Centers for Disease Control and Prevention there are 6 moments of hand hygiene practice that must be performed by patients and families, namely: 1) before preparing or eating food, 2) before touching the eyes, nose and mouth, 3) before and after the wound bandage, 4) after using the toilet, 5) after cleaning the nose, coughing and sneezing, 6) after touching the surface of hospital appliance such as bed barrier, table, door knob, remote controller, telephone etc.

The use of masks in pediatric patients with chemotherapy is important to prevent infections that are transmitted through droplets (secretions from the respiratory tract) in the form of bacteria or viruses. The masks used are masks with surgical or procedural type masks. The Centers for Disease Control and Prevention, the American Occupational Safety and Health Administration, and the World Health Organization recommend people infected with respiratory diseases that are transmitted through droplets to use surgical masks. In addition to prevent transmission to others, people who are not infected with the respiratory tract must also protect themselves by using surgical masks. A well-placed surgical mask can prevent transmission of particles from people who cough or sneeze. Even if the mask is not properly attached (loosely attached) it can still hold particles so that the pathogen does not spread to the closest person (Sim, Moey & Tan, 2014). Therefore, families or visitors who suffer from respiratory infections such as influenza should wear a mask when they are in contact with children who are receiving chemotherapy. In addition, if the child is at risk of contact with many people whose health status is unknown, the child must also wear a surgical mask.

Acupressure can reduce the intensity of nausea and can prevent nausea and vomit. Andancentron is a kind of medicine that is often used to reduce nausea and vomit in patients receiving chemotherapy. Ondansetron is a medicine used to prevent and treat nausea and vomit caused by side effects of chemotherapy, radiotherapy, or surgery. The occurrence of nausea and vomit is caused by the body's natural compound called serotonin. The amount of serotonin in the body will increase when patients undergo chemotherapy, radiotherapy, and surgery. Seretonin will react to 5HT3 receptors in the small intestine and brain, which cause nausea.

Ondansetron will inhibit serotonin which reacts to the 5HT3 receptor, thereby reducing or stopping nausea and vomit. According to Abusaad and Ali (2016), chemotherapy has nausea and vomiting effect that is difficult to treat clinically and standard antiemetic medicine can not completely eliminate the symptoms. It is important to explore non-pharmacological and complementary therapies to reduce nausea and vomit due to chemotherapy. This is in line with several studies that explain the acupressure point P6 can reduce nausea and vomiting in children who are receiving chemotherapy. Among them, the results of Abusaad and Ali's research (2016) show a decrease in the average of nausea and vomit in the treatment group compared to the control group. Hussein and Sadek's (2013) research results show that there are statistically significant differences between the intervention and control groups related to the reduction of vomit frequency which reflects the effectiveness of applying acupressure in reducing the frequency of vomit caused by chemotherapy.

The results above show that acupressure point P6 can prevent and reduce nausea and vomit in children with cancer who get chemotherapy. According to Abusaad and Ali (2016), acupressure point P6 can be performed on nursing interventions to reduce nausea and vomit and nurses can provide education to patients and families for non-pharmacological management in preventing and managing nausea and vomiting problems in children receiving chemotherapy.

CONCLUSION

The results of this research showed there was a significant effect of *CERIA* chemotherapy effect management on the improvement of cancer children life quality. It was proven by the significant mean differences between the average of children life quality before and after the parents received education about *CERIA* chemotherapy effect management consisting of *(C) egah Sariawan* (preventing mucositis), *Cegah (E)kstravasasi* (preventing extravasation, *(R)elaksasi* (progressive muscle relaxation), *Cegah (I)nfeksi* (preventing infection), *(A)kupresur* (acupressure to reduce nausea and vomit) on the life quality of children with cancer with a significant value of 0.0001.

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