

## Persian version of Family Crisis Oriented Personal Evaluation Scales: Psychometric Properties

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### Abstract

#### Background

Family coping is an active process in which the family and each member of it use the available resources to decrease or control the demand. Using effective coping strategy, a family can react to stresses and adapt better to its situation. The purpose of this study was to examine psychometric properties of a Persian version of Family Crisis Oriented Personal Evaluation Scales (F-COPES) in a population of Iranian mothers with cerebral palsy children.

#### Materials and Methods

F-COPES was translated into Persian following Wild et al.'s model, face and content validities of the translated version were determined by 12 faculty board members in different nursing fields, psychology, and tool development. Afterward, to fill out the scale, 208 mothers with cerebral palsy children who had referred to Kermanshah based rehabilitation centers were selected through convenient sampling. Construct validity of the tool was determined by using confirmatory factor analysis. To examine internal consistency, Cronbach's alpha and to examine reliability, intraclass correlation coefficient (ICC) (15 participants with 2 weeks interval) was used. The collected data was analyzed in SPSS (version 16.0) and EQS6.1.

**Results:** Confirmatory factor analysis supported validity of the whole tool and its five subscales. Cronbach's alpha of the whole tool was obtained  $\alpha=0.84$  and the alpha of the five subscales ranged from 0.76 to 0.94. In addition, ICC was obtained equal with 0.89.

**Conclusion:** The Persian version of F-COPES was featured with acceptable psychometric properties so that it can be used to survey family coping in Iranian mothers with cerebral palsy child.

**Key Words:** Cerebral palsy, Family coping, Mothers, Psychometric properties.

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## 1- INTRODUCTION

Family coping refers to an attempt by the family members to reduce or control demands and the family can require the available resources to manage the situation related to the demand (1). In other words, family coping is an active process of using the resources, developing new behavior, and using them to increase capabilities of the family and decrease the effects of stressful events (2). Using effective coping strategies, family can respond positively to stresses and adapt better to its situation (3). Coping strategies are the mechanisms with short-term effects to deal with the stressors, while they have their long-term effects on physical and psychological well-being of individuals (4). The purpose of family coping strategies is to preserve and reinforce family resources and to diminish negative emotions or stressors so that the family could achieve better balance in its performance (5).

It is essential to know that family coping of a family is facing a big challenge (6). One of the most stressful events of life is giving birth to a child with disabilities (5). Finding a disability in the children is a serious crisis for the family (7). Cerebral palsy is one of the most serious and prevalent disabilities of children so that it is the third common disability after autism and intellectual disability (8, 9). Global prevalence of cerebral palsy is 2-3.5 of every 1000 birth; this rate is higher in the developing countries (10). Although, motor disorders are the main cause of disabilities in these children, severity of the disabilities varies depending on the extent of social, cognitive, learning, and sensory disorders (8, 11). Disorders caused by cerebral palsy lead to serious problems in self-care functions (9), which entails long-term cares throughout one's life. Most of these children are kept by the families and the mother undertakes the main responsibility in looking after such children (12-15).

The coping strategies adopted by the family can be considered as an index of adaptation to a chronic disease of children (16). In addition, coping style is directly related to physical and psychological health and decrease of stress in the parents (9, 13, 17, 18). Parents and family' coping are more effective than disability on the quality of life of cerebral palsy children (19). To improve the parents and the child's health, health providers need to assess coping strategies of the parents (20-22) and there are many tools to determine coping strategies (4). One of the widely used tools to this end is Family Crisis Oriented Personal Evaluation Scales (F-COPES), which is designed based on "family stress" – a distinguishing feature of the tool. This tool has been used by more than 100 studies on families with a disable member and its reliability and validity have been supported as well. Of other advantages of the tool are its ease of implementation, understandability, and scoring (4, 23-25). F-COPES consists of 30 items designed based on Likert's five-point scale (5= completely agree, 1 = completely disagree).

The tool is featured with five aspects of seeking spiritual support, passive appraisal, acquiring social support, reframing, and mobilizing family to acquire and accept help. The score range of the tool is 30-150 and the higher the score the better the adaptation behavior of the family in stressful situations (5, 26). Family coping differs in different groups due to differences in concepts of the family and culture. Thus, construct of the tool might not be as efficient with other races and societies as it is with American and European societies and races. Without measurement consistency and due to measurement faults, the differences observed in different studies on family coping cannot be considered as functions of the findings (6). In general, without a proper translation and standardization for

the target population, measurement tools cannot be used for different populations and the obtained results would not be comparable (27). Thus, determining suitability of measurement tools for different societies is a key step in a research work. With this introduction, the present study was conducted to translate and measuring psychometric properties of F-COPES for Iranian mothers with cerebral palsy children.

## 2- MATERIALS AND METHODS

### 2-1. Method

The study is a methodological research (28) so that the English version of F-COPES was translated into Persian and psychometric properties of the tool for mothers of cerebral palsy children were assessed. Study population was comprised of all mothers referred to Kermanshah based rehabilitation centers. This study was started in May 2015 and was completed in November 2015. The participants were selected through convenient sampling. Inclusion criteria were diagnosis of cerebral palsy by the pediatric, at least one year passed from the diagnosis, mother's ability to speak Persian, having only one cerebral palsy child in the family, and parents living together. Based on these criteria 208 participants were selected.

### 2-2. Translation

The tool was translated according Wild et al.'s mode (2005) and its validity and reliability were examined (29). At first, a written consent was obtained from the designers of the tool and then it was translated into Persian by two translators. Afterwards, to spot disconformities and contradictions, the two translation works were compared by the team of research and a third translator. Finally one translation was obtained based on the two translation works. Then the final translation work was translated into

English by another two translators (one was an English native speaker). At the next stages, to ensure semantic and conceptual similarity between the English and Persian versions, they were reviewed. Eventually, the translated tool was sent to the designers of the tool for verification. Validity and reliability of the translated tool were examined using face, content, and construct validity (confirmatory factor analysis), internal consistency, and reliability.

The English version of F-COPES has very good internal consistency with an alpha of 0.86. Individual subscales have alphas that ranged from 0.63 to 0.83. The F-COPES, also has stability with a four week test-retest correlation of 0.81. Individual subscales have test-retest correlations that ranged from 0.61 to 0.95. The F-COPES has very good factorial validity (25).

### 2-3. Data gathering

The selected participants were briefed about the objectives and methodology and they provided their informed written consent to participate in a manner acceptable for the Ethics Committee of Shahid Beheshti Medical Science University. Then they were asked to fill out a demographics questionnaire (mother's age, gender of the child, mother's education and job, number of children in the family, type of cerebral palsy, gross motor function classification system (GMFCS), child's age, time of the disease), and Persian version of F-COPES tool. The time needed to fill out the questionnaire varied from 20 to 25 minutes. We used rule of subjects-to-variables ratio more than 5(:1) for calculate sample size in confirmatory factor analysis. For our study a sample size was 208 mothers with cerebral palsy children who had referred to Kermanshah based rehabilitation centers were selected through convenient sampling.

## 2-4. Content validity

To examine content validity of the tool, it was provided to 12 experts of clinical psychology (n = 2), psychiatry (n = 1), occupational therapy (n = 1), pediatric nursing (n = 2), psychiatric nursing (n = 3), and associate professors in tool development (n = 3). The experts were asked to check content validity of the tool, and rank the statements in terms of relevance, comprehensibility and simplicity from 1 to 4. In this study face validity assessed by the viewpoints of the target group (n=15) and the experts (n=12). To examine the face validity 15 mothers of children with cerebral palsy were randomly selected and they were asked to offer their feedbacks about clarity, understandability and ease of answering the questions. The outcome of this stage was a trivial modification in the statements.

## 2-5. Construct Validity

Construct validity of F-COPES was analyzed according to five-factor model (23) by using confirmatory factor analysis in EQS6.1 based on the estimates of the maximum likelihood (30). Confirmatory factor analysis is a reliable method to produce structural equations model, which was used to determine relevance of goodness of fit between a hypothetical model and the obtained data from the subjects (31, 32). There are many goodness of fit indices to determine suitability of the model and using more than one index is recommended by similar studies (33-35). The ratio of Chi-square to degree of freedom was used ( $\chi^2 / d$ ). Chi-square index is a sample size dependent index and the ratio of Chi-square to degree of freedom < 2 indicates acceptability of goodness of fit (30, 31, 33). Another available index is RMSEA (acceptable goodness of fit <0.08, good goodness of fit <0.05, poor goodness of fit >0.1, SRMR

(acceptable value  $\leq 0.06$ , unacceptable value >0.1) (30, 31), GFI and CFI (acceptable value >0.9) (36, 37), and AGFI (acceptable value >0.85) (38).

## 2-6. Reliability

Internal consistency and reliability of the tool were determined in SPSS version 16.0. To obtain internal consistency, Cronbach's alpha was obtained for the whole tool and the subscales. One of the ways to measure internal consistency is to obtain Cronbach's alpha (acceptable:  $\alpha = 0.7$  and high internal consistency:  $\alpha = 0.8$ ) (39). To evaluate reliability of the tool, it was provided to 15 mothers with cerebral palsy children for two times with 15 days interval. ICC was used as a relative replicability index. In general, time interval of 2-3 weeks is recommended (39).

## 3- RESULTS

Demographic specifications of the subjects are listed in **Table.1**. Average age of the mothers was  $32 \pm 6.4$  years and that of the children was  $59 \pm 3.75$  months. In addition, 52.4% of the children were boys. The output model for the F-COPES in EQS6.1 was showed (**Figure.1**). The results of confirmatory factor analysis along with goodness of fit indices showed that the Persian version of the tool is comprised of five factors. Ratio of Chi-square to degree of freedom was less than two and according to standard value has acceptable goodness (**Table.2**).

The output model for the F-COPES in EQS6.1 was showed (**Figure.1**). The results of confirmatory factor analysis along with goodness of fit indices showed that the Persian version of the tool is comprised of five factors. Ratio of Chi-square to degree of freedom was less than two and according to standard value has acceptable goodness (**Table.2**).

**Table-1:** The demographic characteristics and clinical specifications in mothers with cerebral palsy children

Variables	Cluster	Number	Percent
Mothers' age (year)	20-30	93	44.7
	31-40	91	43.8
	41>	24	11.5
Mothers' education	Illiterate	5	2.4
	Elementary	47	22.6
	Junior high school	55	26.5
	High school	77	37
	Higher education	24	11.5
Occupation	Housewife	189	90.9
	Office employee	16	7.7
	Others	3	1.4
Number of children	1	102	49
	2	72	34.6
	3	23	11.1
	4 $\geq$	11	5.3
Child's age (months)	12-36	79	38
	37-83	77	37
	84-144	52	25
Gender of the child	Girl	99	47.6
	Boy	109	52.4
Type of cerebral palsy	Quadriplegia	34	16.3
	Diplegia	70	33.7
	Hemiplegia	69	33.2
	Athetoid	9	4.3
	Hypotonus	18	8.7
	Ataxic	8	3.8
GMFCS	Level 1	41	19.7
	Level 2	30	14.4
	Level 3	52	25
	Level 4	53	25.5
	Level 5	32	15.4
Duration of disease (month)	12-24	47	22.6
	25-36	48	23
	37-48	22	10.6
	49-60	28	13.5
	61>	63	30.3

GMFCS: Gross motor function classification system.

**Table-2:** Goodness of fit indices of confirmatory factor analysis for the five-factor model.

Goodness of fit indices	$d/\chi^2$	CFI	NNFI	NFI	IFI	SRMR	RSMEA (%90) CI	GFI	AGFI
Value	1.29	0.98	0.98	0.92	0.98	0.049	0.038 (0.027, 0.047)	0.86	0.83
Standard	< 2	> 0.9	> 0.9	> 0.9	> 0.9	<0.05	< 0.05	>0.85	> 0.85
Interpretation	AG	AG	AG	AG	AG	AG	AG	AG	Relatively AG

$\chi^2 / d$ : the ratio of Chi-square to degree of freedom was used; CFI: Comparative fit index; NNFI: Non-normed fit index; NFI: Normal fit index; IFI: Incremental fit index; SRMR: Standardized root mean square residual; RSMEA: Root mean square error approximation; GFI: Goodness of fit index; AGFI: Adjusted goodness of fit index; AG: Acceptable goodness.

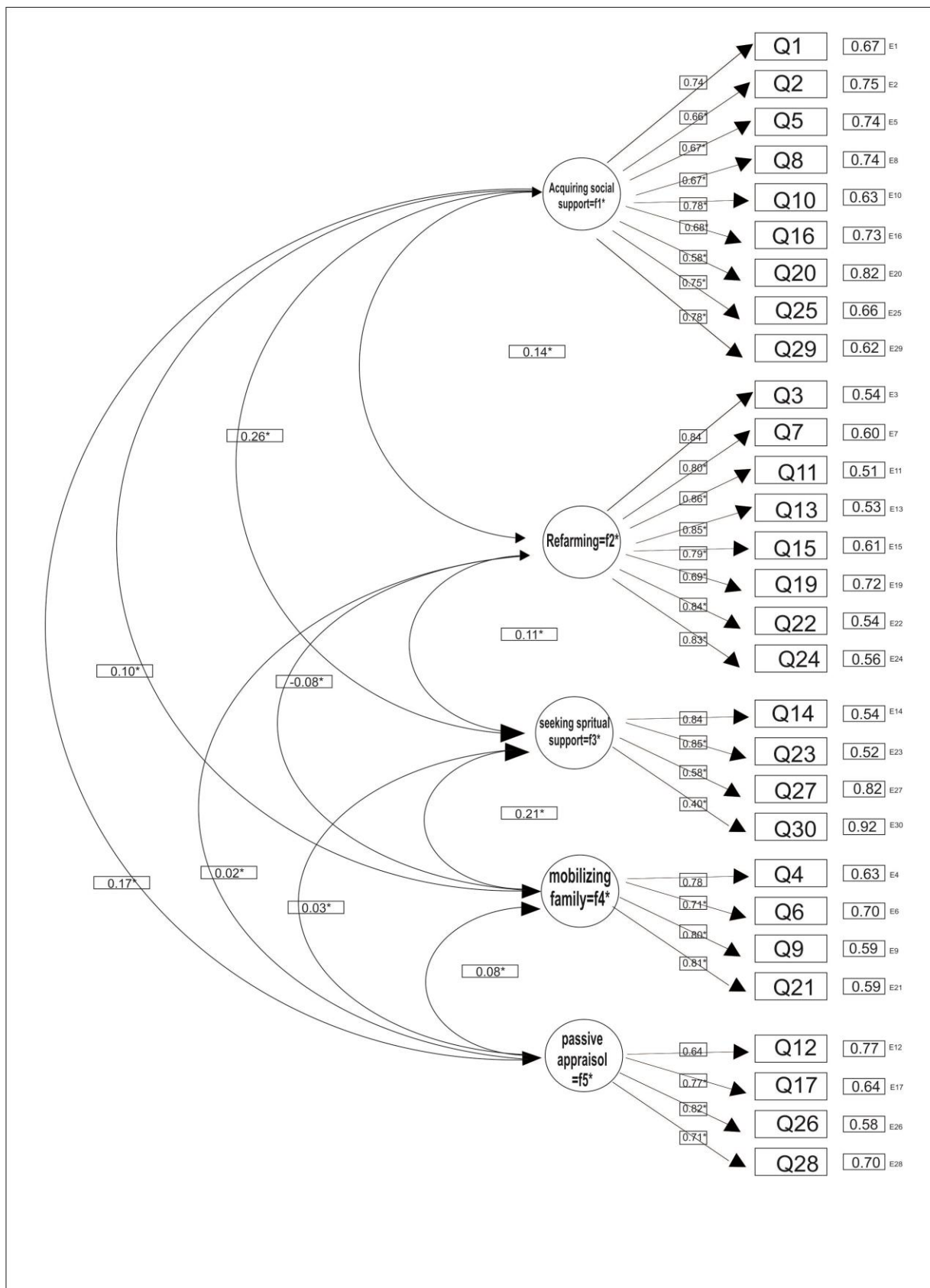


Fig.1: The output Model for the F-COPES in EQS6.1.

**Table-3:** The content validity index, Standard factor loading, multiple correlation coefficient and statistic t

Sub scales	Item	Content Validity Index	Standard Factor Loading	Multiple correlation coefficient	Statistic t
Acquiring social support	1	1	0.74	0.55	10.38
	2	0.97	0.66	0.44	9.29
	5	0.94	0.67	0.43	9.09
	8	0.89	0.67	0.45	9.40
	10	0.97	0.78	0.60	11.01
	16	0.97	0.68	0.46	9.45
	20	1	0.58	0.33	8.06
	25	0.92	0.75	0.56	10.58
	29	1	0.78	0.62	11.12
Reframing	3	0.94	0.84	0.71	14.87
	7	0.97	0.80	0.65	14.15
	11	0.97	0.86	0.73	15.62
	13	0.89	0.85	0.72	15.45
	15	1	0.79	0.68	13.45
	19	1	0.69	0.48	11.38
	22	0.94	0.84	0.71	15.35
	24	0.97	0.83	0.69	14.85
Seeking spiritual support	14	1	0.84	0.71	15.28
	23	0.94	0.85	0.73	10.68
	27	0.94	0.58	0.33	8.09
	30	1	0.40	0.16	5.49
Mobilizing family to acquire and accept help	4	1	0.78	0.60	11.27
	6	1	0.71	0.51	10.03
	9	0.97	0.80	0.65	11.37
	21	1	0.81	0.66	11.42
Passive appraisal	12	0.97	0.64	0.41	8.20
	17	0.89	0.77	0.59	8.63
	26	0.97	0.82	0.67	8.88
	28	1	0.71	0.50	8.19

To examine content validity index (CVI), which is about relevance, comprehensibility and simplicity of the statements, 12 experts received the tool and scale CVI of relevance, comprehensibility and simplicity, and average CVI for the entire questionnaire (S-CVI/Ave) was obtained 0.98, 0.97,

0.95, and 0.97, respectively. S-CVI for each item was 0.89 to 1. The values for the content index of the items are shown in **Table.3**. Cronbach's alpha coefficient for the whole scale was 0.84 and that of its aspects ranged from 0.76 to 0.94 (**Table.4**).

**Table-4:** Internal consistency F-COPES and the subscales for the mothers with cerebral palsy children.

Aspects of the scale	Cronbach's alpha coefficient
Passive appraisal	0.82
Reframing	0.94
Seeking spiritual support	0.76
Acquiring social support	0.89
Mobilizing family to acquire and accept help	0.85
Family coping	0.84

Intra-class correlation coefficient for the whole tool was obtained 0.89 ( $p < 0.001$ ) and the coefficients of seeking spiritual support, mobilizing family to acquire and accept help, passive appraisal, reframing, and acquiring social support were 0.64, 0.70, 0.74, 0.74, and 0.75, respectively. All subscales were significant ( $p < 0.001$ ). **Table.5** presents the minimum and maximum scores on each subscale; it also

shows using the strategies expressed a mean of the scores on each subscale and whole of scale. Reframing is the most strategy using by mothers. The mean score of family coping in mothers with cerebral palsy children is  $97.3 \pm 16.8$  (total possible scores range from 30 to 150, with higher scores indicating higher levels of coping ability).

**Table-5:** Family coping score and its aspects adopted by mothers with cerebral palsy

Elements	Minimum obtained score	Maximum obtained score	Mean	SD
Acquiring social support	9	45	24	9.6
Seeking spiritual support	6	20	14.5	3.6
Passive appraisal	4	20	9.9	4.9
Reframing	9	40	30.8	8.1
Mobilizing family to acquire and accept help	4	20	15	4.5
Total score of family coping	49	136	97.3	16.8

SD: Standard deviation.

#### 4- DISCUSSION

Family Coping strategy is a concept with considerable effects on adaptation capability of family (3). Surveying this concept in families with cerebral palsy children is of prominent importance. However, this concept has been rarely examined in Iran, which might be due to lack of a reliable tool. Reliability and validity of F-COPES for mothers with cerebral palsy children was examined. At first, the tool was translated into Persian and then the psychometric properties of the tool were examined. Using a reliable and valid questionnaire provides a mean to compare populations with different cultures and nationalities (40-42). As the findings indicated, validity and reliability of the Persian version of the tool was supported and its aspects fitted those of the original tool (23). The Persian version of F-COPES was featured with an acceptable scale content validity index (S-CVI/AV) of 0.97. S-CVI for each item was 0.89 to 1. All instrument items were accepted and no one was deleted (35). Polit and Beck

recommended that scale content validity index of 0.9 or higher can be taken as the criterion for acceptable validity (39). Confirmatory factor analysis of F-COPES was performed on a sample group of 208 mothers with cerebral palsy children. The analysis was aimed to measure consistency between the assumed/predicted relationships of the variables and the relationships in the actual data. Goodness of fit indices showed that the main model (30 items and 5 factors) of the Persian version of the tool is acceptable. As listed in **Table.2**, GFI and CFI indices are acceptable (37); while the other indices such as ratio of Chi-square to degree of freedom, RMSEA, SRMR, NFI, NNFI, IFI, AGFI showed highly acceptable goodness of fit of the model (30, 34, 38). A study in California to examine cross-cultural equality of F-COPES between Chinese-American and Korean-American patients showed that the subscales acquiring social support, reframing, and passive appraisal had not acceptable goodness of fit. In addition, the items pertinent to passive appraisal were



eliminated due to very low correlation coefficient so that a revised five-factor construct with 23 items was obtained with subscales: relatives' support (5 items), neighbors' support (2 items), reframing (7 items), spiritual support (4 items), Mobilizing family to acquire and accept help (4 items)(43). Guada (2012) surveyed psychometric properties of F-COPES using explorative factor analysis and showed that passive appraisal obtained the lowest score of coping style with very low Cronbach's alpha. The tool was featured with five aspects viz. sources of power and guidance (8 items), acquiring social support (6 items), familiarization with capabilities (4 items), information gathering (four items), and positive coping approaches (3 items). Three items of the original tool were removed; two of passive appraisal and one of reframing. In addition, classification of some statements was changed (6).

Lin (2000) developed a revised version of F-COPES in which classification of some of the statements were changed. Factor analysis of their tool showed CFI = 0.9 and RMSEA = 0.06 (44). CFI value ranges from 0 to 1 and CFI > 0.9 indicates acceptable goodness of fit. CFI has some advantages over other statistics of goodness of fit such as GFI and IFI because it is, as reported by simulations done by Monte Carol (30), far less sensitive to the size of sample group. RMSEA's value ranges from 0 to 1; however, despite CFI, the closer its value to zero, the better the index so that RMSEA < 0.5 indicates acceptable goodness of it (30, 31). Cronbach's alpha ( $\alpha$ ) values higher than 0.7 indicate internal consistency and  $\alpha \leq 0.8$  indicates higher internal consistency (39). Our results showed that  $\alpha$ -values of all the factors of the tool were equal or higher than 0.76, which means the tool under study has acceptable internal consistency ( $\alpha$ -value of the original tools was 0.87)(23). Lim et al.

reported that Chinese and Korean versions of the tool had acceptable internal consistency in all aspects except for passive appraisal; consistent results have been also reported by other studies (6, 43). The obtained  $\alpha$ -values for different aspects in this study are somehow comparable with those reported by other studies. Validity and internal consistency of the tool and consistency with other studies show that the translation of the tool is fluent and understandable enough so that the participants found no ambiguity in the statements. Moreover, the statements and factor of the tool are sensitive to cultural and racial differences, which is a distinguishing advantage of the tool.

Our results as to mean and standard deviation (SD) of score of F-COPES and its aspect were very similar with those reported by Guada (2012); this shows validity of the Persian version and its aspects (6). In addition to internal consistency, the results of test-retest indicated good reliability of the scale. The results of test-retest showed that intraclass consistency coefficient of the whole tool was 0.89 ( $p < 0.001$ ). According to the standards, intraclass consistency coefficient equal or higher than 0.75 is an acceptable level for replicability (45). The study was not free of limitations, for instance, 2.4% of the participants were illiterate and their questionnaire was filled out through interview. In addition, the questionnaires were filled in the rehabilitation center and since tiredness and restlessness of the children after occupational therapy practices might affect the mothers' responses, the questionnaires were filled out before the practices sessions.

## 5- CONCLUSION

The Persian version of F-COPES can be used as a reliable and valid tool for mothers with cerebral palsy children. Nurses and researchers can use this tool to

help promote family-centered care. This study can be an initiation for further studies on families with children with other disabilities. Given the cognitive nature of family coping strategy, there is a need for further qualitative studies in this field to achieve better understanding about other aspects of the tool for Iranian population. Taking into account that external validity of the tool might be low, reliability and validity of the tool should be assessed for other disabilities.

## 6- ABBREVIATION

RMSEA: Root mean square error approximation,

SRMR: Standardized root mean square residual,

NFI: Normal fit index,

NNFI: Non-normed fit index,

IFI: Incremental fit index,

AGFI: Adjusted goodness of fit index,

GFI: Goodness of fit index,

CFI: Comparative fit index.

**7- CONFLICT OF INTEREST:** None.

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