

Validation of a Child Abuse Questionnaire in Iranian Children with Exploratory and Confirmatory Factor Analysis

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ABSTRACT

Objectives: Protecting children from abuse is a public responsibility. Having a valid tool to assess child abuse is necessary.

Methods: The present analysis variance-covariance matrix study recruited 360 elementary school students selected by multistage sampling method. The mean variance, composite reliability and Cronbach's alpha were used in the form of first order and second order confirmatory factor analysis approaches.

Results: The overall prevalence of child abuse was 27.61%. The prevalence of different types of child abuse including fear, neglect, verbal, parental maltreatment, physical, and destruction of confidence were 62%, 42.2%, 18.7%, 15.6%, 14.5%, and 12.6%, respectively. These 6 factors explained 64.6% of the total variance of child abuse. The first order confirmatory factor analysis explains the model better than the second order.

Conclusion: The Iranian version of the child abuse questionnaire showed acceptable psychometrics. It is necessary to consider different views of parents and children in future studies.

Keywords: Child abuse, Exploratory factor analysis, Confirmatory factor analysis

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Introduction

Children are among the most vulnerable groups in society [1]. Unfortunately, child abuse is a phenomenon that has not been properly addressed [2]. Child abuse has

recently been on the rise in the world [3]. The right to grow up in a violence-free environment is of the fundamental rights of every child. The consequences of child

abuse affect not only the child, but also the family and the society. Therefore, addressing this phenomenon can be crucial for any society. Islam has repeatedly emphasized the preservation of human dignity [4]. Child abuse will leave profound psychological effects on child's life. In fact, the effects of child abuse emerge in short- and long-term. Abuse complications depend on the severity and frequency of abuse and are assessed in two categories of physical and psycho-emotional complications. Long-term effects on children's behavior can delay their normal growth. They will be less capable than other children in communicating with others, social relationships and friendships. Abused children's IQ is significantly lower and they fall behind other children in terms of education. Abused children are weaker in speech and have abnormal, cautious, and often antisocial personalities. Low self-esteem and depression is seen more in these children. Child abuse is also associated with psychological stress, physical complaints, severe disorders, depression, suicidal tendencies, crime, violence, distrust, guilt and anger. Child abuse includes all forms of physical and psychological abuse, sexual abuse, neglect, and exploitation resulting from actual or potential harm to the health, development, or dignity that occur especially in children under 18 [5, 6]. Forty million children under 15 are abused and about 25-50% of the children experience corporal punishment annually in the world [7]. Centers for Disease Control and Prevention estimated the total economic burden of child abuse to be \$ 210 billion, which is optimistically considered \$124 billion a year [8]. In addition, evidence suggests that child abuse causes the death of 850 children under 15 annually [9]. Most

pediatricians have difficulty recognizing child abuse, which roots in the lack of sufficient experience and proper training and more likely the social and legal consequences of such a diagnosis. If pediatricians fail to diagnose child abuse, there is a 5% odds of death due to physical injuries, and a 25% odds of repeated more severe abuse [10]. Each country has a different legal framework and registering system for child abuse, which results in different prevalence rates reported. This also indicates the challenges of the measurement tools. Therefore, it is necessary that countries conduct rigorous scientific studies in order to fulfill their obligations to protect the rights of children against abuse. Based on information available about the deep and comprehensive understanding of child abuse in children, Hosseinkhani et al. conducted a study in three areas of neglect, physical and psychological abuse [11]. Since such studies require a precise and valid tool, the present study aimed to validate the Iranian version of the child abuse questionnaire. The present study sought to provide a standard, valid and reliable tool for measuring child abuse in Iranian children to be used in planning for the improvement of health and quality of life of those children.

Material and Methods

This applied research used variance-covariance matrix design and recruited all 8-13-year-old students in elementary schools of Ahvaz in the 2015-2016 academic year. Klein believes that factor analysis needs 10 or 20 samples for each variable for factor analysis and structural models [12], hence the sample used in this study were the students of 12 classes (360 students) who

were randomly selected through multistage sampling from 6 schools, including three girl's schools and three boy's schools in three districts of Ahvaz. Then two classes were randomly selected from each primary school. The 360 students were randomly selected in proportion to the number of students in each district after visiting each school. Inclusion criteria were ages 9 to 12 and obtaining written consents from the parents, teachers and students. The initial version of the questionnaire was prepared by Hosseinkhani et al. [11]. The questionnaire has 26 items in three domains of negligence (6 items), physical (10 items), and psychological (10 items). The answers are based on a 4-point Likert scale (never, sometimes, often and always, respectively scored from 1 to 4) where higher scores show more agreement with the statement. Higher total scores indicate that children had experienced more abuse. Permission was acquired from the developer before using the tool. Ethics approvals and permits to access the schools were obtained from Ahvaz Jundishapur University of Medical Sciences. Students were briefed on the purpose and method of the study and a written consent was obtained from their parents in advance. They were also assured of the confidentiality of the data and voluntary nature of the study. The tool was first used in a pilot study in another population that matched the sample and after the elimination of its problems, it was collected by several trained interviewers in-person. Data collection took about 15 minutes for each subject. All data were

collected over three months. LISREL version 5.8 was used for data processing. LISREL was used for structural equation modeling in confirmatory factor analysis and path analysis to test the hypothesis [13]. Chi-square test, Chi-square on degrees of freedom, goodness of fit, adjusted goodness of fit, comparative fit, and the root mean square error of approximation were used to assess the fitness of the developed measurement models (6-factor first-order model and 6-factor second-order model) by confirmatory factor analysis of the experimental data [12, 14]. Data were analyzed in SPSS version 21 [15]. Descriptive statistics were used to express the demographic characteristics of the study sample.

Results

The participants' mean age was 11.29 ± 1.15 years, with 55% female and 45% male. Regarding the birth order, 42% of participants were the first child and 29% were the second child. More than 70% of parents had high school diploma or higher education. About 74% of students' mothers were housewives. About 57.5% of their fathers were state employees and about 34% were self-employed. About 85.5% of students ate breakfast. Almost 74% of students watched TV for 1-3 hours. Only 2% of them did not watch TV at all. The overall prevalence of child abuse among the students was 27.61%.

Table 1. Factor loadings, eigenvalues, and variance percentage explained in the child abuse questionnaire

Items	Factor loadings of each indicator along with dimensions of the child abuse tool						Eigenvalues	Explained variance percentage
	Fear	Verbal	Physical	Destruction of confidence	Maltreatment	Neglect		
6	0.738						1.864	13.317
5	0.726							
11	0.599							
1		0.826					1.722	12.299
9		0.744						
12		0.535						
18			0.844				1.511	10.796
19			0.728					
4				0.792			1.398	9.987
3				0.653				
16					0.802		1.391	9.939
14					0.721			
23						0.751	1.154	8.243
20						0.686		

The prevalence of different types of child abuse including fear, neglect, verbal, parental maltreatment, physical, and destruction of confidence were 62%, 42.2%, 18.7%, 15.6%, 14.5%, and 12.6%, respectively. First, the principal component

analysis by varimax rotation was used to improve the basic factor structure in order to assess the number of factors available for the indicators and remove weak indicators from the exploratory factor analysis.

Table 2. Indices of confirmatory factor analysis and reliability of the six-factor first and second order model of child abuse questionnaire

Structure	Item	Factor loading		t-statistic		Average variance extracted		Composite reliability	
		First order	Second order	First order	Second order	First order	Second order	First order	Second order
Fear	6	0.65	0.65	10.05	7.58				
	5	0.69	0.68	11.46	0.1	0.53	0.52	0.76	0.76
	11	0.83	0.82	6.80	6.05				
Verbal	1	0.79	0.63	8.92	0.1				
	9	0.76	0.71	5.40	6.53	0.62	0.44	0.76	0.76
	12	0.82	0.66	6.54	6.72				
Physical	18	0.95	0.95	10.63	0.1	0.75	0.56	0.67	0.67
	19	0.78	0.47	7.34	5.06				
Destruction of confidence	4	0.78	0.76	7.02	5.19	0.63	0.59	0.68	0.68
	3	0.81	0.78	9.22	0.1				
Maltreatment	16	0.77	0.73	6.65	4.79	0.57	0.50	0.68	0.68
	14	0.74	0.68	8.07	0.1				
Neglect	23	0.87	0.36	3.46	2.40				
	20	0.87	0.36	3.44	0.1	0.75	0.13	0.70	0.70

The present study validated the questionnaire of child abuse model design, including 26 items, with the help of

exploratory factor analysis method. Due to the high correlation coefficient between the questions of the questionnaire in the results

of Kaiser-Meyer-Olkin (0.724) and Bartlett's Test of Sphericity, which were significant at the one percent level, exploratory factor analysis can be used for this questionnaire. The results showed that six factors were extracted with eigenvalues greater than one. Table 1 shows extracted factors with eigenvalues and the percentages of variance explained by each factor. Examining the amount of overlap revealed that 14 out of 26 questions had a high overlap (more than 0.5). Thus 12 questions were eliminated. The final factor analysis extracted six factors that explained 64.4% of the variance. Then, in order to examine the factor structure of the questionnaire, the confirmatory factor analysis was used in two levels, including the six-factor first order model and the six-factor second order model (in order to perform the second order factor analysis among 6 latent variables with the structure of child abuse). In the six-factor first order model, each question entered the equation as an indicator or observed variable and each of the six subscales of questionnaire as a latent variable. Table 2 shows the confirmatory factor analysis indices (construct validity and composite reliability) related to the six-factor first and second order model of the child abuse tool. The average variance extracted (AVE) and composite reliability (CR) of the structures of first and second order factor analysis models showed that the first order factorial analysis model had more favorable results in relation to AVE compared to the second order factor analysis. However, they had equal results in terms of CR. This indicated the favorable validity and reliability of the first order factor analysis compared to the second order factor analysis. Based on the first order confirmatory factor analysis results, all observed variables (variables that

entered the six-factor model as latent variables) had significant factor loading above this value (0.5) on their own latent variables (Figure 1).

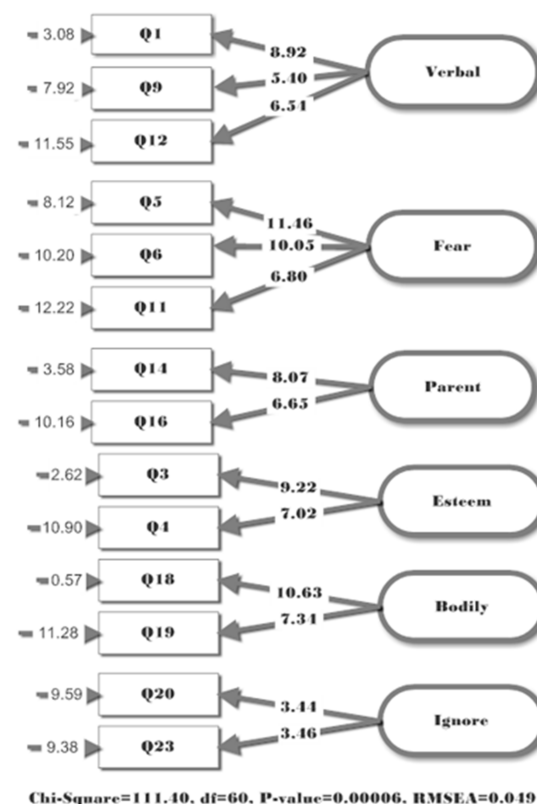


Figure 1. The six-factors structure of the first order confirmatory factor analysis of the child abuse questionnaire

The second order confirmatory factor analysis was used in form of structural equation measurement model to investigate the significance of the studied indicators and ranking dimensions of child abuse (Figure 2). The dimensions studied in the form of conceptual model properly confirmed the indicators related to child abuse model according to the researcher's desired structure. The results showed that fear ranked first in child abuse of Iranian children as its factor loading was more than other dimensions. The results of the second

order confirmatory factor analysis suggested that, fear had the highest factor loading in child abuse. The factor loading of fear was 0.81 and the t-statistic of 9.24. Verbal abuse had the factor loading of 0.69 and the t-statistic of 7.33. The role of parents had the factor loading of 0.60 and the t-statistic of

6.69; the destruction of confidence had the factor loading of 0.66 and the t-statistic of 8.50; the physical abuse had the factor loading of 0.64 and the t-statistic of 10.35; and neglect had the factor loading of 0.56 and the t-statistic of 3.23.

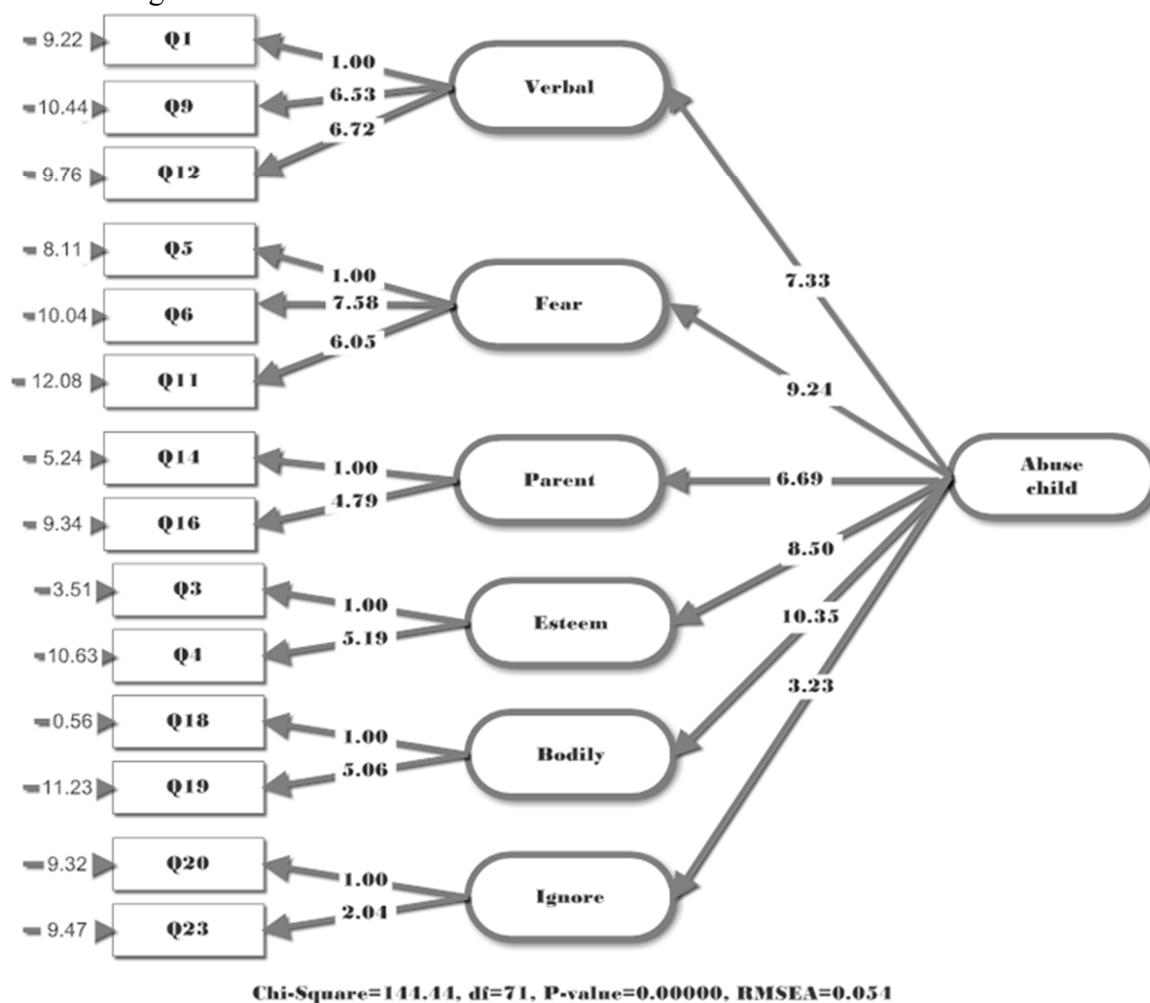


Figure 2. The six-factors structure of the second order confirmatory factor analysis of the child abuse questionnaire

All structures had a t-statistic higher than 2.58 that was significant at the one percent level. Hence all six dimensions had significant factor loading as a result of child abuse with the t-statistic values higher than 2.58 that was significant at the one percent level. Table 3 shows the fit indicators of the

first and second order factor analysis models. According to the table, the results of the indices of checking the residual of covariance and variance including SRMR, RMR and GFI and the indices of checking the alternative patterns including NNFI, NFI, IFI and CFI and finally the RMSEA

showed that the first order confirmatory factor analysis model was more favorable than the second order confirmatory factor analysis model.

Discussion and Conclusion

The present study aimed to investigate the validity and reliability of the questionnaire designed by Hosseinkhani et al. on the

students of the fourth and fifth grades of elementary schools in Ahvaz. The overall prevalence of child abuse among the students was 61.27%. The prevalence of different types of child abuse pertain to fear, neglect, verbal, parental maltreatment, physical, and destruction of confidence, in decreasing order. The results demonstrated a considerable amount of child abuse in the study population.

Table 3. Fit indicators of the first and second order confirmatory factor analysis models in the child abuse questionnaire

Index	The reported value of the first order	The reported value of the second order	The desirable limit
Root mean square residual (RMR)	0.021	0.022	Near 0
Standardized root mean square residual (SRMR)	0.045	0.050	Under 0.08
Goodness of fit index (GFI)	0.96	0.95	0.90
Soft indicators of fitness (NFI)	0.91	0.88	0.90
Soft unsettled fitness index (NNFI)	0.92	0.91	0.90
Increasing fitness index (IFI)	0.95	0.93	0.90
Comparative fitness index (CFI)	0.95	0.93	0.90
Root Mean Square Error of Approximation (RMSEA)	0.049	0.054	Under 0.08

The findings were consistent with the the statistics of U.S. Department of Health and Human Services [16, 17] indicating higher levels of physical abuse to emotional abuse. They were inconsistent with the findings of Creighton [18] and other studies [6] indicating higher levels of emotional abuse to physical abuse. Some studies have shown that neglect was the most prevalent type of child abuse [19-22]. The results may indicate that increased public sensitivity to physical punishment has caused families to use it less. It appears that families provide the physical needs of their children, such as

food and clothing as much as they can, but they might ignore their emotional and psychological needs, leading to their higher emotional neglect. Therefore, proper education of the people on the correct principles of parenting and emphasizing the consequences of emotional and physical punishment on the psyche of the child are necessary to pave the way for promoting community awareness and changing the behavior of parents in order to prevent child abuse. The results of exploratory factor analysis showed that a suitable model with 6 factors and 14 sub-factors (index) can be

prepared for the measurement of child abuse in Iranian children. In this study, 12 items from the 26 items of the original tool were excluded because of low factor loadings. This might be due to the cultural differences between students in Tehran and Ahvaz. Also, confirmatory factor analysis showed that all the questions (14 questions) had a significant factor loading on variables related to them, indicating the approval of the six-factor structure of the child abuse questionnaire and a desirable construct validity. The fit indices of six-factor models of the first and second order represented an excellent fit of the structure with the research data. The results of the six-factor structure provided for child abuse tool was in line with Chan's [23] research and other studies [24, 25]. Checking the six-factor structure obtained from the CFA in this study indicated the reliability and validity of the tool in the measurement of child abuse. In addition to being authentic, the tool was also compatible with the Iranian culture. This tool can be useful in etiology of child abuse in Iranian children. The results of this study emerged from children's self-reporting, and should not be compared with the results of studies that presented parents' views. Therefore, it is recommended that further studies be conducted to examine the differences in the views of parents and children. The diagnostic and content validity, and the reliability of the tool showed that it is suitable for assessing child abuse factors in Iranian children. The base of proper explanation and an appropriate response to child abuse is collecting comprehensive, accurate, reliable, and documented data based on scientific information of the related authorities. The strength of this study was its large sample size in order to meet the need for 5 or more

respondents to each question for factor analysis. The limitation of this study is that children who had experienced any type of child abuse might feel embarrassed and anxious at the time of data collection. This limitation can increase the possibility of selection and information bias. Since the target group comprised children aged 8-13, inaccuracies might have occurred in responses.

The results showed that the Iranian version of child abuse questionnaire had acceptable psychometric properties and approved the usefulness of this instrument in explaining and predicting child abuse in this population. This tool can be useful for policy makers and specialists in behavioral and psychological fields for designing and testing future interventions for reforming parenting principles. Therefore, effective interventions to improve parenting practices can decrease the prevalence of child abuse in Iranian society. It is necessary to examine the differences in psychometric properties of parents' and children's view on child abuse in future studies. Limitations in this study include the possibility of selection and information bias and inaccuracy in responses.

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