A study of the development of the Korean version of PedsQL™ 3.0 cerebral palsy module and reliability and validity

YOUNG-JU YUN, MD, KMD, PhD1), YONG-BEOM SHIN, MD, PhD3), SOO-YEON KIM, MD, PhD3), MYUNG-JUN SHIN, MD, PhD3), RA-JIN KIM, PT, MS4), TAE-YOUNG OH, PT, PhD4)*

1) Department of Integrative Medicine, School of Korean Medicine, Pusan National University, Republic of Korea
2) Department of Rehabilitation Medicine, Pusan National University School of Medicine and Biomedical Research Institute, Pusan National University Hospital, Republic of Korea
3) Department of Rehabilitation Medicine, Pusan National University Yangsan Hospital, Pusan National University School of Medicine, Republic of Korea
4) Department of Physical Therapy, College of Health and Welfare, Silla University: 140 Baegyang-daero 700beon-gil, Sasang-gu, Busan 46956, Republic of Korea

Abstract. [Purpose] The purpose of this study was to develop the Korean version of the PedsQL™ 3.0 Cerebral Palsy Module to evaluate the health-related quality of life of children with cerebral palsy and to test the reliability and validity. [Subjects and Methods] The study included 108 caregivers of children with cerebral palsy aged 2 to 4 years and 72 caregivers of children aged 5 to 7 years, who visited multiple sites between February and August 2015. The Translation Commission performed the first translation with the approval of the Mapi Research Trust Company to create a Korean-version of the PedsQL™. Afterwards, back-translation was performed by one translator specializing in health and medical treatment who was a native English-speaker fluent in Korean, and one native Korean-speaker fluent in English. The consistency of each question was confirmed and a translation-integrated version was created. Test components were explained to caregivers during a one-on-one interview; caregivers then completed the PedsQL™ questionnaire and a Pediatric Evaluation Disability Inventory (PEDI) questionnaire. Subjects contributing to test-retest measures were asked to repeat the PedsQL questionnaire one week later and return it by mail. To assess data quality for the survey question results, non-response rate, ceiling effect, and floor effect were analyzed. Test-retest reliability and internal consistency reliability were assessed. For test-retest reliability, an intraclass correlation coefficient (ICC) was calculated, and for internal consistency reliability, Cronbach’s alpha was used. To test criterion-related validity, Pearson’s correlation coefficient was used. [Results] The content validity of the PedsQL 3.0 Cerebral Palsy Module was high for both age groups, and demonstrated significant internal consistency (>0.7) in all areas. For test-retest reliability, both groups demonstrated a significant ICC (>0.61). Correlation with the PEDI was statistically significant in all areas except pain and hurt. [Conclusion] The Korean version of the PedsQL™ 3.0 Cerebral Palsy Module was found to be reliable and valid, and is expected to contribute greatly to the evaluation of the quality of life of children with cerebral palsy.

Key words: Cerebral palsy, PedsQL™

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*Corresponding Author. Tae-Young Oh (E-mail: ohtaeyoung@silla.ac.kr)

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INTRODUCTION

To live a contented life, human beings need to maintain their individual overall health and functional capabilities, including life roles, easiness, and spiritual health. Health is increasingly likely to be defined as a resource to enable individual, social, and economic productivity, rather than abstractly defined as physical, mental, and social well-being, as it was in the Ottawa Charter (1981). Therefore, the WHO Charter has recently included quality of life in measures of health, and health-related quality of life measures have become an important complement to other data, such as death rates and morbidity rates, in explaining various areas of health.

Quality of life can be defined by different concepts, such as “well-being”, “functional status”, “health conditions”, and “life satisfaction”. Quality of life in the health and medical fields generally refers to health status, as subjectively evaluated by each individual, and is also termed Health-Related Quality of Life (HRQoL).

HRQoL is very subjective because it is centered on the experiences of the individual patient. The meaning of the words “health”, “feeling sick”, “pain”, and “disease” varies according to individual and societal expectations and values. Furthermore, a child’s understanding of quality of life at a particular stage of cognitive development may be expressed differently than the understanding or meaning for an adult. In other words, to measure the quality of life of human subjects, it is necessary to assess the perceptions of that human subject with regard to their quality of life. Children’s cognitive abilities develop through several stages, and their thought processes differ according to the stage of cognitive development.

To measure “quality of life”, which is a subjective and abstract concept, it is necessary to prepare a questionnaire using expressions and approaches appropriate for the developmental level of the target audience. In Korea, various measurement instruments have been developed and studied to assess quality of life in adults, but hardly any instruments exist to assess the quality of life in children. Therefore, it is necessary to develop an age-appropriate tool for children.

Cerebral palsy is a disorder affecting movement and posture, caused by a non-progressive injury to the developing fetal or infant brain, and is often accompanied by disturbances in communication, sensation and cognition, behavior, and motor function, including convulsions. Motor disorders in cerebral palsy can lead to the restriction of physical activity and a lack of movement experience, which causes retardation of the development of sensation and cognition, concept formation, and social development.

The function of children with cerebral palsy can be described based on the International Classification of Functioning, Disability, and Health (ICF) developed by the WHO. The ICF classifies the components of health into physical function and structure, activity and participation, and environmental and individual factors, and describes how each component interacts with each other.

With regard to children with disabilities, there has been a recent focus on the social aspects of disability, such as the safety and care of children with disabilities, expectations for opportunities for new learning, potential for valuable jobs, and commitments to other people, in a manner similar to normally-developing children. For a child with a disability, participation in daily activities at the same level as a normally-developing child is important for the development of a sense of belonging to the community and for the creation of an inclusive and suitable environment. Additionally, Attermeier asserted that children with disabilities should maintain their quality of life and play the same social roles assigned to normally-developing children. Level of physical movement is a significant factor that not only restricts social participation and activities, but also affects quality of life, which is perceived to be an important area for treatment evaluation.

HRQoL for children with cerebral palsy is inferior compared to normally-developing children, especially with regard to physical quality of life rather than psychosocial quality of life. For children with cerebral palsy, the higher the gross motor function performance level and intelligence of the child, the higher the physical quality of life will be. Likewise, Lee et al. reported that the physical quality of life of children with cerebral palsy deteriorates with an increase in the severity of the disability. Many countries have actively studied the quality of life of children with cerebral palsy since the 2000s.

The purpose of this study was to develop a Korean version of the PedsQL 3.0 Cerebral Palsy Module (for caregivers of children aged 2 to 4 and 5 to 7) to measure the quality of life of children with cerebral palsy, established by targeting children and their parents, as well as to test the reliability and validity of the module, and to provide basic data for improving the HRQoL of children with cerebral palsy.

SUBJECTS AND METHODS

The purpose of the study and the contents of the survey were explained to the caregivers of children with cerebral palsy aged 2 to 7 who came to the pediatric physical therapy departments at two ‘A’ city-located hospitals, five ‘B’ city-located university hospitals, a rehabilitation hospital, and a nursery for children with disabilities, and four ‘C’ city-located university hospitals and a rehabilitation hospital between February 4 and August 18, 2015. A questionnaire-based survey was conducted after obtaining written consent. In total, 108 caregivers of children with cerebral palsy aged 2 to 4 years and 72 caregivers of children with cerebral palsy aged 5 to 7 years participated in the survey. The required number of subjects was determined based on the results of study by Lee et al., and the specific selection criteria were based on the following diagnostic codes:
Cerebral palsy (ICD-10 803-809, 838)
- G80.3 Dyskinetic cerebral palsy
- G80.4 Ataxic cerebral palsy
- G80.8 Other cerebral palsy
- G80.9 Cerebral palsy, unspecified
- G83.8 Other specified paralytic syndromes

Children with congenital neuromuscular diseases, gene disorders, and progressive central nervous system diseases, as well as children under treatment for other severe diseases (e.g. tumor, heart disease, severe infectious disease) excepted children with cerebral palsy were excluded from the study.

The present study was approved by the Pusan National University Hospital Institutional Review Board (H-1412-009-024) and the objective of the study and its requirements were explained to the subjects. All participants provided written parental consent; thus, the rights of human subjects were protected.

The PedsQL® 3.0 CP module (for children aged 2 to 4 years), which was the tool used for this study, is composed of 22 items developed by Varni et al.4, and is a proxy report to be prepared by parents, as the caregivers of the children. The sub-areas of the quality of life assessment include 5 items for daily activities, 5 items for movement and balance, 4 items for pain and hurt, 4 items for fatigue, and 4 items for eating activities. A 5-point Likert scale was used: “never a problem (0 points)”, “rarely a problem (1 point)”, “sometimes a problem (2 points)”, “often a problem (3 points)” and “almost always a problem (4 points).” For each item, 0 is converted to 100 points, 1 point to 75 points, 2 points to 50 points, 3 points to 25 points, and 4 points to 0 points. The total score ranges from 0 to 2,200 points. A higher score denotes higher quality of life.22, 23

In a previous study, a proxy report prepared by parents for the PedsQL® 3.0 CP module showed high reliability, with Cronbach’s α=0.91, and a statistically significant correlation with the PedsQL® 4.0 Generic Core Scales.24

The PedsQL® 3.0 CP module (for children aged 5 to 7 years), was also used as a tool for this study, and is composed of 35 items developed by Varni et al.4, including a self-report by the child and a proxy report by the parents. The sub-areas for quality of life include 9 items for daily activities, 4 items for school activities, 5 items for movement and balance, 4 items for pain and hurt, 4 items for fatigue, 5 items for eating activities, and 4 items for speech and communication. A 5-point Likert scale was used: “never a problem (0 points)”, “rarely a problem (1 point)”, “sometimes a problem (2 points)”, “often a problem (3 points)”, and “almost always a problem (4 points).” For each item, 0 is converted to 100 points, 1 point to 75 points, 2 points to 50 points, 3 points to 25 points, and 4 points to 0 points. The total score ranges from 0 to 3,500 points. Again, a higher score denotes higher quality of life.22, 23

The self-report in the PedsQL® 3.0 CP module has shown high reliability, with Cronbach’s α=0.79, and the proxy report prepared by parents has also shown high reliability, with Cronbachα=0.91 in a previous study, as well as a statistically significant correlation with the PedsQL® 4.0 Generic Core Scale.24

The Pediatric Evaluation Disability Inventory (PEDI) is a tool developed by Haley et al. to establish the goals of effective treatment and to measure the extent of change following treatment through the measurement of functional performance capabilities based on the Rasch model.25 The evaluation targets children aged 6 months to 7 years and 6 months, but can be used for children aged over 7 years and 6 months who are at a low functional level. The evaluation items of the PEDI consist of 3 areas, including self-care, mobility, and social function for a total of 217 items, including 197 items related to functional skills and 20 items to measure the extent of caregiver assistance for those areas and the adjustment and modification of tasks.25

Evaluation by the PEDI can be carried out using three methods, such as parent report, structured interview targeting the parent or intimate acquaintance of the child, or direct observation of the child’s functional activities in the hospital or an educational environment. In cases where parents or experts carry out the evaluation, their evaluation scores need to be independently verified, and the evaluation of caregiver assistance and adjustment and modification of tasks needs to be performed by experts through a structured interview with a caregiver intimate with the child.25

The PEDI evaluation scale consists of a nominal scale such as “possible (1 point)” and “impossible (0 points)” for the functional skills side, and an ordinal scale, such as “independent performance (5 points)”, “direction and supervision (4 points)”, “minimum assistance (3 points)”, “moderate assistance (2 points)”, “maximum assistance (1 point)”, and “overall assistance (0 points).” The adjustment and modification of tasks, such as receiving assistance through the use of auxiliary devices or a change in environment, is assessed based on the frequency of occurrence. The analysis of survey results is represented by normative standard scores and scaled scores. The mean of normative standard scores is 50 points with a standard deviation of 10 points. A score of 30 to 70 points at ± 2 standard deviations means normal development. Scaled scores are represented in a range of 0 to 100 points. Higher scores equate to higher functional levels.25

Lee et al.26 reported that the PEDI is a reliable criterion-referenced test method with an intraclass correlation coefficient (ICC) of 0.96–0.99. Kim et al.27 reported that the internal consistency of the Korean version of the PEDI is 0.97 to 0.98.

Consent to use the PedsQL® 3.0 CP module was obtained from James Varni, PhD, who was the developer of this tool, in July 2014. The translation commission (three pediatric physical therapists, one professor from the department of physical therapy, and one education major), who are fluent in both the English and Korean languages, independently performed the first translation of the English version of the PedsQL, in accordance with the procedures presented by the original developer. Afterwards, back-translation was completed by another translator specializing in health and medical treatment, a native English-speaker fluent in Korean, and a native Korean-speaker fluent in English. It was reviewed and revised by the transla-
tion commission, and finally a translation-integrated version was created.

For the second translated version, a pilot survey targeting the caregivers of 10 patients in a rehabilitation hospital was carried out from the first to fourth of December 2014 and survey response time was measured. All 10 respondents provided answers within 10 minutes. Opinions about the revision of phrases were collected for questions that were difficult or ambiguous to understand, and the pilot survey was completed.

Ultimately, some phrases were revised or complemented, and a final questionnaire was completed. A 5-point Likert scale was used: “never a problem (0 point)”, “rarely a problem (1 point)”, “sometimes a problem (2 points)”, “often a problem (3 points)”, and “almost always a problem (4 points).” For each item, 0 was converted to 100 points, 1 point to 75 points, 2 points to 50 points, 3 points to 25 points, and 4 points to 0 points. The total score ranged from 0 to 2,200 points for children aged 2 to 4 and from 0 to 3,500 for children aged 5 to 7, with higher scores representing higher quality of life.

One researcher visited each organization and conducted a one-on-one interview survey with the caregivers of the children in the study.

After the considerations were informed, questionnaires were completed at the relevant organization and immediately collected. Subjects participating in the test-retest reliability assessment of the PedsQL were requested to complete the same questionnaire one week later and return it to the researcher by mail.

Ultimately, 108 caregivers of children with cerebral palsy aged 2 to 4 years and 72 caregivers of children with cerebral palsy aged 5 to 7 years participated in the survey. The subjects participating in test-retest reliability assessment included 15 caregivers of children with cerebral palsy aged 2 to 4 years and 19 caregivers of children with cerebral palsy aged 5 to 7 years.

Data quality assessment for survey results was conducted based on non-response rate, ceiling effect, and floor effect, and was evaluated using frequency analysis.

Reliability was assessed by using a test-retest method and an internal consistency method. For test-retest reliability, an ICC was measured, and for internal consistency reliability, Cronbach’s alpha was measured. To test criterion-related validity, the relationship with the PEDI was analyzed using Pearson’s correlation coefficient. Collected data was analyzed using SPSS WIN 18.0 (PASW Statistics for Windows, Version 18, SPSS Inc., Chicago, IL, USA).

### RESULTS

The pediatric patients aged 2 to 4 years were composed of 69 male (63.9%) and 39 female (36.1%) patients. There were 31 two-year-old patients, 43 three-year-old patients, and 34 four-year-old patients. The average age was 3.03 years (Table 1).

The pediatric patients aged 5 to 7 years were composed of 43 males (59.7%) and 29 females (40.3%). There were 26 five-year-old patients, 20 six-year-old patients, and 26 seven-year-old patients. The average age was 6 years (Table 1).

Responses were provided for all questions on the survey questionnaire. The ceiling effect of the PedsQL CP module for children aged 2 to 4 years was 1.9% to 70.4% and the floor effect was 1.9% to 30.6%. The ceiling effect was highest, at 70.4%, in the pain and hurt sub-area and the floor effect was highest, at 30.6%, in the daily activities sub-area (Table 2).

The ceiling effect of the PedsQL CP module for children aged 5 to 7 years was 2.8% to 56.9% and the floor effect was 0.0% to 31.9%. The ceiling effect was highest, at 56.9%, in the pain and hurt sub-area and the floor effect was highest, at 31.9%, in the school activities sub-area (Table 2).

The quality of life score ranged from 29.40 to 89.53 points out of 100 possible points for children aged 2 to 4 years, and was lowest for the daily activities sub-area. For children aged 5 to 7 years, the quality of life score ranged from 35.24 to 88.80 points and was lowest in the school activities sub-area (Table 2).

Cronbach’s alpha was more than 0.7 for both age groups of children (Table 3).

Among the 108 caregivers of children with cerebral palsy aged 2 to 4 years who had participated in the first survey, 15 caregivers participated in a test-retest reliability survey, and among the 72 caregivers of children with cerebral palsy aged 5 to 7 years who had participated in the first survey, 19 caregivers participated in a test-retest reliability survey.

According to the results, the test-retest reliability for the PedsQL for children aged 2 to 4 years showed very high correlation for daily activities (\(r=0.91, p<0.01\)) and eating activities (\(r=0.96, p<0.01\)), and low correlation for pain and hurt (\(r=0.43, p<0.01\)). The ICC for children aged 2 to 4 years was over 0.81 for the total score for quality of life and the sub-areas of daily activities, movement and balance, fatigue, and eating activities. The ICC was under 0.60 for the pain and hurt sub-area (Table 4).

According to the results, the test-retest reliability for the PedsQL for children aged 5 to 7 years showed high correlation for daily activities (\(r=0.89, p<0.01\)), eating activities (\(r=0.80, p<0.01\)), and speech and communication (\(r=0.79, p<0.01\)), and low correlation for pain and hurt (\(r=0.30, p<0.01\)). The ICC for children aged 5 to 7 years was over 0.81 for the total score for quality of life and the sub-areas of daily activities, eating activities, and speech and communication. The ICC was between 0.61 and 0.80 for school activities, movement and balance, and fatigue, and under 0.60 for pain and hurt (Table 4).

The correlation between quality of life and the PEDI score based on caregiver reports for children with cerebral palsy aged 2 to 4 years was statistically significant (\(p<0.05\)) in all areas except for pain and hurt. The total PedsQL score (\(r=0.87\)), daily activities (\(r=0.89\)), and eating activities (\(r=0.89\)) also showed high correlation (Table 5).
The correlation between quality of life and the PEDI score based on caregiver reports for children with cerebral palsy aged 5 to 7 years was also statistically significant (p<0.05) in all areas except for pain and hurt. The total PedsQL score (r=0.94), daily activities (r=0.90), and eating activities (r=0.92) showed very high correlation, and school activities (r=0.80), movement and balance (r=0.73), and speech and communication (r=0.89) also showed high correlation (Table 6).

**DISCUSSION**

The purpose of this study was to test the reliability and validity of the Korean version of the PedsQL™ Cerebral Palsy Module that is currently being utilized as a tool to evaluate the HRQoL of children with cerebral palsy. HRQoL should be considered in the treatment of children with cerebral palsy.
Recent clinical studies using patient-centered questionnaires have increasingly highlighted the importance of clinical judgement. Most questionnaires are written in English, and their contents are configured to suit English-speaking cultures, which should be considered when translating questionnaires. To reduce translation errors caused by cultural differences, the

| Table 4. Test-retest reliability results |
|-----------------------------------------|
| **Scale** | **Test Mean ± SD** | **Retest Mean ± SD** | **r** | **ICC** |
| 2–4 years (n=15) | | | | |
| Daily activities | 26.0 ± 34.0 | 26.3 ± 32.9 | 0.91** | 0.95** |
| Movement and balance | 57.0 ± 40.6 | 46.7 ± 41.2 | 0.84** | 0.91** |
| Pain and hurt | 85.8 ± 26.3 | 77.5 ± 32.4 | 0.43** | 0.59** |
| Fatigue | 57.5 ± 25.8 | 58.3 ± 24.3 | 0.75** | 0.86** |
| Eating activities | 55.4 ± 40.8 | 52.5 ± 40.7 | 0.96** | 0.98** |
| Total score | 56.4 ± 23.4 | 52.3 ± 27.0 | 0.97** | 0.98** |
| 5–7 years (n=19) | | | | |
| Daily activities | 58.0 ± 39.4 | 56.9 ± 37.6 | 0.89** | 0.94** |
| School activities | 64.1 ± 32.7 | 62.5 ± 30.6 | 0.67** | 0.80** |
| Movement and balance | 67.1 ± 26.4 | 63.4 ± 31.8 | 0.65** | 0.78** |
| Pain and hurt | 88.5 ± 19.0 | 81.6 ± 26.9 | 0.30** | 0.44** |
| Fatigue | 67.1 ± 25.8 | 64.8 ± 26.5 | 0.66** | 0.80** |
| Eating activities | 87.9 ± 17.5 | 84.7 ± 22.7 | 0.80** | 0.87** |
| Speech and communication | 90.1 ± 18.0 | 87.8 ± 22.2 | 0.79** | 0.87** |
| Total score | 74.7 ± 14.9 | 71.7 ± 18.9 | 0.88** | 0.92** |

ICC: intraclass correlation coefficient
**statistically significant

| Table 5. Correlation between PedsQL™ (2 to 4 years) and PEDI |
|-------------------------------------------------------------|
| **Table 5. Correlation between PedsQL™ (2 to 4 years) and PEDI** |
| **Scale** | **PEDI** | Daily | Movement | Pain | Fatigue | Eating | PedsQLl |
|------------------------------------------------------|
| PEDI Daily | 1 | 0.89** | 0.76** | 0.17 | 0.34** | 0.89** | 0.87** |
| Daily | 1 | 0.70** | 0.14 | 0.26** | 0.77** | 0.82** |
| Movement | 1 | 0.19 | 0.41** | 0.73** | 0.86** |
| Pain | 1 | 0.51** | 0.14 | 0.47** |
| Fatigue | 1 | 0.32** | 0.63** |
| Eating | 1 | 0.85** |

PedsQL: Pediatric Quality of Life Inventory; PEDI: Pediatric Evaluation of Disability Inventory
**statistically significant

| Table 6. Correlation between PedsQL™ (5 to 7 years) and PEDI |
|-------------------------------------------------------------|
| **Table 6. Correlation between PedsQL™ (5 to 7 years) and PEDI** |
| **Scale** | **PEDI** | Daily | School | Movement | Pain | Fatigue | Eating | Speech | PedsQLl |
|------------------------------------------------------|
| PEDI Daily | 1 | 0.90** | 0.80** | 0.73** | 0 | 0.47** | 0.92** | 0.89** | 0.94** |
| Daily | 1 | 0.80** | 0.70** | 0.04 | 0.52** | 0.84** | 0.76** | 0.92** |
| School | 1 | 0.56** | 0 | 0.46** | 0.80** | 0.78** | 0.88** |
| Movement | 1 | 0.11 | 0.36** | 0.70** | 0.53** | 0.76** |
| Pain | 1 | 0.15 | 0.04 | 0.73 | 0.18 |
| Fatigue | 1 | 0.47** | 0.37** | 0.59** |
| Eating | 1 | 0.87** | 0.94** |
| Speech | 1 | 0.89** |

PedsQL: Pediatric Quality of Life Inventory; PEDI: Pediatric Evaluation of Disability Inventory
**statistically significant

Recent clinical studies using patient-centered questionnaires have increasingly highlighted the importance of clinical judgement. Most questionnaires are written in English, and their contents are configured to suit English-speaking cultures, which should be considered when translating questionnaires. To reduce translation errors caused by cultural differences, the
translation and back-translation of the original English version were performed in the process of creating a Korean version of the PedsQL™ Cerebral Palsy Module. A pediatric physical therapist, a professor from the department of physical therapy, an international school teacher, and a Korean language major participated in the process as language and subject matter experts, and improved the cultural and linguistic validity of the translated version through review and discussion.

McHorney and Tarlov asserted that in cases where the ceiling effect and floor effect are more than 15%, there is a limitation to the content validity. In this study, the ceiling and floor effects for children with cerebral palsy aged 2 to 4 years were high in the areas of daily activities, pain and hurt, and fatigue, but low in other areas, with values from 0.0% to 14.8%. The ceiling effect for the total score of the PedsQL CP module for children aged 2 to 4 years was 0.9%, and the floor effect was 0.0%. Thus, the criteria for content validity are satisfied.

The ceiling effect and floor effect for children with cerebral palsy aged 5 to 7 years was high in the areas of daily activities, school activities, pain and hurt, eating activities, and speech and communication, but low in other areas, with values from 0.0% to 9.7%. The ceiling effect for the total score of the PedsQL CP module for children aged 5 to 7 years was 0.0% and the floor effect also was 0.0%. Thus, the criteria for content validity are satisfied.

Cronbach’s alpha for the questions about children aged 2 to 4 years and 5 to 7 years was greater than 0.7 in all areas, which demonstrates the internal consistency reliability of questions suitable for the PedsQL™ Cerebral Palsy Module.

Generally, in cases where Cronbach’s α is greater than 0.7, there is significant internal consistency. In cases where it is less than 0.5, there is no internal consistency, and in cases where it is between 0.5 and 0.7, there is good internal consistency. In this study, Cronbach’s α was between 0.89 and 0.94 for children aged 2 to 4 years, and between 0.83 and 0.97 for children aged 5 to 7 years. Therefore, both questionnaires demonstrate significant internal consistency.

The correlation between the repeated questionnaires for children aged 2 to 4 years, for the assessment of test-retest reliability, was high in 4 of 5 areas, excluding only pain and hurt (p<0.01), and the correlation between the repeated questionnaires for children aged 5 to 7 years, was high in 6 of 7 areas, also excluding pain and hurt (p<0.01).

ICC was more than 0.61 in all areas except pain and hurt for both age groups of children, the test-retest reliability was considered to be high (p<0.01). More specifically, as the ICC for children aged 2 to 4 years was 0.98 and the ICC for children aged 5 to 7 years was 0.92, the reliability was very high (p<0.01).

According to the results of a study by Landis and Koch, interpretation of ICC values is as follows: between 0.0 and 0.2, the consistency is very low; between 0.21 and 0.4, the consistency is low; between 0.41 and 0.6, the consistency is moderate; between 0.61 and 0.8, the consistency is high; between 0.81 and 1.0, the consistency is very high; and under 0.6, the reliability is deemed to be lower values.

The validity of the Korean version of the PedsQL was tested based on criterion-related validity to evaluate whether or not the survey result could predict other variables that could be criteria. According to the results of a study of children with cerebral palsy by Lee & Koh, the more severe the disability of the child, the lower the physical quality of life will be. According to a study by Cho et al., among school-age children with cerebral palsy, the group with a high functional level had a relatively high score for quality of life. In this study, we evaluated the relationship between the PEDI and the quality of life score as assessed by caregivers on the PedsQL. As a result, children aged 2 to 4 years and 5 to 7 years showed a statistically significant correlation with the PEDI in all areas except pain and hurt (p<0.01). Children aged 2 to 4 years showed a high correlation in areas of daily activities, movement and balance, eating activities, and total score, while the children aged 5 to 7 years showed a high correlation in areas of daily activities, school activities, movement and balance, eating activities, speech and communication, and total score. These results indicate that the criterion-related validity of the questionnaires is high.

A total of 108 caregivers of children aged 2 to 4 years and 72 caregivers of children aged 5 to 7 years participated in the survey. This study did not address construct validity to establish whether or not the concept of quality of life was properly measured. This study tested the reliability and validity of the Korean version of the PedsQL™ Cerebral Palsy Module for the caregivers of children aged 2 to 4 years and 5 to 7 years. It will be necessary to conduct further studies on the reliability and validity of the PedsQL™ Cerebral Palsy Module for patients. Notwithstanding these limitations, considering the small number of participants in this socio-psychological study on domestic children with cerebral palsy, it is meaningful to have surveyed most of the outpatients from one metropolitan city and a few other cities during the period of this study.

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