Factors Associated with Maternal Perception of Health-related Quality of Life of Vietnamese Preschoolers with Acute Lymphoblastic Leukemia

นิพนธ์ต้นฉบับ

Original Article

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บทคัดย่อ

วัตถุประสงค์: เพื่อศึกษาการรับรู้ของมารดาเกี่ยวกับคุณภาพชีวิตด้านสุขภาพของเด็กวัยก่อนเรียนชาวเวียดนามที่ป่วยด้วยโรคมะเร็งเม็ดเลือดขาวและปัจจัยที่เกี่ยวข้อง ได้แก่ เพศของเด็ก การนอนหลับถูกรบกวน และความเครียดในการเลี้ยงดูบุตร **วิธีการศึกษา:** การศึกษาแบบพรรณนาแบบภาคตัดขวางมีกลุ่มตัวอย่างเป็นมารดาของเด็กวัยก่อนเรียนชาวเวียดนาม อายุ 2 - 5 ปี ที่ป่วยด้วยโรคมะเร็งเม็ดเลือดขาวในระยะการให้ยาเพื่อควบคุมให้โรคสงบจำนวน 76 ราย เก็บข้อมูลระหว่างเดือนกรกฎาคมถึงกันยายน พ.ศ. 2558 ณ หอผู้ป่วยเด็กในโรงพยาบาลมะเร็ง, แผนกผู้ป่วยนอกเด็ก โรงพยาบาลการเปลี่ยนถ่ายเลือดและโลหิตวิทยา และแผนกโลหิต-มะเร็งวิทยา โรงพยาบาลเด็ก 2 เมืองโฮจิมินห์ ประเทศเวียดนาม เครื่องมือวิจัยประกอบด้วย 1) แบบสอบถามข้อมูลทั่วไป 2) แบบสอบถามคุณภาพชีวิตของเด็กตามการรับรู้ของมารดา 3) แบบสอบถามการนอนหลับของเด็ก และ 4) แบบสอบถามความเครียดในการเลี้ยงดูบุตร ซึ่งแบบสอบถาม 2 - 4 มีค่าสัมประสิทธิ์ความเชื่อมั่นเท่ากับ 0.70, 0.74 และ 0.81 ตามลำดับ วิเคราะห์ข้อมูลโดยใช้สถิติพรรณนา สหสัมพันธ์ของเพียร์สัน และสหสัมพันธ์พอยซ์ไบซีเรียล **ผลการศึกษา:** ค่าเฉลี่ยของคะแนนคุณภาพชีวิตด้านสุขภาพของเด็กป่วยโดยรวมเท่ากับ 80.11 (SD = 6.24) ซึ่งจัดอยู่ในระดับสูง เมื่อพิจารณารายด้าน ถ้าค่าเฉลี่ยของคะแนนสูง แสดงว่า มีคุณภาพชีวิตด้านสุขภาพที่ดีหรือมีปัญหาสุขภาพในด้านนั้นน้อย ซึ่งผลการศึกษาในครั้งนี้พบว่า ค่าเฉลี่ยคะแนนคุณภาพชีวิตด้านความปวดและบาดเจ็บมีค่ามากที่สุด (95.07 ± 8.44) (ซึ่งคะแนนสูงหมายถึงคุณภาพชีวิตดี) และด้านการสื่อสารมีค่าน้อยที่สุด (45.29 ± 20.93) การนอนหลับที่ถูกรบกวนสัมพันธ์ทางลบกับคุณภาพชีวิตด้านสุขภาพ (r = -0.36, P < 0.01) **สรุป:** เด็กวัยก่อนเรียนที่ป่วยด้วยโรคมะเร็งเม็ดเลือดขาวมีคุณภาพชีวิตด้านสุขภาพที่รับรู้โดยมารดาในระดับสูง ซึ่งสัมพันธ์ทางลบกับการนอนหลับที่ถูกรบกวน

คำสำคัญ: คุณภาพชีวิตด้านสุขภาพ, การนอนหลับที่ถูกรบกวน, ความเครียดในการเลี้ยงดูบุตร, เด็กวัยก่อนเรียนชาวเวียดนาม, โรคมะเร็งเม็ดเลือดขาว

Abstract

Objectives: To examine the maternal perception of health-related quality of life (HRQoL) of Vietnamese preschoolers with acute lymphoblastic leukemia (ALL) and its related factors, including child gender, sleep disturbance, and parenting stress. **Method:** This cross-sectional descriptive correlational study recruited a sample of 76 mothers of 2 to 5-year-old children diagnosed with ALL in maintenance treatment phase. Data were collected from July to September 2015 at the Pediatric Ward of the Cancer Hospital, the Pediatric Outpatient Department of the Blood Transfusion and Hematology Hospital, and the Hemato-Oncology Department of the Children Hospital No.2, Ho Chi Minh City, Vietnam. Research instruments were 1) a demographic questionnaire, 2) the PedsQL™ cancer module standard version (version 3.0): Parent report for toddlers (ages 2 - 4), 3) the children's sleep habits questionnaire, and 4) the parental stress scale for mothers. Cronbach's alpha coefficients of questionnaires 2 - 4 were 0.70, 0.74 and 0.81, respectively. Descriptive statistics, Pearson's correlation coefficient and point biserial were used to analyze the data. **Results:** A mean total HRQoL score of 80.11 (SD = 6.24) indicated a high HRQoL. We found the highest mean score of HRQoL pain and hurt subscale (95.07 ± 8.44) (which meant high HRQoL), and poorest in communication subscale (45.29 ± 20.93). There was significantly negative correlation between sleep disturbance and maternal perception of child's HRQoL (r = -0.36, P < 0.01). **Conclusion:** Vietnamese preschoolers with ALL had high HRQoL as perceived by their mothers. It was negatively correlated with sleep disturbance.

Keywords: health-related quality of life, sleep disturbance, parenting stress, preschoolers, Vietnam, lymphoblastic leukemia

Introduction

Acute lymphoblastic leukemia (ALL) is an important childhood disease in both developing and developed countries because of its prevalence and health impacts. During 2006 - 2010, the ALL incidence rate in children from 1 to 4 years old has reached a peak at approximately 8 per 100,000.[1] The similar trend was found in other countries such as United Kingdom, Thailand, and Vietnam[2-4]. ALL has been reported as the most common subcategory in childhood leukemia in Vietnam. In 1995 - 1997, ALL accounted for 66% of all leukemia cases registered at Ho Chi Minh City and 35% of them were children aged 3 to 5 years old.[3] Importantly, ALL was peak at 2 - 5 years old.[5,6] A study showed that 80% of 131 ALL children were less than 10 years old as initially diagnosed at Blood Transfusion and Hematology Hospital, University of Medicine Pham Ngoc Thach in Ho Chi Minh City.[6] ALL treatment has powerfully

impacted on various aspects of children's lives, such as diminished functional mobility[7], nutritional status and growth linear changes[8], and neurocognitive problems in the near future.[9] Furthermore, in Vietnam, limitations in pediatric oncologists, diagnostic equipment, and poor economic status actually hindered the number of children registered to be diagnosed early and completely treated.[10,11]

For children, health-related quality of life may be described as multi-dimensional construct relating to subjective perception of the impact of illness and treatment on his/her health, wellbeing or functioning in relation to physical, psychological, and social aspects of life.[12] For preschoolers, parent-proxy report was employed. Preschool-aged children with chronic conditions might experience poorer health-related quality of life than those with acute conditions.[13,14] Children with ALL were considered to be under chronic condition since ALL usually required approximately 2.5 to 3 years of treatment.[15] They had poorer cancer-related quality of life on treatment compared to children off treatment less than 12 months and more than 12 months.[16] Moreover, HRQoL could be a reliable tool to assess the health outcomes in children with ALL.[17,18] It was also a pivotal aim of nursing care in ALL children.[19] Thus, assessment and promotion of health-related quality of life was found to be important in cancer children such as ALL.

Medical trial reported poorer treatment response in boys than in girls.[20] In contrast, quality of life studies pointed out that girls had poorer quality of life than boys.[21,22] However, Sitaresmi and colleagues found that the gender of children of 2 – 16 years at time of diagnosis, hospitalized or visited the clinic, was not related to HRQoL.[23] There was limitation of study examining the relationship between child gender and HRQoL of ALL preschoolers in Vietnam.

Sleep disturbance is another factor that should be considered. Sleep disturbance has been found to be a common clinical symptom regarding bedtime resistance, sleep-onset delay, sleep duration, sleep anxiety, night wakening, parasomnias, sleep-disordered breathing and daytime sleepiness.[24] Sleep is essential for growth and development of the child. There is also a specific role of sleep in the formation of immunological memory.[25] Furthermore, sleep disorders could produce many mental health problems to children.[26,27] Therefore, sleep could be very important to children. Literature revealed that the more sleep disturbance the children had, the poorer HRQoL they may experience. Overall or subscale of sleep disturbance was negatively correlated with total HRQoL or subscale of HRQoL in ALL children and adolescents.[17,28]

Parenting stress refers to feelings of mother with her parental role as well as mother's evaluation of her own parenting competence on caring demands for her young child with ALL. Since young children aged 2 to 5 are too young, most of child's personal care should be supported and carefully watched by parent[29]. Therefore, a parent is very influential on child's life. A study conducted by Roddenberry and Renk revealed the more stress parents had, the worse HRQoL that cancer children may experience.[30]

Literature review revealed some factors including child gender, sleep disturbance and parenting stress that could be associated with HRQoL. However, almost all of reviewed studies were conducted in other countries, recruited a wide range of age group or reported inconsistent findings. There are very limited studies among Vietnamese preschoolers with ALL. In addition, understanding relating factors of child's HRQoL is then pivotal in establishing effective strategy to promote HRQoL among young children with ALL and their family. Such limitation in studies and benefits in nursing practice suggests the conduction of this study in Vietnam. Take as a whole, this study will be conducted to examine the maternal perception of HRQoL of preschoolers with ALL and its relating factors including child gender, sleep disturbance, and parenting stress.

Materials and Methods

This cross-sectional study was conducted to examine the health-related quality of life and determine the associations between child gender, sleep disturbance, parenting stress and maternal perception of HRQoL of preschoolers with acute lymphoblastic leukemia (ALL) the Pediatric Ward of the Cancer Hospital, the Pediatric Outpatient Department of the Blood Transfusion and Hematology Hospital, and the Hemato-Oncology Department of the Children Hospital No.2, Ho Chi Minh City, Vietnam.

Sample was recruited by convenience sampling with inclusion criteria. Mothers were selected if they were mothers of children who were 2 to 5 years old, diagnosed with ALL for at least 6 months and on maintenance therapy, hadn't received radiation treatment or stem cell transplant,

and were not suffering from any other serious physical and mental health problems. In addition, they were older than 18 years old, can communicate, read and understand the Vietnamese language, and be willing to participate in this study.

Sample size was calculated based on the formula developed by Soper.[31] With the anticipated effect size (r^2) of 0.15, a desired statistic power level of 0.80, number of variables of 3 and type I error probability level of 0.05, the minimum sample size for this study was 76 mothers.

Research instruments

There were 4 mother's self-report questionnaires to collect the data.

Demographic questionnaire

A demographic questionnaire was developed by the researcher. It included child and mother characteristics. For children, there were age, gender, birth order, number of siblings, and duration from first diagnosis. For mother, there were age, marital status, education level, occupation, and family income.

PedsQL™ cancer module standard version (version 3.0): Parent report for toddlers (aged 2 - 4)

It is a one-month recall instrument developed by Varni and colleagues[12] and was used to measure the maternal perception of their child's HRQOL. This module consists of 25 items with 8 dimensions namely pain and hurt (2 items), nausea (5 items), procedural anxiety (3 items), treatment anxiety (3 items), worry (3 items), cognitive problems (3 items), perceived physical appearance (3 items), and communication (3 items). Scoring system based on a 5-point Likert-type scale ranges from 0 (Never), 1 (Almost never), 2 (Sometimes), 3 (Often) to 4 (Almost always). Score of each item is transformed on a scale from 0 to 100. The score is reversed and linearly transformed to a 0 - 100 scale as follows: 0 = 100, 1 = 75, 2 = 50, 3 = 25, and 4 = 0. Unless 50% or more items are complete, the scale scores should not be computed. Mean score is equal to sum of the items over the number of items answered. Total score is the sum of all the items over the number of items answered on all the scales. The total score ranges from 0 to 100 of which higher scores indicate better HRQoL. This instrument can also be used to assess HRQoL in children aged 5 with the permission from the author. In this study, Cronbach's alpha coefficients for internal consistency reliability of subscales ranged from 0.76 to 0.95 and that of the total scale was 0.7.

Children's sleep habits questionnaire (CSHQ)

CSHQ is a one-week retrospective, parent-report-for-children questionnaire developed by Owens and colleagues.[24] It was used to screen sleep problems in children aged 4 to 10 and has been shown as a useful screening tool in children aged 2 - 4 as well.[32,33] The CSHQ consist of 35 items and is categorized into 8 subscales. Since two items are both in bedtime resistance and sleep anxiety subscales, only 33 items are scored. These subscales provide measurement of different aspects of sleep including bedtime resistance (6 items), sleep-onset delay (1 item), sleep duration (3 items), sleep anxiety (4 items), night waking (3 items), parasomnia (7 items), sleep disorder breathing (3 items) and daytime sleepiness (8 items). A three-point scale is used to indicate frequency of occurrence and scored as 3-usually (5 - 7 times per week), 2-sometimes (2 - 4 times per week) and 1-rarely (0 - 1 time per week or never). The sleepiness items (items 32 and 33) are scored 0-default (not checked), 1-"very sleepy", and 2-"fall asleep." Scores of items 1, 2, 7, 9, 10, and 26 are reversed as follows: 3 to 1, 2 to 2, and 1 to 3. Then all scores are summed. The total score ranges from 31 to 97. A higher score indicates more sleep problems. The cut-off point of 41 shows good sensitivity (0.80) and specificity (0.72) to screen the problem sleepers and non-problem sleepers.[24] In this study, we found acceptable internal consistency reliability with a Cronbach's alpha coefficient of 0.74.

Parental Stress Scale (PSS)

PSS was developed by Berry and Jones.[34] This 18-item scale was used to measure parenting stress of the mother. A 5-point response is used to indicate parent's answer: 1-"strongly disagree," 2-"disagree," 3-"undecided," 4-"agree" and 5-"strongly agree." Scores of items 1, 2, 5, 6, 7, 8, 17 and 18 should be reversed as follows: 1 to 5, 2 to 4, 3 to 3, 4 to 2, and 5 to 1. Then the scores are summed to reach the total score ranging from 18 to 90. Higher score is indicative of higher stress. The mean score was categorized into three levels, which was calculated by dividing the difference between the highest and lowest scores by three.[35] These three levels of parenting stress were mild (18.00 - 42.00), moderate (42.01 - 66.00), and severe (66.01 - 90.00). In this

study, internal consistency reliability was high with a Cronbach's alpha coefficient of 0.81.

Back translation technique was used to translate all measurements from original English version into Vietnamese language.[36] The proce ss of back translation was used to ensure the scale's validity.

Data collection procedure

After the proposal was approved by the Ethical Committee of the Faculty of Nursing, Burapha University and related hospitals, data collection was carried out at the Children Hospital No. 2, the Cancer Hospital, and the Blood Transfusion and Hematology Hospital, Ho Chi Minh City from July to September, 2015. Data were collected by the researcher at the pediatric cancer department on Monday to Friday from 8 AM to 4 PM. According to the child's medical documents and follow-up schedule, the researcher (first author) contacted the preschoolers' mothers who met the inclusion criteria in their convenient time. The researcher provided mothers with clear information about the study purpose, data collection process and their right to participate or withdraw from the research anytime. With the mothers' agreement, the researcher made an appointment to meet them at the clinic during their waiting time or after finishing the medical examinations.

Mothers were asked to sign a consent form and were allowed to have 30 - 35 minutes to fill in all questionnaires. The researcher always paid attention to the children's health status and answered any relevant questions the mothers would have. The researcher checked for the completion of the questionnaires after filled by the mothers.

Data analyses

Descriptive statistics including frequency with percentage, mean with standard deviation, and range were calculated to describe demographic information of preschoolers and their mothers, maternal perception of child's HRQoL, sleep disturbance and parenting stress. Assumptions of Pearson's correlation coefficients analysis were tested before running the test. The data met the assumptions. Then, Pearson's correlation coefficients were used to examine relationship between sleep disturbance, parenting stress and HRQoL. Point biserial was employed to examine the association between child gender and HRQoL. Statistical significance level was set at *P*-value less than 0.05.

Results

Demographic characteristics

Of the 76 **mothers** participating, they were in their young to early middle age (31.99 ± 5.60 years, range = 21 - 48) (Table 1). Most mothers lived with their husbands (98.7%), completed secondary school and high school (32.9%, equally) and college/university (21.1%). The majority were housewives (31.6%) and government or business employees (22.4%). Families with income less than 4 million VND per month were found in 51.3% of the participants.

Table 1 Frequency, percent, mean, standard deviation, and range of preschool-aged children and their mother characteristics (N = 76).

Characteristics	N	%
Mother		
Age (years): mean = 31.99, S.D. = 5.60, range = 21 – 48		
Marital status		
Married	75	98.7
Separated	1	1.3
Education		
Elementary school or lower	9	11.8
Secondary school	25	32.9
High school	25	32.9
College/University	16	21.1
Graduate	1	1.3
Occupation		
Officer	17	22.4
Worker	9	11.8
Farmer	13	17.1
Vendor	13	17.1
Housewife	24	31.6
Family income (1 USD = 21,780 VND)		
< 2,000,000 VND/month	13	17.1
2,000,000 – < 3,000,000 VND/month	13	17.1
3,000,000 – < 4,000,000 VND/month	13	17.1
> 4,000,000 VND/month	37	48.7
Children		
Age (months): mean = 47.96, S.D. = 10.17, range = 24 – 60		
Gender		
Boy	45	59.2
Girl	31	40.8
Bird order		
1st	33	43.4
2nd	35	46.1
3rd or more	8	10.5
Number of sibling		
None	18	23.7
1	39	51.3
2	14	18.4
3 or more	5	6.6
Duration from first diagnosis (months): mean = 17.63, S.D. = 7.47, range = 10 – 39		

For 76 **preschool-aged children** included, they were all in maintenance phase of ALL treatment (Table 1). Their mean age was 47.96 months old (*SD* = 10.17, range = 24 - 60). Sample had 59.2% boys and 40.8% girls. These children were mostly the first and second child in the family,

43.4% and 46.1%, respectively. The majority of them had one sibling (51.3%). Mean duration of time from the first diagnosis was 17.63 months (*SD* = 7.47, range = 10 - 39).

Description of study variables

The mean total score of HRQoL was 80.11 (*SD* = 6.24, range = 66 - 91) (Table 2). According to PedsQL™, higher mean score indicated higher quality of life or fewer problems. Consequently, children in this study had rather high quality of life and highest quality of life in pain and hurt subscale (mean = 95.07, *SD* = 8.44), but poorest in communication subscale (mean = 45.29, *SD* = 20.93).

Table 2 Mean, standard deviation and range of health-related quality of life scores for overall scale and subscales (N = 76).

Health-related quality of life score	Mean	SD	Range found	Possible range
Overall scale score	80.11	6.24	66 - 91	0-100
Subscale score				
Pain and hurt	95.07	8.44	75 - 100	0-100
Cognitive problems	92.98	10.37	67 - 100	0-100
Worry	91.78	11.18	50 - 100	0-100
Treatment anxiety	88.38	16.51	25 - 100	0-100
Nausea	84.68	13.73	45 - 100	0-100
Perceived physical appearance	84.32	13.40	50 - 100	0-100
Procedure anxiety	60.31	22.52	0 - 100	0-100
Communication	45.29	20.93	0 - 100	0-100

The mean total score of sleep disturbance was 45.54 (*SD* = 6.65, range = 31 - 66), which meant children were problematic sleepers (Table 3). Regarding mean by item, ALL preschoolers had most problem in bedtime resistance (mean = 2.04) and least problem in daytime sleepiness (mean = 0.79).

Table 3 Mean, standard deviation, and range of sleep disturbance for total and subscale scores (N = 76).

Sleep disturbance score	*Mean*	*SD*	Range found	Possible range	Mean by item
Overall scale score	45.54	6.65	31-66	31-97	
Subscale score					
Bedtime resistance	12.24	2.94	6-17	6-18	2.04
Sleep anxiety	7.30	2.18	4-12	4-12	1.83
Sleep-onset delay	1.41	0.64	1-3	1-3	1.41
Sleep duration	4.13	1.30	3-7	3-9	1.38
Night waking	3.95	1.13	3-9	3-9	1.32
Parasomnia	8.74	1.13	7-15	7-21	1.25
Sleep-disordered breathing	3.36	0.58	3-5	3-9	1.12
Daytime sleepiness	9.00	3.07	6-16	6-22	0.79

The mean total score of parenting stress was 42.54 (*SD* = 8.80, range = 24 - 61) which was at the moderate level of stress (Table 4). In detail, mothers experienced mild and moderate level of stress at 46.10% and 53.90%, respectively.

Table 4 Level of stress, interval score, frequency and percentage of mothers (N = 76).

Level	Interval score	N	%
Mild	18.00 - 42.00	35	46.10
Moderate	42.01 - 66.00	41	53.90

There was negatively significant correlation between sleep disturbance and maternal perception of child's HRQoL (r = -0.36, P < 0.01) (Table 5). Both child gender (r = -0.09, P > 0.05) and parenting stress (r = -0.02, P > 0.05) was not significantly correlated with HRQoL.

Table 5 Correlation between child gender, sleep disturbance, parenting stress, and health-related quality of life (N = 76).

Selected factors	Health-related quality of life (r)
Child gender	-0.09
Sleep disturbance	-0.36*
Parenting stress	-0.02

* P < 0.01

Discussions and Conclusion

In this study, mothers reported that HRQoL of Vietnamese preschoolers with ALL on maintenance therapy occupied a mean total score of 80.11 (SD = 6.24, range = 66 - 91). The high HRQoL could be explained by two reasons. Since treatment for children with ALL in maintenance phase was not intensive, they mainly took oral medications, blood tests, intrathecal therapy or bone marrow aspiration monthly, according to their specific treatment plan.[5,37,38] Secondly, the duration of time from diagnosis was somewhat long (mean = 17.63 months, SD = 7.47, range = 10 - 39). Children tended to adapt to the treatment procedure through the coping process over time.[39] The children's HRQoL was rather high as compared with those in other studies using the same PedQL 3.0 cancer module. In a sample of children at least 2 years of age on maintenance ALL treatment, Sung and colleagues reported that the overall

total score was 73.8 (range = 51.2 - 100).[22] Likewise, parents reported the HrQoL on treatment score for their children with cancer 70.28 (range = 54.49 - 77.99).[40] The lower score of HRQoL in these studies might be due to the fact that they included children in a wide range of age, various types of cancer, as well as different stages of treatment.

Regarding HrQoL subscales, high mean score indicated higher quality of life or fewer problems. In this study, Vietnamese preschool-aged ALL children had high scores in hurt and pain subscale (mean = 95.07) and cognitive problems subscale (mean = 92.98). In the maintenance phase, residual disease was eliminated so pain and hurt were not problematic.[20] Similarly, the cognitive function of children under chemotherapy was still in the normal range.[9] In contrast, children had poor HRQoL in procedural anxiety (mean = 60.31) and communication (mean = 45.29). Children's remaining fear to these painful procedures might be because young children are more sensitive to pain[40] and they also experience the negative history of pain.[42] From the diagnosis, ALL preschoolers have lived their life mainly in hospital for treatment regimen and have followed the maintenance modalities at home for years. Even when managed at home, they are not likely to go to kindergarten because of their weak immune ability. Therefore, while early childhood education are significant to achieve interpersonal skills[29], those children might not have a good chance to communicate with other children and people. Their communication skill thus probably has not fully developed. This result was consistent with Tsuji and colleagues.[43]

In our study, there was significantly negative correlation between sleep disturbance and maternal perception of child's HRQoL (r = -0.36, P < 0.01). It could be implied that Vietnamese preschoolers with ALL who had problems in sleep would experience poor HRQoL. This finding was consistent with the revised Wilson and Cleary model for health-related quality of life. Theoretically, a symptom (sleep disturbance) would influence functional status (physical, social, psychological function) so that the symptom has influence on HRQoL.[44] By the cut-off point of 41[24], young children in this study were problematic sleepers (mean = 45.54). The sleep disturbances may lead to behavioral, cognitive, emotional and physical problems in young children.[44] In other words, sleep disorder resulting in impaired attention, anxiety, daytime fatigue, and muscle aches may limit task performance.[45] Therefore, the more sleep disturbance the children had, the worse HRQoL they experienced. Our result was supported by several studies. van Litsenburg and colleagues found that impaired sleep was related to poor HRQoL (r = -0.6; P = 0.044).[17] Similarly, Erickson and colleagues concluded that impaired daytime functioning was associated with worse cancer-related HRQoL at the week after treatment administration (r = -0.55, P < 0.01).[28]

Our study found no significant correlation between child gender and HRQoL (r = -0.09, P > 0.05). It could be implied that whether preschool-aged children were boys or girls, the maternal perception of HRQoL on their children was not different. In this study, Vietnamese children (mean = 47.96 months old) were supposed to know their gender, however their developmental milestones were probably not fully differentiated.[29] Therefore, gender may not be correlated with HRQoL in preschoolers. This result was consistent with the work of Sitaresmi and colleagues[23] in which they figured out that child gender was not related to HRQoL. The finding however was in contrast with the revised Wilson and Cleary model and a few previous studies.[21,22] In these studies, child gender was correlated with HRQoL which could be due to the fact that they included school-aged children and adolescents whose difference in gender meant different growth and development.

Parenting stress was not significantly correlated with HRQoL (r = -0.02, P > 0.05). It could be implied that mother's stress caused by parenting did not relate to child's HRQoL. ALL preschoolers were on maintenance treatment, which does not require intensive regimen. Mothers may understand maintenance stage as a promising response to treatment. Moreover, almost 100 % of mother and father lived together so they can carefully take care of their ill child. This finding did not agree with those from revised Wilson and Cleary model and previous study[30] where parenting stress was significantly correlated with children's HRQoL. The disagreement could be due to the fact that the researchers included children from 9 months to 19 years old who were diagnosed with various types of cancer.[30]

Regarding **th**e **recommendation**, our findings could benefit the nursing practice. Pediatrics nurses may use health-related quality of life (HRQoL) as a mean of holistic evaluation of nursing care in preschool-aged children with ALL on chemotherapy. To assess HRQoL in these patients,

oncology nurses, and pediatrics nurses, not only assess physical health but also psychological and social health in order to comprehensively determine the children's problems. As a consequence, adequate nursing care can be made to handle the problems more effectively. With the finding that children's sleep habits was negatively correlated with HRQoL, an education program about good sleep hygiene should be offered to parents. This would help improve HRQoL in the children, especially when they are mainly managed at home.

Our study potentially had some **limitations**. A convenience sampling could constrain the generalizability of the findings to population. Findings from Vietnamese setting may be noteworthy when being used in other settings. Furthermore, HRQoL and children's sleep habits questionnaires were mother proxy-report. It would affect the results unless the mothers paid adequate attention to their children.

In advancing our knowledge on the issue of health related quality of life in preschoolers with ALL, **future studies** on various aspects are recommended. There is a need for studies to examine other related factors such as child's behavior, personality, sibling's psychological health, care knowledge of parents, family functioning, and parenting style. HRQoL of preschoolers in specific stage of treatment might be addressed. Moreover, longitudinal studies should be conducted to examine the simultaneous changes of related factors and HRQoL over time. Random sampling technique should be used to lessen bias and enhance generalizability. Last but not least, intervention studies, for instance, education program to obtain better children's sleep habits to foster HRQoL should be concerned.

Conclusion

Vietnamese preschoolers with ALL had considerably high health-related quality of life; however, they still experienced poor quality of life in procedural anxiety and communication. Sleep disturbance was found to be negatively correlated with maternal perception of HRQoL of these patients. Longitudinal and intervention studies focusing on sleep hygiene, pain management and communication development could be helpful in increasing health related quality of life in preschoolers with acute lymphoblastic leukemia in Vietnam.

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