

Factors Associated With Post-Traumatic Growth in Korean Survivors of Childhood Cancer

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OBJECTIVES: To analyze the effects of hope and self-efficacy on post-traumatic growth in survivors of childhood cancer in Korea and to identify factors affecting post-traumatic growth.

SAMPLE & SETTING: Data of 117 survivors of childhood cancer aged 11 years or older either in treatment or follow-up recruited by convenience sampling at an advanced general hospital in Korea were analyzed.

METHODS & VARIABLES: Using a self-reported structured questionnaire, data on hope, self-efficacy, and post-traumatic growth were analyzed using Pearson's correlation. Differences in post-traumatic growth according to general and disease-related characteristics (obtained from the survivors and their parents) were analyzed using t tests and analysis of variance. Factors affecting post-traumatic growth were investigated using multiple regression analysis.

RESULTS: Post-traumatic growth showed significant positive correlations with hope and self-efficacy. Factors that significantly affected post-traumatic growth were presence of siblings, high economic status, and hope.

IMPLICATIONS FOR NURSING: To improve post-traumatic growth in survivors of childhood cancer, interventions should be developed to enhance hope. In addition, more efforts are necessary in terms of interventions to improve post-traumatic growth in survivors of childhood cancer without siblings or with low economic status.

KEYWORDS economic status; hope; siblings; childhood cancer; cancer survivorship

ONF, 49(1), 71-80.

DOI 10.1188/22.ONF.71-80

Childhood cancer refers to the malignant tumors developing in children and adolescents aged younger than 19 years. About 15,590 children and adolescents aged 0–19 years were diagnosed with cancer in the United States in 2021 (National Cancer Institute, 2021). In South Korea, the annual incidence of childhood cancer in those aged younger than 17 years was 1,284 in 2017 and 1,275 in 2018, accounting for about 0.5% of all cancers (National Cancer Center, 2018). Proactive treatments and advances in medical techniques, including early diagnosis, hematopoietic stem cell transplantation, chemotherapy, and radiation therapy, have increased the five-year survival rate of childhood cancers to about 85% and the number of survivors of childhood cancer returning to daily living after treatment (National Cancer Center, 2018). There has been growing interest not only in the medical treatment of various cancers but also in the lives of cancer survivors. Because survivors of childhood cancer have a much longer remaining life span than survivors of adult cancer, physical complications, psychosocial adaptation, and quality of life during and after treatment and recovery have been identified as important issues (You, 2006).

In addition, because children and adolescents are still developing, cancer treatments may significantly affect the physical, mental, social, and economic aspects of their lives, even after completing treatment (Brown et al., 2015; Lim, 2021). Patients with childhood cancer may experience difficulties in social adaptation because of social isolation during treatment and have various physical and emotional sequelae after treatment, impairing their performance in various ways (e.g., high school or college graduation, employment, marriage, childbearing) (Gurney et al., 2009; Kirchhoff et al., 2011; Pivetta et al., 2011; Wakimizu et al., 2011).

However, studies have also reported that survivors of childhood cancer show no difference in anxiety, depression, or quality of life as compared to the general population (Chung et al., 2012; Kim et al., 2008; Kwon et al., 2009). According to a study by Kim (2017) that analyzes the experiences of long-term survivors of childhood cancer, these individuals showed positive growth through their negative experiences. Individuals who safely overcome adversity experience unique psychological changes, and the positive changes after trauma have been termed “post-traumatic growth” by Tedeschi and Calhoun (1996). Post-traumatic growth refers to the subjectively experienced positive psychological changes that result from going through a very challenging situation (Tedeschi & Calhoun, 1996).

Growth after the trauma of a cancer diagnosis or treatment requires positive thinking and hope as coping mechanisms (Jeon & Kim, 2016). Hope is an essential coping mechanism for recovery during the course of the disease, and previous studies on survivors of childhood cancer or the parents of individuals diagnosed with childhood cancer have demonstrated that hope has a significant effect on post-traumatic growth (Jeon & Kim, 2016; Song & Lee, 2010; Yuen et al., 2014). In addition, parenting, social support, optimism, and emotional well-being have been found to affect post-traumatic growth in survivors of childhood cancer (Koutná et al., 2017; Yi et al., 2015).

In life-threatening crises, self-efficacy can help parents of individuals with childhood cancer focus on opportunities and positive outcomes, such as personal growth (Jeon & Kim, 2016; Mystakidou et al., 2015). Research on self-efficacy and post-traumatic growth in adults with cancer has also found that higher self-efficacy is associated with greater post-traumatic growth (Mystakidou et al., 2015). A study by Miller et al. (2017) involving survivors of childhood cancer reported a positive relationship between higher healthcare self-efficacy and post-traumatic growth. However, a study by Jeon and Kim (2016) involving the parents of individuals with childhood cancer reported that self-efficacy was not a factor affecting post-traumatic growth. Therefore, additional investigation is required to confirm whether self-efficacy affects post-traumatic growth only in survivors of childhood cancer.

Interest in the positive experience of post-traumatic growth in survivors of childhood cancer has grown (Duran, 2013; Klosky et al., 2014; Tremolada et al., 2016; Turner-Sack et al., 2016; Yi et al., 2015). In systematic reviews investigating post-traumatic

growth after childhood cancer, survivors showed increased post-traumatic growth that was associated with social support and optimism (Berkman et al., 2020; Turner et al., 2018). However, post-traumatic growth is affected by race, ethnicity, and cultural background (Duran, 2013; Yi et al., 2015), and there is a serious lack of research on post-traumatic growth in Korean survivors of childhood cancer, with only two reported studies (Yi, 2015; Yi & Kim, 2014). Therefore, the current study aimed to analyze the factors associated with post-traumatic growth in survivors who were diagnosed with cancer in childhood and adolescence and who are currently undergoing treatment or who have completed treatment.

This study aimed to (a) investigate differences in post-traumatic growth according to the participants’ general and disease-related characteristics; (b) investigate the extent of participants’ hope, self-efficacy, and post-traumatic growth; (c) analyze the correlations between participants’ hope, self-efficacy, and post-traumatic growth; and (d) identify factors affecting the participants’ post-traumatic growth.

Methods

This descriptive, correlational study examined the relationships between hope, self-efficacy, and post-traumatic growth in survivors of childhood cancer, analyzed their effects, and identified other factors affecting post-traumatic growth.

Participants

Participants in the current study were individuals diagnosed with childhood cancer who were recruited by convenience sampling at an advanced general hospital in Seoul, South Korea. The participants were receiving maintenance therapy at the time of data collection or had completed treatment. The specific inclusion criteria were as follows:

- Survivors of childhood cancer aged 11 years or older who had been diagnosed with cancer during childhood and adolescence and were receiving maintenance therapy for acute lymphocytic leukemia or had completed treatment
- Individuals who knew that they had experienced cancer
- Individuals who had heard an explanation of the study and provided written consent to participate based on an understanding of the study objectives

The exclusion criteria were as follows:

- Individuals currently taking psychiatric medication
- Individuals experiencing difficulties in communication (e.g., because of cerebral dysfunction)

The required number of participants was calculated using G*Power, version 3.1.9, for multiple linear regression, with three variables based on the expected effect size ($d = 0.15$), significance level (Cronbach's alpha of 0.05), and power ($1-\beta = 0.9$); the minimum sample size was calculated to be 99, and considering a dropout rate of 20%, the current author aimed to recruit 120 participants. Among the 120 retrieved questionnaires, 3 were excluded because of missing or insincere responses, and the remaining 117 were used in the final analysis.

Measures

Post-traumatic growth: The Korean Post-Traumatic Growth Inventory (K-PTGI) was used to measure post-traumatic growth; it was translated, reconstructed, and validated for use with university students and adults by Song et al. (2009) and based on the PTGI developed by Tedeschi and Calhoun (1996), which consisted of five factors and 21 questions. This tool is widely used in individuals ranging from elementary school students to adults (Ju, 2016; Yi, 2015; Yi & Kim, 2014). Permission was obtained from the original authors and the authors of the adapted instrument to use it in the current study. The K-PTGI consists of 16 questions, which are scored on a Likert-type scale ranging from 0 ("I did not experience this") to 5 ("I experienced this to a very great degree"). The range of possible scores is 0–80, and higher scores indicate greater post-traumatic growth. The original instrument had a Cronbach's alpha of 0.9, and the K-PTGI, adapted and validated by Song et al. (2009), had a Cronbach's alpha of 0.91. In the current study, the Cronbach's alpha was 0.89.

Hope: The Hope Scale was developed by Cho (2009) for upper-grade elementary school students in Korea based on Snyder et al.'s (1991) hope theory. Permission was obtained for its use in the current study. The instrument contains 11 questions, which are scored on a five-point Likert-type scale ranging from 1 (strongly disagree) to 5 (strongly agree). Possible scores range from 11 to 55, and higher scores indicate higher levels of hope. At the time of development, the Cronbach's alpha was 0.86; in the current study, a Cronbach's alpha of 0.94 was observed.

Self-efficacy: The Korean version of the Self-Efficacy Scale, developed by Sherer et al. (1982), was used to measure general self-efficacy (i.e., self-efficacy measured in general circumstances); permission was received from the authors. The Korean version of the Self-Efficacy Scale consists of 17 questions that are scored on a Likert-type scale ranging from 1 (strongly

disagree) to 5 (strongly agree). Possible scores range from 17 to 85, and higher scores indicate higher self-efficacy. At the time of development, the Cronbach's alpha was 0.86; in the current study, the Cronbach's alpha was 0.84.

Covariates

In terms of participants' general characteristics, the current study investigated sex, current age, religion, whether the participant was currently attending school, school grades, personality, whether the participant had siblings, and economic status. Regarding whether participants were currently attending school, those who were not attending school because they were on leave or had graduated were considered to be not currently attending school. For school grades, participants were asked to choose among high, middle, and low in response to the question "How are your grades in school?" In terms of personality, participants were asked to choose either extrovert or introvert based on the following question: "Which side is your personality closer to?" For economic status, participants were asked, "What do you think your family's economic level is?" and selected among high, middle, and low.

In terms of participants' disease-related characteristics, the current study investigated diagnosis, recurrence, whether the participant currently had complications, treatment method, age at diagnosis, treatment duration, and treatment status. Diagnosis was classified as hematologic cancer or solid tumor. In terms of treatment method, participants were classified as only receiving chemotherapy or also receiving treatments other than chemotherapy (e.g., radiation therapy, surgery, hematopoietic stem cell transplantation). Treatment status was divided into three groups: on maintenance treatment, completed treatment during the past year, and completed treatment one year ago or greater. General characteristics were self-reported, and disease characteristics were obtained from the survivors and their parents.

Data Collection

Data collection was performed from December 2017 to December 2018 after receiving approval from the institutional review board and the head of the relevant department. A specialist nurse in the childhood cancer ward explained the study objectives to each participant and obtained voluntary written consent, after which the questionnaire was administered in an outpatient consultation room. This was done while participants were awaiting their blood test

results. The questionnaire took about 15 minutes to complete.

Statistical Analysis

Data in this study were analyzed using IBM SPSS Statistics, version 24.0. The participants' general and disease-related characteristics were analyzed using frequency, mean, and standard deviation (SD). Participants' hope, self-efficacy, and post-traumatic growth were presented as mean and SD. Differences in post-traumatic growth according to general and disease-related characteristics were analyzed using *t* tests and analysis of variance, and Scheffé's test was used for post-hoc analysis. The correlations between hope, self-efficacy, and post-traumatic growth were analyzed using Pearson's correlation. To investigate factors affecting post-traumatic growth, a multiple regression analysis was performed. For all results, statistical significance was defined as $p < 0.05$.

Research Ethics

For ethical protection of the participants, approval was obtained from the institutional review board where the study was conducted. Participants were given an explanation of the study objectives and methods in writing, and the study was performed with voluntary consent. Participants were informed that they could withdraw at any time, and participants' anonymity was guaranteed. Participants were informed that the results would not be used for anything other than research purposes and that the results would be destroyed following the study. Written informed consent was obtained from each participant and their guardian.

Results

Post-Traumatic Growth According to Sample Characteristics

Tables 1 and 2 show the results of differences in post-traumatic growth according to the participants' general and disease-related characteristics. Among the general characteristics, post-traumatic growth differed significantly depending on personality ($t = 2.22, p = 0.029$), the presence or absence of siblings ($t = -2.68, p = 0.009$), and the family's economic status ($F = 5.77, p = 0.004$). Greater post-traumatic growth was associated with extroverted personality and the presence of siblings. In addition, in a post-hoc analysis, the high economic status group showed greater post-traumatic growth than the low economic status group. The other general characteristics—current age, sex, religion, whether the participant was

currently attending school, and school grades—were not associated with significant differences in post-traumatic growth. The disease-related characteristics of diagnosis, recurrence, complications, treatment method, age at diagnosis, treatment duration, and treatment status were also not associated with significant differences in post-traumatic growth.

Post-Traumatic Growth, Hope, and Self-Efficacy

Participants' mean total hope score was 41.19 (SD = 7.38), their mean total self-efficacy score was 60.82 (SD = 8.21), and their mean total post-traumatic growth score was 54.53 (SD = 2.23). When the correlations between hope, self-efficacy, and post-traumatic growth were investigated, post-traumatic growth showed significant positive correlations with hope ($r = 0.588, p < 0.001$) and self-efficacy ($r = 0.298, p = 0.001$). Consequently, higher hope and self-efficacy were associated with higher post-traumatic growth.

Factors Affecting Post-Traumatic Growth

To investigate the factors affecting post-traumatic growth, a multiple regression analysis was performed, with hope and self-efficacy as independent factors and personality, the presence or absence of siblings, and economic status as general characteristics; significant differences were observed (see Table 3). To test the basic hypothesis of the regression analysis for independent factors, collinearity was investigated. For all variables, tolerance was 0.1 or greater (range = 0.5–0.96), the variance inflation factor was 10 or less (range = 1.04–2), and the correlation between the independent variables was 0.8 or less, indicating that there were no problems with collinearity between the independent variables.

The regression model was significant ($F = 13.74, p < 0.001$). The factors that significantly affected post-traumatic growth were the presence of siblings ($\beta = 0.15, p = 0.038$), high economic status ($\beta = 0.2, p = 0.009$), and hope ($\beta = 0.64, p < 0.001$); the most important of these factors was hope. The explanatory power of the multiple regression model for post-traumatic growth was 40%.

Discussion

This study aimed to investigate the relationships between post-traumatic growth, hope, and self-efficacy in survivors of childhood cancer and analyze the factors affecting post-traumatic growth in them.

Survivors of childhood cancer showed a mean hope score of 41.19 (SD = 7.38), which is above average.

Although the same instrument was not used, other studies of Korean survivors of childhood cancer reported scores of 35 and 36 (of 48), which can be considered similar to the findings of the current study (Hong & Park, 2015; Shin, 2018). In comparison, survivors of childhood cancer in Hong Kong had a hope score of 29 (of 48), meaning that the hope scores were

slightly higher in Korean childhood cancer survivors (Ho et al., 2019). Individuals with high levels of hope tend to complain less and have fewer psychiatric symptoms because they have more positive thoughts, leading to even more positive outcomes (Yuen et al., 2014). Therefore, it is necessary to measure the extent of hope in survivors of childhood cancer, provide

TABLE 1. Differences in Post-Traumatic Growth According to General Characteristics of Survivors of Childhood Cancer (N = 117)

Characteristic	n	Post-Traumatic Growth			p
		\bar{X}	SD	t or F	
Current age (years)				0.76	0.52
11–13	35	56.6	12.66	–	–
14–16	35	52.37	13.32	–	–
17–19	35	55.06	12.18	–	–
20–30	12	53.25	6.61	–	–
Sex				–0.4	0.693
Male	71	54.17	12.47	–	–
Female	46	55.09	11.95	–	–
Religion				0.97	0.409
Christian	33	54.09	14.63	–	–
Buddhist	15	57	12.72	–	–
Catholic	8	60.25	8.71	–	–
None	61	53.41	11	–	–
Currently attending school				–0.24	0.81
Yes	87	54.37	12.51	–	–
No	30	55	11.57	–	–
School grades				0.65	0.525
High	37	55.43	11.03	–	–
Middle	59	54.93	12.8	–	–
Low	21	51.81	12.79	–	–
Personality				2.22	0.029
Introvert	67	52.4	12.13	–	–
Extrovert	50	57.38	11.88	–	–
Siblings				–2.68	0.009
Yes	101	55.7	12.38	–	–
No	16	47.13	8.17	–	–
Economic status				5.77	0.004
High	12	65.25	10.13	–	–
Middle	87	52.97	11.74	–	–
Low	18	54.94	12.76	–	–

Note. The characteristic of school grades refers to grades received in terms of evaluation of learning and performance.
Note. For post-traumatic growth, the range of possible scores is 0–80, with higher scores indicating greater post-traumatic growth.

interventions that can improve hope with proactive interest, and support those who show low hope scores.

The mean self-efficacy of survivors of childhood cancer in this study was 60.82 (SD = 8.21), which was above average. Because there are almost no previous studies that have measured self-efficacy in survivors of childhood cancer, direct comparisons are difficult; however, in a study by Mystakidou et al. (2015) involving adult patients with cancer, the self-efficacy score was 26 (of 40), which can be considered similar to the scores in the current study. Although using different

instruments than the current study, a study by Kang and Noh (2012) of healthy children reported a mean self-efficacy score of 2.52 (of 5), which, when compared with the current study, shows that survivors of childhood cancer had higher self-efficacy. Self-efficacy does not develop instantaneously but rather develops gradually through age and experiences related to repeated tasks (Yoon, 2017). The survivors of childhood cancer in the current study were receiving maintenance therapy or had completed treatment; therefore, they had expanded their capabilities by perceiving themselves more positively through their experiences.

TABLE 2. Differences in Post-Traumatic Growth According to Disease-Related Characteristics of Survivors of Childhood Cancer (N = 117)

Characteristic	n	Post-Traumatic Growth			p
		\bar{X}	SD	t or F	
Diagnosis				-0.22	0.825
Hematologic cancer	82	54.36	12.55	-	-
Solid tumor	35	54.91	11.6	-	-
Relapse				0.74	0.463
No	101	54.2	12.23	-	-
Yes	16	56.63	12.36	-	-
Complications				-1.19	0.237
No	105	54.08	12.11	-	-
Yes	12	58.5	13.09	-	-
Treatment type				-1.11	0.27
Chemotherapy and other ^a	76	55.54	10.59	-	-
Chemotherapy only	41	52.66	14.76	-	-
Age at diagnosis (years)				0.42	0.74
1-7	36	53.06	12.2	-	-
8-13	55	55.62	12.42	-	-
14-16	20	55	12.9	-	-
17-19	6	51.83	9.45	-	-
Treatment period (months)				0.3	0.88
12 or fewer	62	54.73	11.45	-	-
13-24	15	52.13	6.85	-	-
25-36	19	55.37	12.88	-	-
37 or greater	21	54.9	16.72	-	-
Treatment status				1.17	0.31
On maintenance treatment	5	61.4	15.43	-	-
Completed in past year	13	56.85	11.05	-	-
Completed 1 year ago or more	99	53.88	12.19	-	-

^a Includes radiation therapy, surgery, and hematopoietic stem cell transplantation

Note. For post-traumatic growth, the range of possible scores is 0-80, with higher scores indicating greater post-traumatic growth.

The mean post-traumatic growth score of survivors of childhood cancer in the current study was 54.53 (SD = 12.23), which was above average. Although different instruments were used compared to the current study, other studies of survivors of childhood cancer have reported post-traumatic growth scores of 48 and 66 (of 105) (Weinstein et al., 2018; Yi & Kim, 2014), meaning that the survivors in the current study had higher post-traumatic growth scores. Survivors of childhood cancer achieve post-traumatic growth by reacting and perceiving themselves positively, instead of passively accepting the negative image placed on them (Yi & Kim, 2014). This is supported by findings from the current study.

When the current authors investigated the factors affecting post-traumatic growth in survivors of childhood cancer, the presence of siblings, high family economic status, and hope were significant. Self-efficacy showed a positive correlation with post-traumatic growth, but it was not a significant factor in the regression model. In contrast, hope showed the strongest explanatory power for post-traumatic growth. Given that previous studies have also reported that hope has a significant effect on post-traumatic growth, this demonstrates the necessity of interventions to improve hope in individuals who have experienced trauma (Jeon & Kim, 2016; Kim & Kim, 2012; Yuen et al., 2014). The significance of this can be surmised based on claims that when individuals with high hope encounter difficulties associated with a cancer diagnosis, they hope that they can overcome these difficulties and experience post-traumatic growth in the process of finding solutions (Jeon & Kim, 2016; Snyder et al., 1991; Tedeschi

& Calhoun, 1996). Individuals with high levels of hope experience fewer psychiatric symptoms. This is because hopeful individuals have more positive thoughts about cancer, and this tends to lead to even more positive outcomes (Yuen et al., 2014). Hope is a key factor in enabling people to persevere in difficult times and provides remarkable resilience to many individuals with cancer (Kim et al., 2015; Penson et al., 2007). Likewise, the current study also demonstrated that hope acts as the factor with the greatest influence on post-traumatic growth in survivors of childhood cancer. Also, it is consistent with the results of a study by Haase et al. (2014), indicating that hope and family support significantly affect resilience.

Self-efficacy was also correlated with post-traumatic growth; however, it had no effect on post-traumatic growth. This is consistent with the findings of the study by Jeon and Kim (2016) involving the mothers of individuals with childhood cancer. However, the study by Mystakidou et al. (2015) involving adults with cancer reported that self-efficacy does affect post-traumatic growth. In addition, health-care self-efficacy is reported to affect post-traumatic growth in survivors of childhood cancer. Therefore, additional research will be needed to verify whether post-traumatic growth during the process of cancer diagnosis and treatment results in higher self-efficacy in survivors of childhood cancer.

Finally, this study found that post-traumatic growth was higher in survivors with siblings and with high family economic status. Disease-related characteristics, such as diagnosis, treatment method, recurrence, and treatment status, did not affect post-traumatic growth. Results of previous studies

TABLE 3. Factors Influencing Post-Traumatic Growth (N = 117)

Variable	B	SE	β	t	p	Tol	VIF
Overall (constant)	19.79	9.64	-	2.05	0.042	-	-
Personality	-1.54	1.88	-0.06	-0.82	0.413	0.89	1.12
Siblings	5.2	2.61	0.15	1.99	0.038	0.96	1.04
Self-efficacy	-0.29	0.15	-0.19	-1.91	0.058	0.51	1.97
Hope	1.06	0.17	0.64	6.31	<0.001	0.5	2
Economic status: high	7.96	2.98	0.2	2.67	0.009	0.94	1.06
Economic status: low	2.24	2.49	0.07	0.9	0.37	0.96	1.04

β —standardized beta; B—unstandardized beta; SE—standard error; tol—tolerance; VIF—variance inflation factor
Note. R = 0.66, adjusted R² = 0.4, F = 13.74, p < 0.001

were inconsistent. In a study by Koutná et al. (2017) of survivors of childhood cancer aged 11–25 years, sex and age at the time of the survey affected post-traumatic growth, but other medical factors had no effect. In a study by Tremolada et al. (2016) involving childhood cancer survivors aged 15–25 years, sex, current age, age at diagnosis, and time since the end of treatment affected post-traumatic growth, but diagnosis and hematopoietic stem cell transplantation did not have any effect. In the Childhood Cancer Survivor Study, age at diagnosis, severe chronic health conditions, cancer recurrence or relapse, and diagnosis of a non-central nervous system cancer were found to affect post-traumatic growth (Weinstein et al., 2018). Meanwhile, a study restricted to survivors of childhood cancer who had completed treatment within the past six months reported that, for survivors of bone tumors only, post-traumatic growth was low and unrelated to sex, age, treatment method, treatment duration, and treatment intensity (Arpawong et al., 2013). In studies of survivors of childhood cancer in South Korea, only age at diagnosis and time since the end of treatment were found to affect post-traumatic growth (Yi, 2015; Yi & Kim, 2014).

The demographic and disease-related characteristics affecting post-traumatic growth differ among studies. This could be the result of differences in survey instruments, participant age, timing of the survey, or surveyed variables, or even large disparities in the age of onset. Another possible explanation is that post-traumatic growth may not reflect negative outcomes or the absence of distress. To experience post-traumatic growth, an individual needs to directly encounter a challenging or shocking incident that causes them to experience both distress and growth (Weinstein et al., 2018). Therefore, the effects of demographic and disease-related factors on the post-traumatic growth of survivors of childhood cancer need to be investigated further, and hope-based interventions will be important for various demographic and disease-related characteristics. Accordingly, if hope could be improved during the negative and positive experiences of survivors of childhood cancer, it would enable more post-traumatic growth.

Limitations

The current study had several limitations. First, because the participants were restricted to survivors of childhood cancer at an advanced general hospital in a single region of South Korea, the results may be difficult to generalize. For this reason, an expanded study

KNOWLEDGE TRANSLATION

- In survivors of childhood cancer, post-traumatic growth showed significant positive correlations with hope and self-efficacy.
 - Post-traumatic growth was affected more by siblings and economic status than by objective medical data.
 - Efforts are needed to improve post-traumatic growth in survivors who have no siblings or low economic status.
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including other regions may be useful. Second, the participants in this study were survivors of childhood cancer in a diverse age range, from elementary school students to adults; in some cases, the recommended age of the research instruments did not fit the age of the participants. Notably, medical staff and nursing professors specializing in childhood cancer judged that the use of these instruments would not be problematic. Nevertheless, additional studies that separate participants by age group and that select appropriate age-matched instruments are warranted. Despite the current study's limitations, it is the first to analyze the effects of hope and self-efficacy on post-traumatic growth in survivors of childhood cancer in South Korea. In addition, by identifying hope as an important factor affecting post-traumatic growth, this study has value in nursing by providing evidence for the development of effective nursing interventions to improve hope in survivors of childhood cancer.

Implications for Nursing

The findings of this study provided evidence of the need to develop effective intervention programs to improve hope in survivors of childhood cancer. If interventions were implemented in clinical practice and local communities to enable patients with childhood cancer and survivors to adopt a more hopeful attitude, then it would be expected that these individuals would develop more positive thoughts, regain awareness of the meaning of life, and experience post-traumatic growth. In addition, it will be necessary to focus more efforts on interventions to improve post-traumatic growth in survivors of childhood cancer who have no siblings or low economic status.

Conclusion

This study examined the correlations between hope, self-efficacy, and post-traumatic growth in survivors of childhood cancer and also investigated factors affecting post-traumatic growth. Survivors of

childhood cancer displayed higher than average hope, self-efficacy, and post-traumatic growth, and higher levels of hope and self-efficacy were associated with greater post-traumatic growth. In addition, the factors that affected post-traumatic growth were the presence of siblings, high family economic status, and hope; hope was the factor with the greatest effect on post-traumatic growth in survivors of childhood cancer.

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The research was funded by a grant from the National Research Foundation of Korea, funded by the Korean government (2019R1F1A1058944).

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