

Original Research

# The Use of CERIA E-Module in Enhancing Parents' Knowledge and Family Support Practices for Childhood Cancer Survivors Undergoing Chemotherapy



Kadek Cahya Utami<sup>1\*</sup>, Ni Luh Putu Shinta Devi<sup>1</sup>, & Luh Mira Puspita<sup>1</sup>

<sup>1</sup>Nursing Department, Faculty of Medicine, Udayana University, Denpasar, Indonesia

Article Info	Abstract
<p>Article history: Received: 31 October 2023 Accepted: 29 January 2024</p>	<p><i>Introduction:</i> Chemotherapy is scientifically demonstrated as an effective modality for childhood cancers. However, despite its therapeutic effects, chemotherapy can induce unpleasant side effects. These adverse effects often cause readmissions and trigger stressful, frightening, and painful experiences. Family social support has been widely mentioned as a significant factor affecting childhood cancer survivors' quality of life. Therefore, an adequate level of knowledge is needed to achieve the ideal family support for the children. However, electronic health education is now considered an excellent alternative to the standard methods. This study examined the effect of the CERIA e-module application as an electronic health education media for childhood cancer survivors and their parents as well as the effectiveness of the CERIA e-module in improving parents' knowledge and family support practices for childhood cancer survivors.</p> <p><i>Methods:</i> This research was a quasi-experimental study with a one-group pre-test and post-test design employing a purposive sampling technique. Thirty participants from Rumah Singgah Yayasan Peduli Kanker Anak Bali were recruited for this study. The research phase included a pre-test, an intervention providing the CERIA e-module 4 times in two weeks, and a post-test. Data analysis using paired t-test.</p> <p><i>Results:</i> Findings from this study showed that CERIA e-Module is effective in improving parents' knowledge (<math>p=0.000</math>; <math>p&lt;0.05</math>) and enhancing skills in delivering adequate care and support for children with cancer (<math>p=0.001</math>; <math>p&lt;0.05</math>).</p> <p><i>Conclusion:</i> Based on the results, the authors suggest that nurses organize novel and creative education media for families with childhood cancer survivors to deliver health messages more attractively.</p>
<p>Keywords: CERIA e-module, family support, parents' knowledge</p>	

\*Corresponding Author:

e-mail: [cahyautami@unud.ac.id](mailto:cahyautami@unud.ac.id)



This work is licensed under a Creative Commons Attribution 4.0 International License.

## INTRODUCTION

Childhood cancer survivors require ongoing high-quality and comprehensive long-term follow-up care. National Cancer Institute (2017) mentioned several recommendations for cancer therapies: chemotherapy, biological therapy, radiation therapy, bone marrow transplantation, and peripheral stem cell transplantation [1] Chemotherapy has been widely demonstrated as a highly effective modality offering high cure rates among childhood cancer survivors [2,3].

Chemotherapy administration provides therapeutic effects for cancer survivors. Its cytotoxic traits mainly target cancer cells that divide and proliferate. However, fast-growing healthy cells, such as epithelial, mucosa, and hair follicle cells, are also most likely affected by chemotherapy, inducing adverse side effects among cancer survivors.

Chemotherapy could cause serious long-term effects on various body systems. It would appear a few hours after medication administration and even in a few months or during the subsequent treatment cycles. Common unpleasant side effects of chemotherapy could manifest as nausea, diarrhea, neurological problems, constipation, fatigue, hair follicle damage, infection risk, and oral health issues such as mucositis oral [2,4]. Parents' support is highly advised to assist and relieve the side effects of chemotherapy. Their engagement in therapies such as active monitoring would minimize the chemotherapy side effects in the hospital and at home.

Family support is a lifetime process, possessing distinctive characteristics and types in each life cycle. It is categorized into two types of support: (1) internal, such as support from the husband, wife, or sibling, and (2) external from other members of the nuclear family. Family support facilitates the family to function as a unit, employing various bits of intelligences and senses that would improve the family's health status and adaptation [5,6].

Knowledge brings substantial influences on family support for childhood cancer survivors. A pilot study conducted in Rumah Singgah Yayasan Peduli Kanker Anak Bali on ten parents of children with cancer revealed a poor level of post-chemotherapy knowledge. Direct health education, leaflets, and booklets were common methods of information dissemination in the foundation. They claimed no electronic-based information was ever organized during the care.

Nowadays, electronic-based health education is a component of e-healthcare, a novel and popular way to disseminate health information to the community. One of the electronic-based health education is telenursing. Telenursing is an e-health strategy that allows nursing care and delivery without geographical boundaries. Nurses could utilize various devices when providing care through telenursing, such as the Internet, mobile phones, SMS, and social media platforms [7].

A recent study merged and systematically organized the concept of e-health and telenursing in an e-module, namely the CERIA e-module, which encompassed chemotherapy-related information and

follow-up sessions required for families of childhood cancer survivors. Electronic-based texts, messages, and calls are proposed as follow-up tools in this e-module. CERIA e-module was designed as an electronic-based health education method that provides information about chemotherapy and its side effects, aiming for knowledge improvement, anxiety management, confidence development, and acceptance of difficult situations. The research location was chosen because the children with cancer there were in stable condition so parents could participate in research activities. The ultimate goal of the e-module is to achieve optimal family support for childhood cancer survivors. Here, the authors investigated the effectiveness of the CERIA e-module on parents' knowledge and skill in delivering adequate care and support for childhood cancer survivors.

## **METHODS**

This research was a quasi-experimental study with one group pre-test and post-test design. The study population was parents of childhood cancer survivors in Rumah Singgah Yayasan Peduli Kanker Anak Bali. After the study population was determined, the purposive sampling technique was used to recruit eligible study participants. Thirty childhood cancer survivors currently undergoing chemotherapy treatment and their parents participated in this study. Two questionnaires were used in this study: (1) Knowledge of Parents and (2) Family Support. These questionnaires were used to collect the study data. The pre-test questionnaires were

administered before the CERIA e-module intervention. The post-test questionnaires were administered after two weeks.

CERIA e-module is a systematic electronic health education tool designed as public health teaching materials. CERIA is an acronym for health-related chemotherapy effects in Bahasa Indonesia that stands for Cegah Sariawan (Oral Ulcer Prevention), Cegah Ekstravasasi (Extravasation Injury Prevention), Relaksasi Progresif (Progressive Relaxation), Cegah Infeksi (Infection Control and Prevention), and Akupresur Mengurangi Mual Muntah (Acupressure to Relieve Nausea).

The information from the Modul was then regularly broadcast to participants' mobile phones. The researchers also conducted follow-up sessions through calls, messages, and interactions on social media platforms. Univariate and bivariate analyses were performed using a frequency distribution table and paired t-test.

The authors ensure the proper implementation of study ethical principles. All study participants in this research have given their informed consent. The authors confirmed the implementation of the self-determination ethic by respecting the participants' decision to participate or withdraw from the study after the consent session. The protection from discomfort ethic was also implemented throughout the study. The authors respected the participants' privacy and applied the principle of justice in the study. All participants were treated equally. Study ethical approval was granted by the Research Ethics Committee of the

Faculty of Medicine, Udayana University with number 2021.01.1.0375.

## RESULTS

Statistical analysis revealed significant differences in families' knowledge and support for childhood cancer survivors before and after the intervention of CERIA e-module.

**Table 1**  
Participants' Characteristics According to Age, Gender, Educational Background, and Occupation

Variable	Mean	Min-Max	CI 95%	
			Lower	Upper
Parent's Age	32.37 6.212	24-45	30.37	34.53
Variable	Frequency (n)		Percentage (%)	
Gender				
a. Male		2		6.7
b. Female		28		93.3
Educational Background				
a. Elementary School		5		16.7
b. Middle School		25		83.3
Occupation				
a. Housewife		24		80.0
b. Private Sector Employee		3		10.0
c. Farmer		3		10.0

**Table 2**  
Knowledge and Family Support Score Before the Intervention of CERIA e-Module

Variable	Period of Evaluation	Mean	SD	Min-Max	95% CI
Parent's Knowledge	Pre-Test (Before Intervention)	9.95	1.23	8-13	9.37-10.53
Family Support		14.50	1.19	12-16	13.94-15.06

**Table 3**  
Knowledge and Family Support Score After the Intervention of CERIA e-Module

Variable	Period of Evaluation	Mean	SD	Min-Max	95% CI
Parent's Knowledge	Post-Test (After the Intervention)	12.50	1.792	10-15	11.66-13.34
Family Support		15.50	1.28	12-18	14.90-16.10

**Table 4**

Statistical Analysis on the Difference of Knowledge and Family Support Score Before and After the Intervention of CERIA e-Module

<b>Variable</b>	<b>Period of Evaluation</b>	<b>Mean</b>	<b>SD</b>	<b>p-value</b>
Parent's Knowledge	Pre-Test	9.95	1.234	0.000
	Post-Test	12.50	1.792	
Family Support	Pre-Test	14.50	1.192	0.001
	Post-Test	15.50	1.277	

## DISCUSSION

Chemotherapy is an effective modality for many types of cancers in children. In addition, it also offers high cure rates [2,3]. However, despite its therapeutic effects, chemotherapy also risks side effects. Common chemotherapy side effects reported were nausea, diarrhea, fatigue, neurological problems, constipation, damaged hair follicles, infection risk, and oral health issues such as oral mucositis [2,4].

Additionally, chemotherapy also initiates several psychological problems among children, such as anxiety, fear, mood disorder, and low self-esteem. Chemotherapy-induced side effects often end up in unplanned readmission to the hospital. Thus, several invasive therapies are suggested to relieve the side effects. Cumulatively, those side effects seriously impact childhood cancer survivors' quality of life [8,9].

The Chronic Care Model (CCM) is an ideal strategy for childhood cancer survivors' care. CCM mentioned the correlation between the quality of life of children with chronic diseases and self-management and family active participation (family-centered care). Parents are presumed to be the primary caregivers for their children. Hence, they are expected to maintain good physical and psychological

health to provide high-quality support to their children. Companion from parents or significant others would help cancer survivors get through the challenging situation with a secure and comfortable feeling. Family support also strengthens the motivation to engage in the therapies. Parents' psychological well-being and confidence have been widely confirmed as significant factors of successful recovery and compliance among childhood cancer survivors. This study proposed a novel health promotion program in childhood cancer management to enhance parents' knowledge and family support practice. A health promotion program is important because successful health education is closely associated with health educators, media, and methods.

One of the most effective media for conducting health promotion programs is audio-visual media. Audio-visual media provides stimulation through the eyes and ears, with a percentage of 87% and 25%, respectively. Health messages are translated into pictures and voices, accepted by two human sense organs, thereby rousing attention and enthusiasm that finally improves the retention of learned information and knowledge [10]. A study from Sari [11]

mentioned that educational videos influenced parents' motivation and attitude due to their attractiveness and features. As a medium, a video presents movements, pictures, and voices that may attract the inquisitiveness of the audience and encourage them to implement the lessons learned from the videos on a daily basis [11]. Mumtaz, Effendy, and Haryani [12] also confirmed video as an effective audio-visual media in improving pre-chemotherapy knowledge and self-efficacy in cancer symptom management [12].

Recent studies revealed that the CERIA e-module effectively improved parents' knowledge and support for their children. Findings also reported a higher level of knowledge after the intervention. The e-module was particularly effective because it repeated information during the presentation. This repetition is important because repeated health information exposures could produce a sufficient level of knowledge. In addition to that, participants were allowed to re-read and re-watch the health education videos and information. Regular monitoring and feedback sessions also allowed the participants to ask and discuss vague information during the study. The aforementioned sessions led to higher information retention among the participants.

A higher level of knowledge is associated with lower anxiety levels among the parents. A sufficient level of knowledge generates calmer feelings, causes less stress, and develops confidence in caring for their children. Hence, the ideal family support could be delivered. Solid family support may lead to proper therapy completion and enhance the quality of life. Family of children

with cancer are required to appear happy, suppress their miseries, and showcase optimistic attitudes. They are also required to accompany and actively engage their children in all therapy sessions. Thus, they felt assured and protected, facing their illnesses and overwhelming therapies. Parents are also expected to collaborate with health professionals, becoming mediators for their children and health professionals during therapeutic sessions. Ryff [13] accentuated that parents' open, pleasant, and effective communication would manifest holistic care for their children. These behaviors would stimulate comfortable and calm feelings among the children. It shifted their focus and worry from the disease. Furthermore, parental warmth would improve children's health conditions and quality of life [13].

A study conducted by Sari [11] discovered a correlation between family support and motivation among breast cancer survivors who were undergoing chemotherapy [14]. Furthermore, WHO (2004) highlighted the major role of family social support on cancer survivors' quality of life. Cancer survivors with poor family support were at risk for an 8.2 times lower quality of life with controlled variables [15]. Similar studies by Noorhidayah [16] also confirmed the correlation between family support and quality of life in breast cancer patients. Quality of life appeared to be better in cancer patients with sufficient family support [16]. Ryff [13] also mentioned positive behavior changes among children with proper social family support, primarily in therapy compliance. This situation would indirectly contribute to a better recovery

process, promoting health status and enhancing the quality of life, especially among childhood cancer survivors. High quality of life would also extend their life expectancy eventually [17].

### **NURSING IMPLICATION**

The CERIA e-module can facilitate nurses to be more effective in providing education regarding parental support for children suffering from cancer, and nurses can apply broader health education applications to parents with cancer-stricken children. This will also enhance public knowledge.

### **LIMITATION**

This research only examines the level of parental knowledge and family support. Further research regarding changes in parental behavior after receiving education through the CERIA E-Module needs to be investigated.

### **CONCLUSION**

CERIA e-Module is confirmed as an effective electronic education tool for parents' knowledge and skill improvement in delivering adequate care and support for children with cancer ( $p=0.001$ ;  $p<0.05$ ). Based on the results of this study, the authors suggest that nurses organize novel and creative education media for families with childhood cancer survivors to deliver health messages more attractively.

### **ACKNOWLEDGMENT**

The authors are very grateful to the almighty God for the graces and blessings. The authors are also deeply indebted to childhood cancer survivors and their parents for their valuable support and participation in this study. Also, this study would not have been possible without the support from the Head of Yayasan Peduli Kanker Anak Bali. The authors also would like to thank our research assistants for their thorough assistance in the data collection process.

### **CONFLICT OF INTEREST**

There are not conflict of interest for author to publish this article.

### **REFERENCES**

- [1] National Cancer Institute. Types of cancer treatment, 2017. Retrived from: <https://www.cancer.gov>, Accessed: Nov. 20, 2020.
- [2] V.R. Bowden., & C.S. Greenberg. Children and their families the continuum of care (2nd ed.). Philadelphia: Lippincott Williams & Wilkins, 2010.
- [3] D.B. Velten, E. Zandonade, M. Helena, M, D. Barros. Prevalence of oral manifestations in children and adolescents with cancer submitted to chemotherapy. BMC Oral Health, 17(1), DOI: <https://doi.org/10.1186/s12903-016-0300-2> , 2016.
- [4] E. Chu, & V.T. Devita. Cancer chemotherapy: Drug manual. Burlington: Jones & Bartlett, 2015.

- [5] Friedman, dkk. Keperawatan Keluarga. Jakarta: EGC, 2010.
- [6] E.D. Papalia, & Feldman. Human development, edisi 10. terj. Brian Marsendy. Jakarta: Salemba Humanika, 2019.
- [7] F. Ghoulami-Shilsari, M. Bandboni M. Tele-Nursing in Chronic Disease Care: A Systematic Review. Jundishapur J Chronic Dis Care, 8(2). DOI: <https://doi.org/10.5812/jjcdc.84379>, 2019.
- [8] S. Hendrawati, I. Nurhidayah, & A. Mardhiyah. Self-efficacy parents in undergoing child cancer treatment at the Rumah Kanker Anak Cinta Bandung. NurseLine Journal, 4(1), DOI: <https://doi.org/10.19184/nlj.v4i1.8911>, 2019.
- [9] S. Herfiana, & S. Arifah. Dampak fisiologis kemoterapi pada anak dengan leukemia di Rumah Sakit. Jurnal Berita Ilmu Keperawatan, 12(1), DOI: <https://doi.org/10.23917/bik.v12i1.10583>, 2019.
- [10] R.H. Simamora. Pengaruh penyuluhan identifikasi pasien dengan menggunakan media audiovisual terhadap pengetahuan pasien rawat inap. Jurnal Keperawatan Silampari, 3(1), DOI: <https://doi.org/10.31539/jks.v3i1.8412019>.
- [11] I.Y. Sari. The Effectiveness Of Health Education With Audiovisual Methods On Parents Motivation In Prividing Anthelmintic At Primary School. Journal of Health, 8, (1), pp. 28-35, DOI: <https://doi.org.10.30590/joh.v8i1.219>, 2021.
- [12] D.F. Mumtaz, C. Effendy, & H. Haryani. Impact of pre-chemotherapy education with audio visual methods on the self-efficacy of symptom management in patients with cancer. Journal of Cancer Education, 36(3), DOI: <https://doi.org.10.1007/s13187-021-02006-1>, 2021.
- [13] C.D. Ryff. Psychological Well-Being Revisited: Advances in The Science and Practice of Eudaimonia, Psychother Psychosom, 83, 10-28, DOI: <https://doi.org/10.1159/000353263>, 2014.
- [14] M. Sari, Y.I Dewi, A. Utami. Hubungan Dukungan Keluarga Terhadap Motivasi Pasien Kanker Payudara Dalam Menjalani Kemoterapi Di Ruang Cendrawasih I RSUD Arifin Achmad Provinsi Riau. Jurnal Ners Indonesia, 2 (2), DOI: <https://doi.org/10.31258/jni.2.2.158-166>, 2012.
- [15] D. Anggraini, R. Semiarty, R. Rasyid, & D. Khambri. Faktor Yang Mempengaruhi Kualitas Hidup Pasien Kanker Payudara Di Kota Padang, 2016. Jurnal Endurance, 3(3). DOI: <https://doi.org/1022216/jen.v3i3.3094>, 2018.
- [16] Noorhidayah, H.P. Widiastuti, U. Kalsum. Family Support and Quality of Life in Breast Cancer Patients. Health Notion, 4(4). DOI: <https://doi.org/10.33846/hn40302>, 2020.
- [17] C.D. Ryff, & C.L.M. Keyes. The Structure of Psychological Well-Being Revisited. Journal of Personality and Social Psychology, 69(4), 719-727. Retrieved



from:  
[https://www.ncbi.nlm.nih.gov/pubmed/7473027,](https://www.ncbi.nlm.nih.gov/pubmed/7473027)  
DOI:

[http://dx.doi.org/10.1037/0022-3514.69.4.719,](http://dx.doi.org/10.1037/0022-3514.69.4.719) 1995.