The Impact of Hematologic Cancer and Its Treatment on Physical Activity Level and Quality of Life Among Children in Mainland China

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Abstract:	Background: The effects of hematologic cancer and its treatment on Chinese children's physical activity level and quality of life (QoL) remain unclear despite numerous studies conducted in Western countries and Hong Kong. Objective: To examine the effects of hematologic cancer and its treatment on the physical activity level and QoL among Chinese children. Methods: A cross-sectional study was conducted. One hundred twenty-five children who were admitted for treatment of hematologic cancer and 243 healthy counterparts of similar age participated in this study. All participants were asked to complete the Chinese University of Hong Kong: Physical Activity Rating for Children and Youth and Pediatric Quality of Life Inventory. The children with hematologic cancer also completed a therapy-related symptom checklist. Results: There were statistically significant differences in the mean physical activity and QoL between children with hematologic cancer and their healthy counterparts. Multiple regression analyses showed that physical activity levels and the side effects of hematologic cancer treatment had statistically significant effects on the children's QoL. Conclusions: Physical activity level and QoL in children with hematologic cancer were

	both lower than in their healthy counterparts. Implications for Practice: This study provides further evidence that hematologic cancer and the side effects of its treatment have negative effects on Chinese children's QoL. Although a lack of physical activity is deeply embedded in Chinese culture, nurses should take a proactive role in effecting change by educating parents about the benefits to their children's physiologic and psychological well-being of physical activity during and after treatment.

The Impact of Hematologic Cancer and Its Treatment on Physical Activity Level and Quality of Life among Children in Mainland China: A Descriptive Study

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Abstract

Background: The effects of hematologic cancer and its treatment on Chinese children's physical activity level and quality of life (QoL) remain unclear despite numerous studies conducted in Western countries and Hong Kong.

Objective: To examine the effects of hematologic cancer and its treatment on the physical activity level and QoL among Chinese children.

Methods: A cross-sectional study was conducted. One hundred twenty-five children who were admitted for treatment of hematologic cancer and 243 healthy counterparts of similar age participated in this study. All participants were asked to complete the Chinese University of Hong Kong: Physical Activity Rating for Children and Youth and Pediatric Quality of Life Inventory. The children with hematologic cancer also completed a therapy-related symptom checklist.

Results: There were statistically significant differences in the mean physical activity and QoL between children with hematologic cancer and their healthy counterparts. Multiple regression analyses showed that physical activity levels and the side effects of hematologic cancer treatment had statistically significant effects on the children's QoL.

Conclusions: Physical activity level and QoL in children with hematologic cancer were both lower than in their healthy counterparts.

Implications for Practice: This study provides further evidence that hematologic cancer and the side effects of its treatment have negative effects on Chinese children's QoL.

Although a lack of physical activity is deeply embedded in Chinese culture, nurses should take a proactive role in effecting change by educating parents about the benefits to their children's physiologic and psychological well-being of physical activity during and after treatment.

Introduction

Hematologic cancer is the most common type of cancer among children and adolescents worldwide.[1] As of 2012, hematologic cancer accounted for nearly one in three childhood cancers, and the annual incidence of hematologic cancer in children has been increasing.[2] According to the *Children and Cancer* report by the World Health Organization (WHO),[3] the incidence of hematologic cancer ranged from 37.2 to 47.3 per million in Finland, the United Kingdom, Japan, Sweden, the United States, Iceland, and Denmark, and is still steadily increasing every year. The epidemiologic picture is similar in mainland China, where the incidence reached 53 per million by 2013 and continues to rise.[4]

Hematologic cancer and the side effects of its treatment can be devastating to children. The primary treatment for hematologic cancer in mainland China is chemotherapy.[5] Children receiving chemotherapy often suffer from adverse effects such as nausea, vomiting, fatigue, lack of appetite, pain, and lethargy, [6-8] severely affecting their physical and psychological well-being and consequently impairing their quality of life.[9,10]

Understanding the adverse effects of cancer treatment can facilitate health professionals' implementation of appropriate interventions to improve the physical and psychological well-being and quality of life of children with hematologic cancer. In particular, compelling evidence

shows that regular physical activity ameliorates the adverse effects of cancer and its treatment.[11] It is crucial therefore to also assess the physical activity level of children with cancer. Numerous studies on the effects of cancer on children's physical and psychological well-being have been published,[12,13] but most were conducted in Western countries,[14,15] and only a few were focused on Hong Kong,[8,9] which was a former British colony and has thus been greatly influenced by Western culture for more than a century. Because of cultural differences, it is difficult to generalize the findings of studies that examine the effects of cancer on Hong Kong Chinese children's physical and psychological well-being to mainland China.[8,9,16] Indeed, a review of the literature reveals that no study has been conducted to examine the effects of hematologic cancer and the side effects of its treatment on children in mainland China. [17] The aim of this study was therefore to examine the effects of hematologic cancer and adverse treatment effects on the physical activity level and quality of life of hospitalized children in mainland China.

Conceptual framework

The literature indicates that culture influences how patients understand and interpret a disease and its treatment.[18] Therefore, the cultural differences between Chinese and Western societies, especially in terms of the philosophies of care and treatment, may affect children's responses to

hematologic cancer and its treatment-related adverse effects, resulting in different effects on their physical and psychological well-being.[19]

There are some cultural issues specific to mainland China. First, the philosophy of care in China focuses on medical treatment and physiologic outcomes. The other effects of hematologic cancer on the psychological well-being and quality of life of children, and particularly the effects of treatment side effects, are often underestimated or overlooked.[20] Also, mainland China has a long history of independent philosophical and religious development, which strongly influences people's way of life and their concepts of health.[21] In mainland China, children and their parents are generally conservative and superstitious because of the influence of Confucianism.[22] Most believe in traditional Chinese medicine, which emphasizes achieving health by maintaining harmony in the body.[23] This practice encourages children with hematologic cancer to rest and sleep more, especially during the treatment period, and to avoid high-energy physical activities. Notwithstanding that engaging in regular moderate-intensity physical activity can help ameliorate some adverse treatment-related effects, particularly fatigue and decreased functional capacity, [24,25] this philosophical belief may lead to physical inactivity, which can aggravate adverse treatment-related effects and their effects on children with hematologic cancer. Family structure also differs significantly in mainland China compared with Western countries and Hong

Kong, especially since the implementation of China's one-child policy in 1979. As a result of this policy, parents spent much more of their time raising their child,[26] and many were overprotective.[27] As a result, the children were more vulnerable to psychological distress and less resilient than those of previous generations.[28] Furthermore, children with hematologic cancer in mainland China may not have the psychological support and encouragement of siblings, which may profoundly affect their psychological well-being.[29] Figure 1 shows a conceptual framework that illustrates how these cultural issues in mainland China might affect the effects of treatment side effects on the psychological well-being of children with hematologic cancer. [30]

Methods

Design

A cross-sectional study was conducted in Beijing. Three tertiary hospitals that have pediatric oncology units were chosen for this study.

Subjects

Chinese children were eligible to be included if they (a) were 9 to 16 years of age, (b) were able to speak Mandarin and read simplified Chinese, and (c) had received a diagnosis of hematologic cancer and had been hospitalized for treatment. Children with evidence of recurrence or secondary malignancies and those with cognitive and learning disabilities identified from their

medical records were excluded. A community sample of healthy children of similar age in Beijing was selected for comparison.

We understand that children younger than 9 years of age also suffer from the devastating effects of hematologic cancer. However, these children may not possess adequate cognitive skills to comprehend the questionnaires. After a discussion among the research team, we decided to recruit only patients between 9 and 16 years of age, which is also the age range commonly adopted for subject recruitment in our previous studies on pediatric cancer.[31]

The sample size of this study was calculated based on the literature. A review reported that the correlation coefficient between the side effects of cancer treatment and quality of life in children with hematologic cancer was 0.25.[32] Two studies indicated that the correlation coefficients between the side effects of cancer treatment and physical activity and between physical activity and quality of life for children with hematologic cancer were -0.33 and 0.66, respectively.[33,34] With reference to the guideline proposed by Cohen, the aforementioned correlation coefficients were arranged from small to large effect sizes (r), and the necessary sample size of this study was calculated using the smallest effect size.[35] An effect size at a 5% significance level ($p < 0.5$) and a power of 0.8 was used to predict the difference between the hematologic cancer group and the healthy group. Based on this estimation, at least 120

participants should be recruited in each group as calculated by G-power, and the minimum sample size required for this study was 240.

Measurement

Demographic and clinical data assessment

Demographic and clinical data, including age, sex, time since diagnosis, and types of treatment received, were collected.

Therapy-related symptom checklist for children (TRSC-Cp)

The TRSC-Cp was used to document the occurrence and severity of side effects experienced by our participants during their treatment for hematologic cancer.[7, 36] It includes 23 items. Each item is rated on a numeric scale from 0 (none) to 4 (a whole lot), with higher scores indicating greater severity of symptoms. The psychometric properties of this checklist were empirically examined in Chinese children, and it was found to have good internal consistency, reliability, concurrent validity, and construct validity.[9] Also, the internal consistency of this checklist in this study was 0.76, and the concurrent validity was 0.72, $p < .01$.

The Chinese University of Hong Kong: Physical Activity Rating for Children and Youth (CUHK-PARCY)

The CUHK-PARCY was used in previous studies to assess the physical activity of Hong Kong Chinese children.[11,16] It contains one item modified from the Jackson Activity Coding [37] and the Godin–Shephard Activity Questionnaire Modified for Adolescents.[38] This item is rated from 0 (no exercise at all) to ten (vigorous exercise on most days), accounting for frequency, duration, and intensity. Scores of 0 to 2, 3 to 6, and 7 to 10 represent low, moderate, and high physical activity levels, respectively. The psychometric properties of the scale were tested by Chung et al. in a cross-sectional study, which examined physical activity levels among Hong Kong Chinese childhood cancer survivors. [11] The results indicated that the scale has good internal consistency and test–retest reliability.

Pediatric Quality of Life Inventory (PedsQL): Cancer Module, Version 3.0

The cancer module of the PedsQL measures the health-related quality of life of children and adolescents between 2 and 18 years old with cancer.[39] It consists of 27 items that are each rated on a five-point Likert scale (0 = never a problem, 1 = almost never a problem, 2 = sometimes a problem, 3 = often a problem, 4 = almost always a problem). Each item's score is required to be reverse scored and linearly transformed into a scale of 0 to 100 (0 = 100, 1 = 75, 2 = 50, 3 = 25, 4 = 0). The score of each subscale is the average of item scores in that subscale, and the scale score is calculated by adding up the subscale scores. A higher score on the PedsQL indicates a

better quality of life. The psychometric properties of the Chinese version of the PedsQL have been validated in Chinese pediatric research and clinical settings.[40]

Pediatric Quality of Life Inventory: Generic Module, Version 4.0

The generic module of the PedsQL measures the health-related quality of life of healthy children and adolescents between 2 and 18 years old. It consists of 23 items that are rated on the same five-point Likert scale as the items in the cancer module. The scale has an internal consistency coefficient of 0.86 and test–retest reliability between $r = 0.62$ and $r = 0.8$.[41]

Although the questions in the generic module are different from those in the cancer module, Varni, Seid, and Kurtin[42] explained that the two modules were developed from the same measurement system, which allows researchers to directly compare the scores of patients with cancer and their healthy counterparts.

Procedure

Ethical approval to conduct this study in three hospitals in Beijing was obtained from the hospital ethical committee in mainland China (Reference number: 2014-753). To ensure that the rights of all participants were protected, especially given the vulnerability of the child subjects in this study, the researchers strictly adhered to the Declaration of Helsinki [43] and the ethical principles for designing and conducting clinical research. A leaflet describing the study was

posted on notice boards in the pediatric oncology units. Children and their parents who were interested in taking part in the study approached a nurse on the pediatric oncology unit. The purpose of the study was explained to parents, who were given the option of allowing or refusing to allow their child to participate. Written consent was obtained from parents who approved. The children were told that their participation was voluntary, and they were invited to sign a consent form.

After demographic and clinical data were obtained, children with hematologic cancer completed the Chinese version of the PedsQL cancer module and the therapy-related symptom checklist. Children in the comparison group completed the PedsQL generic module. All the participants completed the Chinese version of the CUHK-PARCY.

Data Analysis

SPSS version 20.0 (SPSS Inc., Chicago, IL) was used for data analysis. Descriptive statistics included the frequency, percentage, mean, standard deviation, and range of the scores for the different scales. Independent *t*-tests were conducted to compare the physical activity and quality of life of children with hematologic cancer and their healthy counterparts. The relationships between the demographic variables of the children with hematologic cancer and their scores on the different scales were assessed using the Pearson product-moment correlation coefficient (*r*).

Multiple regression analyses were used to identify variables that predicted quality of life. The results were considered to be statistically significant at the 5% level.

Results

A total of 149 children with hematologic cancer and 274 healthy counterparts were enrolled between June and September 2014. Although the minimum sample size for each group was 120, the recruitment of healthy children was conducted in a carnival that could not be terminated halfway. We therefore recruited 274 healthy children, which was more than our proposed sample size for each group. In addition, questionnaires from 24 children with hematologic cancer and 31 healthy children were largely incomplete. The analysis therefore included 125 children with hematologic cancer and 243 healthy children. The demographic and clinical characteristics of the children with hematologic cancer and their healthy counterparts are shown in Table 1. The mean age of the hematologic cancer group was 12.98 years (standard deviation = 2.58) and that of the healthy group was 13.15 (standard deviation = 2.37). Around 60% of the participants in the hematologic cancer group and 45% of the healthy group were male. Regarding the clinical characteristics of those in the hematologic cancer group, nearly 70% received chemotherapy treatment and most of them (81.6%) had been diagnosed with hematologic cancer within the

previous 12 months. The participants in the two groups were comparable in terms of their age (p=.54) but not sex (p = .01) by chi-square test.

The occurrence of treatment side effects among the children with hematologic cancer is shown in Figure 2. More than 50% reported nausea, vomiting, hair loss, fatigue, and depression, which were the most common treatment side effects. Table 2 shows the severity of treatment side effects as measured by the TRSC-Cp. The most severe side effect reported was hair loss (mean = 2.30), followed by feeling sluggish (mean = 1.43), depression (mean =1.38), nausea (mean = 1.33), vomiting (mean = 1.20), and pain (mean = 0.88). The number of treatment side effects reported by each child is shown in Figure 3. Fifteen treatment side effects were identified and 67% and 16% of children with hematologic cancer reported having 6 or more and 10 or more concurrent side effects, respectively.

The physical activity levels of the children with hematologic cancer and their healthy counterparts are shown in Table 3. Independent *t*-tests showed that there were statistically significant differences in mean physical activity (t [366] = −32.1, $p < .001$) and quality of life (t [366] = −6.6, $p < .001$) between the children with hematologic cancer and their healthy counterparts, with children with hematologic cancer scoring lower on both items.

The relationships among the scores on the different scales and the demographic data of the children with hematologic cancer were examined. A greater number of treatment side effects was associated with lower levels of physical activity and lower quality of life. There were significant negative correlations between the occurrence of treatment side effects and physical activity level ($r = -0.49$, $n = 368$, $p < .01$) and between the occurrence of treatment side effects and quality of life ($r = -0.45$, $n = 368$, $p < .01$). There was a significant positive correlation between physical activity level and quality of life ($r = 0.43$, $n = 368$, $p < .01$), indicating that a higher level of physical activity was associated with better quality of life for the children with hematologic cancer. In addition, there was a significant positive correlation between the type of treatment received and the occurrence of treatment side effects ($r = 0.29$, $n = 368$, $p < .01$), indicating that the children who received chemotherapy plus a bone marrow transplant reported a greater occurrence of treatment side effects.

A multiple regression analysis was performed to examine whether the type of treatment received, current physical activity levels, and the occurrence of treatment side effects in the children with hematologic cancer predicted their quality of life, after controlling for the possible effects of age, sex, diagnosis, and time since diagnosis. The results are shown in Table 4. The overall model explained 45% of the variance. After controlling for the possible effects of age,

sex, and time since diagnosis, the change in the R^2 value was 0.28. In other words, type of treatment received, physical activity levels and treatment side effects explained an additional 28% of the variance in quality of life. When all the variables were entered in the regression model only physical activity level and treatment side effects were statistically significant ($p < .05$), indicating that these two factors predict quality of life for children with hematologic cancer. The β coefficients for physical activity level and treatment side effects were 0.26 and −0.35, respectively, indicating that the occurrence of treatment side effects was a comparatively strong predictor of quality of life.

Discussion

China is an extremely large country with a population of more than 1.3 billion people and unique cultural features, family structure, and philosophy of medical care. The effects of hematologic cancer and the side effects of its treatment on children in mainland China remains unclear despite numerous studies conducted in Western countries and Hong Kong. This study examined the effects of hematologic cancer and treatment side effects on the physical and psychologic well-being and quality of life of children in mainland China, a topic of research that is underrepresented in the literature.

More than half of the children with hematologic cancer reported having six or more concurrent treatment side effects, a finding that should not be overlooked or ignored. Our results indicate that the occurrence of more treatment side effects in children hospitalized with hematologic cancer was associated with lower levels of physical activity and quality of life. These findings are consistent with those of previous studies conducted in the United States[6,7] and Hong Kong.[9,17] They provide further evidence that cancer treatments have adverse effects on physiologic and psychological well-being and affect children's quality of life.

Among all of the treatment side effects measured by the TRSC-Cp, we found that hair loss was the most severe when children underwent treatment for hematologic cancer, which is consistent with a previous study conducted in the West.[44] However, in contrast to the experience of children with cancer in Western countries,[6,15] feeling sluggish and depression were the second and third most severe treatment side effects encountered by the Chinese children in our study during treatment for hematologic cancer. These results might be attributable to the fact that physical inactivity is highly embedded in Chinese culture. Even though a large body of evidence shows that regular physical activity can help alleviate fatigue and improve muscle strength and endurance,[45] most people in mainland China are subject to the influence of Confucianism, which emphasizes that engaging in physical activity exacerbates cancer and cancer treatment because of

a violation of the rule of harmony. Hence, many parents in mainland China advise their children with hematologic cancer to rest more and not engage in moderate to vigorous activity.[22] However, this can result in muscle catabolism and atrophy, which in turn aggravates fatigue, lowers the functional capacity of muscles,[46] and can even lead to depression.[47]

When compared to one of our previous studies in Hong Kong, which examined the exercise behaviors of children with mixed cancers, [19] children in this study were more likely to abstain from physical activity (23.7% and 65.6%, respectively) and had a lower mean activity level (2.03 and 0.35, respectively). Both studies found a low level of physical activity among children with cancer. The situation appears to be more serious in mainland China, as more children in this study did not participate or only participated in low-intensity physical activity and very few engaged in moderate to vigorous activity. One possible reason is that Hong Kong is a considerably Westernized city with a culture heavily influenced by the West, whereas mainland China has remained more traditional and is still deeply influenced by Confucianism.

Similar to the findings of previous studies conducted on Hong Kong Chinese children with cancer,[9,19] the results of this study reveal that both physical activity levels and treatment side effects are indicators of quality of life among children with hematologic cancer. Although the results of multiple regression analysis indicated that treatment side effects formed a

comparatively strong predictor of quality of life among children with hematologic cancer, engaging in regular physical activity may ameliorate some adverse treatment-related effects,[48] thereby reducing treatment side effects and enhancing children's quality of life.

This study has several strengths. To the best of our knowledge, this is the first report of the effects of hematologic cancer and the side effects of its treatment on physical activity level and quality of life among children in mainland China. It is likely that the cancer experience is different for children with different diagnoses and treatments so only children with hematologic cancer, the most common childhood cancer, were invited to participate in this study. In addition, this study assessed quality of life among young cancer patients, which is of the utmost importance in gaining a better understanding of the effects of hematologic cancer and treatment side effects from the patient's perspective.[49,50]

There are some limitations to the study. All the data were collected in Beijing and the use of convenience sampling limits the generalizability of the results. The study compared physical activity levels between children with hematologic cancer and a healthy comparison group but did not assess the children's physical activity level prior to their hematologic cancer diagnosis. It is unknown how children's physical activity levels changed compared with those before diagnosis. Due to restricted access to patients' medical records, we were not able to collect information on

the length of stay. Even though all of the participants were diagnosed with hematologic cancer, they varied in terms of the treatment received. All of these factors could be potential confounders that biased our estimates in the data analysis. This study also failed to identify which treatment side effects could be ameliorated by physical activity because we could not enter all items measured by the TRSC-Cp into the regression model as this required a larger sample size. Furthermore, the study used a purely quantitative approach. Qualitative information might enable us to more thoroughly understand the major reasons or concerns that caused children not to participate in physical activity.

Implications for practice and future research

These findings have important implications for nursing practice and future research. We found that a significant number of children with hematologic cancer had treatment side effects, which were associated with poorer quality of life. It is crucial for pediatric oncology nurses to carefully monitor the adverse effects of hematologic cancer and its treatment and to develop and rapidly implement interventions to ameliorate treatment side effects and enhance the children's quality of life. Chinese children with hematologic cancer were shown to not participate in regular physical activity due to the influence of Confucianism; however, such activity can ameliorate fatigue and depression, which were the second and third most severe treatment side effects

reported by these children during active treatment. Therefore, it is important for nurses to correct the misconceptions about physical activity and illness among parents in mainland China. Although a lack of physical activity is deeply embedded in Chinese culture, as primary health care providers, nurses should play a proactive role in effecting change by educating parents about the benefits to their children's physiologic and psychological well-being of physical activity during and after treatment for hematologic cancer.

Longitudinal rather than cross-sectional studies should also be conducted to examine and monitor changes in physical activity level and quality of life among children starting before their diagnosis of hematologic cancer until the completion of cancer treatment. Such studies would contribute to a more thorough understanding of how hematologic cancer and its treatment affect children's physical and psychological well-being. Almost all parents in mainland China are the primary caregivers and play a significant role in taking care of, advising, and determining their child's daily activities, including physical activities. Further research involving qualitative interviews to document parents' views and perspectives on their child's physical activity during the cancer treatment period would expand the body of knowledge. Also, during the analysis, we divided the participants into two groups and compared the participants 9 to 12 years of age with those between 13 and 16 years of age. No statistically significant differences were observed with

regard to treatment side effects, physical activity levels, or quality of life. More studies should be conducted to explore the effects of hematologic cancer by age.

Conclusions

This study addressed a gap in the literature by examining the effects of hematologic cancer and the side effects of its treatment on the level of physical activity and quality of life among children in mainland China. The findings revealed that many children did not participate in physical activity and experienced a significant number of treatment side effects that severely affected their quality of life. It is important for health care professionals to develop and implement appropriate interventions to alleviate the severity of the adverse effects of cancer treatment and to promote regular physical activity among children with hematologic cancer in mainland China, to enhance their quality of life during their treatment.

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Table(s)

Table 1. Demographic and Clinical Characteristics of Children with Hematologic Cancer (n=125) and Their Healthy Counterparts (n=243)

	Children with hematologic cancer (n=125)	Healthy counterparts (n=243)		
	n(%)	n(%)	x^2	*p*
Age (in years)			6.02	.538[ns]
9	21 (16.8)	25 (10.3)		
10	10 (8.0)	21 (8.6)		
11	8 (6.4)	19 (7.8)		
12	11 (8.8)	31 (12.8)		
13	16 (12.8)	25 (10.3)		
14	10 (8.0)	27 (11.1)		
15	19 (15.2)	43 (17.7)		
16	30 (24.0)	52 (21.4)		
Sex			7.19	.007*
Male	74 (59.2)	108 (44.4)		
Female	51 (40.8)	135 (55.6)		
Types of treatment received				
Chemotherapy	86 (68.8)	-		
Chemotherapy plus bone marrow transplant	39 (31.2)	-		
Time since diagnosed				
0-6 months	63 (50.4)	-		
7-12 months	39 (31.2)	-		
13-18 months	10 (8.0)	-		
18-24 months	5 (4.0)	-		
More than 24 months	8 (6.4)	-		

ns = Not significant at p > 0.05

Table 2. Severity of Treatment Side Effects in Children with Hematologic Cancer by the TRSC-Cp (n=125)

	Severity (%)						
Symptoms	None=0	Mild=1	Moderate=2	Severe=3	Very severe=4	Mean Severity	Range
Hair loss	19.2	14.4	15.2	19.2	32.0	2.30	0-4
Feeling sluggish	36.0	21.6	16.0	16.0	10.4	1.43	0-4
Depression	40.8	13.6	21.6	15.2	8.8	1.38	0-4
Nausea	21.6	44.8	16.8	12.8	4.0	1.33	0-4
Vomiting	23.2	48.8	14.4	12.0	1.6	1.20	0-4
Pain	60.8	12.0	11.2	10.4	5.6	0.88	0-4
Loss of appetite	57.6	16.0	3.2	15.2	8.0	0.80	0-4
Sore mouth	70.4	7.2	9.6	8.0	4.8	0.70	0-4
Constipation	65.6	12.0	9.6	12.0	0.8	0.70	0-4
Weight loss	65.6	12.0	16.8	4.0	1.6	0.64	0-4
Taste change	63.2	18.4	11.2	5.6	1.6	0.64	0-4
Fever	56.8	38.4	4.0	0.8	0	0.49	0-3
Bleeding	59.2	35.2	4.8	0.8	0	0.47	0-3
Difficult concentrating	75.2	11.2	8.0	4.0	1.6	0.46	0-4
Difficulty sleeping	83.2	6.4	7.2	2.4	0.8	0.31	0-4
Skin changes	83.2	8.0	6.4	2.4	0	0.28	0-3
Numbness in fingers and toes	88.0	3.2	5.6	2.4	0.8	0.25	0-4
Bruising	84.8	7.2	7.2	0.8	0	0.24	0-3
Cough	96.8	1.6	1.6	0	0	0.05	0-2
Jaw pain	97.6	0.8	1.6	0	0	0.04	0-2
Difficulty swallowing	97.6	1.6	0.8	0	0	0.03	0-2
Sore throat	97.6	1.6	0.8	0	0	0.03	0-2
Shortness of breath	98.4	0	1.6	0	0	0.03	0-2

Note: The table shows (in addition to the mean severity column) the distribution of responses, thus the columns corresponding to the 0- to 4- point ratings indicate the symptom severity reported by this sample.

Table 3. Distribution of the Physical Activity between Children with Hematologic Cancer and Healthy Children (N = 368)

Score	Description	Children with hematologic cancer (n=125)		Healthy children (n=243)	
		Frequency	%	Frequency	%
0	No physical activity at all, spend most of your time sitting or sleeping.	82	65.6	0	0
1	I rarely participate in light activities last longer than 20 minutes	23	18.4	22	9.1
2	I sometimes participate in light activities last longer than 20 minutes once or twice a month	6	4.8	19	7.8
3	I participate in light activities last longer than 20 minutes only once or twice every week	4	3.2	27	11.1
4	I participate in light activities last longer than 20 minutes for three times a week	2	1.6	41	16.9
5	I participate in light activities last longer than 20 minutes almost everyday	2	1.6	38	15.6
6	I participate in moderate activities last longer than 20 minutes once or twice a week	1	0.8	73	30.0
7	I participate in moderate activities last longer than 20 minutes three to five times a week	3	2.4	17	7.0
8	I participate in moderate activities last longer than 20 minutes almost everyday	2	1.6	5	2.1
9	I participate in vigorous activities last longer than 20 minutes three times or less weekly	1	0.8	1	0.4
10	I participate in vigorous activities last longer than 20 minutes almost everyday	0	0	0	0
		0.35 ± 0.612[a]		4.53 ± 1.84[a]	

[a] Values given are mean ± SD.

Table 4. Summary of Hierarchical Multiple Regression for Variables Contributing to Quality of Life in Children with Hematologic Cancer (n = 125)

Variables	B	SE	β	*p*-value
Step 1				
Sex	-1.785	2.944	-0.057	.546
Age	-0.586	0.555	-0.097	.293
Time since diagnosis of cancer	0.571	1.508	0.040	.706
Type of treatment received	-2.573	1.115	-0.206	.023
Step 2				
Sex	-2.619	2.759	-0.083	.344
Age	-0.100	0.551	-0.017	.856
Time since diagnosis of cancer	0.492	1.363	0.034	.361
Type of treatment received	-1.230	1.143	-0.099	.284
Physical activity levels	5.251	2.290	0.207	.024
Treatment side effects	-1.434	0.536	-0.243	.009
R^2= 0.381				
Adjust R^2= 0.319				
R^2 change = 0.192				

Abbreviations: B, unstandardized coefficient; β: standardized coefficient; SE: standard errors.

Note: The analysis was only performed on the data collected from children with hematologic cancer.

Figure

Figure 1. A Conceptual Framework Showing How Culture in Mainland China May Affect the Psychological Well-being of Children with Hematologic Cancer.

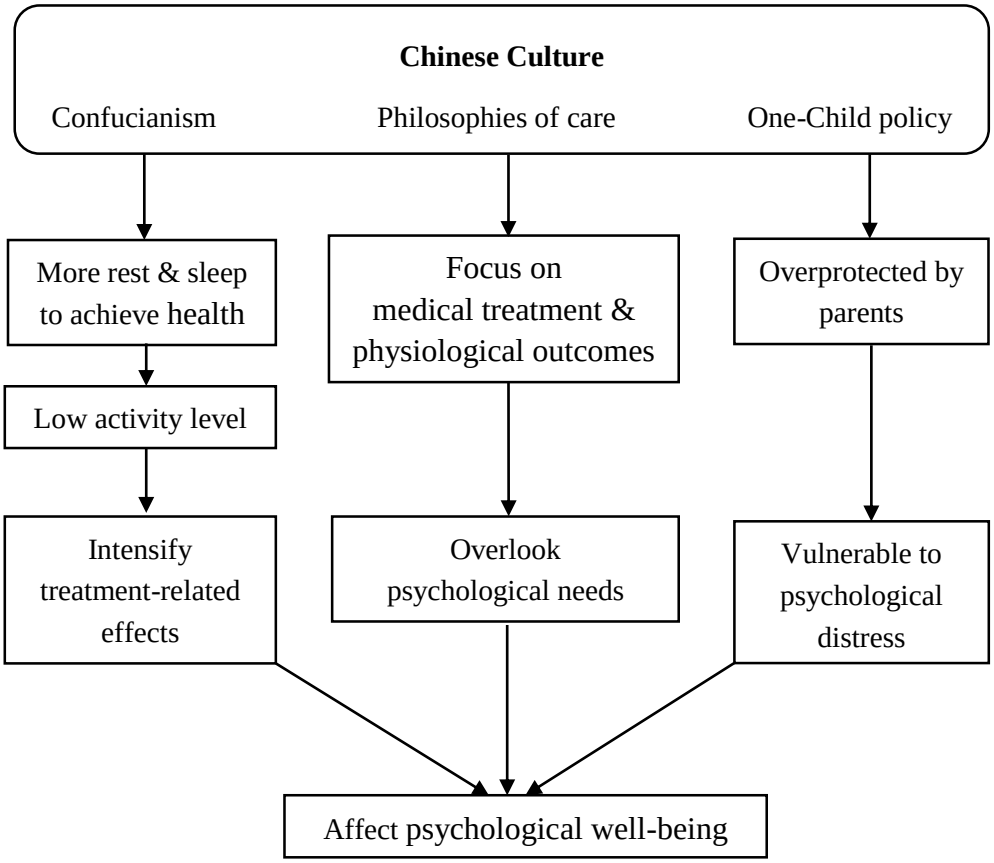

Figure 2. The Distribution of the Reported Occurrence of Treatment Side Effects Reported by Children With Hematologic Cancer (n=125).

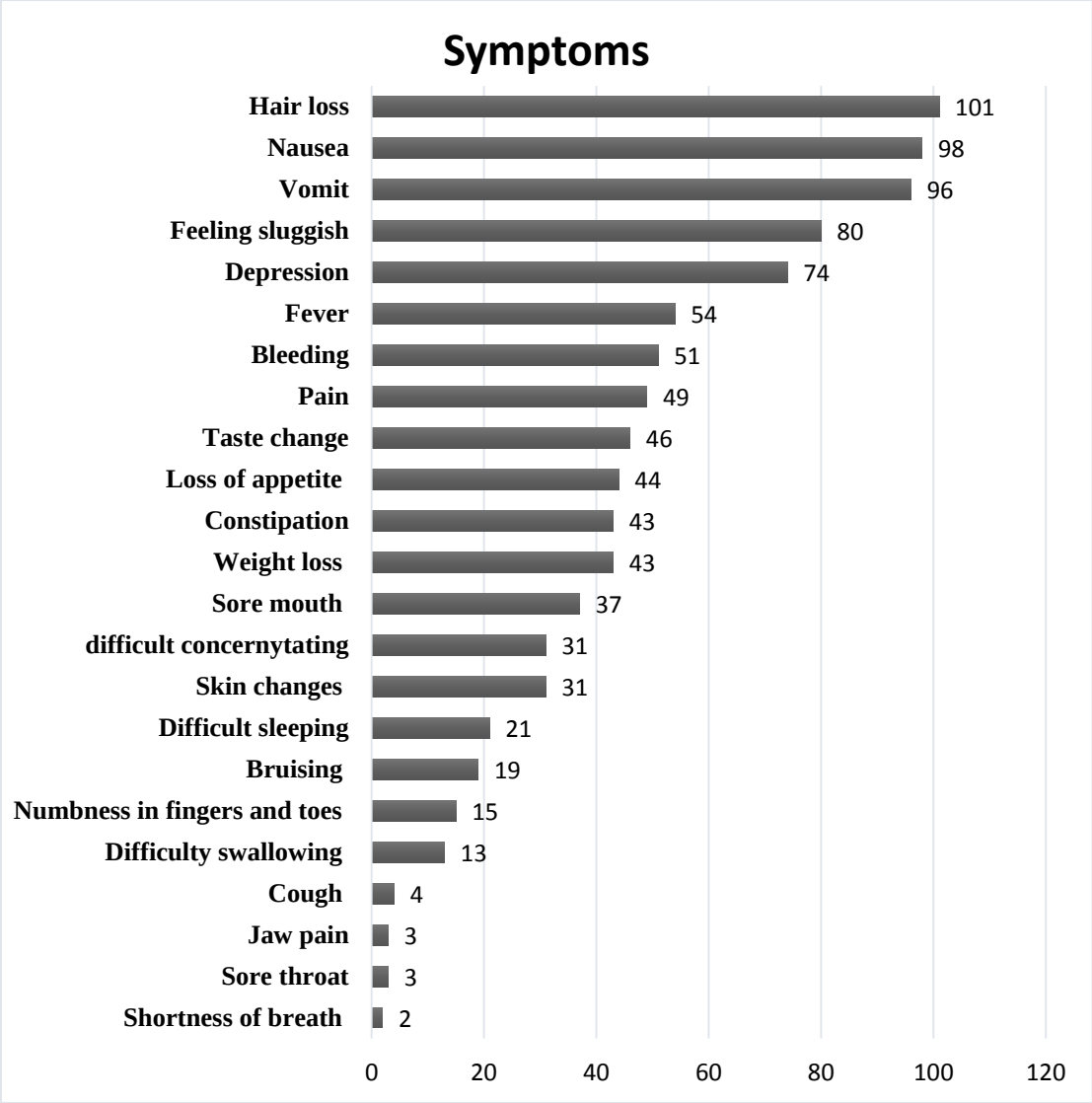

Figure 3. Number of Treatment Side Effects Reported by Each Child with Hematologic Cancer (n=125).