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Assessing Self-concept as a Mediator Between Anger and Resilience in Adolescents With Cancer in Taiwan

KEY WORDS

Adolescents with cancer
Anger
Mediator
Resilience
Self-concept

Background: Anger is considered a common method used by patients to relieve emotional frustrations. However, this emotional response is not a common research focus for adolescents with cancer. **Objective:** The aim of this study was to determine whether self-concept mediated the relationship between anger and resilience for adolescent patients currently being treated for cancer. **Methods:** A cross-sectional study of 40 adolescents with cancer was conducted. The instruments included the Chinese Beck Self-Concept Inventory, the Chinese Beck Anger Inventory, and the Chinese Resilience Scale. Mediation analysis was also conducted. **Results:** The results indicate that (1) variations in anger significantly account for 6.86% of observed variations in self-concept, (2) variations in self-concept significantly account for 52.83% of observed variations in resilience, (3) variations in anger significantly account for 10.96% of observed variations in resilience, and (4) when paths in conditions 1 and 2 were controlled, variations in anger through self-concept significantly account for 54.04% of observed variations in resilience, and variations in anger did not significantly account for observed variations in resilience.

Conclusions: Gender and age might affect anger control. Despite worse physical functioning and an impacted appearance, participants had normative-to-positive self-concept levels, suggesting that their self-concept might not be affected by cancer. Self-concept might play a mediating role between anger and resilience, thus helping to bridge this knowledge gap. **Implications for Practice:** The current gap in

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knowledge regarding the mediating relationship necessitates the implementation of a large-scale study designed to verify the mediating role of self-concept between anger and resilience.

Anger, one of the most reported psychosocial symptoms of adolescents with cancer,¹ is considered as a common method that is used by patients to communicate and relieve their emotional frustrations. Anger is significantly negatively correlated with adolescents' optimism.² Inability to cope effectively with anger may negatively impact a patient's physical and psychological well-being³ in the realms of resilience⁴ and self-concept.^{2,5} However, this emotional response is not a common research focus for this population.

Resilience, the capacity of individuals to successfully maintain their psychosocial well-being in the face of adversity,⁶ is a positive health concept that may be used to improve psychosocial well-being and quality of life in adolescents with cancer.⁷ Much previous research has focused on adverse consequences of cancer experiences. A more complete understanding of resilience would enable healthcare providers to foster resilience in clinical practice so as to meet the psychosocial needs of adolescents with cancer. Designing evidence-based interventions aimed at decreasing the negative impact of anger on resilience can be advanced by examining the potential mediation effect between anger and resilience. Although the National Institutes of Health has acknowledged that resilience in the face of adversity is a topic that remains inadequately understood,⁸ the examination of a mediation effect between anger and resilience has not received much attention among the adolescent patient population with cancer.

Self-concept correlates with both anger⁵ and resilience⁹ and enhances the desirable outcomes in psychosocial situations.¹⁰ These findings provide evidence that self-concept may mediate the effect of anger on resilience.¹¹ The continued investigation of this mediation relationship among self-concept (mediator), anger (the independent variable), and resilience (the dependent variable) for adolescents with cancer has the potential to expand knowledge and identify useful avenues for psychosocial interventions that could enhance the well-being of adolescent patients with cancer who undergo such treatment in clinical practice.

■ Literature Review

Adolescent Cancer and Its Impact

Defined by World Health Organization, adolescence includes the ages of 10 to 18 years.¹² Adolescents experience a radical change in the biologic, psychosocial, emotional, and intellectual aspects of growth and development.¹³ Adolescents with cancer are further burdened by the difficulties of cancer treatment and dealing with death. They have lower survival rates and poorer health outcomes than either children or adult patients with cancer.^{14–16} Even so, between 1975 and 2006, the cancer survival rate for adolescents improved dramatically.¹⁷ This extended survivorship has broadened the focus from the

efficacy of medical treatments to include the psychosocial well-being of cancer survivors.

According to Erikson's psychosocial development theory, adolescents face developmental tasks: role identity versus role confusion, confronting challenges to reestablish self-identity. They tend to ask themselves existential questions, such as "Who am I? Who can I be?", which reflect the concern that adolescents have about how they are perceived by themselves or others.¹⁸

Self-concept, Anger, and Resilience

SELF-CONCEPT

Self-concept is the core of personality and encapsulates self-evaluation about one's own character, abilities, appearance, attitudes, emotions, and values.¹⁹ Concepts similar to self-concept include self-esteem, self-perception, self-image, self-evaluation, and body image.^{20,21} The self-concept of adolescent patients with cancer is significantly worse than that of their healthy peers,²² which may be secondary to the side effects of cancer treatments, such as alopecia, weight gain, muscle wastage, and amputation. However, adolescents have also reported increased satisfaction with their appearance and decreased importance attached to appearance after experiencing cancer.²³ The difference in findings highlights the need for more research focusing on self-concept. Enhancing self-concept may be beneficial for adolescents to overcome crisis situations, such as being treated for cancer.²²

ANGER

Anger, a common response among patients with cancer, may develop at any time during treatment and survivorship.²⁴ Macartney et al¹ indicated that adolescents experience anger because of frustration and sadness over their physical impairment. Inappropriate expressions of anger may generate negative effects on an individual's physical and psychological well-being.³ Appropriately expressing anger may both diminish an individual's stress and provide the energy and strength necessary to overcome the challenges of cancer and treatment.²⁴ Thus, it is essential to direct anger in a positive manner by means of positive coping.⁵ As indicated by Cha and Sok,⁵ enhancing self-concept is important to successfully control anger and prevent depression.

RESILIENCE

Resilience is conceived as an interactive dynamic process that includes positive adaptation despite exposure to severe adversity.²⁵ Resilience focuses on how protective and risk factors impact on positive adaption, instead of only focusing on negative factors in adversity.⁷

Resilient individuals may exhibit characteristics of positive attitudes such as optimism and acceptance of illness.⁶ Most

adolescents with cancer experience a period of acute distress and mood disturbance after diagnosis, and only a small subset of this population experiences lingering problems.²⁶ Resilience may be an appropriate explanation of the positive psychosocial adjustment for adolescents with cancer.²⁷ As indicated by Wu et al,²⁸ adolescents with cancer demonstrate remarkable psychosocial resilience, which supports the finding in a review article that individuals who describe benefit-seeking from the experience of illness often report finding positive meaning in the adverse events, viewing the illness as a learning experience; they tend to have longer survivorship and better spiritual and mental well-being.⁶

There is still no consensus whether resilience is a trait, state, process, or outcome; nevertheless, there is an agreement that models of resilience should include factors described as “protective” and “risk.” A major problem with resilience is the lack of hypothesized paths, relating to whether these protective and risk factors generate direct or indirect effects reserved for individuals who possess certain attributes and who are relatively unaffected by adversity on resilience.²⁹

Theoretical Framework

The Adolescent Resilience Model (ARM) is the model that is often used to describe paths to enhancing or diminishing the psychological well-being of adolescents with cancer.²⁷ Originally, it was developed for adolescents with cancer for the purpose of guiding interventions that would help them to experience meaning during illness.²⁷ The ARM was used as the theoretical framework in this study.

The ARM treats resilience as a multidimensional concept, with other positive health concepts; for example, optimism is regarded as an antecedent of resilience.²⁷ Positive health is defined as the process of developing strength to manage stressors flexibly and gain a positive outcome and sense of confidence and mastery.³⁰ According to the ARM, enhancing the impact of resilience-related protective factors and diminishing resilience-related risk factors are 2 approaches to improving resilience. The conceptual structure and its conditions 1 to 4 is depicted in the Figure.

In summary, the literature review demonstrates the multiple influencing factors and the possible relationships among anger, self-concept, and resilience for adolescents with cancer. On the

basis of the literature review, in this study, anger was categorized as an emotive coping mechanism that would negatively affect resilience, whereas self-concept was categorized as an optimistic coping mechanism that would positively affect resilience.²⁷ Guided by the ARM, we hypothesize that self-concept mediates the effect of anger on resilience.

Study Objective

The objectives of this study were to (1) describe self-concept, anger, and resilience and (2) determine whether self-concept was a mediating variable between anger and resilience for adolescent patients currently being treated for cancer.

Methods

Design, Setting, and Sample

This cross-sectional, descriptive study was conducted between February and December 2014 at 3 pediatric oncology/hematology wards in university-affiliated hospitals in northern Taiwan. Approvals to conduct this research were obtained from the institutional review boards at the 3 hospitals.

A total of 60 eligible participants were invited to participate; of these, 40 agreed to take part in the study—a recruitment rate of 66.7%. Inclusion criteria were (1) 10 to 18 years old, (2) currently undergoing treatment of cancer, (3) able to speak and read Chinese, and (4) understand the study information. Parents of eligible participants aged 10 to 17 years gave consents for their child's study participation. Parents and the research assistant were present in case any assistance was needed. Parents of participants aged 18 to 20 years were not required to be present.

Once adolescents had agreed to participate, participants were compensated according to the protocol. Paper questionnaires were handed to participants, and completed questionnaires were returned to the research assistant. The research assistant would give friendly reminders if any missing data were noted. Participants were told that they had the right to stop at any time for any reason.

Instruments

The instruments of this study included a self-reported demographic questionnaire that was designed by the authors and 3 standardized questionnaires, including the Chinese Beck Self-Concept Inventory (BSCI-Y),³¹ the Chinese Beck Anger Inventory (BANI-Y),³¹ and the Chinese Resilience Scale (RS).³² Before conducting the current study, the 6 adolescents with cancer, two aged 10 to 12 years, two aged 13 to 15 years, and two aged 16 to 18 years, were recruited to assess the acceptability and feasibility of the questionnaires. Each reported that the questionnaires were appropriate for use and that they had no difficulties in comprehending the meaning of questionnaires.

The BSCI-Y and BANI-Y are brief instruments that take into account changing developmental needs. They are useful

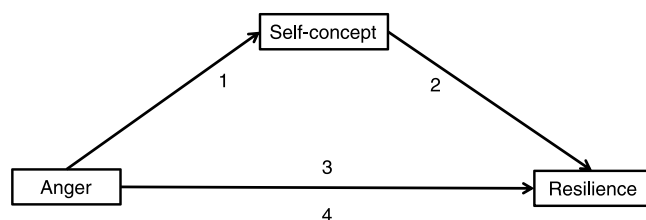


Figure 1 The mediation effect model. Note that condition 1 demonstrated the relationship between anger and self-concept, condition 2 demonstrated the relationship between self-concept and resilience, condition 3 demonstrated the relationship between anger and resilience, and condition 4 demonstrated the relationship between anger and resilience after controlling for conditions 1 and 2.

in screening children and adolescents aged 7 to 18 years who may be at risk of developing maladaptive thoughts or behaviors.³³ The BSCI reflects optimal perceptions of positive self-worth, self-esteem, potency, and competency.^{33,34} This inventory uses a 4-point Likert scale (from 0 to 3) to gauge responses to 20 items, yielding a single raw score with a possible range of 0 to 60 that may be translated into a *t* score that is assigned by age and gender. A *t* score of 39 or less indicates low self-concept, 40 to 44 indicates a slightly lower than average self-concept, 45 to 55 indicates an average self-concept, and 56 or higher indicates a higher than average self-concept. A higher BSCI *t* score indicates a higher level of optimal perceptions of competency and self-concept. The Cronbach's α range for the BSCI is .92 to .94, and test-retest reliability is 0.81, which indicates that the BSCI provides consistent reliability.³¹ Furthermore, the BSCI has demonstrated good construct validity and criterion-related validity.³¹

The BANI was developed and normed using standardization samples. This inventory is typically used with adolescents to evaluate thoughts of unfair treatment by others and feelings of anger and hatred as a standard measure of hostility, physiological overarousal, and perceptions of aggressive attributions of others.^{33,34} The measure uses a 4-point Likert scale (0-3) to gauge responses to 20 items, yielding a single raw score with a possible range of 0 to 60 that may be translated into *t* scores assigned by age and gender. *t* Scores allow profile analysis, which assists in conceptualizing how anger works within the context of an individual's overall distress. *t* Scores of 55 or less indicate an average score, 55 to 59 indicate mildly elevated anger, 60 to 69 indicate moderately elevated anger, and 70 or higher indicate extremely elevated anger. A higher BANI *t* score indicates a higher level of anger, whereas a lower BANI *t* score indicates a lower level or absence of anger. The Cronbach's α range for the BANI is .91 to .94, and test-retest reliability is 0.74, which indicates that the BANI provides consistent reliability.³¹ Furthermore, the BANI has demonstrated good construct validity and criterion-related validity.³¹

The RS, developed by Wagnild,³² is regarded as the best survey instrument for researching resilience among adolescents.³⁵ The Chinese version of the RS uses a 7-point Likert scale of 25 items, with total possible scores ranging from 25 to 175. Higher scores on the RS are associated with higher resilience, scores equal to or greater than 147 indicate high resilience, scores ranging from 121 to 146 indicate average resilience, and scores less than 121 indicate weak resilience. Cronbach's α for the Chinese version of the RS is .95. The test-retest reliability for the total scale was 0.80.³⁶

Statistical Analyses

All statistical analyses were carried out using R (version 3.0.4). Demographic characteristics of the study cohort were characterized using frequency and percentage. Mean (SDs) of the scores for self-concept, anger, and resilience were calculated by demographic group. *t* Tests were used to compare the differences among the means of each group, with *P* values less than .05 representing a significant difference in mean values.

Pearson correlation was used to examine the relationship between self-concept, anger, and resilience.

A series of regression equations originally outlined by Baron and Kenny¹¹ were conducted to examine whether self-concept mediated the effect of anger on resilience. Hierarchical multiple regression was used to determine the mediation relation. Self-concept functions as a mediator when it meets the following conditions: (1) variations in levels of anger significantly account for variations in self-concept, (2) variations in self-concept significantly account for variations in resilience, and (3) first, the direct effect of anger on resilience is significant, and second, the indirect effect of anger on resilience through self-concept is significant when paths in conditions 1 and 2 are controlled and a previously significant direct effect is no longer significant.¹¹ Sobel test examines whether the indirect effect is significant.¹¹

Results

Demographic Characteristics

A total of 40 qualified individuals agreed to participate in this study, including 23 men and 17 women with a median age of 14.88 years (range, 10-18 years). All participants were currently receiving cancer treatment. One-third of the participants (32.5%) had osteosarcoma, 30.0% had acute lymphoblastic leukemia (ALL), and 15.0% had lymphoma (Table 1).

Descriptive Statistics for the BSCI, BANI, and RS

The mean (SD) of BSCI, BANI, and RS scores are 52.5 (8.3), 43.9 (10.0), and 122.6 (27.9), respectively. Male participants had significantly higher scores than female participants in terms of anger ($P=.023$); participants aged 10 to 12 years had significantly higher scores than those aged 13 to 15 years in terms of anger ($P=.009$) (Table 1).

Relationships Among Self-concept, Anger, and Resilience

The results in Table 2 show a moderately significant and negative correlation between anger and resilience ($r=-0.403$, $P=.009$), a strongly significant and positive correlation between resilience and self-concept ($r=0.75$, $P<.000$), and a significant and negative correlation between anger and self-concept ($r=-0.344$, $P=.029$).

The Mediating Effect of Self-concept on the Relationship Between Anger and Resilience

After adjusting for age and gender, the results in conditions 1 to 4 were (1) variations in anger significantly account for 6.86% of observed variations in self-concept with $\beta=-0.30$, $P=.037$; (2) variations in self-concept significantly account for 52.83% of observed variations in resilience with $\beta=2.51$, $P=.000$; (3) variations in anger significantly account for 10.96% of observed variations in resilience with $\beta=-1.18$,

| Table 1 • Descriptive Analysis: Demographic-based Differences in Self-concept, Anger, and Resilience | | | | | | | | | | | | |
|--|-----------|---------------------------|------|----------|--------------------|-------------------|--------------------------------|-----------------------|------|----------|--|--|
| Variables | n (%) | (BSCI) Self-concept Score | | | (BANI) Anger Score | | | (RS) Resilience Score | | | | |
| | | Mean (SD) | P | Post Hoc | Mean (SD) | P | Post Hoc | Mean (SD) | P | Post Hoc | | |
| Gender | | | | | | | | | | | | |
| Male | 23 (57.5) | – | .469 | – | 46.8 (10.7) | .023 ^a | – | 119.6 (29.8) | .441 | – | | |
| Female | 17 (42.5) | – | | | 40.0 (7.5) | | | 126.5 (26.4) | | | | |
| Age, y | | | | | | | | | | | | |
| Group 1: aged 10–12 | 8 (20.0) | 14.88 (2.26) | .383 | – | 50.3 (9.4) | .009 ^b | Group 1 > group 2 ^c | 111.2 (41.5) | .358 | – | | |
| Group 2: aged 13–15 | 15 (37.5) | | | | 38.3 (8.0) | | | 129.1 (24.5) | | | | |
| Group 3: aged 16–18 | 17 (42.5) | | | | 45.9 (9.7) | | | 122.1 (23.6) | | | | |
| Participant education | | | | | | | | | | | | |
| Elementary school | 20 (50.0) | – | .392 | – | 41.4 (11.0) | .215 | – | 121.3 (33.5) | .914 | – | | |
| High school | 17 (42.5) | | | | 47.1 (8.4) | | | 123.0 (21.6) | | | | |
| College/university | 3 (7.5) | | | | 42.3 (8.4) | | | 128.7 (32.7) | | | | |
| Diagnosis | | | | | | | | | | | | |
| ALL | 12 (30.0) | – | .406 | – | 42.8 (10.1) | .671 | – | 126.3 (34.1) | .637 | – | | |
| Non-ALL ^d | 28 (70.0) | – | | | 44.4 (10.0) | | | 121.0 (25.8) | | | | |
| Total scores | | | | | 43.9 (10.0) | | | 122.6 (27.9) | | | | |

^a $p < .05$.
^b $p < .01$.
^c Tukey test.
^d Osteosarcoma, AML, lymphoma, and others.

Table 2 • Pearson Correlations Among Self-concept, Anger, and Resilience

| Variables | Self-concept | Anger | Resilience |
|--------------|-------------------|-------------------|------------|
| Self-concept | | | |
| <i>r</i> | 1.00 | | |
| <i>P</i> | | | |
| Anger | | | |
| <i>r</i> | −0.345 | 1.00 | |
| <i>P</i> | .029 ^a | | |
| Resilience | | | |
| <i>r</i> | 0.750 | −0.403 | 1.00 |
| <i>P</i> | .000 ^b | .009 ^c | |

^a*P*<.05.

^b*P*<.001.

^c*P*<.01.

P=.013; and (4) when paths in conditions 1 and 2 were controlled, variations in anger through self-concept significantly account for 54.04% of observed variations in resilience with $\beta=2.32$, *P*=.000, and variations in anger did not significantly account for observed variations in resilience with $\beta=-0.49$, *P*=.171. In addition, the β of anger increased from −1.18 (condition 3) to −0.49 (condition 4) when self-concept was included in the equation, indicating that self-concept mediated 58.80% of the observed variance. The Sobel test showed a significant indirect effect (*P*=.033). The previously mentioned results of this study demonstrate that self-concept mediates the effect of anger on resilience among adolescents with cancer (Table 3).

Discussion

The first study aim was to describe self-concept, anger, and resilience. Men exhibited significantly higher levels of anger than women, which may indicate that men are less effective at controlling anger than their female peers. This finding is similar to a previously reported finding that young women are more likely to express their anger inwardly, whereas young men are more likely to express their anger outwardly.³⁷ This difference may be explained by neuroimaging data that revealed that “tend and befriend” is the predominant response of women to stress, whereas “fight or flight” is the predominant response of men.³⁸ In addition, the onset of puberty differs between genders. This difference may also result in differences in the

onset of maturation, causing gender-based differences in psychosocial responses to adversity.¹³

The youngest age group (10–12 years) in this study was more likely to have a significantly higher level of anger than the middle age group (13–15 years), a finding meriting more future studies. In addition, anger has been observed in pediatric patients receiving treatment of ALL, especially after administering corticosteroid, which is one of the major chemotherapeutic agents for pediatric patients with ALL.³⁹ In this study, the difference in anger between ALL and non-ALL patients was not statistically significant. The lack of statistical significance between ALL and non-ALL patients may be due to the study design, which does not specifically assess the impact of corticosteroids. A previous study that examined the impact of corticosteroids on behavior and quality of life in children treated for ALL collected data on the period of maintenance therapy, when high doses of corticosteroids are administered. The results associate corticosteroid consumption with behavioral and emotional disturbances and adverse effects on the quality of life in children with cancer.⁴⁰

In our study, the youngest age group displayed the worst resilience, a finding similar to that in a previous study of older adults with cancer having higher resilience than younger adults.⁴¹ However, this inference may not apply to an adolescent population given Smorti's⁴² assertion that resilience level may not reflect the true status of psychosocial health in adolescents with cancer. Smorti documented that adolescents with cancer have more optimistic expectations of the future, lower resilience, and a higher tendency to use avoidance strategies than their healthy counterparts and that their positive expectations of the future may be associated with positive adjustment to adversity or unrealistic optimism. This finding highlights the importance of health education for young patients with cancer on future expectations to reduce maladjustments to reality.

The resilience status of the study participants was in the lower normative score range (mean [SD], 122.61 [27.87]). A previous study conducted in the United States and using the same scale found a better resilience status in the middle of the normative score range (mean [SD], 134.62 [25.43]).²⁸ This discrepancy suggests that Taiwanese adolescents with cancer may have lower resilience than their US counterparts. On the basis of the ARM, resilience negatively relates to risk factors (ie, uncertainty, cancer symptoms, and/or defensive coping) and positively relates to protective factors that are amenable to interventions (ie, hope, positive coping, and/or perceived

Table 3 • Mediating Effect of Self-concept on the Relationship Between Anger and Resilience

| Sequence | Dependent Variable | Independent Variable | <i>R</i> ² | β | <i>P</i> | Mediation, % | Sobel Test (<i>P</i>) |
|-------------|--------------------|----------------------|-----------------------|---------|-------------------|--------------|---------------------------|
| Condition 1 | Self-concept | Anger | 0.0686 | −0.30 | .037 ^a | 58.80 | −2.12 ^a (.033) |
| Condition 2 | Resilience | Self-concept | 0.5283 | 2.51 | .000 ^b | | |
| Condition 3 | Resilience | Anger | 0.1096 | −1.18 | .013 ^a | | |
| Condition 4 | Resilience | Anger | 0.5404 | −0.49 | .171 | | |
| | | Self-concept | | 2.32 | .000 ^b | | |

Adjusted for age and gender.

^a*P*<.05.

^b*P*<.001.

social support).⁷ These patterns of protective and risk factors also differ across various countries. Thus, the previously mentioned indirect evidence provides us a future research focus on how cultural factors may affect resilience. Direct comparisons between Taiwan and other countries are necessary to assess the actual effects of culture influence on resilience in adolescents with cancer.

This study found no differences in self-concept by gender, age group, level of education, or cancer diagnosis. In addition, self-concept presented a normative/positive status in our population, demonstrating that cancer and its treatment may not generate significant adverse effects on the self-evaluation of participants regarding their “new body” during the cancer treatment trajectory. These findings reflect the similar conclusions of a previous systematic review article there being no differences in body image between healthy adolescents and adolescents with cancer.²⁰ The adolescents indicated being satisfied with their current imperfect appearance and physical functioning.⁴³

The Mediating Role of Self-concept on the Relationship Between Anger and Resilience

Our findings support the contention that self-concept mediates the anger-resilience relationship by reducing the negative impact of anger on resilience. The negative effect of anger on resilience of adolescents with cancer may be further improved by enhancing their self-concept. This finding confirms that of a previous study, which found that health promotion programs have the potential to bolster self-concept and thus diminish the harm caused by anger in adolescent healthcare.² Another similar study indicated that self-concept plays a mediating role on resilience characteristics and psychosocial well-being in healthy adolescents participating in an exercise program.⁴⁴ Thus, self-concept may be an influential factor with attempts to improve resilience and well-being of adolescents treated for cancer, which is consistent with the finding that self-concept is frequently reported to be predictive of better resilience.⁶ Helping patients to look past immediate illness hardships and have a positive anticipation of a healthier status in the near future may be essential to trigger patients' motivations to engage in health promotion.⁶

Currently, services designed to enhance the self-concept of adolescents with cancer are uncommon in clinical settings in Taiwan. It is the healthcare provider's professional responsibility to provide adolescents with cancer age- and disease-specific health education. To minimize the disruptions from cancer experiences and to maintain a state of normality, strategies concerning both physical and psychosocial aspects merit consideration.

Providing health education regarding changes in appearance, physical function, and peer relationship may help adolescents with cancer to actively participate in self-care and self-security and control.⁴⁵ Carefully assessing adolescents' concerns and sensitive and empathic explanations to details matters while initiating this health education. Physical activities, such as yoga or tai-chi, enhance mind-body experiences and may enrich the inner self for adolescents with cancer.⁴⁵ In addition,

support by other adolescents with cancer is considered invaluable by adolescents with cancer because the information, understanding, empathy, and acceptance received from support groups are very useful and their value is difficult to replace.⁴⁶

■ Limitations

This study may be affected by limitations common to studies with small convenience samples. This study was conducted at 3 medical centers in northern Taiwan dedicated to pediatric oncology care. Thus, our findings preclude generalization beyond this type of hospital setting or other cultural or geographic settings. Social desirability must be carefully considered in the context of assessing variables such as self-concept, anger, and resilience.⁴⁷ To decrease the potential for bias, researchers had to promise to protect the identities of all participants through an anonymous survey.

■ Implications for Nursing Practice and Nursing Research

The routine evaluation of self-concept, anger, and resilience of adolescent patients in pediatric oncology wards is recommended. Routine self-reported assessments may be integrated into hospital check-in procedures in pediatric oncology settings. More attention may be focused on anger control for male adolescents aged 10 to 12 years. Providing timely gender- and age-specific interventions in response to self-reported concerns for assisting anger adjustment among adolescents with cancer is essential. Evaluating adolescents' expectations regarding their future and clarifying what they need to know are important to enhance adjustment. Furthermore, in-service education that enhances the ability of nurses to detect patients' anger levels may help them to focus greater attention on this important but often neglected health issue in clinical practice.

The current gap in scholarly knowledge regarding the mediating relationship among self-concept, anger, and resilience necessitates the implementation of a large-scale study designed to verify the mediating role of self-concept. In addition, conducting research to examine the effect of corticosteroid on anger for adolescents with cancer is necessary. Furthermore, conducting international studies in different countries is important to assess the impact of culture on resilience.

■ Conclusions

This study reached 3 primary conclusions. First, gender and age might significantly affect anger control. Second, despite a worse physical functioning and changed appearance, participants in this study had normative-to-positive self-concept, indicating that their self-concept might not have been affected by cancer or its treatment. Third, self-concept might play a mediating role between anger and resilience, thus helping to bridge the current knowledge gap among self-concept, anger,

and resilience. The study provides evidence-based support for the importance of improving psychosocial well-being in adolescent patients with cancer.

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