Research Article

Influencing Factors of Health-Related Quality of Life in Thai Children with Cancer[1]

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บทคัดย่อ

การระบุปัจจัยทำนายคุณภาพชีวิตเป็นสิ่งสำคัญในการพัฒนาโปรแกรมที่มีประสิทธิภาพสำหรับพยาบาล เพื่อใช้ในการส่งเสริมคุณภาพชีวิตเด็กโรคมะเร็งในประเทศไทย การศึกษาเชิงบรรยายนี้ มีวัตถุประสงค์เพื่อทดสอบอิทธิพลของการทำหน้าที่ของครอบครัว การปรับตัว ความรู้สึกทุกข์ทรมานรบกวนการดำเนินชีวิตจากอาการ ความวิตกกังวลแฝง ความวิตกกังวลขณะกำลังเผชิญ ความสามารถในการปฏิบัติกิจกรรม และพฤติกรรมการดูแลตนเอง ต่อคุณภาพชีวิตเด็กโรคมะเร็ง กลุ่มตัวอย่างเป็นเด็กป่วยโรคมะเร็ง จำนวน 199 ราย และผู้ดูแลจำนวน 199 ราย คัดเลือกกลุ่มตัวอย่างแบบเฉพาะเจาะจงตามคุณสมบัติจากโรงพยาบาลระดับตติยภูมิ 8 แห่ง ใน 3 ภูมิภาคของประเทศไทย เด็กป่วยต้องมีอายุ 9-18 ปี เคยได้รับยาเคมีบำบัดอย่างน้อย 1 ครั้ง รู้สึกตัวดีและไม่มีปัญหาสุขภาพที่รุนแรง เก็บรวบรวมข้อมูลโดยให้กลุ่มตัวอย่างตอบแบบสอบถาม จำนวน 8 ชุด ได้แก่ 1) แบบสอบถามข้อมูลส่วนบุคคล 2) แบบประเมินการทำหน้าที่ของครอบครัว 3) แบบประเมินการเล่นของเด็ก 4) แบบสอบถามคุณภาพชีวิต 5) แบบประเมินวิธีการเผชิญกับความเจ็บป่วย 6) แบบประเมินความวิตกกังวล 7) แบบสอบถามพฤติกรรมในการดูแลตนเอง และ 8) แบบประเมินอาการของผู้ป่วยเด็กโรคมะเร็ง ผู้ดูแลตอบแบบสอบถาม 3 ชุดแรก และเด็กป่วยโรคมะเร็งตอบแบบสอบถามหมายเลข 4-8 ทดสอบความเที่ยงของแบบสอบถามหมายเลข 2, 4-5 และ 7-8 โดยใช้สัมประสิทธิ์แอลฟาครอนบาคได้เท่ากับ .89, .93, .88, .82 และ .91 ตามลำดับ ส่วนแบบสอบถามหมายเลข 6 ได้ค่าสัมประสิทธิ์แอลฟาครอนบาคของความวิตกกังวลขณะกำลังเผชิญ เท่ากับ .89 และความวิตกกังวลแฝง เท่ากับ .88 สำหรับค่าสัมประสิทธิ์สหสัมพันธ์ของแบบสอบถามหมายเลข 3 เท่ากับ .93 วิเคราะห์ข้อมูลโดยใช้สถิติเชิงบรรยายและการวิเคราะห์การถดถอยพหุคูณแบบขั้นตอน

ผลการศึกษา พบว่า ความวิตกกังวลแฝง (β=-.391, p< .001) *และความสามารถในการปฏิบัติกิจกรรม* (β= .347, p< .001) *สามารถร่วมกันอธิบายความแปรปรวนของคุณภาพชีวิตผู้ป่วยเด็กไทยโรคมะเร็งได้อย่างมีนัยสำคัญทางสถิติ ร้อยละ 33.3* (R^2= .333, p< .001) *ผลการวิจัยนี้ ให้ข้อมูลที่เป็นประโยชน์สำหรับพยาบาลในการส่งเสริมความสามารถในการปฏิบัติกิจกรรมในเด็ก เพื่อช่วยเพิ่มคุณภาพชีวิตให้กับเด็กไทยโรคมะเร็งตามศักยภาพ*

คำสำคัญ: เด็กไทย; มะเร็ง; คุณภาพชีวิต; ปัจจัยที่มีอิทธิพล

Abstract

Identification of factors predicting health-related quality of life (HRQOL) is essential to develop effective interventions for nurses in order to improve HRQOL in children with cancer in Thailand. This descriptive study aimed to examine the influences of family functioning, coping, symptom distress, trait anxiety, state anxiety, functional status, and self-care behavior on HRQOL of children with cancer. Purposive sampling was used to recruit 199 children with cancer and 199 caregivers from eight tertiary hospitals in three parts of Thailand. Children were 9-18 years old, received chemotherapy at least one cycle, had good consciousness, and had no serious conditions. Eight self-report questionnaires were used to collect the data: 1) Demographic data questionnaire, 2) Chulalongkorn Family Inventory, 3) The Play-Performance Scale for Children, 4) The Thai Pediatric Quality of Life Inventory version 4.0, 5) The Thai version of Coping of Disease Inventory, 6) The revised Thai versions of State and Trait Anxiety Inventory for Children, 7) Self-care Behavior Questionnaire, and 8) The Memorial Symptom Assessment. Caregivers self-reported the first three questionnaires and children self-reported Questionnaires 4-8. Questionnaires 2, 4-5, and 7-8 were tested for reliability using Cronbach's alpha coefficient; yielding values of .89, .93, .88, .82, and .91 respectively. The reliability of Questionnaire 6 yielded Cronbach's alpha coefficient of .89 for A-State scale and .88 for A-Trait scale. The test-retest intraclass correlation coefficient for Questionnaire 3 was .93. Descriptive statistics and multiple stepwise regression were used for data analysis.

The results revealed that 33.3 percent of the variance ($R^2 = .333$, $p < .001$) of the HRQOL of Thai children with cancer was explained by trait anxiety ($\beta = -.391$, $p < .001$) and functional status ($\beta = .347$, $p < .001$). This provides useful information for nurses to promote functional status of children, thereby enhancing optimal HRQOL in Thai children with cancer.

Keywords: cancer; health-related quality of life; influencing factor; Thai children

Introduction

Childhood cancer, a chronic illness, is recognized as one of the major causes of death among children. In Thailand, according to a 2016 report of the Ministry of Public Health, cancer caused the death of 825 children less than 15 years of age[1]. The incidence rate for cancer in Thai male children aged 0-4 years, 5-9 years, and 10-14 years has been reported at 21.7, 16.6, and 10.2 per 100,000 of population, respectively[2]. Meanwhile, in Thai female children, it stands at 14.1, 10.5, and 9.4 per 100,000 of population, respectively[2]. Nowadays, advances in medicine and nursing care have resulted in a more successful pediatric cancer treatment. Consequently, the five-year survival rate of children below 20 years old, who have been diagnosed with acute lymphoblastic leukemia and non-Hodgkin lymphoma, has increased to 88% and 89%, respectively[3]. Nevertheless, the affected children still suffer from the severity of the symptoms associated with their disease and the treatment they receive[4,5]. Children face numerous and complex experiences, and problems during and after cancer treatment, e.g., physical, psychological or emotional, and school-related or behavioural problems[6]. These problems affect their quality of life[7,8]. Quality of life (QOL) is defined as an individual's perceptions of their position in life including physical health, psychological status, level of independence, social relationships and personal beliefs and their relationship to salient features of their environment in the context of the culture and value system in which they live, and in relation to their goals, expectations, standards and concerns[9]. Health-related quality of life (HRQOL) emphasized health, illness, and treatment aspects[10]. However, in research and literature, the terms QOL and HRQOL are often used interchangeably[11] as well as in this study.

Several studies have reported that the HRQOL of children with cancer is lower than that of other children. Overall HRQOL had been reported poorer than that of general children among both newly-diagnosed cancer patients and those undergoing therapy[12,13]. In survivor children with cancer, it was reported poorer than that of other children in physical and school domain[14]. Furthermore, caregivers perceived the quality of life of children with cancer, both newly-diagnosed[15] and surviving with cancer[16], to be lower than that of the general population. In Thailand, the overall QOL in children with cancer had been reported at a high level[17]. However, in several of its domains, especially the psychological domain, it had been reported at a moderate level[17]. Similarly, the physical domain that is related to illness and treatment had been reported at a moderate level[18,19].

This is probably due to the impact of contributing factors. Several studies have examined factors, both non-modifiable and modifiable, that contribute to the quality of life in children with cancer. For the non-modifiable factors, evidence showed that low quality of life in children with cancer was associated with older age[20], gender[20], and low family income and a low level of caregiver education[17]. Type of cancer[21,22], treatment[21,22], complications[12], treatment duration[23], prognosis[23], and sickness duration[17] was associated with overall QOL and several of its domains, especially the physical, psychological and social function domains.

For modifiable factors, evidence showed that symptoms[24], functional status[12,24], coping[23], anxiety[25,26], family functioning[27], and self-care behavior[17] was associated with either the overall QOL or individual QOL domains. Baggott et al.[24] identified that the number of symptoms, symptom severity, and symptom distress were negatively related to the HRQOL of American children following myelosuppressive chemotherapy. In Japanese with brain tumor, HRQOL was affected by trait and state anxiety[25]. Also, state anxiety was a negative predictor of HRQOL in American children with cancer undergoing treatment for cancer[26]. In addition, functional status was positively related to overall HRQOL in American children following myelosuppressive chemotherapy[24]. This has also been found in several domains of HRQOL, physical functioning and emotional functioning, in Swiss children with newly diagnosed with cancer[12]. In American adolescents with cancer, one study showed that dysfunction in the role domain of family functioning predicted both the physical and psychosocial domains of HRQOL[27]. Coping is another factor that can influence QOL. It has been shown that disease-related cognitive coping by predictive control strategy had a positive influence on physical, and psychological domains, and the total score of quality of daily functioning in surviving Dutch children with cancer measured at two months after the end of successful treatment[23]. Besides, self-care behavior has been identified as a positive predictor of QOL in Thai children with cancer[17].

Wilson and Cleary's conceptual model (WCM) of HRQOL is a theoretical model that identifies an approach for explaining and predicting HRQOL[28]. The revised WCM by Ferrans et al., provides a theoretical background for each component of the model and an example of the instrument to measure some of the components such as symptoms, functional status, general health perception, and QOL[10]. Therefore, the revised WCM was used as a conceptual model of this study. In the revised WCM[10], the characteristics of the individual, characteristics of the environment, and general health perceptions directly influence the overall QOL. Meanwhile, biological function, symptoms, and functional status indirectly influence overall QOL[10].

Based on the evidence from previous studies[12,17,23-27] and the revised WCM[10], several factors were associated with the overall QOL. However, only seven modifiable factors reported either correlation coefficients equal or greater than 0.40 or predictive coefficients equal or greater than 0.30 were selected in this study. These factors included family functioning[27], symptom distress[24], trait anxiety[25], state anxiety[25-26], functional status[12,24], coping[23], and self-care behavior[17]. All of these independent variables had not been studied in Thai context[12,23-27] except self-care behavior[17]. Only the correlation results between symptom distress and HRQOL and also functional status and HRQOL were reported[12,24]. For self-care behavior, although one previous study examined this factor in a Thai setting, the result did not clarify specifically the HRQOL in participants undergoing therapy[17]. Thus, this study will examine the predictors of HRQOL in Thai children with cancer undergoing therapy. The results of this study can be used to provide appropriate nursing care and develop effective interventions in order to improve the HRQOL in children with cancer in Thailand and beyond.

Objective

To examine the influences of family functioning, symptom distress, trait anxiety, state anxiety, functional status, coping, and self-care behavior on HRQOL of children with cancer.

Research Questions

1. Do family functioning, functional status, coping, and self-care behavior positively influence HRQOL in children with cancer?

2. Do symptom distress, trait anxiety, and state anxiety negatively influence HRQOL in children with cancer?

Conceptual Framework

The conceptual framework in this study was guided by the revised WCM by Ferrans et al.[10] and previous empirical evidence regarding the factors associated with HRQOL or QOL in children with cancer[12,17,23-27]. In the revised WCM by Ferrans et al., overall QOL is defined as subjective well-being or satisfaction with life as a whole[10]. The characteristics of the individual, characteristics of the environment, and general health perceptions directly influenced the overall QOL. Meanwhile, biological function, symptoms, and functional status indirectly influenced overall QOL[10]. Besides, HRQOL was interchangeably utilized with overall QOL to identify the perception of an individual concerning his/her position in life, functioning, and health[10]. In this study, five modifiable factors from the revised WCM were selected as predictors (e.g., family functioning, symptom distress, trait anxiety, state anxiety, and functional status). Family functioning represented the characteristics of the environment. Symptom distress, trait anxiety and state anxiety represented symptoms. Functional status is another component of the revised WCM. Additionally, two factors from previous studies, coping[23] and self-care behavior[17], were added. In a prior study, family functioning[27], functional status[12,24], coping[23], and self-care behavior[17] positively influenced HRQOL in children with cancer. Meanwhile symptom distress[24], trait anxiety[25], and state anxiety[25,26] negatively influenced HRQOL in children with cancer. The conceptual framework of this study is shown in Figure 1.

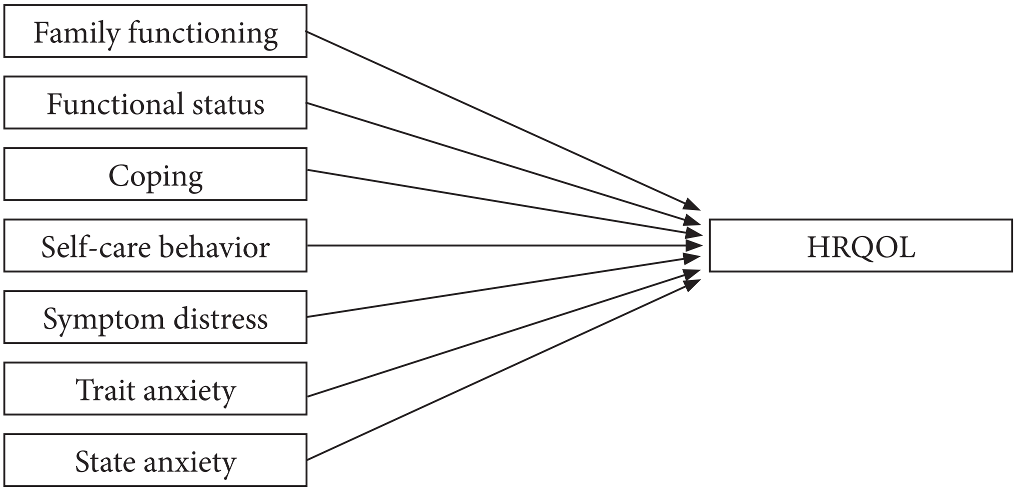

Figure 1 Conceptual framework in this study

Methods

Design

A cross-sectional, predictive research design.

Sample and Setting

The sample of this study composed of children with cancer aged 9-18 years old hospitalized in Thailand and their caregivers or those being followed up at outpatient units in tertiary hospitals in Thailand and their caregivers. Inclusion criteria of children with cancer consisted of: 1) had a good level of consciousness, 2) could communicate in Thai language, 3) had no serious conditions such as on oxygen or on a ventilator, 4) diagnosed with any type of cancer for at least one month but no more than two years and undergoing therapy[12,29], 5) received treatment with chemotherapy for at least one cycle, or chemotherapy at least one cycle in combination with surgery or radiation[12,30], and 6) had symptom experience. The inclusion criteria of caregivers comprised: 1) were the major caregivers who took responsibility of taking care of their child for at least 1 year, and 2) could communicate in Thai language.

Since this study was a part of the study entitled "A causal model of health-related quality of life in Thai children with cancer[31]", 199 children and 199 caregivers were estimated. This sample size was adequate for this study because the sample size determined using Throndike formula[32] was 120. Purposive sampling was used to selected eight tertiary hospitals providing treatment for children with cancer in three regions (e.g., Northern, Northeastern, and Southern) of Thailand. The central region was not included because of inaccessibility. The selected hospitals were composed of three hospitals from the Northern region (Buddhachinaraj Hospital, Chiangrai Prachanukroh Hospital, and Maharaj Nakorn Chiang Mai Hospital), two hospitals from the Northeastern region (Khonkaen hospital and Srinagarind hospital), and three hospitals from the Southern region (Songklanagarind Hospital, Hatyai Hospital, and Suratthani Hospital). Each group of children and caregivers from Northern, Northeast and Southern hospitals numbered 60, 50, and 100, respectively, with a total of 210. However, 11 children and their caregivers were excluded because of outliers (n=6) and no symptom experience (n=5).

Ethical Considerations

Prior to data collection, a request form seeking approval to conduct the study and informed consent were submitted to the Ethical Committee, Faculty of Nursing, Prince of Songkla University (IRB No.0521.1.05/3009), and permission was also obtained from the ethical committees of the hospitals chosen for the study (Maharaj Nakorn Chiang Mai Hospital, IRB No. 389/2016; Chiangrai Prachanukroh hospital, IRB No. 0032.102/3499; Buddhachinaraj hospital, IRB No. 094/59; Srinagarind hospital, IRB No. HE591152; Khon kaen hospital, IRB No. HE 60010; Songklanagarind hospital, IRB No. 58-339-19-19; Hatyai hospital, IRB No. 74/2015; and Suratthani hospital, IRB No. 2/2560). The caregivers of children with cancer and children with cancer were contacted for their permission to take part in the study. The caregivers and participants were explained the protection of the subjects' rights based on three basic ethical principles for research including respect for persons, beneficence, and justice.

Data Collection

Instruments

1. Demographic data questionnaire (DDQ) was developed by the researchers based on literature review. It comprised eight items including age, gender, child's level of education, type of cancer, illness duration, treatment and procedure, parent's level of education, and family income. Caregivers were asked to answer this questionnaire.

2. The Thai version of Pediatric Quality of Life Inventory Version 4.0 (Thai PedsQL 4.0). The version for children age 8-12 years old and 13-18 years old[33] was used to measure HRQOL in children with cancer. It already had been translated from English into Thai[33]. The English version was developed to measure the main health dimensions as defined by WHO[34]. It was used to measure HRQOL of children during the past 1 month. It consisted of 23 items and 4 dimensions of physical functioning (8 items), emotional functioning (5 items), social functioning (5 items), and school functioning (5 items). It is a 5-point Likert scale ranging from 0 (never a problem), 1 (almost never a problem), 2 (sometimes a problem), 3 (often a problem), to 4 (almost always a problem). All items were stated negatively. Therefore, the items were reverse scored and transformed to a 0-100 scale. Higher scores indicated better HRQOL. The scores were calculated as the sum of the items divided by the number of items answered. The score was not computed if more than half of the items in the scale were missing. In this study, no missing data were found.

The internal consistency reliability coefficients were tested with Thai healthy children and children diagnosed with chronic illness[35] for each part were as follows: The total scale score (α= .84 self-report, .88 proxy-report), physical health summary score (α= .76 self-report, .79 proxy-report), and psychosocial health summary score (α= .74 self-report, .85 proxy-report). Test-retest reliability[35] showed correlation coefficients above .60 in all subscales ($p< .001$). Besides, in Thai adolescents with cancer, a reliability coefficient of the total scale score was .90[36]. In this study, the reliability of the instrument was tested with 20 children with cancer who met inclusion criteria, yielding Cronbach's alpha coefficient of .93.

3. Chulalongkorn Family Inventory (CFI)[37] was modified from the Thai version of Family Assessment Device (FAD) translated by Oupramand[38] and based on the McMaster Model of Family Functioning (MMFF)[39]. It consisted of 36 items and is measured on a 4-point Likert scale ranging from 1 (not agree), 2 (mildly agree), 3 (sometimes agree), to 4 (strongly agree) and 12 items were negatively worded so that the score needs to be reverse scored. The score of the instrument used was determined by the sum score of the items divided by the number of the items. The reliability (alpha Cronbach) tested with a community sample was .88[37]. This instrument was used to examine family functioning perceived by caregivers in this study. In this study, the reliability of the instrument was tested with 20 caregivers

having children who met inclusion criteria, yielding Cronbach's alpha coefficient of .89.

4. The Memorial Symptom Assessment Scale for children aged 10-18 years old (MSAS 10-18)[40] was used to evaluate symptoms in terms of frequency, severity, and distress of children. It was modified from the MSAS for adults with cancer by Collins et al.[40] It consisted of 30 items and two sections. Section I consists of 22 symptoms which have occurred during the past week. Each symptom was evaluated as did not have (yes, no), if yes, how often did you have it (1=rarely to 4=almost constantly); if yes, how severe was it usually? (1= slight to 4=very severe); and if yes how much did it distress or bother you? (0=not at all to 4=very much). Section II consisted of 8 symptoms that occurred during the past week. Each symptom was evaluated as did not have (yes, no) if yes, how severe was it usually? (1=slight to 4=very severe); and if yes how much did it distress or bother you? (0=not at all to 4=very much). The scores of symptom distress were computed as the sum of items divided by the number of items answered (the number of symptoms). The internal consistency reliability tested with children having cancer for each dimension: physical, psychological, and global symptom distress subscales were .83, .87, and .85, respectively[40]. In this study, since this instrument was developed in English, back translation was performed based on Hilton and Skrutkowski.[41] In this study, no symptom experiences (n=5) were excluded, only distress part (30 distress items) was interpreted as symptom distress and used for further analysis. The reliability of the instrument in this study was tested with 20 children with cancer who met inclusion criteria, yielding Cronbach's alpha coefficient of .91.

5. The revised Thai version of the State-Trait Anxiety Inventory for Children (Thai STAIC-R)[42] was used to measure level of trait and state anxiety of children. The instrument had been translated and modified from STAIC by Chaiyawat[42]. This instrument is composed of two parts including A-State scale and A-Trait scale. A-State scale consisted of 19 items used to evaluate anxiety while facing a problem. The items were scored from 1 to 3 as follows: 3 represents the highest degree of feeling and 1 represents the lowest degree of feeling, with the total score on each scale ranging from 19 to 57 and 11 items need to be reverse scored. A-Trait scale consists of 20 items used to measure trait anxiety. The items were scored from 1 to 3 as follows: 1 (hardly), 2 (sometimes), and 3 (often), with the total score on each scale ranging from 20 to 60. The scores were computed as the sum scores of the items on each scale. The higher scores indicated higher anxiety levels. The content validity index (CVI) of A-State scale and A-Trait scale were .89 and .90, respectively[42]. The reliability of the instrument was tested with Thai healthy school aged children, yielding a test-retest reliability coefficient of .58 for A-State scale and .72 for A-Trait scale[42]. Alpha coefficients were .83, .81, at the first administration in a no anxiety group and .87, .86, at the second administration in no anxiety group for A-State scale and A-Trait scale, respectively[42]. The alpha coefficients were .82, .85 in an anxiety group for A-State scale and A-Trait scale, respectively[42]. In this study, the reliability of the instrument was tested with 20 children with cancer who met inclusion criteria, yielding Cronbach's alpha coefficient of .88 for A-State scale and .89 for A-Trait scale.

6. The Play-Performance Scale for Children (PPSC)[43] was developed to measure the performance status or functional status of the children with cancer aged 1-16 years, any types of cancer, inpatients or outpatients, and in active treatment and long-term follow-up procedures. It is an 11-point continuous rating scale ranging from 0 (unresponsive) to 100 (fully active, normal) and was designed to be rated

by a parent. The correlation coefficients between parent ratings and nurses' global ratings and among parent ratings and clinicians' global ratings have been reported at adequate value (r= .75, r= .92, respectively, p< .001)[43]. The interrater reliability showed good correlation coefficient between mother and father (r= .71, p< .0001)[43]. In this study, since this instrument was developed in English, back translation was performed based on Hilton and Skrutkowski.[41] In this study, the test-retest intraclass correlation coefficient performed with 20 caregivers with children with cancer was .93.

7. The Thai version of Coping of Disease Inventory (Thai version of CODI)[44] was used to evaluate the coping strategies and coping ability of children. The instrument had been translated from English to Thai language by Silapavitayatorn[44]. It is composed of 28 items and 6 domains which included avoidance, cognitive–palliative, emotional reaction, acceptance, wishful thinking, and distance. The first 27- item Thai CODI is a 5-point Likert scale ranging from 1 (never), 2 (almost never), 3 (sometimes), 4 (often), to 5 (almost always). The final item (item 28) evaluated the overall coping ability which was measured on a 5-point Likert scale ranging from 1 (bad), 2 (poor), 3 (moderate), 4 (good), to 5 (very good). The domain scores were computed as the sum of the items in each domain divided by the number of items. A high score indicated high coping strategies used. The internal consistency of the Thai version of CODI was tested in Thai children with cancer, yielding an entire scale coefficient of .86[44]. In this study, the internal consistency was tested in Thai children with cancer, yielding an alpha coefficient of .88.

8. Self- Care Behavior Questionnaire[19] was used to examine self-care behaviour of children. This instrument was developed by Punthmatharith et al.[19] It consists of 25 items in the Thai version. Cancer children were asked to rate their self-care behavior on a 4-point Likert scale ranging from 0 (never) to 3 (always). Higher scores indicated better self-care behavior of children. The content validity of the instrument was tested by a panel of experts and the reliability of the instrument was tested in children with cancer, yielding Cronbach's alpha of .87[19]. In this study, Cronbach's alpha coefficient after testing with 20 Thai children with cancer was .82.

Data Collection Procedure

The data collection process in this study consisted of two phases including the preparation phase and data collection phase as follows:

Preparation phase: In this phase, the permission to collect data was obtained. The research assistants (RAs) were trained by the researcher regarding the instructions for recruitment of potential participants, administration of the instruments, and issues pertaining to informed consent.

Data collection phase: The data were collected from the participants who met the inclusion criteria and had agreed to participate in this study. The objective of the study, the study procedures, the risks and benefits for the subjects, the rights and responsibilities of the subjects, and the confidentiality principles were explained to children with cancer and their parents. Children with cancer were requested to self-complete six questionnaires (e.g., Thai PedsQL 4.0, Thai version of CODI, Thai STAIC-R, Self-care Behavior, and MSAS10–18). His/her caregiver was requested to self-complete three questionnaires (e.g., DDQ, CFI, and PPSC). Additionally, the interview method was used for data collection in a few cases of inability of reading. While answering the questionnaires, if participants had any problems such as fatigue, data collection was stopped and started again if the participant was willing and able to continue completing the questionnaires. Data collection was performed from July 2015-March 2017.

Data Analysis

Descriptive statistics were used to describe the demographics of participants, as well as the study variables. Multiple stepwise regression analysis was used to examine the influences of the selected factors on HRQOL. Data were checked and no missing data were found. All assumptions of the data presented as mean and multiple stepwise regression analysis were examined and met the criteria.

Results

1. Participant characteristics

The sample in this study comprised of 199 Thai children with cancer and 199 caregivers. The majority of children were male (64.8%) with average age equal to 11.9 years (SD=2.23). They studied at grades 4-6 (44.2%) and 1-3 (20.6%). Two-fifths of the children were diagnosed with leukemia (40.7%), 16.1% with brain tumor, and 12.6% with lymphoma and osteosarcoma, respectively. Regarding illness duration, 70.9% of children were diagnosed with cancer for 1-12 months. Nearly two-thirds received chemotherapy (63.3%) and 21.2% underwent chemotherapy combined with surgery. For caregivers, most of them were educated at a high school or equivalent (43.2%) and followed by primary school 39.7%. Only 16.1% of caregivers were educated higher than high school or equivalent. Nearly half of them had a family income of 5,000-10,000 Baht/month (53.3%).

2. The study variables characteristics

The family functioning scores ranged from 2 to 3.86 with a mean of 3.15 (SD= .35). Coping scores ranged from 1 to 5 with a mean of 3.64 (SD= .80). Symptom distress scores ranged from 0 to 2.83 with a mean of 1.04 (SD= .64). Self-care behavior scores ranged from 30 to 75 with a mean of 59.41 (SD=10.55). Trait anxiety scores ranged from 20 to 48 with a mean of 30.23 (SD=6.77). State anxiety scores ranged from 19 to 39 with a mean of 28.38 (SD=3.82). Functional status scores ranged from 20 to 100 with a mean of 76.53 (SD=17.82). HRQOL scores ranged from 28.26 to 100 with a mean o 70.79 (SD=15.24)

Table 1 Possible score, actual score, mean (M), standard deviation (SD) of study variables (N=199)

Variable	Possible score	Actual score	Mean	SD
Family functioning	1-4	2.00-3.86	3.15	0.35
Coping	1-5	1.00-5.00	3.64	0.80
Symptom distress	0-4	0-2.83	1.04	0.64
Self-care behavior	0-75	30-75	59.41	10.55
Trait anxiety	20-60	20-48	30.23	6.77
State anxiety	19-57	19-39	28.38	3.82
Functional status	0-100	20-100	76.53	17.82
Health-related quality of life	0-100	28.26-100	70.79	15.24

3. The influencing factors of HRQOL

Before performing multiple stepwise regression the correlation among independent variables and between independent variables and dependent variable were performed. Results showed that correlation coefficients among independent variables varied from -.001 to .463. Thus, no multicollinearity was found. Correlation coefficients between independent variables and dependent variable varied from .050 to -.467. Trait anxiety ($r=-.467$, $p< .001$), state anxiety ($r=-.334$, $p< .001$), and symptom distress ($r=-.181$, $p< .01$) significantly negative correlated with HRQOL whereas self-care behavior and functional status significantly positive correlated with HRQOL ($r=.133$, $p<.05$; $r= .432$, $p< .001$, respectively). In contrast, coping and family functioning did not correlate with HRQOL (Table 2).

The results from multiple stepwise regression revealed that 33.3 percent of the variance ($R^2= .333$, $p< .001$) of the HRQOL of Thai children with cancer was explained by trait anxiety ($\beta=-.391$, $p < .001$) and functional status ($\beta= .347$, $p< .001$). Coping, state-anxiety, family functioning, self-care behavior, and symptom distress did not influence HRQOL (Table 3).

Table 2 Correlation coefficients among predicted variables and HRQOL (N=199)

Variables	1	2	3	4	5	6	7	8
1. Coping	1							
2. Trait anxiety	-.107	1						
3. State anxiety	-.267***	.463***	1					
4. Family functioning	.185**	-.105	-.135*	1				
5. Self-care behavior	-.064	-.294**	-.165*	-.001	1			
6. Symptom distress	-.190**	.176**	.081	-.199**	.248***	1		
7. Functional status	.195**	-.219**	-.297***	.112	-.092	-.179**	1	
8. HRQOL	.050	-.467***	-.334***	.057	.133*	-.181**	.432***	1

*p<.05 **p<.01 ***p<.001

Table 3 Multiple stepwise regression of the influencing factors with HRQOL in Thai children with cancer (N=199)

Predictors	B	SE	b	t	p
Trait-anxiety	-.881	.135	-.391	-6.545	.000
Functional status	.297	.051	.347	5.801	.000
R^2 = .333; Adjusted R^2 = .326; Overall F = 48.884; p = .000; constant = 11.873					

The multiple stepwise regression equation;

HRQOL of children = 11.873 - .391 (trait anxiety) + .347 (functional status)

Discussion

The result of this study revealed that only 33.3 percent of the variance of the HRQOL of Thai children with cancer was explained by trait anxiety and functional status. The rest of the unexplained variance for HRQOL (66.7%) is probably due to other factors that were not included in this study. Based on the revised WCM by Ferrans et al.[10], the overall HRQOL is influenced by several variables that were not included in this study such as characteristics of the individual, biological function, and general health perceptions. In addition, based on the previous evidence, several other factors were associated with HRQOL including both non-modifiable (e.g., age[20], gender[20], type of cancer[21-22], treatment[21-22]) and modifiable factors (e.g., the number of symptom[24], symptom severity[24]). Thus, the low percentage of the explained variance for HRQOL is probably due to these factors. The significant and non-significant factors influencing HRQOL are discussed as follows.

1. Significant factors influencing HRQOL

Two significant factors predicted HRQOL, trait anxiety and functional status. Trait anxiety, as an individual's personality, was a latent characteristic and was triggered by stressful stimuli. It is the tendency of a person to become state anxious[45]. Findings demonstrated that trait anxiety negatively low correlated with HRQOL and trait anxiety was the most significantly negative predictor of HRQOL. This means that children who had high trait anxiety would have low HRQOL. Based on the revised WCM, trait anxiety was one of psychological factors categorized under symptoms. This component has indirect influence on HRQOL via functional status, and general health perception[10]. Besides, these results were in line with those of previous studies in Japanese children with cancer. Japanese children with brain tumors perceived that HRQOL was affected by their trait anxiety[25].

Functional status positively low correlated with HRQOL and was the second significantly positive predictor on HRQOL. This means that children who had high functional status would have high HRQOL. Functional status was determined as play performance in this study. Play could contribute the cognitive, physical, social, and emotional well-being of children and youths[46]. This finding was partially supported by the revised WCM[10]. The revised WCM model showed that functional status had no direct effect on HRQOL but it had an indirect effect on HRQOL via general health perception. This finding was consistent with the study in American children following myelosuppressive chemotherapy[24]. Similarly, in Swiss children with newly diagnosed cancer, low functional status negatively correlated with some domains of HRQOL such as motor functioning at 6 weeks and 1 year after diagnosis and negative emotions at 1 year after diagnosis[12].

2. The non-significant influencing factors of HRQOL

Five significant factors could not predict HRQOL including coping, state anxiety, family functioning, self-care behavior, and symptom distress. Coping did not predict HRQOL ($p > .05$) because coping did not significantly correlate with HRQOL. This was an unexpected result. The possible reasons for the non-significant result were probably due to children with cancer being able to cope better as time since diagnosis increased[47]. Meta-analysis[47] showed that coping-adjustment was statistically significant and negative for individuals reporting 6-12 months post-diagnosis, and statistically significant and positive for individuals reporting 1-5 years post-diagnosis. As the time from diagnosis increased, the positive approach coping-adjustment became stronger. Therefore, time since diagnosis related to dealing with the illness. In this study, the average duration of children having cancer was 9.17 months. Thus, children had time to cope with their illness and treatments. In this study, mean score of coping was 3.64 from 5. The levels of coping could not be interpreted in this study because they were not mentioned in the Thai version of CODI[44].

Other possible reason for non-significant result of coping on HRQOL might be due to the developmental stage of children. Hampel and Petermann[48] identified that coping strategy that children use to cope depends on their developmental status. Cognitive coping strategies begin in middle childhood (6-12 years) and become more complex and flexible in adolescence (13-19 years)[49]. As children progress to adolescence, they are able to use more complex cognitive coping strategies[49]. The participants in this study had wide range of age (9-18 years old) and most of them (64.8%) were school age children or middle childhood (M of age=11.9, SD=2.23). This might affect coping ability and non-significance in this study. In contrast, this finding was not congruent with a similar previous study in American adolescents with cancer 6 months after the completion of treatment[50]. Coping behaviors with humor was a positive predictor psychosocial HRQOL after the completion of treatment[50]. This study[50] measured coping behaviors with humor and one dimension of HRQOL, but the present study measured coping ability and overall HRQOL.

State anxiety was not a predictor of HRQOL although it negatively low correlated with HRQOL. The correlation result was consistent with Japanese children with brain tumors that found negative correlation between state anxiety and HRQOL[25]. However, the prediction result was inconsistent with the study in American children with cancer[26]. Fortier et al.[26] reported that state anxiety was a negative predictor of HRQOL in children receiving treatment for cancer. Besides, Kanellopoulos et al.[51] identified that the level of hospital anxiety can predict QOL in Norwegian survivors of childhood acute lymphoblastic leukemia and lymphoma. The possible reasons for the non-significant predictor of state anxiety on HRQOL have been described as the characteristic of state anxiety. State anxiety refers to the level of an uncomfortable feeling when faced with threats[52] such as treatment or surgery. Factors such as knowledge[53] can reduce state anxiety. A previous study found that giving information in combination with therapeutic play before surgery can reduce state anxiety in school age children[53]. In contrast, painful medical procedures experience was correlated with fear and anxiety before subsequent procedures[54]. Children in the present study had experience in receiving treatment with chemotherapy at least one cycle, or chemotherapy at least one cycle in combination with surgery or radiation. However, nearly half (40.7%) of children with cancer have been diagnosed with leukemia and came to the hospital for chemotherapy and no severe side effects occurring. They received information in management from the previous cancer treatment that probably reduced their state anxiety and most of them had no experiences that triggered state anxiety. As in the present study, the mean score of state anxiety was nearly half of the total score (M = 28.38 from 57). Therefore, this might impact on the non-significant result.

Family functioning did not significantly predict HRQOL ($p > .05$) because it did not correlate with HRQOL. The result of this study could not compare with that of previous studies because no such previous studies were found. However, the result was comparable with the study in Chinese healthy elders[55]. This study[55] reported that family functioning did not have significant direct effect on QOL. The possible reasons for the non-significance in the present study, was probably due to several factors from the previous study[56] as higher levels of education and income positively related to family functioning. In contrast, the present study, 83.9% of caregivers had low education (43.2% high school and

39.7% primary school) and 53.3% had low income. Besides, in this study, family functioning was measured in caregivers' perception whereas HRQOL was measured in children. The perception of caregivers might not reflect the perception of children. Thus, family functioning did not correlate and did not predict HRQOL.

Self-care behavior was a non-significant predictor of HRQOL although it positively very low correlated with HRQOL. This correlation result was congruent with the result of the previous study[17] whereas the prediction result was incongruent[17]. Self-care behavior did not predict HRQOL probably due to the age and developmental status of children. The previous study[57] reported that the child's age significantly correlated with self-care behavior (r= .65, p< .001). This means that the older children would have higher self-care behavior. As children progress to adolescence, they are able to perform their self-care behavior better. In this study, the age of children varied from 9 to18 years old and the mean age 11.9 years (SD=2.23). Most of them (64.8%) were school age. Thus, the age and developmental status might affect their self-care behavior. In this study, the mean score of self-care behavior was 59.41 from a total score of 75.

Symptom distress negatively and very low correlated with HRQOL but it did not significantly influence HRQOL. The possible reason was probably due to 40.7% of participants being diagnosed with leukemia. Mostly, leukemia is treated by chemotherapy and nowadays because of advanced medical technology resulted in its side effects is not being so serious. Thus, children in this study would have less suffering from treatment and side effects of chemotherapy as supported by the mean score of symptom distress, 1.04 from total score of 4. Thus, symptom distress in this study did not predict HRQOL. The non-significant finding of symptom distress on HRQOL was inconsistent with previous evidence that reported some domains of QOL including physical functioning, emotional functioning, and school functioning were influenced by symptom distress[58]. The correlation result in the present study was in line with prior research, symptom distress correlated with HRQOL in American children and adolescents with cancer[24].

Conclusion, Recommendations and Implications

Based on the results of this study, trait anxiety and functional status, modifiable factors from the revised WCM, were significant predictors of HRQOL. Even though trait anxiety depends on the personality of the individual, nurses should assess the child's trait anxiety before providing nursing intervention. In addition, functional status measured by play performance positively influenced HRQOL. It is advisable for nurses to develop interventions using play to enhance HRQOL in Thai children with cancer. However, a path analysis should be further analyzed to clarify a causal relationship among these seven factors of HRQOL.

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