



## The effect of multimedia-based nutrition education on parents' knowledge and body weight change in leukemia children<sup>☆</sup>



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### KEYWORDS

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### Abstract

**Objectives:** The present study aimed to identify the effect of multimedia-based education targeting the parents of children with leukemia on their knowledge about leukemia and on body weight changes in their children.

**Methods:** A quasi-experimental design with non-equivalent pre- and post-test groups was used in this study. A total of 28 parents of children with leukemia were recruited using a consecutive sampling method and assigned into the intervention and control groups ( $n = 14$  each). Parents in the intervention group were given a 10–15-min multimedia video to watch before their children's chemotherapy sessions.

**Results:** We found a significant improvement in parents' knowledge level after the multimedia-based education ( $p = 0.001$ ). However, there was no significant difference in the weight changes of the children in the intervention and control groups ( $p = 1.00$ ).

**Conclusions:** Multimedia-based education is associated with an increased knowledge level for the parents of children with leukemia.

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## Introduction

Cancer is the world's second leading cause of mortality.<sup>1</sup> According to global cancer statistics, there were 300,000 cases of cancer of 153 types that occurred in children from 2000 to 2010.<sup>2</sup> Cancer contributes to the

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death of 90,000 children every year.<sup>3</sup> In Indonesia, an estimated 11,000 new cases of pediatric cancer are diagnosed annually, 650 of which occur in the capital city of Indonesia.<sup>1</sup> Leukemia comprises one-third of all childhood cancer cases in Indonesia.<sup>1</sup> According to the data from the National Cancer Center in Jakarta, leukemia ranks first as the most frequent diagnosis and is a major cause of cancer death in pediatric patients in Indonesia.<sup>1</sup>

Leukemia is a malignancy in the blood-forming tissue, and it is mainly treated by chemotherapy.<sup>4,5</sup> However, patients may suffer from various side effects of leukemia treatment, including nutritional issue.<sup>6</sup> Forty six percent of children with cancer experience weight loss.<sup>7</sup> Aside from the systemic impacts of leukemia, weight loss is also caused by altered nutritional intake in children receiving chemotherapy.<sup>8,9</sup> In fact, nutrition plays a primary role in cancer therapy and in the overall care of children patients.<sup>10</sup>

The concept of "patient- and family-centered care" (PFCC) in pediatric nursing puts the family at the center of children's care.<sup>11</sup> A child's family is his or her principal source of support and an integral partner of the health care team.<sup>12</sup> From this perspective, families are a valuable source of information for clinical decision-making as well as an essential target for health education to provide care for children.<sup>12</sup> A lack of family health education can negatively impact the clinical conditions of children,<sup>12</sup> whereas educating families contributes to better daily care of leukemic children and improves their quality of life.<sup>13</sup> Indeed, parents' understanding of leukemia and its related aspects are linearly correlated with leukemic children's quality of life.<sup>14</sup>

A systematic review of video-based education suggests that video can facilitate the learning of new health behaviors.<sup>15</sup> A previous study in Indonesia also found that multimedia-based education on the management of chemotherapy side effects improved parents' knowledge and behavior in caring for children with leukemia.<sup>16</sup> Given the significant impact of nutritional status on cancer therapy outcomes, it is essential to develop educational strategies for parents to manage the nutrition of their children with cancer at home. The present study aimed to identify the effect of multimedia-based education targeting parents of children with leukemia on the parents' knowledge and on their children's body weight.

## Method

A quasi-experimental design with non-equivalent pre and post-test control groups was used in this study. Utilizing a consecutive sampling method, the participants were recruited from the population of children with leukemia undergoing chemotherapy at a hospital in Jakarta. Inclusion criteria for the children were as follows: age 3–18 years; receiving chemotherapy (regardless of the cycle); hemodynamically stable; and having oral nutritional intake. Only parents living with the eligible children were included in this study. Children with any accompanying chronic or congenital diseases and those who did not attend the pre- and post-tests were excluded from the study. A total of 28 participants were assigned into the intervention ( $n=14$ ) and control groups ( $n=14$ ). Data collection was carried out during May and June 2018.

Parents gave their informed consent to take part in the study. Afterwards, the parents in the intervention group were given a 10–15-min multimedia video to watch before their children's chemotherapy sessions. The same video was shown to the parents in the control group after the post-tests of both groups.

Parents filled out the questionnaire to measure their knowledge level before and after the intervention. The questionnaire contained items based on the educational material contained in the multimedia video. This tool was previously piloted with 15 parents of leukemic children and demonstrated to be reliable (Cronbach's  $\alpha=0.816$ ). In addition, the children's body weight was measured in all groups before and after the educational intervention using a calibrated scale. The period between each weight measurement was seven days.

We performed a dependent *T*-test to identify the difference between the parents' knowledge level before and after the intervention. Changes in the children's body weight in the intervention and control groups were evaluated using a Kruskal–Wallis test. A *p* value  $<0.05$  indicated a significant difference.

## Results

In this study, the majority of the children were boys (60.7%) with an acute lymphoblastic leukemia (ALL) diagnosis (96.4%). The preschool- and school-aged children were distributed fairly equally in both groups. Most of the parents in our study were of lower educational status. There was one parent who did not finish elementary school, and only two (7.2%) had a college degree. Parents with junior and senior high school backgrounds comprised around one-third of the total respondents. The mean age of the parents in both groups was 35 years old. The distribution of the respondents' characteristics was presented on [Table 1](#).

The parents' knowledge scores in the intervention group before and after the intervention were significantly different ( $p=0.001$ ). The mean knowledge score rose by 38 percent from 45.2 to 83.2 after the intervention. The lowest score was 26.7 prior to the multimedia-based intervention and 73.3 afterwards ([Table 2](#)).

### How about the score in control group?

[Table 3](#) showed that there was no significant difference in the weight changes of the children in the intervention and control groups ( $p=1.00$ ). Moreover, weight loss in the intervention group (28.6%) was lower than that in the control group (64.3%), and weight gain in the intervention group (35.7%) was also lower than in the control group (64.3%).

## Discussion

The majority of the children in this study were preschool- and school-age (3- to 12 years old). The data showed that childhood cancer, especially acute leukemia, is largely diagnosed in children under 15 years of age.<sup>17,18</sup> Parents of children aged 3–12 years are responsible for the children's daily nutrition. Interestingly, we had more boys than girls

**Table 1** Distribution of respondents by age, gender, type of leukemia, and parents' education level (n = 28).

No.	Variable	Intervention (n = 14) Freq (%)	Control (n = 14) Freq (%)	Total (%)
1	<i>Age</i>			
	Preschool	5 (35.7)	6 (42.9)	11 (39.3)
	School-age	6 (42.9)	5 (35.7)	11 (39.3)
	Adolescent	3 (21.4)	3 (21.4)	6 (21.4)
2	<i>Gender</i>			
	Male	8 (57.1)	9 (64.3)	17 (60.7)
	Female	6 (42.9)	5 (35.7)	11 (39.3)
3	<i>Leukemia type</i>			
	ALL	14 (100)	13 (92.9)	27 (96.4)
	AML	0	1 (7.1)	1 (3.6)
4	<i>Parents' education</i>			
	Did not finish elementary school	1 (7.1)	0	1 (3.6)
	Elementary school	4 (28.6)	2 (14.3)	6 (21.4)
	Junior high school	6 (42.9)	4 (28.6)	10 (35.7)
	Senior high school	3 (21.4)	6 (42.9)	9 (32.1)
	College	-	2 (14.3)	2 (7.2)
5	<i>Parents' age</i>			
	Mean	35.29	35.57	
	SD	6.31	7.35	
	Min-max	24-48	25-47	

**Table 2** Comparison of the parents' knowledge scores in the control and intervention group before and after intervention (n = 14).

Group	Knowledge score	Mean	SD	Min-Max	p-value
Control	Before	39.7	14.6	20-73.3	0.74
	After	45.9	13.2	26.7-73.3	
Intervention	Before	45.2	13.8	26.7-66.7	0.001
	After	83.2	7.1	73.3-93.0	

**Table 3** Comparison between weight changes of the children in the intervention and control groups (n = 28).

Weight change	Intervention		Control		p-value
	Freq	%	Freq	%	
Weight loss	4	28.6	9	64.3	1.00
Weight unchanged	1	7.1	-	-	
Weight gain	9	64.3	5	35.7	

with leukemia in this study. A previous study also reported that leukemia diagnoses were more common found in boys (65.7% of cases) than in girls.<sup>19</sup> In this study, 27 out of 28 children had a diagnosis of ALL while only one child had acute myeloid leukemia (AML). Another study also found that ALL is more common than AML.<sup>17</sup>

In this study, the educational backgrounds of the parents of children with leukemia varied and most were of lower educational status. In the intervention group, there was one parent who had not finished elementary school. A previous study regarding parents' knowledge and attitudes in a counseling intervention revealed that although the majority of the participants did not have higher education, they could

acquire adequate information on cancer and its treatment through counseling and education.<sup>20</sup> However, another study found that a person's educational status was significantly associated with his or her ability to obtain information and behave accordingly.<sup>21</sup> Furthermore, the mean age of the parents was 35 years old (middle adult).<sup>16</sup> According to Potter and Perry, people in this group are able to support the next generation. Therefore, the parents in this study had the ability to make and execute health-related decisions for their children.<sup>16</sup>

Our results, showed a significant improvement in the parents' knowledge level after the multimedia-based education. Similarly, a prior study demonstrated that the

knowledge level of parents of children with cancer increased significantly after they viewed an educational program about cancer.<sup>22</sup> According to another study, the outcome of an educational intervention for cancer management could be measured through changes in knowledge, perceived benefits and the self-efficacy to overcome the side effects of chemotherapy.<sup>3</sup> A study conducted by Hapsari in Indonesia suggested significant differences in the knowledge level, attitude, and skills of parents whose children were undergoing chemotherapy after engaging in multimedia-based health education.<sup>16</sup> A link between multimedia-based education and the increased knowledge level of parents of children with cancer was also found in another study.<sup>3</sup> Audio-visual media can facilitate learning for the parents of leukemic children to help them better manage their children's symptoms, hence contributing to improving their children's quality of life.<sup>23</sup>

On a different note, there was no significant difference in the weight changes of the leukemic children in the intervention and control groups after the multimedia-based education. However, it takes some time for nutritional management to manifest in body weight changes.<sup>12</sup> Improving parents' knowledge of nutritional management may be an initial step toward palpable changes in the children's nutritional status.<sup>18</sup> Moreover, effective nutritional management requires a careful plan and concerted efforts on the part of the health care team and as well as parents.<sup>9</sup> Education on nutrition is an essential element in managing nutritional issues and maintaining a good nutritional status in pediatric cancer patients undergoing cancer therapy.<sup>3</sup>

In conclusion, multimedia-based education can increase the knowledge level of parents of children with leukemia. Multimedia technology can be used to educate parents with lower educational backgrounds. However, this study did not identify any empirical evidence of a positive impact of multimedia-based education on the children's nutritional statuses. Even so, parents' knowledge could be a key step toward managing nutritional problems in children, in partnership with the health care team.

Parents of children with leukemia should be educated regarding the nutritional management of their children immediately after the cancer diagnosis or prior to chemotherapy. In this way, parents could effectively participate in the nutritional management of their children. Our findings can be used to inform nurses or other health care team members in regard to educate the parents of children with leukemia. Nonetheless, given the limited sample size and less rigorous design of our study, the results should be considered with caution. Further studies with a more stringent design are necessary to provide evidence supporting the efficacy of multimedia-based education.

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## Conflict of interests

The authors declare no conflict of interest.

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