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CORRELATION BETWEEN PEDIATRIC SYMPTOM CHECKLIST-17 (PSC-17) AND PEDIATRIC QUALITY OF LIFE INVENTORY (PedsQL) IN ELEMENTARY SCHOOL CHILDREN

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ABSTRACT

Background : Identification of psychosocial problems and quality of life of school-aged children should be routinely applied in child developmental health-related practices. The main concerns in measuring the quality of life of children with psychosocial disorders are mainly related to language development, cognitive development and the type of disorder. This has led to the identification of developmental disorders in school-aged children requiring specific tools (PSC-17 score and PedsQL score) designed for pediatric patients. The similarities or differences obtained based on these measurement tools will depend on the precise formulation of the questions as well as the assessment of the situation of the individual being evaluated.

Methods : An analytic observational study using a cross-sectional design involve three elementary schools in the Jimbaran area, Badung, Bali. The study was conducted at Udayana University Hospital in July 2022. The scores used in this study were self-reported PedsQL scores and PSC-17 scores obtained based on interviews with children. The correlation between the evaluation results using the PSC-17 and PedsQL questionnaires was evaluated using the Spearman correlation test.

Results : Amongst 189 children, median age was 11 years (range 11–13 years). There was a significant correlation between PSC-17 scores and PedsQL scores ($r= -0.59$; $p<0.001$). Subgroup analysis on PSC-17 aspect subscales and PedsQL dimensions found significantly varying negative correlations.

Conclusion : This study found a moderate negative correlation between PSC-17 scores and PedsQL scores, varying correlations strength between each aspect/dimension of each score.

Keywords: *children, quality of life, PedsQL, psychosocial, PSC-17.*

INTRODUCTION

Elementary school age children are categorized based on age 6 -1 2 years. During this developmental period, differences can be seen in body weight composition, body height, and body structure. Child development during this period is driven by basic psychological needs to achieve competence, autonomy, and connectedness. The developmental aspect also involves learning and mastering new skills, making independent decisions, self-control, and establishing social relationships with peers and the surrounding environment.[1] These developmental processes are necessary in preparing children for the next development phase.

Identification of psychosocial problems and the quality of life of school-age children should be routinely implemented in practices related to children's developmental health. Detecting behavioral disorders in children takes work, even for an expert. Many evidence shows children tend to lie due to various stimuli that give the wrong impression to investigators, resulting in false negative interpretations.[2,3] Lack of early identification can cause worsening developmental symptoms in the quality of daily life of children, families, and the surrounding community.

The World Health Organization (WHO) defines quality of life as an individual's perception of their position in life in the context of culture and value systems and its relationship to the individual's goals, hopes, standards, and concerns.[4] A child's quality of life is associated with several aspects, such as physical health, psychological condition, level of independence, personal beliefs, and relationship with the surroundings.[5] Obstacles in psychological functioning are often associated with physical disorders, but psychological functioning is a typical component of mental health problems and psychological disorders.[6] The Covid 19 pandemic also impacts children's psychosocial development because the situation that occurred during the pandemic (quarantine, social distancing) was not following the child's tasks at the stages of development.[7]

The main concerns in measuring the quality of life of children who experience psychosocial disorders are mainly related to language development, cognitive development, and the type of disorder.[6] This causes the identification of developmental disorders in school-aged children to require special tools designed for pediatric patients. Pediatricians, child psychologists, and child psychiatrists often use simple measuring tools, including the Pediatric Quality of Live Inventory (PedsQL) and the

Pediatric Symptom Checklist-17 (PSC-17). The PSC-17 measuring instrument is used to measure psychosocial problems, as well as emotional, mental, and behavioral disorders, while PedsQL is used to measure children's quality of life. The similarities or differences obtained based on these measuring tools will depend on the correct question formulation and an assessment of the situation of the evaluated individual. The similarities that can arise are also due to the similarity of the components contained in each measuring instrument.[8] This study aims to determine the correlation between the PSC-17 and PedsQL scores used to assess the quality of children's development.

METHOD

This study is an analytical observational study using a cross-sectional design. Sampling consecutively used the purposive sampling technique. The study was conducted in the Academic Center room at Universitas Udayana Hospital in July 2022 in conjunction with community service activities organized by Universitas Udayana Hospital to commemorate National Children's Day 2022. This study involved a number of elementary school students from three elementary schools in the area of Jimbaran, Badung, Bali. The three elementary schools were selected purposively based on distance and geographical location. The three elementary schools include two public and one private elementary school. The school has just held an offline meeting in the past 1-month post-Covid-19 quarantine program. School authorities are briefed on the planned activities, and approval is obtained from the school principal, parents, and students. The number of samples uses the total sampling method. The inclusion criteria were grade 6 elementary school patients (aged 10-13 years). In contrast, the exclusion criteria included children who did not receive permission to participate in study activities from their parents after explaining informed consent (PSP), children with chronic diseases such as malignancies, autoimmune diseases, chronic kidney disease, congenital or acquired heart disease, and epilepsy. Detailed explanations about the context and how to fill out the PedsQL and PSC-17 forms were given to students.

The PedsQL score used in this study is a self-report PedsQL score obtained based on interviews with children using the PedsQL version 4.0 questionnaire, including questions on physical, emotional, social, and school function dimensions.[9] The total score ranges from 0 - 100, with a higher score representing a better quality of life. The cut point for a PedsQL score of <70% indicates interference with a child's quality of life.[10] The PSC-17 score is obtained based on interviews with children using the PSC-17 questionnaire, including questions on internalization, externalization, and attention. The total score ranges from 0 - 34. The PSC-17 score cut point is said to be at high risk of experiencing psychosocial disorders if one of the following is: an internalization aspect score ≥ 5, an externalization aspect score ≥ 7, an attention aspect score ≥ 7, or a total score ≥ 15.[11] The PSC-17 score is not a diagnosis but rather a screening tool in identifying behavioral problems.[12]

The observed outcome is the correlation of the child's quality of life obtained from the PSC-17 and PedsQL evaluations. All data was collected and recorded, then processed and analyzed statistically using the SPSS version 21 program for Windows, which was displayed in the form of proportion (percentage), number, mean (standard deviation), and median (range, minimum-maximum). The correlation between evaluation results using the PSC-17 and PedsQL questionnaires was evaluated using the Spearman correlation test. Interpretation of correlation strength is statistically divided into very weak (0-<0.2), weak (0.2-<0.4), moderate (0.4-<0.6), strong (0.6-<0.8), and very strong (0.8-1).[13]

RESULT

A total of 189 grade 6 elementary school children participated in the study and met the inclusion and exclusion criteria. As many as 54.3% of children attend public elementary schools, while the rest attend private elementary schools. The majority was male (56.1%). The mean age was 11.4 ± 0.51 years with a median of 11 years (range, 11 – 13 years). **Table 1** shows the results of evaluating PedsQL and PSC-17 scores in children. A total of 13.8% of children had impaired quality of life based only on the PedsQL self-report evaluation. Children with a high risk of experiencing psychosocial disorders based on the PSC-17 evaluation were found to be 13.2%. The proportion of children who experienced problems with quality of life accompanied by psychosocial disorders was found to be 6.3%. The functional dimensions analysis of PedsQL found that there were disturbances in the quality of life in each functional dimension, which were physical function (7.9%), emotional function (23.3%), social function (8.5%), and school function (27. 5%). Psychosocial disorders analysis on the PSC-17 subscale aspect showed disorders in internalization (11.6%), externalization (3.2%), and attention (2.6%). **Table 2** shows the correlation between PedsQL scores and PSC-17 scores. There was a significant moderate negative correlation between PedsQL and PSC-17 scores. **Table 3** shows subgroup correlations between PedsQL functional dimensions and PSC-17 aspects. There was a varying correlation strength with a range of weak and moderate between the PSC-17 score aspect subscales and the PedsQLfunctional dimensions.

Table 1. PedsQL and PSC-17 Score

Total Score	Mean (SD)	Median (range)
PedsQL Total Score (%)	84.72 (11.24)	85.62 (50.16 – 100)
Physical functioning (%)	90.34 (11.12)	93.75 (53.1 – 100)
Emotional functioning (%)	81.18 (16.98)	85 (30 – 100)
Social functioning (%)	89.17 (13.08)	95 (40 -100)
School functioning (%)	76.22 (15.71)	80 (35 – 100)
PSC-17 Total Score (%)	5.5 (4.58)	5 (0 – 24)
Internalization	2.02 (1.82)	2 (0 – 7)
Externalization	1.51 (1.88)	1 (0 – 8)
Attention	1.96 (1.87)	2 (0 – 9)

* SD : standard deviation

Table 2. PedsQL and PSC-17 correlation

Total Score	Correlation coefficient (r)	P value
PedsQL score (%)	- 0.59	< 0.001
PSC-17 score		

Table 3. Subgroup analysis of correlation between PedsQL functional dimension and PSC-17 aspect

Score	PSC-17 internalization	PSC-17 externalization	PSC-17 attention
PedsQL physical function			
r	- 0.307	- 0.281	- 0.336
p value	< 0.001	< 0.001	< 0.001
PedsQL emotional function			
r	- 0.496	- 0.222	- 0.401
p value	< 0.001	< 0.001	< 0.001
PedsQL social function			
r	- 0.433	- 0.219	- 0.401
p value	< 0.001	< 0.001	< 0.001
PedsQL school function			
r	- 0.387	- 0.334	- 0.532
p value	< 0.001	< 0.001	< 0.001

DISCUSSION

This study found the age range of children between 11 and 13 years. The developmental period for children at this age is a period when children become increasingly involved with the social world and learn skills that will be used as adults. Children begin to get used to following rules, laws, and cultural norms. Children also shift their focus and attention from dependent relationships with parents to become more oriented toward social activities and peers. Children's self-control processes, such as emotional control, self-esteem, perspective, morals, and relationships between peers, develop rapidly during this development period.[14]

This study found a significant moderate negative correlation between PedsQL and PSC-17 scores with the interpretation that children with psychosocial disorders (high PSC-17 scores) will have a low quality of life (low PedsQL scores). A better quality of life will be reflected in reasonable control of health and physical fitness, lifestyle, social support, and controlling emotions and behavior in a socio-economic context.[15]

To fully assess the correlation between psychosocial disorders evaluated using the PSC-17 instrument and quality of life evaluated using PedsQL, the results must reflect all affected domains of quality of life functioning. Assessments are carried out on each aspect in PSC-17 (internalization, externalization, and attention) with aspects in PedsQL (physical, emotional, social, and school). This study found that the correlation between PSC-17 aspects and PedsQL functional domains varied significantly, with the strength of the correlation ranging from weak to moderate.

The internalization aspect is the process of identifying values in a child that will shape their thinking patterns. Internal factors refer to certain traits and skills that enable a person to act independently. These factors can include an individual's physical and psychological health. Internalization problems occur more dominantly because apart from physical development in children, there is also social, emotional, moral, and personality development.[16] Achieving the goals of socialization patterns by making many new adjustments such as adapting to the influence of peer groups, changes in social behavior, social groupings, new values, new values in friendship selection, new values in social support and rejection. We noted a weak to moderate negative correlation between the internalization aspect and the PedsQL dimension, which focuses on the emotional dimension as the dimension with the most significant correlation to the internalization aspect. Internalized

emotional problems are characterized by more self-centered experiences and behaviors, such as depression, anxiety, and withdrawn behavior, accompanied by self-punitive emotions, such as sadness, guilt, fear, and excessive worry.[16,17]

The externalization aspect can be described as a child's adjustment to the sociocultural world as a human product that forms a personality. External factors refer to the environmental conditions of an individual's life, which include social networks and environmental conditions. This process is more related to a child's relating to others around him. Externalizing problems include temperamental tendencies, decreased attention, hyperactivity, difficulty solving problems, increased aggression, and antisocial behavior.[18] Younger children are more susceptible to peer pressure as a way to integrate into groups that exert such pressure. In contrast, older children are usually better prepared to face the challenge of withstanding pressure from peers in building self-identity.[19] The externalization aspect in this study had a weak and significant negative correlation with all dimensions of PedsQL. This result shows that the externalization aspect of a child adapting to the environment can be influenced by various aspects listed in the PedsQL dimensions (physical, emotional, social, and school) as one of the contributing factors.

Attention is a conscious process of gathering information through sensing, memory, and other cognitive processes. Problems with attention can include problems concentrating, inability to complete tasks/work correctly, and inability to remain calm.[20] We noted that the attention aspect of the PSC-17 score in this study has the most significant correlation with the school domain of the PedsQL score. The home and school environment is prone to influence the development period of elementary school-age children. The structure of the school includes discipline, study habits, and self-control. Schools act as institutions that contribute to education and socialization through scheduled routines, participating in extracurricular activities, and completing school assignments at home.[21]

CONCLUSION

This study obtained moderate negative correlation results between PSC-17 scores and PedsQL scores, with varying correlations between each dimension/aspect of each score. These results illustrate that there is still a need for separate evaluation of psychosocial disorders and quality of life in children using appropriate screening tools. Evaluation of related factors through a subscale structure in each dimension/aspect of the score is essential for the clinician.

CONFLICT OF INTEREST

The authors declare that they have no competing interests.

INSTITUTIONAL REVIEW BOARD STATEMENT

This research was conducted following the Declaration of Helsinki and was approved by the Research Ethics Committee Unit of the Faculty of Medicine, Udayana University (ethical suitability statement number 2682/UN14.2.2.VII.14/LT/2023). All participants received detailed information about the study's aims and gave informed consent after an explanation to participate.

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