Original Article

Measuring function in children with chronic pain: Investigating the validity, reliability, and factor structure of the child and parent versions of the Function Disability Inventory (FDI) in the population of children with chronic pain and their parents

***Soheila Ghomian[1]; Mohammad Reza Shaeiri[2]; Samira Masoumian[3];
Tahere Malek Zadeh[4]; Neda Nuri[5]**

[1]*Ph.D in clinical psychology, Faculty of Humanities, Shahed University, Tehran, Iran.*
[2]*Ph.D. in clinical psychology, Associate professor of clinical psychology, Faculty of Humanities, Shahed University, Tehran, Iran.*
[3]*Ph.D. in clinical psychology, Tehran Institute of Psychiatry, Iran University of Medical Sciences, Tehran, Iran.*
[4]*MSc. In. general psychology, Tabriz University, Tabriz, Iran.*
[5]*BA. in clinical psychology, Islamic Azad University, Roudhen Branch, Roudhen, Iran.*

Abstract

Introduction: This study aimed to investigate the validity, reliability, and factor structure of the child and parent versions of The Function Disability Inventory (FDI) in the children with chronic pain and their parents.

Materials and Methods: The sample consists of 112 pairs of children (7-12 years) and parents selected through convenient sampling from child hospitals in Tehran in 2017 to 2018. The Function Disability Inventory (FDI), KIDScreen, Child Behavior Checklist (CBCL), Youth Self Report (YSR), and Visual Analogous Scale (VAS) were implemented. The data were analyzed using Pearson's correlation and exploratory and confirmatory factor analysis were used to obtain the findings.

Results: The reliability results of FDI showed that the Cronbach's alpha of the child and parent versions were 0.89 and 0.90, respectively, which indicates high alpha coefficients. Also, many run twice correlations of child and parent versions obtained in a significant and acceptable range (0.53 to 0.93). Also, the convergent and divergent validity of the parent version showed that the parent version has a negative correlation with the quality of life subscales (-0.08 to -0.20) and with the CBCL subscales (0.30 to 0.35) and also the visual similarity scale (0.15), has a positive and significant correlation. The exploratory factor analysis identified four factors in the child's version and three factors in the parent's version, and in the confirmation factor analysis, the fitting of these new factors were confirmed.

Conclusion: Function Disability Inventory has proper psychometric features in the population of children with chronic pain and their parents.

Keywords: Chronic pain, Functional disability, Reliability, Validity

*Corresponding Author:
Faculty of Humanities, Shahed University, Persian Gulf Highway, Tehran, Iran.
soheila_ghomian@yahoo.com

Introduction

Clinical observations and research show that chronic pain has harmful psychological and behavioral consequences such as depression, anxiety, reduced work performance, and drug consumption. Various research in Iran and other countries has shown that chronic pain is often accompanied by psychological symptoms, especially anxiety and depression. In addition, research results have shown that depression and indicators of psychiatric disorders have a high correlation with chronic pain (1). Physical disability with chronic pain is usually severe and long-term. These patients are worried, impatient, and upset and are usually prone to psychological and social problems. Chronic pain affects all aspects of life, such as daily schedules, independence level, cognitive and physical activities, work, intimate relationships, and emotional and psychological well-being (2). Clinical observations and researches show that chronic pain has harmful psychological and behavioral consequences such as depression, anxiety, reduced work performance, and drug use. Various researches in Iran and other countries have shown that chronic pain is often accompanied by psychological symptoms, especially anxiety and depression, and research results have shown that depression and indicators of psychiatric disorders have a high correlation with chronic pain (1).

Pain is primarily a mental and individual experience. Thus, self-reporting measurements of children, that is what the children say, despite its limitations, is considered a "gold standard" (3). The presence of chronic diseases in children can have a significant impact on their quality of life and psychological health. In this way, chronic pain causes disability and disruption in various aspects, especially the child's education, and communication, and causes a decrease in the child's quality of life (4). Despite the controversy in children's self-reporting, it is still considered the most common measure of children's pain. Various tools have been developed with the approach of children's self-reporting. Among these tools, we can mention the Poker Chip (5), the Visual Analogous Scale (VAS) (6), the Pain Thermometer (7), and the Color Scale (8). The presence of chronic diseases in children can have a significant

impact on their quality of life and psychological health. In this way, chronic pain causes disability and disruption in various aspects, especially the child's education, and communication, and causes a decrease in the child's quality of life (4). Thus, assessing pain-related disability is considered an essential component in the evaluation and treatment of children with chronic pain. The Functional Disability Scale (FDI) is one of the most widely used tools for assessing the functional disability of children and adolescents and, in previous studies, has shown good psychometric properties (9,10). This questionnaire is a 12-item scale that initially was designed to measure the functional disability of children with chronic abdominal pain (10,11) and later was used to measure the range of chronic pain in children, such as fibromyalgia (12), headache (13-15), back pain (16), and skeletal muscle pain syndromes (17-19). So far, the FDI scale has been recognized as one of the essential tools in many cognitive-behavioral therapies for children with chronic pain (20-22). This tool is also a good tool for tracking children's physical therapy courses and outpatient clinics (23). Limited studies have considered the validity and reliability of the FDI. Therefore, further examination of this questionnaire, especially from the angle of clinical application and its functional structure, should be considered in the population of children with chronic pain. Thus, on the one hand, taking into account that chronic pain is a health problem that has a significant impact on emotions and physical and social functions, people with chronic diseases face many psychological problems in addition to physical problems, which these psychological factors mutual illness overshadows them (4) and on the other hand, due to the lack of research in the field of questionnaires to measure the performance of people suffering from chronic pain, especially in the children population, the issue of current research is that what is the reliability and reliability of FDI? Also, because of the possibility of not reporting children's pain (due to low level of parents' anxiety or access barriers to treatment) (24) and the need to study the parents' report, this research assesses the reliability and validity of the FDI among parents of these children. Finally, this research assesses

the factor structure of the child's and parent's versions of this questionnaire in Iran and its differences from external versions.

Materials and Methods

The statistical society consisted of all children with chronic pain referred to specialized pediatric hospitals in Tehran city, Iran. The sample consists of 112 pairs of children and parents who were selected by convenient sampling method from the Mofid Children's Hospital, Children's Medical Center, Hazrat Ali Asghar Hospital, and Bahrami Hospital (In these centers, different parts and clinics were used, such as neurology, neuro-surgery, surgery, hematology, rheumatology, orthopedics, and physiotherapy). The number of sample people was considered based on the average sample size of similar foreign studies. In this research, there was no drop of sample people, and they all cooperated.

Research instruments

A) Function Disability Inventory (FDI): This questionnaire is a 15-item scale that evaluates the child's ability for functional activities such as homework, watching TV, reading, and doing schoolwork. The two factors of this questionnaire are physical activities, which include eight items, and non-physical activities, which include seven items. The scoring of this questionnaire is based on a 5-point Likert scale from 0 "no problem" to 4 "impossible". The range of scores of this questionnaire is such that the range of 0 to 12 is a mild disability or lack of disability, the range of 13 to 29 is a moderate disability, and the range of 30 and above measures severe disability, and the overall range is from 0 to 60 (24). Numerous researchers have shown suitable psychometric properties of this tool for both clinical and non-clinical samples (25). The factor analysis of Kashikar-Zuck et al. study showed that the items related to the physical performance of this questionnaire identify the physical performance area well, have high internal consistency, and explain the largest amount of variance in the overall score. Items related to daily functioning explain a small amount of the variance of the overall score but have good internal consistency. Each of these two factors has a significant correlation with each other and with other tools for measuring pain and depression symptoms (24).

B) KIDScreen: KidScreen was created using the European project "screening and improving the quality of life-related to health in children and adolescents," which included 22,827 children from 13 European countries. KidScreen is used as a self-test for healthy children and adolescents with chronic diseases aged 8-18 years. The 27-item version includes five dimensions: 1- Physical well-being has five items and measures the level of physical activity, energy, and fitness. 2- Psychological well-being has seven items and measures positive emotions, life satisfaction, and balanced feelings. 3- Relationship with parents and autonomy has seven items, and it measures the relationship with parents, the atmosphere at home, sufficient freedom related to age, and the degree of satisfaction with financial resources. 4- Social and peer support has four objectives and examines the relationship with peers. 5- The school environment has four items and examines the child's and adolescent's perception of cognitive capacity, learning and concentration, and feelings about the school. This tool is answered on a five-point Likert scale (from 1= never to 5= always or from 1= never to 5= infinitely) and shows the frequency of a specific behavior or feeling or the intensity of an attitude. The results of Nik-Azin et al.'s research (26) showed that the co-variance validity study showed that the correlation between the dimensions of KidScreen, except for the dimension of social and peer support, with similar dimensions in other questionnaires that measure similar structures, was moderately strong (*P*< 0.01). Also, there was a difference between two groups with high and low socioeconomic status and three groups of psychological status (normal, borderline, and abnormal) in some dimensions (*P*< 0.05). The Cronbach's alpha coefficients were higher than 0.70 for all dimensions, except for the school environment dimension, and the two-week re-test coefficients for all dimensions were strong (*P*< 0.01) (26).

C) Child Behavior Checklist (CBCL): CBCL assesses competencies (abilities), adaptive functioning, and emotional-behavioral problems of 6-18-year-old children. This checklist which

contained 13 questions and 113 items answered by parents or a person responsible for the child and took care of him/her. The CBCL scales included competence and adaptive functioning scales, scales based on experience, and scales based on DSM. The raw scores of problem CBCL scales were obtained by summing the scores of 0, 1, or 2 related to questions on any scale. Minaei (27) obtained good psychometric properties of CBCL. In this research, also the child's form of this questionnaire (YSR) was used.

D) Visual Analogous Scale (VAS): The severity of the pain is graded in response to the question "How much do you pain today?", Based on an analogous visual scale from 0, "I am not bad at all", to 10 "as I imagine I am bad," once on the day. The average of these scores is measured in all subjects (28). Due to the special characteristics of rating by person, this scale does not require psychometric properties.

The method of this study included two steps. Firstly, the FDI was translated by a few psychologists. Then the translations were compared, their problems were fixed, and the prepared version was translated by an English expert and compared with the original questionnaire. Finally, a final questionnaire was prepared. In the second stage, the prepared questionnaire (FDI), along with CBCL, KIDScreen, YSR, and Visual Analogous Scale (VAS), was performed on 112 pairs of children with chronic pain and their parents who were referred to children's hospitals, Hazrat Ali Asghar hospital, Children's Medical Center and Bahrami Children's Hospital.

Inclusion criteria were: Children were aged 7-

12 years, children's history of chronic pain for six months or more, and parents' and children's consent to participate in the research. Exclusion criteria were: Having a physical injury or having a cast in such a way that parents or children cannot participate in the sessions.

This research was approved by the ethical committee of Shahed University, and ethical considerations, including information confidentiality, were observed.

To analyze the data, descriptive methods were used to calculate the mean, standard deviation, minimum and maximum. This research used the Pearson correlation coefficient and alpha coefficients to calculate the reliability coefficients. To assess the construct validity, we used exploratory and confirmatory analysis, and to assess convergent and divergent validity, the correlation of the FDI with CBCL (parent report), YSR (child report), KIDScreen, and VAS were investigated. The samples were selected voluntary so that each of the parents and their children, who were ready to participate in the research, participated in this research.

Results

The mean age of children was 9.62 years. The mean duration of chronic pain in children was 1 year and 17 months. The numbers of boys and girls were 48 (42.9%) and 64 (57.1%), respectively. Most children were in elementary school (72.3 %). The education of most parents was at the intermediate level (30%). The descriptive features of the child and parent versions of FDI are shown in Table 1. In both populations of children and parents, the disability of daily function has the lowest mean.

Table 1. Descriptive Indices of FDI (Child and Parent versions)

Child version	Physical disability	8.67	6.84
	Disability in daily function	4.11	5.20
	Total	12.58	10.55
Parent version	Physical disability	7.55	6.75
	Disability in daily function	4.19	4.61
	Total	10.95	10.09

Table 2 shows the reliability findings in both the Cronbach's alpha and test-retest methods for both child and parent versions. The Cronbach's alpha for child and parent versions was 0.89 and 0.90, respectively, representing the high alpha coefficients. Also, other than the correlation of the twice implementation of the physical disability subscale of the child's version, the other correlations of the child and parent's versions were obtained in a meaningful and acceptable range (0.53 to 0.93).

The correlation between FDI dimensions in both child and parent versions was moderate and vigorous, representing a conceptual relationship between dimensions (Table 3). In two versions of the child and parent, the highest correlation was related to the physical disability subscale, and the overall score was obtained 0.92 and 0.91, respectively. Thus according to the results, it can be said that the child and parent versions of FDI have good reliability.

Table 2. Cronbach's alpha coefficients and test re-test correlation of child and parent versions

Version		Intercorrelation		Test - retest				
				Pre-test		Post-test		Test- retest correlations
		N of Items	Cronbach's Alpha	M	SD	M	SD	
Child version	Physical disability	7	0.83	37.75	9.27	9.05	5.26	0.11
	Disability in daily function	8	0.86	5.25	4.28	4.40	3.83	0.82**
	Total	15	0.90	16.95	6.21	13.45	7.26	0.53*
Parent version	Physical disability	7	0.75	9.70	7.27	7.70	7.42	0.89**
	Disability in daily function	8	0.90	7.10	6.74	6.60	7.27	0.93**
	Total	15	0.90	16.80	13.34	14.30	14.24	0.93**

*P< 0.05   **P< 0.01

Table 3. Correlation between FDI dimensions- child and parent versions

Version		Physical disability	Disability in daily function	Total
Child version	Physical disability	1		
	Disability in daily function	0.56**	1	
	Total	0.92**	0.81**	1
Parent version	Physical disability	1		
	Disability in daily function	0.66**	1	
	Total	0.90**	0.87**	1

*P< 0.05   **P< 0.01

The findings of convergent and divergent validity showed that the child version showed a positive and significant correlation with subscales of KIDScreen (negative correlation) and YSR subscales (emotional problems, anxiety problems, depression anxiety, and depression isolation) as well as VAS. Similarly, findings on the convergent and divergent validity of the parent version showed that it has

a positive and significant correlation with KIDScreen subscales (negative correlation) and CBCL subscales (emotional problems, anxiety problems, depression anxiety, and depression isolation) as well as VAS (Table 4). Thus, it can be said that both the child and parent versions of the FDI have the appropriate convergent and divergent validity.

Table 4. Correlation between child version of FDI with KIDScreen, YSR, and VAS and correlation between parent version of FDI with KIDScreen, CBCL, and VAS

Version			Physical disability	Disability in daily function	Total
Child version	KIDScreen	Physical well-being	-0.29**	-0.15	-0.28**
		Psychological well-being	-0.08	-0.03	-0.08
		Parent relation and self-perception	-0.11	-0.13	-0.13
		Social support and peers	-0.06	-0.14	-0.09
		School environment	-0.08	-0.21*	-0.17
	YSR	Affect problem	0.37**	0.41**	0.45**
		Anxiety problem	0.44**	0.44**	0.50**
		Anxiety depression	0.36**	0.44**	0.45**
		Solid depression	0.41**	0.46**	0.47**
	VAS	VAS	0.21*	0.31**	0.25**
Parent version	KIDScreen	Physical well-being	-0.25**	-0.11	-0.20*
		Psychological well-being	-0.075	-0.12	-0.085
		Parent relation and self-perception	-0.09	-0.10	-0.08
		Social support and peers	-0.17	-0.08	-0.13
		School environment	-0.09	-0.16	-0.12
	CBCL	Affect problem	0.33**	0. 32**	0.33**
		Anxiety problem	0.35**	0.30**	0.32**
		Anxiety depression	0.28**	0.31**	0.30**
		Solid depression	0.34**	0.35**	0.35**
	VAS	VAS	0.20*	0.15	0.15

*$P< 0.05$ **$P< 0.01$

In order to assess the construct validity, the results of exploratory factor analysis and confirmatory factor analysis were used. Also, the results of the KMO of the parent and child versions were 0.81 and 0.84, respectively, indicating a sufficient sample size. Although the original versions of the parent and child FDI considered two factors of physical disability and disability of daily function, the exploratory analysis obtained four factors for the child's version and three factors for the parent version. As shown in Table 5, the model fitting indicators indicate the fitness of the previous models (two factors for child and parent versions) and the new models (four factors for the child's version and three factors for the parent version). Of course, as can be seen, the fitness of the new models is somewhat better than the previous models.

Table 5. The confirmatory factor analysis of child and parent versions of FDI

	Child version of FDI		Parent version of FDI	
	Four factors of FDI	Two factors of FDI	Three factors of FDI	Two factors of FDI
X^2/df	3.43	2.81	3.34	2.44
GFI	0.73	0.77	0.73	0.80
AGFI	0.64	0.69	0.65	0.72
CFI	0.89	0.92	0.86	0.91
RMSEA	0.15	0.13	0.15	0.11

Discussion

The present study was conducted to evaluate the validity and reliability of FDI in a sample of children with chronic pain and their parents. In general, the results of the internal correlation of this tool (the child and parent versions) are consistent with previous research results (29,30) which, respectively, these studies were conducted on a patient with chronic pain and children with pain and with the help of Children's Activity Limitations Interview-21 (CALI-21) and Revised Child Anxiety and Depression Scale (RCADS) as well as self-reported quality of life and self-reported

functional disability. In this study, the KIDScreen, VAS, and some subscales of CBCL and YSR were used to assess the convergent and divergent validity of FDI. As previous studies showed (31,32), there is a significant correlation between the function level of children and signs of anxiety and depression. Similarly, the results of other studies (28,32) which were implemented on children with chronic pain and with questionnaires such as FDI and Pain and Impairment Relationship Scale (PIRS) and the Short Form-36 Health Survey (SF-36), showed a significant correlation between the degree of functional disability and the severity of pain. Psychological disorders, anxiety, and depression are common among people with chronic pain. Strong evidence has shown the coexistence of these disorders concerning chronic pain. Also, in previous findings, the prevalence of depression and anxiety among people with chronic pain has been reported from 40 to 80%; high scores in anxiety and depression and fear are associated with low tolerance levels. Anxiety related to pain can lead to avoidance of activity as well as being wary of pain stimuli and causing patients to become anxious and worried about the symptoms and future of the disease. This fear and avoidance lead to avoidance of activity, and as a result, patients become more disabled (33). The results of Rostami et al.'s research, which was implemented on a patient with chronic pain and with the help of questionnaires like McGill Pain Questionnaire and Lovibond Depression, Anxiety and Stress Scale (DASS), concerning the relationship model between anxiety, stress, and depression with pain perception with the mediating role of resilience in patients with chronic pain in one of the military hospitals showed that there is a relationship between anxiety, depression, and stress with resilience. There is an inverse relationship and a positive relationship with pain perception.

This research showed that the variables of anxiety, depression, and stress directly affect pain perception and can reduce pain perception in patients with chronic pain by strengthening the mediating role of resilience (34). In another research, the relationship between pain perception, depression and anxiety was assessed. The results showed that depression and anxiety are associated with increased pain perception of pain intensity (35).

In addition, the results of the reliability findings by two methods of the Cronbach's alpha and test-retest of both versions of the child and parents are consistent with the results of previous studies (29,30).

A remarkable point in this study is that, as expected, the scores of function disability had a negative correlation with the subscales of KIDScreen for children, but in most cases, this connection has not been made significant, except in the subscale of physical well-being. Given the lack of research on the relationship between the disability of children with their quality of life, it seems that one of the causes of this situation is the lack of a divergent validity of items of the quality of life of children with items of functional disability. In confirmation of the current research, the results of Ashuri et al.'s research, on patients with chronic pain, patients without chronic pain, and healthy people, showed that there is a significant difference between the three groups of patients with chronic pain, non-chronic pain and ordinary people in the variables of cognitive distortion and quality of life. Similarly, this research showed that the group of patients with chronic pain had higher mean cognitive distortion scores and lower quality of life than the two groups of patients with non-chronic pain and ordinary people. In general, psychological well-being is one of the most important psychological components involved in the perception of illness and pain (36.) . The results of exploratory factor analysis showed new factors in both child and parent versions. For example, in the previous version of the FDI, there were two factors physical disability and disability in daily function. In contrast, in the current research, four factors for the child version and three factors for the parent version were identified in the exploratory factor analysis. One of the reasons for adding factors in both parent and child versions is the removal of items related to a school function (such as doing homework, staying in school until the last hour, etc.) from other daily and physical functions. Although the KMO results indicated that the sample size was sufficient, it seems that, in general, the low sample size is the constraint of current research.

Also, given that children with chronic pain were sampled only from hospitals in Tehran, it is not possible to generalize the results of this study to all Iranian children with chronic pain. Finally, about the limitations of this study, we can mention the lack of samples of healthy children and compare their function with children with chronic pain. Given the limitations of current research, it can be suggested that the FDI be used in a larger population of children with chronic pain and different cities. In addition, the application of this scale in a sample of healthy children to evaluate differential validity is another suggestion of this research.

Conclusion
In conclusion, FDI has an appropriate psychometric feature for Iranian children with chronic pain and their parents. Thus, it can be used with other tools in the population of children with chronic pain and assess the functional disability of these children.

Acknowledgments

References
1. Farid M, Rahimi C, Mohammadi N. [Prediction of pain based on personality characteristics, anxiety and depression in patients with chronic pain]. Scientific research quarterly journal of Lorestan University of Medical Sciences 2018; 20(2): 76-85. (Persian)
2. Alavi B, Makundi B, Asgari P, Moradi Manesh F. [The effectiveness of group play therapy on hope, adaptation and response to pain in children with cancer]. Journal of Islamic studies in the field of health 2019; 4(4): 27-38. (Persian)
3. Merskey H, Bogduk N. Classification of chronic pain: description of chronic pain syndromes and definitions of pain terms. Pain Suppl 1986; 3: S1-226.
4. Barghun R, Demhari F, Azizi M. [Investigating the effectiveness of mindfulness-based therapy on psychological well-being and reducing pain symptoms in children with chronic diseases]. Journal of thought and behavior in clinical psychology 2019; 14: 37-48. (Persian)
5. Hester NO, Foster RL, Kristensen K. Measurement of pain in children: Generalizability and validity of the pain ladder and the poker chip tool. In: Tyler DC, Krane EJ. (editors). Advances in pain research and therapy. New York: Raven; 1979: 79-84.
6. Huskisson EC. Measurement of pain. Lancet 1974; 2(9): 1127-31.
7. Jay SM, Ozolins M, Elliott CH, Caldwell S. Assessment of children's distress during painful medical procedures. Health Psychol 1983; 2: 133-47.
8. Eland JM. Minimizing pain associated with prekindergarten intramuscular injections. Issues Comp Pediatr Nurs 1981; 5: 361-72.
9. Long AC, Palermo TM, Manees AM. Brief report: Using actigraphy to compare physical activity levels in adolescents with chronic pain and healthy adolescents. J Pediatr Psychol 2008; 33(6): 660-65.
10. Claar RL, Walker LS. Functional assessment of pediatric pain patients: Psychometric properties of the functional disability inventory. Pain 2006; 121(1-2): 77-84.
11. Walker LS, Heflinger CA. Quality of life predictors of outcome in pediatric abdominal pain patients: Findings at initial assessment and 5-year follow-up. In: Drotar D. (editor). Measuring health-related quality of life in children and adolescents. Mahwah, NJ: Lawrence Erlbaum; 1998: 237-52.
12. Kashikar-Zuck S, Vaught MH, Goldschneider KR, Graham TB, Miller JC. Depression, coping and functional disability in juvenile primary fibromyalgia syndrome. J Pain 2002; 3(5): 412-9.
13. Lewandowski AS, Palermo TM, Peterson CC. Age-dependent relationships among pain, depressive symptoms, and functional disability in youth with recurrent headaches. Headache 2006; 46(4): 656-62.
14. Logan DE, Scharff L. Relationships between family and parent characteristics and functional abilities in children with recurrent pain syndromes: An investigation of moderating effects on the pathway from pain to disability. J Pediatr Psychol 2005; 30(8): 698-707.
15. Palermo TM, Riley CA, Mitchell BA. Daily functioning and quality of life in children with sickle cell disease pain: Relationship with family and neighborhood socioeconomic distress. J Pain 2008; 9(9): 833-40.
16. Lynch AM, Kashikar-Zuck S, Goldschneider KR, Jones BA. Psychosocial risks for disability in children with chronic back pain. J Pain 2006; 7(4): 244-51.

17. Guite JW, Logan DE, McCue R, Sherry DD, Rose JB. Parental beliefs and worries regarding adolescent chronic pain. Clin J Pain 2009; 25(3): 223-32.
18. Guite JW, Logan DE, Sherry DD, Rose JB. Adolescent self-perception: associations with chronic musculoskeletal pain and functional disability. J Pain 2007; 8(5): 379-86.
19. Logan DE, Guite JW, Sherry DD, Rose JB. Adolescent-parent relationships in the context of adolescent chronic pain conditions. Clin J Pain 2006; 22(6): 576-83.
20. Eccleston C, Malleson PN, Clinch J, Connell H, Sourbut C. Chronic pain in adolescents: evaluation of a programme of interdisciplinary cognitive behaviour therapy. Arch Dis Child 2003; 88(10): 881-5.
21. Kashikar-Zuck S, Swain NF, Jones BA, Graham TB. Efficacy of cognitive behavioral intervention for juvenile primary fibromyalgia syndrome. J Rheumatol 2005; 32(8): 1594-602.
22. Reid GJ, Lang BA, McGrath PJ. Primary juvenile fibromyalgia: psychological adjustment, family functioning, coping, and functional disability. Arthritis Rheum 1997; 40(4): 752-60.
23. Lynch-Jordan AM, Kashikar-Zuck S, Crosby LE, Lopez WL, Smolyansky BH, Parkins IS, et al. Applying quality improvement methods to implement a measurement system for chronic pain related disability. J Pediatr Psychol 2010; 35(1): 32-41.
24. Kashikar-Zuck S, Flowers SR, Claar RL, Guite JW, Logan DE, Lynch-Jordan AM, et al. Clinical utility and validity of the Functional Disability Inventory among a multicenter sample of youth with chronic pain. Pain 2011; 152(7): 1600-7.
25. Walker LS, Greene JW. The functional disability inventory: Measuring a neglected dimension of child health status. J Pediatr Psychol 1991; 16(1): 39-58.
26. Nik-Azin A, Naeinian MR, Shairi MR. [Validity and reliability of Health Related Quality of Life Questionnaire "KIDSCREEN-27" in a sample of Iranian students]. Iranian journal of psychiatry and clinical psychology 2013; 18(4): 310-21. (Persian)
27. Minaei A. [Manual of school-age forms of Achenbach System of Empirically Based Assessment (ASEBA)]. Research on exceptional children 2006; 19: 529. (Persian)
28. Wicksell RK, Melin L, Lekander M, Olsson GL. Evaluating the effectiveness of exposure and acceptance strategies to improve functioning and quality of life in longstanding pediatric pain – a randomized controlled trial. Pain 2009; 141(3): 248-57.
29. Palermo TM, Lewandowski AS, Long AC, Burant CJ. Validation of a self-report questionnaire version of the Child Activity Limitations Interview (CALI): The CALI-21. Pain 2008; 139(3): 644-52.
30. Huguet A, Eccleston C, Miró J, Gauntlett-Gilbert J. Young people making sense of pain: Cognitive appraisal, function, and pain in 8–16 year old children. Eur J Pain 2009; 13(7): 751-9.
31. Kashikar-Zuck S, Goldschneider KR, Powers SW, Vaught MH, Hershey AD. Depression and functional disability in chronic pediatric pain. Clin J Pain 2001; 17(4): 341-9.
32. Powers SW, Gilman DK, Hershey AD. Headache and psychological functioning in children and adolescents. Headache 2006; 46(9): 1404-15.
33. Khayyer Gh, Manshaei Gh. [Effectiveness of child-centered mindfulness therapy on pain self-efficacy and pain anxiety in children with rheumatism]. Quarterly journal of health psychology 2021; 10(2): 85-100. (Persian)
34. Rostami H, Ahmadi A, Nouri A, Andalib R. [Model of the relationship between anxiety, stress and depression with pain perception with the mediating role of resilience in patients with chronic pain in a military hospital]. Scientific journal of military psychology 2021; 13: 39-63. (Persian)
35. Michaelides A, Zis P. Depression, anxiety and acute pain: links and management challenges. J Postgrad Med 2019; 131(7): 438-44.
36. Ashuri A, Ebrahimi MA, Ghasemipour Y. [Comparison of cognitive distortion and quality of life in patients with chronic pain, non-chronic pain and normal people]. Journal of the Faculty of Medicine of Mashhad University of Medical Sciences 2019; 62(5): 1723-32. (Persian)